Cartridge" option provided by the chart plotter. This function initializes the user cartridge and prepares it for storing information.

Remember that if a user cartridge is not blank, formatting it destroys any data already on the user cartridge (See par. 7.2.5 for more details).

Warning!

The cartridges must be formatted in order to be reused, but remember that with this operation all data memorized on the cartridge will be lost.

7.2.1) Display User Cartridge directory

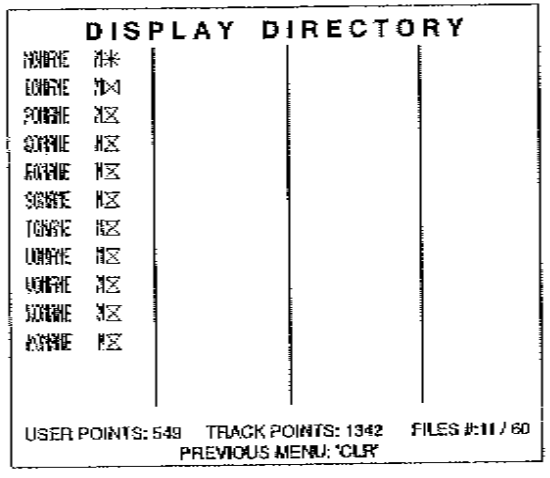
Data stored on user cartridge is grouped in files. A file is a collection of information (of the same type) stored on a user cartridge. Each file must have a unique name, ideally one that describes its contents. For example, MARK1 is a file of Marks of the first type.

The names of your files are kept in a directory on each user cartridge.
If you want to know which files are on your user cartridge, you can use the "Display Directory" option.
This function is accessed by the following commands (after inserting the user cartridge into the slot):

Selection of DISPLAY DIRECTORY

MENU → F MODE → A DEST → CLR → CLR

After pressing the 'A' key, the directory will appear:



50 files are available, which are grouped on screen organized in 4 columns each of 15 files. The file name consisting of an "extension" to indicate the contents of the file (*).
In the bottom line of the screen information about the number of user and track points free, with the number of created files, are shown.

Note(*)

The available extension are M⧖, M⋈, M✳ for the three types of Marks, EVT for Events, RTE for routes and TRK for tracks.

Before pressing the 'A' key to display directory, check the user cartridge is inserted into the slot. If there is no user cartridge present in the slot, the warning message "INSERT USER CARTRIDGE AND PRESS ANY KEY WHEN READY" will appear: insert the cartridge and press any key when ready.

7.2.2) Save a file

The Save File submenu stores on user cartridge the desired group (file) of user points, for example a file of routes, present on screen. To access this function:

Selection of SAVE FILE

MENU → F MODE → 3 WP → A DEST → CLR → CLR → CLR

or

- 3 WP
- C PLOT
- D MARK
- E SET
- F MODE

After selecting a group and pressing the ENT key to confirm the choice, the user can choose the filename. At first the default name ("NONAME") or the name of the last stored file is shown. Use the up and down arrow keys to change the character highlighted and use the right and left arrow keys to move the cursor to previous or next letter.
If you have inserted an existing name, the plotter emits three beeps and the message "UNABLE TO SAVE DATA FILE ALREADY EXISTS" is shown on the screen: change the name using arrow keys. Once finished, press ENT to confirm (or CLR to abort operation): on the screen will be shown the message "SAVING DATA ..." followed by the number of saved points (For example, saving a file of Events, it shows the number of stored Events points).

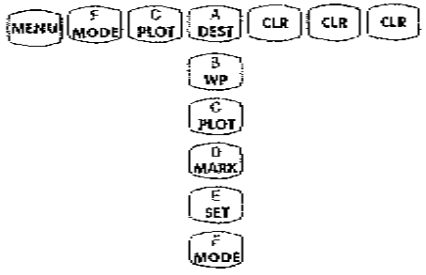
Note

When naming a file, you may have trouble finding a name that uniquely identifies the file's contents. Dates, for example, are often used in filenames; however, they take up several characters, leaving you with little flexibility. The secret is to find a compromise, a point where you can combine a date with a word, creating a unique filename. The maximum length of the filename is 8 characters. The characters may be numbers (0,...,9), letters (A,...,Z) and spaces (For example legal identifiers are "ABC", "AA", "12121212", "A B A", "1 A 1", and so on).

7.2.3) Load a file

The Load File submenu loads from user cartridge the desired group of user points, for example a file of routes. To access this function:

Selection of LOAD FILE



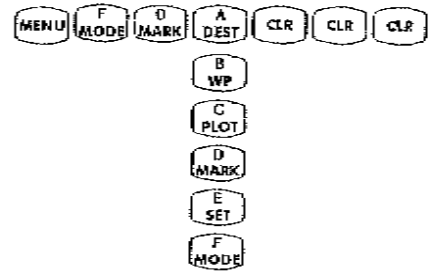
After doing so, the first filename isdisplayed. Use ZOOM IN and ZOOM OUT keys to select other filenames from the same type.

When you have found the desired filename, press ENT to confirm (or CLR to abort operation): displayed will be the message "LOADING DATA ..." followed by the number of stored points (for example, loading a file of Events, it is shown the number of Events points present in the file). When on the screen the message "MEMORY FULL" appears, the file is not loaded completely. Delete any unnecessary points and then repeat the operation.

7.2.4) Delete a file

Just as you may need to saving files, you may also need to remove old or unnecessary files to clean up your user cartridge.
When you want to erase a file from user cartridge, you can use the "Delete File" option. Remember, though, that this option permanently erases the file.
To access this function:

Selection of DELETE FILE



After doing so, the first filename will be displayed. Use ZOOM IN or ZOOM OUT keys to select other filenames from the same type. When you have found the desired filename, press ENT to confirm: on the screen will be displayed the message "ARE YOU SURE?", press ENT key to confirm or any key to abort function.

7.2.5) Format User Cartridge

Formatting user cartridge must be done before using a new user cartridge: this operation prepares the user cartridge to receive and store information.
A used user cartridge can also be formatted; if a used user cartridge is formatted, however, all previously stored data on the user cartridge will be lost completely.

Warning!

Formatting a user cartridge destroys all information on it. Before you format a used user cartridge, use the "Display Directory" option (See par. 7.2.1) to see what's on it. That way you won't lose any needed files.

Before you start the formatting procedure, insert a user cartridge into the slot and press the following keys:

Selection of FORMAT USER CARTRIDGE

After pressing the 'E' key, the message "ARE YOU SURE YOU WANT TO FORMAT THE USER CARTRIDGE ?" is shown: press ENT to confirm (or CLR to abort operation).
During formatting, the message "FORMATTING CARTRIDGE ...PLEASE WAIT" is displayed on the screen. Once finished, your user cartridge is formatted and ready to use. On the screen the message "DO YOU WANT TO FORMAT ANOTHER

CARTRIDGE ?" is shown. Press [ENT] if you want to format another cartridge or [CLR] to finish the format operation.
Be sure to label user cartridge; the label will remind you that you formatted the user cartridge, and will help you identify its contents.

7.2.6) Change User Cartridge

To change the user cartridge follow this procedure:

Selection of CHANGE USER CARTRIDGE

[MENU] [F MODE] [F MODE] [CLR] [CLR]

Insert the desired user cartridge and then press any key when ready.

7.2.7) Error messages

This paragraph contains an alphabetical listing of the messages that might appear in the handling of user cartridge:

CARTRIDGE FULL
The user cartridge the chart plotter is writing to is full. Delete any unnecessary files (See par. *7.2.4*) and retry, or use another user cartridge.

CARTRIDGE NOT FORMATTED
The user cartridge into the slot is not formatted. Before using it, you must format to prepare the user cartridge to receive and store information (See par. *7.2.5*).

DIRECTORY FULL
The number of files is the maximum available (see par. *7.1.1*). Delete any unnecessary files (See par. *7.2.4*) and retry, or use another user cartridge.

FILE ALREADY EXISTS
The filename you specified in the command is the same as a filename present on the user cartridge.

FILE NOT FOUND
The file named in a function does not exist on the user cartridge in the slot. Check to see that you entered the filename correctly and try again.

USER CARTRIDGE NOT PRESENT
The user cartridge is not present into the slot. Insert the user cartridge into the slot (See par. *1.1*) and retrive.

There are other types of messages that you could see on your screen:

INTERNAL ERROR: < N° system error >
A specific error number is associated with each type of system error. Write down the error number and report it to your dealer.

chapter 8
ALARMS

❖ 8.1 - CLEARING ALARMS

When there is an alarm condition, the [CLR] and [D MARK] keys reset it. The reason for the alarm is displayed in the Note Pad area (see par. 8.3), if you are in the split screen mode.

❖ 8.2 - FIX ALARM SETTINGS

The user can enable or disable the fix alarm and the auto alarm clear.
To select these options, press the following keys:

Selection of AUDIBLE ALARM

[MENU] [8 WP] [E SET] [A DEST] [CLR] [CLR] [CLR]

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

Selection of AUTO ALARM CLEAR

[MENU] [8 WP] [E SET] [3 WP] (*) [CLR] [CLR] [CLR]

The 'B' (*) key toggles the selection On or Off.

❖ 8.3 - ALARM MESSAGES

There are five different alarm messages.
Three of them are related to the received data from the positioning instrument (see also par.1.4):

"NOT RECEIVED" : no data is received.
"NOT GOOD" : the received format is correct, but the information is declared "not good" by the positioning instrument.
"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.

The fourth alarm message is related to autopilot alarm range.
"AUTOPILOT ARRIVAL RANGE": when the position of the boat is within the radius that the user has set.

The fifth alarm message is the following:
"WAYPOINT REACHED": when the actual position of a Waypoint is reached and the plotter sets course to the next Waypoint.

appendix A - QUICK COMMANDS REFERENCE

This appendix is intended to provide a quick reference for users familiar with the chart plotter. It lists keyboard operations and the steps necessary to perform them. Menu operations are listed by key sequence. It is assumed that the user knows how to press the [CLR] key to back out of the menu and return to charts.
Commands that require Cross-Hair placement will indicate this with an "*". Basic operations such as power ON/OFF, Dim, and Zoom are not included.

ALARMS

Audible Alarm ON/OFF	[MENU] [0 WP] [E SET] [A DEST] par. 8.2
Auto Alarm Clear ON/OFF	[MENU] [8 WP] [E SET] [8 WP] par. 8.2

AUTOPILOT

Autopilot Arrival Range	[MENU] [0 MARK] [B WP] par. 6.3
Autopilot ON (With Target selected) (1)	[A DEST] [0 MARK] par. 6.2
*Autopilot ON (No Target selected) (1)	[A DEST] [A DEST] [0 MARK] par. 6.2
Autopilot OFF	[A DEST] [0 MARK] par. 6.2
Output Format	[MENU] [0 MARK] [A DEST] par. 6.4

DATUM WGS84

Chart	[MENU] [B WP] [F MODE] [B WP] par. 2.6
Fix	[MENU] [B WP] [F MODE] [A DEST] par. 2.6

EVENT

* Delete single Event	[CLR] [8 WP] par. 5.6

Deleting all Events — MENU, A DEST, D MARK, ENT
par. 5.6

Placing Event — D MARK, D MARK
par. 5.3

FIX

Automatic Computing Fix Error — MENU, B WP, A DEST, B WP
par. 4.4.1

Correction ON/OFF — MENU, B WP, A DEST, A DEST
par. 4.4.3

Input Format Selection — MENU, B WP, B WP
par. 4.3.2

Input Source Selection — MENU, D WP, C PLOT
par. 4.3.1

Manual Computing Fix Error [2] — MENU, B WP, A DEST, C PLOT
par. 4.4.2

Position Filter ON/OFF — E SET, C PLOT, A DEST
par. 4.5.1

Speed Filter ON/OFF — E SET, C PLOT, B WP
par. 4.5.2

Speed Filter Step [2] — E SET, C PLOT, C PLOT
par. 4.5.2

FIX FUNCTIONS

Compass Calibration [2] — E SET, D MARK, B WP
par. 2.5.1

Display True/Magnetic Headings — E SET, D MARK, A DEST
par. 2.5.2

Magnetic Variation — E SET, D MARK, C PLOT
par. 2.5.3

Magnetic Variation Step selection [2] — E SET, D MARK, D MARK
par. 2.5.3

GPS

GPS Data Display — MENU, B WP, D MARK
par. 4.3.4

GPS Data Page Selection — MENU, B WP, D MARK, A DEST
par. 4.3.4

Local Time Offset Setting — MENU, B WP, D MARK, B WP
par. 4.3.4

LANGUAGE

Language Selection — E SET, B WP, A DEST
par. 1.12

MAP SETTINGS

Attention Areas ON/OFF — E SET, A DEST, C PLOT, B WP
par. 2.4.2

Bathymetric & Soundings Range — E SET, A DEST, B WP, F MODE
par. 2.3.6

Bathymetric Lines ON/OFF — E SET, A DEST, B WP, B WP
par. 2.3.2

Bottom Type ON/OFF — E SET, A DEST, B WP, E SET
par. 2.3.5

Buoys and Beacons ON/OFF — E SET, A DEST, C PLOT, E SET
par. 2.4.5

Cartographic Objects ON/OFF — E SET, A DEST, E SET, D MARK
par. 2.6.4

Chart Boundaries ON/OFF/AUTO — E SET, A DEST, E SET, B WP
par. 2.6.2

Chart Generation ON/OFF/TIMEOUT — E SET, A DEST, D MARK, C PLOT
par. 2.5.3

Compass ON/OFF — E SET, A DEST, D MARK, B WP
par. 2.5.2

Complex Object Icon SINGLE/BASIC — E SET, A DEST, D MARK, E SET
par. 2.5.5

Coordinates ON/OFF — E SET, A DEST, E SET, A DEST
par. 2.6.1

Cultural Features ON/OFF — E SET, A DEST, A DEST, C PLOT
par. 2.2.3

Info Level DETAILED/BASIC — E SET, A DEST, D MARK, F MODE
par. 2.5.6

Landmarks ON/OFF ..... E SET A DEST A DEST D MARK
par. 2.2.4

Lights ON/OFF ..... E SET A DEST C PLOT D MARK
par. 2.4.4

Names ON/OFF ..... E SET A DEST D MARK A DEST
par. 2.5.1

Natural Features ON/OFF ..... E SET A DEST A DEST A DEST
par. 2.2.1

New Objects ON/OFF ..... E SET A DEST D MARK D MARK
par. 2.5.4

Ports and Services ON/OFF ..... E SET A DEST C PLOT A DEST
par. 2.4.1

Rivers and Lakes ON/OFF ..... E SET A DEST A DEST B WP
par. 2.2.2

Signals ON/OFF ..... E SET A DEST C PLOT F MODE
par. 2.4.6

Smooth Scroll ON/OFF ..... E SET A DEST E SET C PLOT
par. 2.6.3

Spot Soundings ON/OFF ..... E SET A DEST B WP D MARK
par. 2.3.3

Tracks and routes ON/OFF ..... E SET A DEST C PLOT C PLOT
par. 2.4.3

Water Turbolence ON/OFF ..... E SET A DEST B WP A DEST
par. 2.3.1

MARK

* Deleting a single Mark ..... CLR A DEST
par. 5.6

Deleting all Marks ⧖ ..... MENU A DEST A DEST ENT

Deleting all Marks ✳ ..... MENU A DEST B WP ENT

Deleting all Marks ⋈ ..... MENU A DEST C PLOT ENT
par. 5.6

Mark Identifier ON/OFF ..... E SET B WP B WP
par. 5.5

Mark Autonumber ON/OFF ..... E SET B WP C PLOT
par. 5.4

* Placing Mark ⧖ ..... D MARK A DEST

* Placing Mark ✳ ..... D MARK B WP

* Placing Mark ⋈ ..... D MARK C PLOT
par. 5.2

NAVIGATION DATA PAGE

Display ..... ENT *for 1 second*
par. 4.9

PLOTTING

Automatic Replot ..... MENU C PLOT A DEST
par. 2.4.4

Plot track ..... C PLOT A DEST
par. 2.4.4

RANGE AND BEARING

Deleting A-B Line ..... CLR C PLOT
par. 3.3

* Display (Charting Mode) ..... R/B + *Cross-Hair* + R/B
par. 3.3

* Display (Navigation Mode) ..... R/B
par. 4.7

ROUTES

* Creating new route ..... B WP C PLOT A DEST
par. 3.2.3

* Change route to edit ..... B WP C PLOT
par. 3.2.3

Deleting last Waypoint ..... B WP B WP
par. 3.2.2

Deleting route[0] ..... B WP E SET
par. 3.2.5

Deleting all routes ..... MENU A DEST E SET ENT
par. 3.2.6

* Placing Waypoint ..... B WP A DEST
par. 3.2.1

* Reverse route direction ..... B WP D MARK
par. 3.2.4

Route Data Report[9] ..... B WP, F MODE
par. 3.2.7

SPECIAL NAVIGATOR

Display of Special Navigator ..... MENU, 3 WP, 0 MARK
par. 4.3.3

Selection of Special Navigator ..... MENU, B WP, 0 WP
par. 4.3.3

TARGET

Deleting Target ..... A DEST, B WP
par. 4.6

Display distance, time or XTE ..... A DEST, C PLOT
par. 4.6

*Placing Target ..... A DEST, A DEST
par. 4.6

TRACKING

Automatic Replot ..... MENU, C PLOT, A DEST
par. 2.4.4

Distance Step selection ..... MENU, C PLOT, C PLOT
par. 2.4.3

Tracking Step Unit ..... MENU, C PLOT, 3 WP
par. 2.4.2

Clear track ..... MENU, C PLOT, E SET
par. 2.4.5

Time Step selection ..... MENU, C PLOT, D MARK
par. 2.4.3

Track storing ON/OFF ..... F MODE, 9 WP
par. 2.4.1

USER CARTRIDGE

Change user cartridge ..... MENU, F MODE, F MODE
par. 7.2.6

Delete file of Mark ⧖ ..... MENU, F MODE, 0 MARK, A DEST

Delete file of Marks ✳ ..... MENU, F MODE, 0 MARK, B WP

Delete file of Marks ⋈ ..... MENU, F MODE, 0 MARK, C PLOT

Delete file of Events 人 ..... MENU, F MODE, 0 MARK, 0 MARK

Delete file of routes ..... MENU, F MODE, 0 MARK, E SET

Delete file of track ..... MENU, F MODE, 0 MARK, F MODE
par. 7.2.4

Display directory ..... MENU, F MODE, A DEST
par. 7.2.1

Format user cartridge ..... MENU, F MODE, E SET
par. 7.2.5

Load file of Marks ⧖ ..... MENU, F MODE, C PLOT, A DEST

Load file of Marks ✳ ..... MENU, F MODE, C PLOT, 9 WP

Load file of Marks ⋈ ..... MENU, F MODE, C PLOT, C PLOT

Load file of Events 人 ..... MENU, F MODE, C PLOT, 0 MARK

Load file of routes ..... MENU, F MODE, C PLOT, E SET

Load file of track ..... MENU, F MODE, C PLOT, F MODE
par. 7.2.3

Save file of Marks ⧖ ..... MENU, F MODE, B WP, A DEST

Save file of Marks ✳ ..... MENU, F MODE, B WP, 3 WP

Save file of Marks ⋈ ..... MENU, F MODE, B WP, C PLOT

Save file of Events 人 ..... MENU, F MODE, B WP, D MARK

Save file of routes ..... MENU, F MODE, B WP, E SET

Save file of track ..... MENU, F MODE, B WP, F MODE
par. 7.2.2

USER POINTS

Autonumbering function ON/OFF ..... E SET, B WP, C PLOT
par. 5.4

Deleting all user points ..... MENU, A DEST, F MODE, ENT
par. 5.6

User Point Identifier ON/OFF ..... E SET, 9 WP, B WP
par. 5.5

User Point List page ..... MENU, E SET
par. 5.8

WAYPOINT (see also ROUTES) .....

Deleting last Waypoint ..... B WP, B WP
par. 3.2.2

External Waypoint ON/OFF ..... E SET, B WP, O MASK
par. 3.2.9

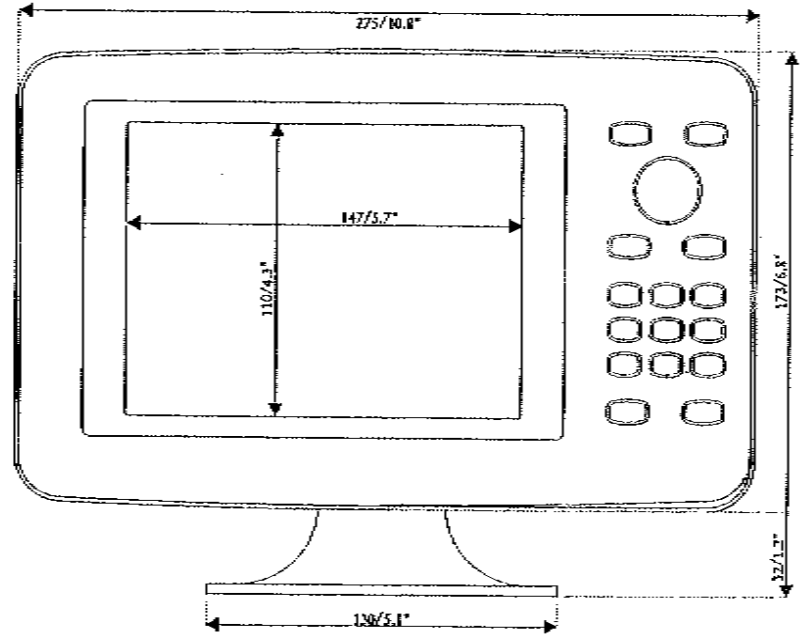
* Placing Waypoint ..... S WP, A DEST
par. 3.2.1

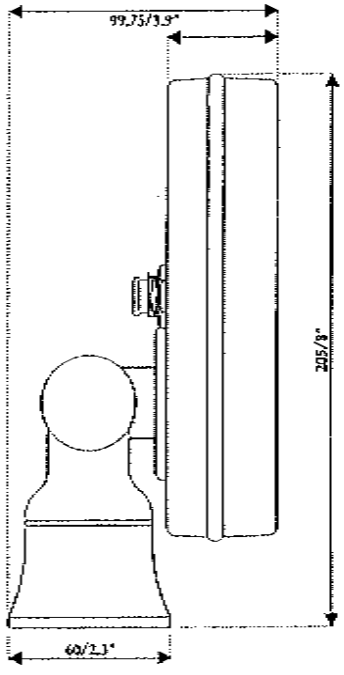
Note

(1) The autopilot cannot be engaged without a good fix indication.
(2) Use arrow keys to select the desired value.
(3) Select route before making these commands.

appendix B - TECHNICAL SPECIFICATIONS

Power Consumption ..... Less than 6 Watt (7 for chart plotter with GPS), 10 - 35 Volt dc
Navigation interface ..... From Loran, GPS, Decca, Omega via NMEA 0182/0183 and others
Autopilot interface NMEA-0180
NMEA-0180/CDX
NMEA-0183 (*)
Display ..... Trancflective backlighted LCD 8"
Display resolution ..... 640 x 480 pixels
Cartography ..... C-MAP NT+ C-CARD
Zoom ..... From 1 meter to 40 km per pixel
Operational temperature range ..... 0/ + 65 degrees Celsius
Memory ..... Non volatile with battery back-up
Keyboard ..... Silicon rubber backlighted
Weight ..... 1.5 kg
Dimensions: (mm/inch)





Note

(*) In accordance with Standard NMEA 0183 v. 2.00.

appendix C - SOFTWARE SPECIFICATIONS

USER POINTS

GROUPS(*): 1

RECORDABLE INDIVIDUAL POINTS(**):Wpts + Marks + Events 500

ROUTES:
- Routes ..... 500(***)
- Waypoints per Route 500
- Target 1

TRACKING:
- Track 1
- Points per Track 800
- Steps by Distance ..... 1, .5, .1, .05, .01 (NM)
- Steps by Time ..... 5, 3, 1, .5 (min) 5, 15 (sec)

MARK/EVENT:
- User point alphanumeric identifier
- Type of Marks 3
- Type of Events 1

FUNCTIONS

CARTOGRAPHIC FUNCTIONS :
- Worldwide chart coverage
- Depth Unit Selection (MT, FT, FM)
- Depths Areas Limit
- Bathymetrics & Soundings Range
- Natural Features, Rivers & Lakes, Cultural Features, Landmarks, Water Turbolence, Bathymetric Lines, Spot Soundings, Bottom Type, Ports & Services, Attention Areas, Tracks & Routes, Lights, Buoys & Beacons, Signals, Names, Compass, Chart Generation, New Objects, Complex Object Icon, Info Level, Coordinates, Chart Boundaries, Smooth Scroll, Cartographic Objects, Plotter Mode.
- Full screen
- WGS84 Coordinates System
- Thousand handling coordinates

FIX FUNCTIONS	: . Fix Correction . Display Headings True or Magnetic . Keypad entry to modify Fix Correction . COG vector . Position filter . Speed filter . Magnetic variation user selections
REPORT FUNCTIONS	: . Route Data Report with selectable units, fuel consumption and estimated time arrival . Extended GPS Data page . Navigation Data Display (LAT, LON, COG, SOG, BRG, XTE, TTG) . BRG/DST from ship to cursor . User Points List page
SPECIAL FUNCTIONS	: . Automatic Info on cartographic objects and user point . Multiwindow system . External waypoint
AUXILIARY MEMORY	: . User cartridge 128K

INTERFACE

I/O SUPPORT	: . Two selectable serial ports . Autopilot output
INPUT FORMATS	: . NMEA-0183 (#) (GLL, SBK, SCY, SNU, XTE, GXP, GDP, GOP, GLP, VTG, RMA, RMC, BWC, GGA) . NMEA-0183/1200 . NMEA-0182/TAIYO . KODEN 717 . KODEN 757 . FURUNO CIF . TRIMBLE-200 . DECCA MK3 . IMORROW AVENGER . MICROLOGIC VOYAGER . TEXAS TI9900 I/F . NAVSTAR 2000D . GPS ROCKWELL
SPECIAL NAVIGATORS	: . MICROLOGIC ML 8000T . AP NAV-MK4

OUTPUT FORMATS	: . NMEA-0180 . NMEA-0180/CDX . NMEA-0183 (****)(#): GLL, VTG, BWC(void) (with Autopilot on: BWC, GLL, XTE, BOD, APB, WCV, APA, VTG)

Note

(*) Groups: number of pages of memory.
(**) For each page. The total number of points is this number times the number of pages.
(***) The number of routes is limited by the maximum number of waypoints available. Theoretically you can have 500 routes each one made of one point only.
(****) These sentences are continuously sent only if a fix is received.
(#) In accordance with Standard NMEA 0183 v. 2.00.

❖Appendix D - OUTPUT NMEA-0183 SENTENCES

Common information:
$, II = Start of Sentence, Integrated Instrument
[CR][LF] = Sentence Terminator

$IIAPA,A,A,X.XX,L,N,A,A,XXX.,M,CCCC[CR][LF]

- DESTINATION WAYPOINT IDENTIFIER
- BEARING DESTINATION WAYPOINT from ORIGIN WAYPOINT, MAGNETIC
- ARRIVAL PERPENDICULAR
- ARRIVAL CIRCLE
- UNITS (N. MI.)
- SENSE (L or R)
- CROSS TRACK ERROR
- CYCLE LOCK
- OR'ed BLINK and SNR

ADDRESS: TALKER IDENTIFIER & SENTENCE FORMATTER
APA = AUTOPILOT SENTENCE "A"

$IIAPB,A,A,X.XX,L,N,A,A,XXX.,M,CCCC,XXX.,M,XXX.,M[CR][LF]

- HEADING to STEER from PRESENT POSITION to NEXT WPT, MAGNETIC or TRUE
- BEARING to DEST. WPT from PRESENT
- DESTINATION WAYPOINT IDENTIFIER
- BEARING DESTINATION WAYPOINT from ORIGIN WAYPOINT, MAGNETIC
- ARRIVAL PERPENDICULAR
- ARRIVAL CIRCLE
- UNITS (N. MI.)
- SENSE (L or R)
- CROSS TRACK ERROR
- CYCLE LOCK
- OR'ed BLINK and SNR

ADDRESS: TALKER IDENTIFIER & SENTENCE FORMATTER
APB = AUTOPILOT SENTENCE "B"

$IIBOD,XXX.,T,XXX.,M,CCCC,CCCC[CR][LF]

- ORIGIN WAYPOINT IDENTIFIER
- DESTINATION WAYPOINT IDENTIFIER
- BEARING, MAGNETIC
- BEARING, TRUE

ADDRESS: TALKER IDENTIFIER & SENTENCE FORMATTER
BOD = BEARING to DESTINATION

$IIBWC,XXXXXX,XXXX.XX,N,XXXXX.XX,W,XXX.,T,XXX.,M,XXX.X,N,CCCC[CR][LF]

- WAYPOINT IDENTIFIER
- DISTANCE, NAUTICAL MI.S
- BEARING, MAGNETIC
- BEARING, TRUE
- LONGITUDE E or W of WPT
- LATITUDE N or S of WPT
- UTC of BEARING

ADDRESS: TALKER IDENTIFIER & SENTENCE FORMATTER
BWC = BEARING & DISTANCE to WAYPOINT

$IIRMC,XXXXXX.XX,A,XXXX.XX,A,XXXXX.XX,A,X.X,X.X,XXXXXX,X.X,A[CR][LF]

- DEGREE E/W
- MAGNETIC VARIAT
- DATE:DDMMYY
- TRACK MADE GOOD, DEGREES TRUE
- SPEED OVER GROUND, KNOTS
- LONGITUDE, E/W
- LATITUDE, N/S
- STATUS: V=NAV RECEIVER WARNING
- UTC of POSITION FIX

ADDRESS: TALKER IDENTIFIER & SENTENCE FORMATTER
RMC = RECOMMENDED MINIMUM SPECIFIC GPS/TRANSIT DATA

$IIRMA,A,XXXX.XX,A,XXXXX.XX,A,X.X,X.X,X.X,X.X,X.X,A[CR][LF]

- DEGREE E/W
- MAGNETIC VARIATION
- TRACK MADE GOOD, DEGREES TRUE
- SPEED OVER GROUND, KNOTS
- TIME DIFFERENCE B, uS
- TIME DIFFERENCE A, uS
- LONGITUDE, DEGREES E/W
- LATITUDE, DEGREES N/S
- STATUS: V=BLINK, CYCLE or SNR WARNING
- ADDRESS: TALKER IDENTIFIER & SENTENCE FORMATTER
  RMA = RECOMMENDED MINIMUM SPECIFIC LORAN-C DATA

$IIGLL,XXX.XX,N,XXXXX.XX,W[CR][LF]

- W=WEST, E=EAST LONGITUDE
- LONGITUDE DEG. MIN HUNDREDTHS
- N=NORTH, S=SOUTH LATITUDE
- LATITUDE DEG. MIN. HUNDREDTHS
- ADDRESS: TALKER IDENTIFIER & SENTENCE FORMATTER
  GLL = GEOGRAPHICAL POSITION, LATITUDE/LONGITUDE

$IIVTG,XXX.,T,XXX.,M,XX.X,N,XX.X,K[CR][LF]

- SPEED KILOMETERS/Hr
- SPEED, KNOTS
- TRACK DEG., MAG.
- TRACK DEG., TRUE
- ADDRESS: TALKER IDENTIFIER & SENTENCE FORMATTER
  VTG = TRACK MADE GOOD and GROUND SPEED

$IIWCV,XX.X,N,CCCC[CR][LF]

- WAYPOINT IDENTIFIER
- VELOCITY, KNOTS
- ADDRESS: TALKER IDENTIFIER & SENTENCE FORMATTER
  WCV = WAYPOINT CLOSURE VELOCITY

$IIXTE,A,A,X.XX,L,N[CR][LF]

- UNITS (N. MI.)
- STEER LEFT or RIGHT (L=LEFT, R=RIGHT)
- CROSS TRACK ERROR
- CYCLE LOCK (A=VALID, V=INVALID)
- OR'ed VALUE BLINK and SNR (A=VALID, V=INVALID)
- ADDRESS: TALKER IDENTIFIER & SENTENCE FORMATTER
  XTE = CROSS TRACK ERROR

Appendix E - INPUT NMEA-0183 SENTENCES

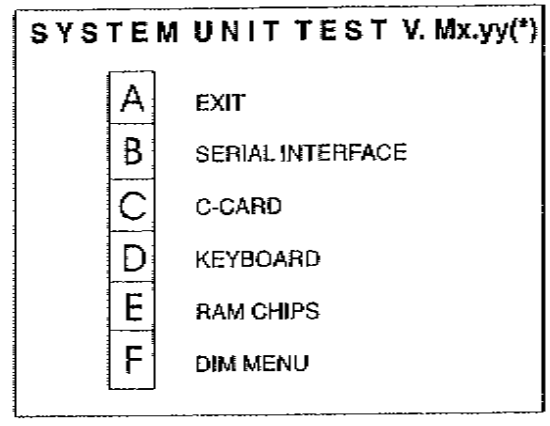
Formatters of accepted sentences:

BWC	:	Bearing and Distance to selected Waypoint
GDP	:	Dead Reckoning Positions
GGA	:	Global Positioning System Fix Data
GLL	:	Geographical Position, Latitude/Longitude
GLP	:	Loran-C Positions
GOP	:	OMEGA Positions
GXP	:	TRANSIT Positions
PKMAP	:	Proprietary of King Marine
PKMLC	:	Proprietary of King Marine
RMA	:	Recommended Minimum Specific Loran-C Data
RMC	:	Recommended Minimum Specific GPS/TRANSIT Data
SBK	:	Loran-C Blink Status
SCY	:	Loran-C Cycle Lock Status
SNU	:	Loran-C SNR Status
VTG	:	Track Made Good and Ground Speed
XTE	:	Cross-Track Error, Measured

Appendix F - EXTENDED AUTO-TEST

If you have connected your position-finding according to the instructions, and chosen the proper menu selection for your device, and are still having problems with your chart plotter, the extending auto-test should help determine the problem.

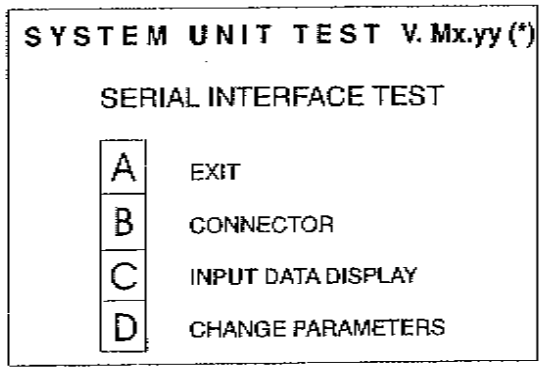
Make sure the chart plotter is turned off. While pressing and holding any other key, press the [POWER] key to turn the chart plotter on until you hear two beeps. A new menu will appear on the display:



Use the arrow keys to make your selection: as you position the cursor on the box of your choice, the chart plotter will select the item. Also you may use the indicated keys to move up and down the cursor and the [ENT] key to make the selection.

F.1) SERIAL INTERFACE TEST

If you are having problems receiving data from the position-finding instrument, the first test in the menu, the "Serial Interface Test", should help determine the problem. When you select this test a new menu will appear:



F.1.1) Connector Test

The first test in this new menu is the "Connector Test". This test will indicate if there is a malfunction in the transmitting or receiving circuitry. In order to run the "Connector Test", you need a special test output connector: contact your dealer with more information.

F.1.2) Input Data Display Test

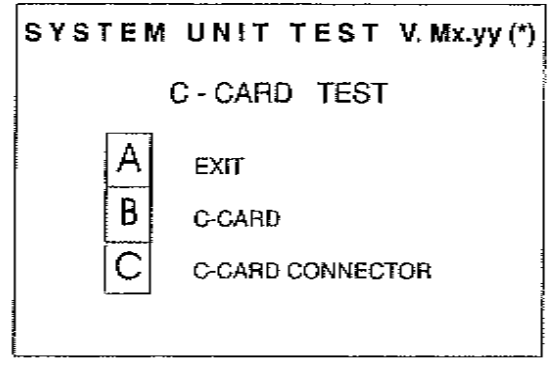
The next test "Input Data Display" allows your chart plotter act as a computer terminal and display the incoming data exactly as it received.
If the data displayed on the screen is unrecognizable, you may have selected the wrong input parameters for your particular receiver, for example, NMEA-0183 instead of NMEA-0182. Check your receiver manual to be sure that you have selected the proper interface format. If the screen is blank, you may have a broken connection, and no data is being received.
Use the MENU key to stop (or continue after pause) data displaying, the ENT key to show data in hex or ASCII mode (normal or small) and the CLR key to exit from "Input Data Display" page.

F.1.3) Change Parameter Test

You can check to make sure that the chart plotter is receiving properly, by exiting back to the "Serial Interface" Menu and selecting "Change Parameters", which allows you change the parameters of the serial interface.
You will receive a new menu, which allows you to change the Baud Rate (300, 1200, 2400, 4800 or 9600), the Word Length (7, 8), Parity (EVEN, ODD or NONE), Signal Polarity (NORMAL, INVERSE) and Signal Source (UART0, UART1). Set the parameters to those that match the navigation receiver and return to the input "Data Display Test" to confirm that the data is correct.
These settings are only used in the "Input Data Display Test", and are ignored by the chart plotter when in its normal operation mode. It may be necessary to experiment with the input parameters to determine exactly what format your receiver is providing.

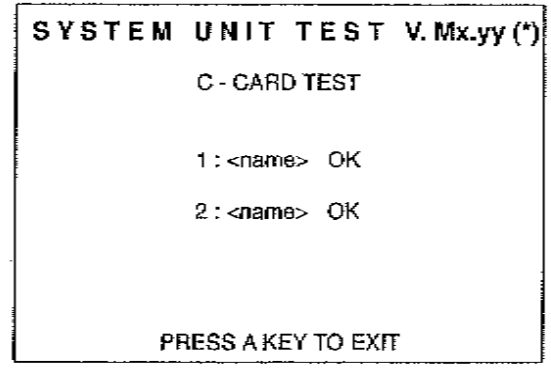
F.2) C-MAP NT C-CARD TEST

The "C-Card Test" allows you to check the C-Card and its connector.
After selecting this test, the following menu page appears on the screen:



F.2.1) C-Card Test

The first test in this new menu is the "C-Card Test". This test will indicate if there is a C-Card inserted or not in the slot and the integrity of the C-Card. When selecting this test the following page is shown on the screen:



There are four possible situations:

1. If there is a data cartridge inserted in the slot and there is not a malfunction, the name of the cartridge zone (<name>) and the message "OK" are shown.
2. If there is a data cartridge inserted in the slot, but it is a dameged cartridge, the name of the cartridge zone (<name>) and the message "ERROR 1" are shown.
3. If there is not any cartridge inserted in the slot, the message "ERROR 01" is shown.
4. If there is an user cartridge in the slot, the message "USER CARTRIDGE" is shown.

F.2.2) Connector Test

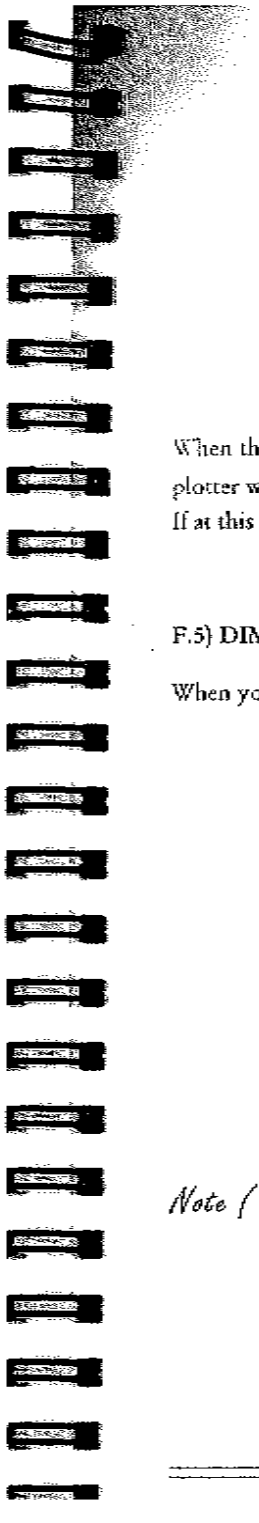
This test will indicate if there is a malfunction in the connector(s). It is used only in production.

F.3) KEYBOARD TEST

The "Keyboard Test" allows you check your keyboard for malfunctions. As you press the keys, an "X" will appear on the keyboard diagram and the chart plotter will beep. Contact your dealer if there seems to be a faulty keyboard.
As soon as you position the cursor on the box with label "EXIT", the chart plotter returns to "System Unit Test" page.

F.4) RAM CHIP TEST

This test verifies the integrity of the memories and if desired during this test all the internal memory can be erased and the default setting restored.
If the chart plotter exhibits unusual behavior, or appears to be malfunctioning, it may be possible to correct the problem by clearing RAM.
This operation will erase all Marks, Events, Routes, stored track plots and destinations. It will also return all selections (Input Data Format, Autopilot selection, etc.) to original default values.
To clear system RAM, select the "RAM Chip Test" option from the "System Unit Test" menu. The chart plotter will run an automatic test; on the screen the following menu will appear:



SYSTEM UNIT TEST V. Mx.yy (*)

RAM CHIPS TEST

RAM TEST: OK

PRESS <CLR> TO CLEAR RAM

ANOTHER KEY TO EXIT

When the automatic test is finished, press the indicated key to clear RAM. The chart plotter will ask you to confirm your decision to clear RAM by pressing the [CLR] key. If at this time you do not wish to clear RAM, press any other key.

F.5) DIM TEST

When you select Dim menu, the following menu will appear:

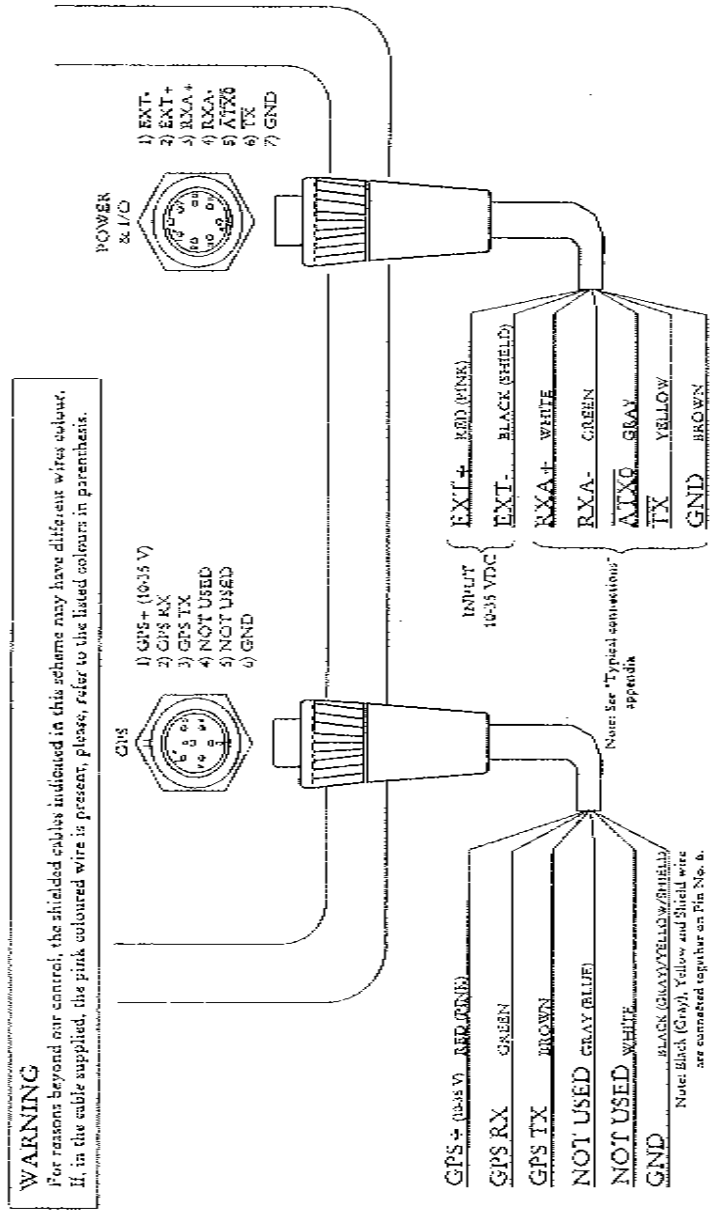
SYSTEM UNIT TEST V. Mx.yy (*)

DIM MENU

A	EXIT
B	CONTRAST -
C	CONTRAST +
D	BACKLIGHT
E	RESET DEFAULTS

Note (*)

The number of version displayed in the top right corner indicates the system program version

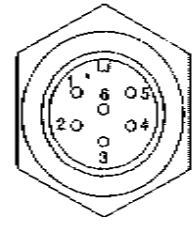


WARNING!!!

The "GPS Port" on this unit supplies a 10-35Vdc voltage (on pin 1) to power a GPS Sensor.

Caution:
Do not attempt to connect a 5Vdc GPS Sensor to this port as the over voltage will cause serious damage to the GPS Sensor.
If you have any doubts as to the GPS Sensor operating voltage, please contact your local agent before you complete this installation.

GPS

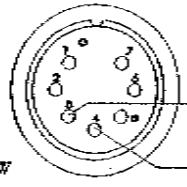


1) GPS+ (10-35 V)
2) GPS RX/signal TX →
3) GPS TX/signal RX ←
4) NOT USED
5) NOT USED
6) GND/signal RETURN ↔

File: GPS-35V.CDR

POSITIONING DEVICE

I/O



7 PIN CONNECTOR

EXTERNAL VIEW

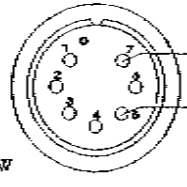
DEVICE TX SIGNAL (WHITE)

DEVICE TX RETURN (GREEN)

NOTE: POSITIONING DEVICE = GPS, LORAN, ECC.

AUTOPILOT

I/O



7 PIN CONNECTOR

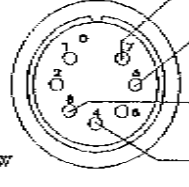
EXTERNAL VIEW

DEVICE TX RETURN (BROWN)

DEVICE TX SIGNAL (GRAY)

BIDIRECTIONAL COMMUNICATION

I/O



7 PIN CONNECTOR

EXTERNAL VIEW

DEVICE RX RETURN (BROWN)

DEVICE RX SIGNAL (YELLOW)

DEVICE TX SIGNAL (WHITE)

DEVICE TX RETURN (GREEN)

Note

Wire colors are referred to the supplied 7-wires cable.

I.1) GLOBAL POSITION SYSTEM (GPS)

The Global Positioning System (GPS) is a space-based radio positioning system which provides suitably equipped users with accurate position, velocity and time data.
Originally the GPS was conceived for military purpouses, but now it is used in civilian applications as surveying, marine, aviation, ...

The GPS constellation consists of 24 orbiting satellites, four equally spaced around each of six different orbital plane. These satellites provide anywhere on earth, 24 hour a day, under all weather conditions, three dimensional (3D) coverage.
The GPS receiver can compute an accurate position calculating the distance to the GPS satellites that orbite the earth. This is called Satellites Ranging. So a 2D position calculation requires three Satellites Ranges, a 3D position calculation requires four Satellites Ranges.

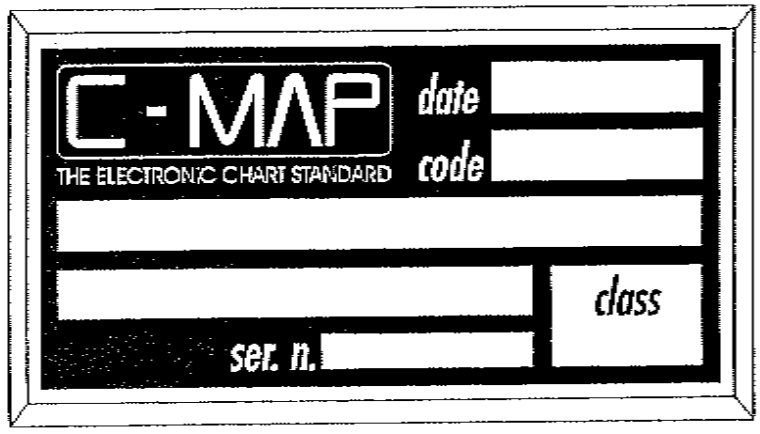
I.2) GPS DIFFERENZIALE (DGPS)

Differential GPS (DGPS) is an accurate form of GPS navigation which may be used to correct certain errors in the GPS signals (errors in GPS measurements are due to the atmosphere, the ionosphere and the SA - Selective Availability) enabling a highly accurate position calculation.

DGPS uses pseudorange errors recorded at known location to improve the measurements made by other standard GPS receivers within the same general geographic area.

DGPS relies on error corrections transmitted from a GPS receiver placed at known location. This receiver, called reference station, measures ranges from all visible satellites to its surveyed position. The differences between the measured and estimated ranges are computed, comparated and transmitted via radio or other signals to differential equipped receivers in a local area. The DGPS receiver applies the corrections received to achieve accurate position and velocity measurements.

appendix L - NOTE ON DATA CARTRIDGE



where:

date : appears on the cartridge and in the plot catalog. It identifies the release date of the cartridge.

code : indicates the geographic area and product code of the cartridge (see cartridge code details below).

class : identifies the quantity of cartographic data present in a cartridge. This varies according to the area covered by the charts and in particular on the complexity of the cartography itself. This size identifies the price class of the cartridge.

ser.n.: indicates the cartridge serial number.

C-MAP cartridges contain a number of charts and subcharts to cover a wide geographical area with a variety of scales (from 2 up to 90 charts, with an average of 40).
Coast lines, landmark names, lighthouses, depth lines, restrictions and other data normally available on nautical maps are all stored in the cartridge.
Chart selection is completely automatic and is performed by pointing the Cross-Hair and selecting the zoom level of the charts and subcharts.

C-CARDs are identified as follows:

XX-Yxxx.yy

Where: XX : identifies the geographical area;
Y : identifies the C-CARD generation (incremental lettering indicates new data types, compression, etc... Current generation is "B" - as of October 1996 .
xxx : identifies the specific product code;
yy : identifies the revision number (in case cartography is modified - for updates and/or corrections - and released).

For example, the chart with the code EM-A002.01 indicates:

EM : Mediterranean Europe;
A : First generation C-CARD.
002 : Product code 2;
01 : First revision.

If you are in Split screen mode, reference to the official HO (Hydrographic Offices) chart code is always displayed in the data window just below the screen scale.

"See chart: AA2345" means refer to the British Admiralty (AA) chart # 2345.

Examples of abbreviations you may find include:
AA : British Admiralty
ISTIDR : Istituto Idrografico Italiano
NOAA : National Oceanic Atmospheric Administration (USA)
SHF : Service Hydrographique Francaise
DMA : Defense Mapping Agency

❖appendix M - COMMAND TREE

In this appendix you can find how the chart plotter works following the available menu, using the "command tree" structure. It is also indicated the "key path" necessary to activate a special menu. The keys are indicated by the picture of the real key shown on the keyboard. The three dots "..." shown in the command tree indicate that the item activates a menu explained in the following pages.

Warning Page

ENT *Maps displaying*

- A DEST — DEST PAD MENU ...
- B WP — ROUTE PAD MENU ...
- C PLOT — PLOT PAD MENU...
- D MARK — MARK PAD MENU ...
- E SET — SETTINGS MENU ...
- F MODE — MODE PAD MENU ...
- CLR — CLEAR PAD MENU ...
- MENU — AUXILIARY FUNCTIONS MENU ...
- ENT — if pressed for 1 second displays Navigation Data Page
- DIM — LCD PAD MENU ...
- INFO — Info on points. 1 sec. pressed selects Split or Full Screen
- ZOOM IN — Shows more details of a smaller area
- ZOOM OUT — Shows fewer details of a larger area
- R/B — Displays distance and bearing between two points

Dest Pad Menu

A DEST *DEST PAD MENU*

- A DEST — Insert Target
- B WP — Delete Target
- C PLOT — Display [XTE/Dist/Time]

- D MARK — Set Autopilot [On/Off]
- CLR — Exit from Dest Pad Menu

Route Pad Menu

B WP *ROUTE PAD MENU*

- A DEST — Insert a Waypoint
- B WP — Delete the last Waypoint
- C PLOT — Change route to edit
- D MARK — Reverse the route direction
- E SET — Delete route
- F MODE — Select the Route Data Report
- CLR — Exit from Route Pad Menu

Plot Pad Menu

C PLOT *PLOT PAD MENU*

- A DEST — Plots past tracks
- CLR — Exit from Plot Pad Menu

Mark Pad Menu

D MARK *MARK PAD MENU*

- A DEST — Set Mark ⧖ on Cross-Hair coordinates
- B WP — Set Mark ⋈ on Cross-Hair coordinates
- C PLOT — Set Mark ✳ on Cross-Hair coordinates
- D MARK — Set Event ⅄ on ship position
- CLR — Exit from Mark Pad Menu

Settings Menu

E SET *SETTINGS MENU*

- A DEST — MAP SETTINGS MENU ...
- B WP — SETUP MENU ...
- C PLOT — FILTERS MENU ...

D MARK COMPASS FUNCTIONS ...

CLR Returns to charts

E SET SETTINGS MENU

A DEST *MAP SETTING MENU*

A DEST LAND SETTINGS MENU ...

B WP MARINE SETTINGS MENU ...

C PLOT NAVAL AIDS MENU ...

D MARK OTHER SETTINGS MENU ...

E SET CHART SETTINGS MENU ...

CLR Returns to Settings Menu

E SET SETTINGS MENU

A DEST MAP SETTING MENU

A DEST *LAND SETTINGS MENU*

A DEST Natural Features (On/Off)

B WP Rivers and Lakes (On/Off)

C PLOT Cultural Features (On/Off)

D MARK Landmarks (On/Off)

CLR Returns to MapSetting Menu

E SET SETTINGS MENU

A DEST MAP SETTING MENU

A DEST *MARINE SETTINGS MENU*

A DEST Water Turbolence (On/Off)

B WP Bathymetric Lines (On/Off)

C PLOT Depth Areas Limit (1)

D MARK Spot Soundings (On/Off)

E SET Bottom Type (On/Off)

F MODE Bathymetrics & Soundings Range (1)

CLR Returns to Map Settings Menu

E SET SETTINGS MENU

A DEST MAP SETTING MENU

C PLOT *NAVAL AIDS MENU*

A DEST Ports and Services (On/Off)

B WP Attention Areas (On/Off)

C PLOT Tracks and Routes (On/Off)

D MARK Lights (On/Off)

E SET Buoys and Beacons (On/Off)

F MODE Signals (On/Off)

CLR Returns to Map Setting Menu

E SET SETTINGS MENU

A DEST MAP SETTING MENU

D MARK *OTHER SETTINGS MENU*

A DEST Names (On/Off)

B WP Compass (On/Off)

C PLOT Chart Generation (On/Off)

D MARK New Objects (On/Off)

E SET Complex Object Icon (Single/Multiple)

F MODE Info Level (Detailed/Basic)

CLR Returns to Map Setting Menu

E SET SETTINGS MENU

A DEST MAP SETTING MENU

E SET *CHART SETTINGS MENU*

A DEST Coordinates (On/Off)