(where "#n" indicates the number of active route).

2. Press (ENTER) more than one second and then release it: the coordinates of the point identified by the Cross-Hair will appear on the screen. The Latitude and the Longitude of this point is shown on the screen, and the user can change it, by moving the cursor with the left and right arrows and editing the position with the up or down arrows.
3. Press (ENTER) to set the waypoint or (CLEAR) to abort operation.
4. If the 'ENTER' key was pressed, it is also possible to name the Waypoint. With the left and right arrows it is possible to move the cursor, and with the up and down arrows you can write the desired name (the label may have 8 characters max).
5. Press (ENTER) to set the name (Pressing the (CLEAR) key confirms the default identifier).
6. Press (MENU) to exit.

Note

The previous procedure allows the user to store a Waypoint by coordinates and also to name that Waypoint.

3.2.3) Inserting waypoint into the active route

It is possible to insert a Waypoint between two waypoint of a route:

Selection of INSERT WAYPOINT function

1. Press (MENU) until "ROUTE#n" appears in the status window (where "#n" indicates the number of active route).
2. Place the Cross-Hair on the segment connecting two waypoints and press (ENTER). Pressing the 'ENTER' key will cause the line

between the waypoints to turn into a dot-line. Now the cursor may be moved to the new position. When the cursor has been stationary for a second or two, the line will "rubber band", drawing a dot-line between the last waypoint and the cursor, and another dot-line between the cursor and the next waypoint.

3. Once you have positioned the cursor at the new location, press the ENTER key again to place the waypoint at that position or CLEAR to abort operation.
4. Press MENU to exit.

3.2.4) Moving waypoints

The chart plotter allows the user to move on the screen already existed waypoints to place them in new positions.
To move waypoint follow the procedure:

Selection of MOVING WAYPOINTS

1. Press MENU until "ROUTE #n" appears in the status window.
2. Placing the Cross-Hair on an existing waypoint and pressing the ENTER key, it is possible to move waypoint on the screen, with its identifier, to place in the desired position. After pressing the 'ENTER' key, moving the Cross-Hair by the arrow keys, on the screen a dot line that connects the waypoint with the new position is shown on the screen.
3. When the desired position is obtained, press the ENTER key again: the waypoint is placed in the new position.
4. Press MENU to exit.

To move waypoint on the screen changing the identifier follow the procedure:

Selection of MOVING WAYPOINT
CHANGING IDENTIFIER

1. Press (MENU) until "ROUTE #n" appears in the status window.
2. Placing the Cross-Hair on an existing waypoint and pressing the (ENTER) key for more than 1 second, it is possible to modify the position and the identifier of the waypoint too.
3. On the screen a window shown waypoint coordinates is displayed: by the left or right arrow key it is possible to move the cursor to the left or to the right, while by the up or down arrow key it is possible to change the coordinates increasing or decreasing the character displayed in reverse video. Press the (ENTER) key to confirm or the (CLEAR) key to abort operation.
4. After pressing the 'ENTER' key, on the screen a window containing the waypoint identifier is shown: by using the left or right arrow key it is possible to move the cursor left or to the right, and with the up or down arrow key it is possible to modify the character displayed in reverse video. Press the (ENTER) key to confirm or the (CLEAR) key to abort operation.
5. Press (MENU) to exit.

3.2.5) Deleting waypoints

The user can delete a waypoint of the route "in edit", that is indicated by the Cross-Hair. The line connecting the waypoint and the previous one is deleted, the line between the waypoint and the next one is deleted, and a new line between the previous and the next waypoints is shown on the screen.
To delete the waypoint following the procedure:

is not displayed).
The distance unit may be selected among km/nm/sm in the par. 2.7.2.

3.2.8) Route data report

To display the data report of the active route, press the following keys:

Selection of ROUTE DATA REPORT

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Route Menu (N. 5).
4. When you have highlighted that menu, press (ENTER) to select the Route Menu.
5. Use up or down arrow keys to highlight the Route Data Report option (N. 3).
6. When you have highlighted that option, press (ENTER) to select the Route Data Report on the active route.
   The data will be displayed on separate pages (screens): to proceed from one page to the other, the (ENTER) key must be pressed, and to exit from this function, press the (CLEAR) 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 (MENU) key to change the unit, from knots to kilometers per hour (km/h) or vice versa; then insert the boat speed by pressing the up and down arrows key and then the (ENTER) key to confirm the input.
   The reverse video is shifted on the fuel consumption field, press the

(MENU) key to change the unit from liter per hour (l/h) to Gallon per hour (Gall/h) or vice versa, then press the up and down arrows key to change value and the (ENTER) key again.

ROUTE #1 DATA REPORT

SPD: 10 knots
CONS: 100 l/h

WP	POSITION	HDG T HDG M	LEG DST TOT DST	TIME	CONSUMPT
01	43 37.997 N 010 03.305 E				
02	43 46.442 N 010 10.572 E	031.9° 031.9°	299 309	009H 56M	2980 L
03	43 49.088 N 010 04.213 E	321.1° 321.1°	321 572	015H 14M	8637 L

The navigation info is shown refering to the waypoints of the active route. The coordinates of each waypoint from number 1 to number 8 with data including distances and headings will be displayed on the first page. The second page the information will be the same, but with reference to waypoints from number 9 to number 16, and so on for the other pages (their number depending on the number of waypoints of the active route). Every page shows information for 8 waypoints: if the active route has less than 8 waypoints, only one page is displayed.
The data displayed is as follows:

WP	: waypoint number
POSITION	: Latitude and Longitude of each waypoint
HDG T	: true heading
HDG M	: compass heading
LEG DST	: distance between waypoints of each segment of the course

TOT. DST	: total distance from the first waypoint
TIME	: total navigation time from the starting waypoint, at set speed and power
CONSUMPT	: total fuel consupmtion from the starting waypoint, at set speed and power (L stands for liters, G for Gallons)

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 onto that symbol.
As soon as the chart plotter 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 waypoint storing feature can be selected by pressing:

Selection of EXTERNAL WAYPOINT DISPLAY

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press (ENTER) to select the Auxiliary Functions Menu
5. Use up or down arrow keys to highlight the Setup Menu (N. 3).
6. When you have highlighted that option, press (ENTER) to select the Setup Menu.
7. Use up or down arrow keys to highlight the External Waypoint option (N. 2).
8. Press (ENTER) to select the External Waypoint On or Off. Every

time the 'ENTER' key is pressing, the External Waypoint option is enabled or disabled.

9. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

3.3 - DISTANCE AND BEARING BETWEEN TWO POINTS ON THE MAP

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

Selection of FR-TO function

1. Press (MENU) until "FR-TO" appears in the status window.
2. Press (ENTER) to place the "FR" point on the place identified by the Cross-Hair.
3. Move the Cross-Hair to the desired position and then press the (ENTER) key to place the "TO" point: the two points are connected by a straight line. A cross will identify the beginning and the end of the "FR-TO" line.
4. Press (MENU) to select another function

To cancel the "FR-TO" segment press the following keys:

Selection of CLEAR FR-TO function

1. Press (MENU) until "FR-TO" appears in the status window.
2. Press (CLEAR) to delete the point "FR", "TO" and the line

connecting these points.

3. Press (MENU) to select another function.

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 monitors the navigation, provided a positioning instrument is connected and working properly.
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 powered up it is always set to the Charting mode.
To find the chart portion with the ship's position in it simply press the following keys:

Selection of OPERATION MODE

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the operation mode option (N. 1).
4. When you have highlighted that option, press (ENTER) to select the desired operation mode. Every time the 'ENTER' key is pressed, the plotter will operate in Charting or Navigation mode.
5. Press (CLEAR) to exit to charts.

Note

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

When in Navigation mode, all operations and calculation are referred to the ship's position and not to the Cross-Hair.
In Navigation mode, the ship's position will eventually reach one edge of the screen and the chart will shift in order to scroll in the direction the vessel is moving to. If the edge of the screen is also the edge of the chart the chart plotter will look for neighboring chart in the current cartridge, with a similar scale.
Unlike the Charting mode, when the Cross-Hair "bumps" the edge of the chart, no redrawing will take place. Your boat will never leave the chart while in the Navigation mode.
The zoom functions in Navigation mode are always related to the ship's position.

4.1.1) Navigation Area Amplifier and Auto Zoom on Target

There are two other modes of operation related to Navigation mode, selecting by the procedure indicated in the par. 4.1, called "Navigation Area Amplifier" and "Auto Zoom on Target".

The first mode, "Navigation Area Amplifier", allows you to display the vessel position in order to show the maximum area ahead, based on the ships heading.

The other mode, the "Auto Zoom on Target", automatically selects the best available chart level to show both the ship and Target on the screen. It is automatically disabled if the user calls a scroll or zoom function.

4.2 - INCOMING SIGNAL STATUS INDICATION

The chart plotter indicates the status of incoming data 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 the crossed circle, representing the ship's position on the display, will blink.

The following are the messages that 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 virtual cartography. In cartography on the chart plotter substitutes the message "CORRECTION OFF" with one of the following:
"CHART DATUM"
"WGS84"
"<Datum Name>"

If the ship is sailing in an area not covered by any chart digitized in the data cartridge, the chart plotter displays "OUT OF MAPS" instead of "CORRECTION ON/OFF". When the ship returns into the covered zone, the proper information will be displayed again.

If there are problems with the information received, the chart plotter substitutes the message "CORRECTION ON/OFF" with one of the following:

- WRONG FORMAT : the received format does not correspond to the selected format or the received data do 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. An audio alarm is sounded when a usable fix has not been 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 when the chart plotter emits a

series of beeps.
If a fix has never been received, the diamond symbols are displayed instead of ship's position coordinates. If a fix has been received, the chart plotter displays the coordinates of the last position memorized with the last decimal digits substituted with diamond symbols, until a good fix is received.

4.3 - INPUT FORMATS

The chart plotter accepts several input formats:

1) NMEA-0183
2) NMEA-0182/TAIYO
3) KODEN 717
4) KODEN 757
5) FURUNO CIF
6) TRIMBLE-200
7) DECCA MK3
8) II MORROW AVENGER
9) MICROLOGIC VOYAGER
10) TEXAS TI9900 I/II
11) NAVSTAR 2000D
12) MICROLOGIC ML 8000 T
13) AP NAV-MK4
14) GPS-NMEA/0183
15) GPS ROCKWELL

4.3.1) Port selection

The chart plotter has two input ports: PORT I/O and PORT GPS.

To select the desired port, press the following keys:

Selection of INPUT PORT

1. Press (MENU) until "MENU" appears in the status window.

2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press (ENTER) to select the Auxiliary Functions Menu
5. Use up or down arrow keys to highlight the Fix and Compass Functions Menu (N. 4).
6. When you have highlighted that option, press (ENTER) to select the Fix and Compass Functions Menu.
7. Use up or down arrow keys to highlight the Input Source option (N. 3).
8. Press (ENTER) to select the desired port: Port I/O or Port GPS.
9. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

4.3.2) Interface Selection

If the selected port is the PORT GPS, the format selection automatically becomes GPS and the plotter sets the proper format for receiving the ship position. If the selected port is the PORT I/O, then select the desired interface format by pressing the following keys:

Selection of INTERFACE FORMAT

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

Auxiliary Functions Menu.

5. Use up or down arrow keys to highlight the Fix and Compass Functions Menu (N. 4).
6. When you have highlighted that option, press (ENTER) to select the Fix and Compass Functions Menu.
7. Use up or down arrow keys to highlight the Data Format option (N. 2).
8. Press (ENTER) to select the desired format. The available formats (see par. 4.3) are shown on the screen.
9. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

Note

When selecting the format, the serial interface is automatically set and any previous parameters selected thru the "SERIAL INTERFACE TEST" are ignored. The chart plotter maintains the format selected when switched Off.

4.3.3) Special Navigator Selection

The chart plotter currently accepts two special interface formats, AP NAV-MK4 and MICROLOGIC ML 8000 T.

The Special Navigator Selection Menu can be selected through the following process:

Selection of SPECIAL NAVIGATOR

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).

4. When you have highlighted that menu, press ENTER to select the Auxiliary Functions Menu
5. Use up or down arrow keys to highlight the Fix and Compass Functions Menu (N. 4).
6. When you have highlighted that option, press ENTER to select the Fix and Compass Functions Menu.
7. Use up or down arrow keys to highlight the Data Format option (N. 2).
8. Press ENTER to select the desired format: AP NAV-MK4 or MICROLOGIC ML 8000 T.
9. Press MENU to return to previous menu or CLEAR to exit to charts.

Either of the special navigator interfaces must be selected first.

The Special Navigator Menu can be selected through the following procedure:

Selection of SPECIAL NAVIGATOR MENU

1. Press MENU until "MENU" appears in the status window.
2. Press ENTER to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press ENTER to select the Auxiliary Functions Menu
5. Use up or down arrow keys to highlight the Fix and Compass Functions Menu (N. 4).
6. When you have highlighted that option, press ENTER to select the Fix and Compass Functions Menu.

7. Use up or down arrow keys to highlight the Special Navigator Menu (N. 4).

8. Press (ENTER) to select the Special Navigator Menu; after pressing the 'ENTER' key, if MICROLOGIC ML 8000 T is selected, two options are available:
   - highlighting by the up and down arrow keys the first option and pressing the (ENTER) key, the transmission of Cross-Hair coordinates is enabled;
   - highlighting by the up and down arrow keys the second option and pressing the (ENTER) key the transmission of chain numbers is enabled. After pressing the 'ENTER' key, the message "CHAIN NUMBER" will appear on screen: up and down arrows key insert the desired number and then press (ENTER) to complete process or press (CLEAR) to abort function.

   If AP NAV - MK4 has been selected, only the transmission of the Cross-Hair coordinates may be set.

9. Press (CLEAR) to exit to charts.

4.3.4) GPS Data Page

In order to display the GPS Data Page, the GPS-NMEA/0183 or GPS ROCKWELL choice must be selected first.
It is possible by this procedure:

Selection of GPS format

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).

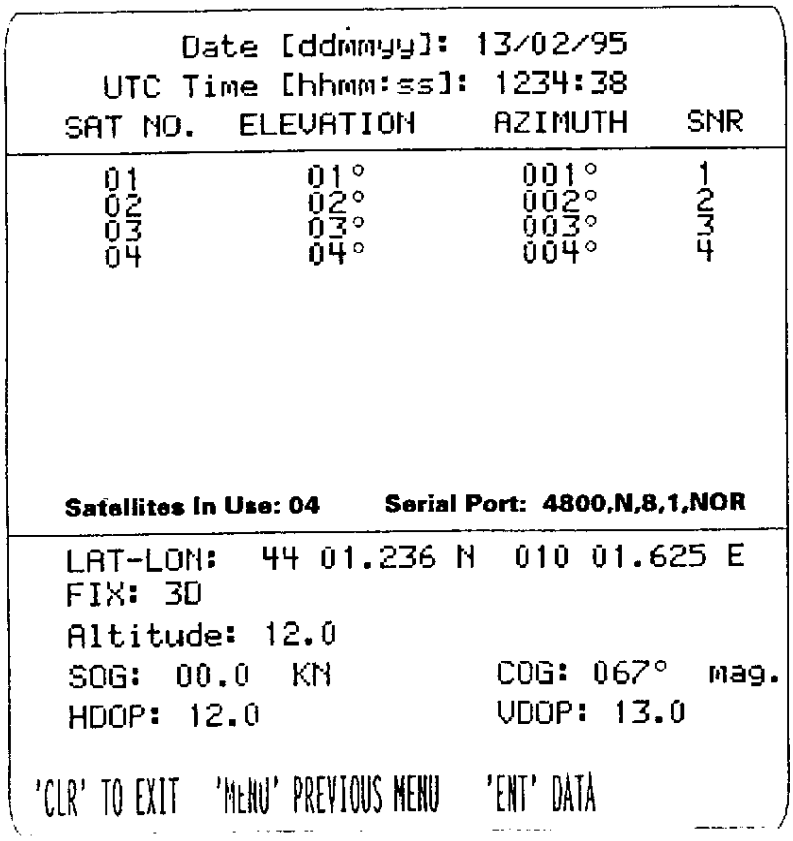
4. When you have highlighted that menu, press ENTER to select the Auxiliary Functions Menu
5. Use up or down arrow keys to highlight the Fix and Compass Functions Menu (N. 4).
6. When you have highlighted that option, press ENTER to select the Fix and Compass Functions Menu.
7. Use up or down arrow keys to highlight the Data Format option (N. 2).
8. Press ENTER to select the desired GPS format.
9. Press MENU to return to previous menu or CLEAR to exit to charts.

When one of the two formats, GPS-NMEA/0183 or GPS ROCKWELL, have been selected, the GPS Data Page can be selected through the following procedure:

Selection of GPS DATA PAGE

1. Press MENU until "MENU" appears in the status window.
2. Press ENTER to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press ENTER to select the Auxiliary Functions Menu
5. Use up or down arrow keys to highlight the Fix and Compass Functions Menu (N. 4).
6. When you have highlighted that option, press ENTER to select the Fix and Compass Functions Menu.
7. Use up or down arrow keys to highlight the Special Navigator Menu to display the GPS Data Page (N. 4).

8. Press (ENTER) to select the display of the GPS Data Page; after pressing the 'ENTER' key, on the screen the following page is shown.



Note

If there are problems with the information received, the "FIX" indication messages might appear: "NOT GOOD" (the received format is correct but the information is declared "invalid" by the positioning instrument), "WRONG FORMAT" (the received format does not correspond to the selected format or the received data do not have information on the ship's position), "NOT RECEIVED" (no data is received).

9. One additional option is available: press the ENTER key to show the GPS data display. Press the ENTER key to stop (or to continue after pause) the transmission of data on the screen. Press CLEAR to return to GPS data page.
10. Press MENU to return to previous menu or CLEAR to exit to charts.

4.3.4.1) GPS Receiver Initialization

To speed up the GPS data acquiring, it is possible to initialize the GPS, inserting the desired values for Latitude, Longitude, UTC data and time, following the procedure:

Selection of GPS Receiver Initialization

1. Follow the procedure indicated in the par. 4.3.4 to display the GPS Data Page.
2. When the GPS Data Page is shown on the screen, press ZOOM IN to display the GPS Receiver Initialization Page.
3. To insert the desired value for Latitude, Longitude, date and time use up or down arrow key to change the digit shown in reverse video, left or right arrow key to move the cursor to the left or to the right. After each new entry press ENTER to confirm the inserted value (or CLEAR to abort operation). The default value for Latitude and Longitude is the current Cross-Hair position on the map display, for date and time is zero.
4. After pressing the 'ENTER' key to confirm the time, the initialize sentences are sent to the GPS module and the message "TRASMITTING" is shown.

Warning!

Be aware that if wrong values are inserted, the GPS resets, the almanac is lost and reacquisition will take about 20 minutes.

5. After the "TRASMITTING" message disappeared, press (MENU) to return to previous menu or (CLEAR) to exit to charts. Pressing (ENTER) the procedure will restart from step 1.

4.4 - COMPUTING FIX ERROR

The chart plotter can automatically correct fixes from the positioning instrument which have a low accuracy level. (use this function carefully as misuse can cause positioning errors.)

4.4.1) Automatic Mode

To compute the fix error in automatic mode, move the Cross-Hair to the ship's real position and then press the following keys:

Selection of AUTOMATIC COMPUTING FIX ERROR

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

5. Use up or down arrow keys to highlight the Fix and Compass Functions Menu (N. 4).
6. When you have highlighted that option, press (ENTER) to select the Fix and Compass Functions Menu.
7. Use up or down arrow keys to highlight the Fix Correction Menu (N. 1).
8. Press (ENTER) to select the Fix Correction Menu.
9. Use up or down arrow keys to highlight the automatic computing of fix error option (N. 2).
10. Press (ENTER) to select the automatic computing of fix error. Through this operation, the error is calculated and internally memorized for appropriate correction, but not applied.
11. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

4.4.2) Manual Mode

To compute the fix error in manual mode, please follow the procedure:

Selection of MANUAL COMPUTING FIX ERROR

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

6. When you have highlighted that option, press (ENTER) to select the Fix and Compass Functions Menu.
7. Use up or down arrow keys to highlight the Fix Correction Menu (N. 1).
8. Press (ENTER) to select the Fix Correction Menu.
9. Use up or down arrow keys to highlight the manual computing of fix error option (N. 3).
10. Press (ENTER) to select the manual computing of fix error. After pressing the 'ENTER' key, the latitude value may be modified by the up and down arrows key, and the longitude value may be modified by the left and right arrows key. When the desired values has been inserted, press the (ENTER) key to confirm or the (CLEAR) key to abort operation.
11. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

4.4.3) Correcting Fix Error

Once you compute the error (See par. 4.4.1 or par. 4.4.2), you may turn the Fix Correction On or Off as desired by pressing the following keys:

Selection of CORRECTING FIX ERROR

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).

4. When you have highlighted that menu, press (ENTER) to select the Auxiliary Functions Menu
5. Use up or down arrow keys to highlight the Fix and Compass Functions Menu (N. 4).
6. When you have highlighted that option, press (ENTER) to select the Fix and Compass Functions Menu.
7. Use up or down arrow keys to highlight the Fix Correction Menu (N. 1).
8. Press (ENTER) to select the Fix Correction Menu.
9. Use up or down arrow keys to highlight the fix correction On or Off (N. 1).
10. Press (ENTER) to select the enable or disable of fix correction.
11. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

The chart plotter accepts corrections up to 10 nautical miles.

4.5 - FILTER FUNCTIONS

The chart plotter can filter the fix received and also the speed.

4.5.1) Position filter

The chart plotter can filter the fix received from a positioning device. In case of a jittering fix this option makes the ship's position more stable and the track smoother. This is called Position filter.

The Position filter can be turned On or Off by pressing the following keys:

Selection of POSITION FILTER

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press (ENTER) to select the Auxiliary Functions Menu
5. Use up or down arrow keys to highlight the Fix/Compass Functions (N. 4).
6. When you have highlighted that option, press (ENTER) to select theFix/Compass Functions.
7. Use up or down arrow keys to highlight the Filters Menu (N. 9).
8. When you have highlighted that menu, press (ENTER) to select the Filters Menu.
9. Use up or down arrow keys to highlight the Position Filter option (N.1).
10. When you have highlighted that option, press (ENTER) to select the position filter option. Every time the 'ENTER' key is pressed it is possible to toggle the selection On/Off.
11. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

4.5.2) Speed filter

The chart plotter can filter the spped too. The Speed filter can be turned On or Off by pressing the following keys:

Selection of SPEED FILTER

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press (ENTER) to select the Auxiliary Functions Menu
5. Use up or down arrow keys to highlight the Fix/Compass Functions (N. 4).
6. When you have highlighted that option, press (ENTER) to select theFix/Compass Functions.
7. Use up or down arrow keys to highlight the Filters Menu (N. 9).
8. When you have highlighted that menu, press (ENTER) to select the Filters Menu.
9. Use up or down arrow keys to highlight the Speed Filter option (N.2).
10. When you have highlighted that option, press (ENTER) to select the speed filter option. Every time the 'ENTER' key is pressed it is possible to toggle the selection On/Off.
11. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

4.5.3) Filter Step Parameter

The chart plotter can set the filter step for the speed or the position.

This step for the filter can be selected by pressing the following keys:

Selection of FILTER STEP PARAMETER

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press (ENTER) to select the Auxiliary Functions Menu
5. Use up or down arrow keys to highlight the Fix/Compass Functions (N. 4).
6. When you have highlighted that option, press (ENTER) to select theFix/Compass Functions.
7. Use up or down arrow keys to highlight the Filters Menu (N. 9).
8. When you have highlighted that menu, press (ENTER) to select the Filters Menu.
9. Use up or down arrow keys to highlight the Filter Parameter option (N.3).
10. When you have highlighted that option, press (ENTER) to set the filter step. Use the (ZOOM IN) or (ZOOM OUT) key to change value in the range [1, 2, 3, 4, 5], press the (ENTER) key to confirm or the (CLEAR) key to abort operation.
11. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

4.6 - CHOOSING A TARGET

You can tag a particular mark on the map by using the Target function. In order to activate the Target function, the Cross-Hair must be placed over the desired waypoint and the following keys must be pressed:

Selection of INSERT TARGET function

1. Press (MENU) until "GOTO" appears in the status window.
2. Press (ENTER) to select the insert Target function. After pressing the 'ENTER' key, on the screen, on the Cross-Hair position, the Target symbol is shown.

After activating the Target, it is possible to activate the navigation to Target enabling autopilot (see par. 6.2).
If the Target is activated, three situations are possible:

- if autopilot is not activated and the Cross-Hair is placed on the existing Target, press the 'ENTER' key and the autopilot will be enabled (see par. 6.2): and on the screen a dotted line connecting the Target point with the ship is drawn;
- if autopilot is not activated and the Cross-Hair is not on the existing Target, press the 'ENTER' key and the "old" Target is deleted and a "new" Target is placed on the position indicated by Cross-Hair;
- if autopilot is activated, pressing the 'ENTER' key will disable any previous navigation (the dotted line connecting the Target with the ship and the "old" Target point are deleted) and a "new" Target is inserted on the position indicated by the Cross-Hair.

3. Press (MENU) to select another function.

It is possible to insert the Target on L/L coordinates following this procedure:

Selection of TARGET ON COORDINATES function

1. Press (MENU) until "GOTO" appears in the status window.

2. Press (ENTER) for more than one second and then release : the L/L coordinates of the point identified by the Cross-Hair will appear on the screen and the user can change them, by moving the cursor with the left and right arrows and selecting new numerical values with the up or down arrows.
3. Press (ENTER) to confirm the Lat/Lon position or (CLEAR) to abort operation.
4. Press (MENU) to select another function.

Target deletion is possible by following this procedure:

Selection of DELETE TARGET function

1. Press (MENU) until "GOTO" appears in the status window.
2. Press (CLEAR) to select the delete Target function.
3. Press (ENTER) to confirm the deleting of the Target . After pressing the 'ENTER' key, the symbol that identifies Target disappears from the screen.
   If autopilot is activated, pressing the 'ENTER' key confirms the deletion, the autopilot is disabled but the Target symbol remains. The dotted line connecting the Target with the ship disappears from the screen, but not the symbol that identifies the Target. To delete the Target you must press the 'CLEAR' key again and the 'ENTER' key to confirm the deletion.
   Pressing the 'ENTER' key when a Target has not been inserted will cause the chart plotter to emits three beeps to indicate an error condition.
4. Press (MENU) to select another function.

The chart plotter can display the Distance (Distance To Go = DTG), the Time to the Target (Time To Go = TTG) or the Cross Track Error (XTE) follow the procedure described in the par. 2.6.5.

It also possible to set the Target point anywhere (not necessary on an existing Waypoint): in this case when you set the Target, a Waypoint is inserted on the Target position.

4.7 - DISTANCE AND BEARING BETWEEN SHIP'S POSITION AND ANY GIVEN POINT

In Navigation mode, Navigation Area Amplifier and in Auto Zoom on Target this function allows fast and easy measurements of distances and bearings between ship's position and any point on the chart.
To activate this option follow this procedure:

Selection of FR-TO function

1. Press (MENU) until "FR-TO" appears in the status window.
2. Press (ENTER) to place the "FR" point on the ship's position and the "TO" point on the place identified by the Cross-Hair : the two points are connected by a straight line. A cross will identify the beginning and the end of the "FR-TO" line.
3. Press (MENU) to select another function.

To clear the "FR-TO" segment press the following keys:

Selection of CLEAR FR-TO function

1. Press (MENU) until "FR-TO" appears in the status window.
2. Press (CLEAR) to delete the point "FR", -"TO" and the line connecting these points.
3. Press (MENU) to select another function.

Note

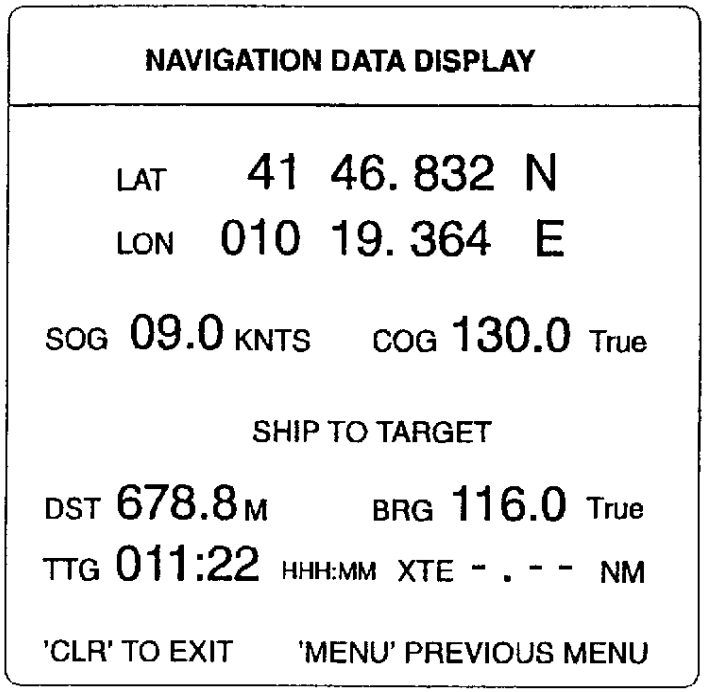
In Navigation mode, in Navigation Area Amplifier and in Auto Zoom on Target the "FR-TO distance is between the ship's position and any given point. In the Charting mode, it is between the Cross-Hair and any given point (See also par. 3.3).

4.8 - NAVIGATION DATA DISPLAY

The Navigation Data Display can be selected by following the procedure:

Selection of NAVIGATION DATA page

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Navigation Data Page (N. 3).
6. When you have highlighted that option, press (ENTER): the Navigation Data Page will appear on the screen.
   See the following figure.



5. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

4.9 - MAN OVERBOARD FUNCTION (M.O.B)

The Man Overboard function is an important function should someone or something fall overboard.
To activate this function you have to be in split screen or full screen mode and it is receiving a valid fix, follow this procedure:

Selection of M.O.B. function

1. Press (MENU) for about 2 seconds: the symbol that identifies the MOB is placed at ship's coordinates and a screen window that

contains the MOB coordinates is open.
To activate navigation to MOB, you must place the Target on the position identified by the MOB symbol (see par. 4.6) and then activate the navigation to Target (see par. 6.2).

To delete the MOB symbol follow the procedure:

Selection of DELETE M.O.B. function

1. Press (MENU) for about 2 seconds: the symbol that identifies the MOB is deleted from the screen.

If navigation to MOB is activated, the MOB is deleted but the Target remains (so the navigation remains activated to Target). To delete the Target and to disable the navigation see par. 4.6.

4.10 - SIMULATE MODE

For practicing operation, it is possible to simulate navigation without receiving a fix.
To set this mode of operation follow the procedure:

Selection of SIMULATE MODE

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

6. When you have highlighted that menu, press ENTER to select the Fix and Compass Function Menu.
7. Use up or down arrow keys to highlight the Simulate Mode option (N. 10).
8. Press ENTER to select the Simulate Mode On or Off (*).
9. Press ENTER to confirm. After pressing the 'ENTER' key the simulated ship's position is placed on the Cross-Hair position. If in Split screen in the top line of the text area the message "SIMULATION" is shown instead of "CHART DATUM"; if in Full screen in the top right corner of the screen the message "SIMULAT." is shown.
10. Press MENU to return to previous menu or CLEAR to exit to charts.

To exit from Simulate Mode follow the above procedure setting the Simulate Mode to Off at the 8 step (*).

chapter 5
USER POINTS

5.1 - INTRODUCTION

A user point is a place on the chart stored by its coordinates and displayed on the screen with a reference symbol.
The chart plotter gives two types of user points, Mark and Event points.

The Marks are reference points, that can be set either in Charting or in Navigation mode, related to Cross-Hair position.

Events are markers directly related to the ship's position. It is simply a way of marking where the boat is or was.

5.2 - PLACING MARKS ON THE CHART

To place a Mark on the chart the Cross-Hair must be followed the procedure:

Selection of INSERT MARK function

1. Press (MENU) until "MARKS" appears in the status window.
2. Press (ENTER) to place the Mark on the screen. Three types of Marks are available. Press the (ENTER) key to select Mark style.
3. Press (MENU) to select another function.

The user may also create Marks at precise points of latitude and longitude:

Selection of MARK AT L/L COORDINATES function

1. Press (MENU) until "MARKS" appears in the status window.
2. Press (ENTER) for more than one second and then release : the coordinates of the point identified by the Cross-Hair will appear on the screen. The Latitude and the Longitude of the point is shown on the screen, and the user can change it by moving the cursor with the left and right arrows and setting the numerical values with the up or down arrows.
3. Press (ENTER) to confirm the insert value or (CLEAR) to abort operation.
4. If the 'ENTER' key is pressed, it is possible to insert a name on the Mark. The left and right arrows move the cursor, and with the up and down arrows you can insert the desired character (the label may have 8 characters to max).
5. Press (ENTER) to confirm the name. It is possible to select the desired Mark type by pressing the (ENTER) key.
6. Press (MENU) to select another function.

Note

The previous procedure allows the user to store a Mark on coordinates and also to name that Mark.

It is not possible to set another Mark over an existing Mark (see par. 5.7).

5.3 - PLACING EVENTS ON THE CHART

As previously pointed out, a Mark is simply a reference point on the map. It can be set in either Charting or Navigation mode.
An Event, is a marker directly related to the ship's position. It is simply a way of marking where the boat is or was.

To create Events, in either modes, simply follow the procedure:

Selection of INSERT EVENT function

1. Press (MENU) until "EVENT" appears in the status window.
2. Press (ENTER) to place the Event. Instantly, a symbol will appear on the screen, marking the boat's position.
3. Press (MENU) to select another function.

It is possible to name the Event following this procedure:

Selection of INSERT LABEL ON EVENT function

1. Press (MENU) until "EVENT" appears in the status window.
2. Press (ENTER) for more than one second and then release it to name the Event. The left and right arrows move the cursor, and with the up and down arrows you can insert the desired character (the label may have 8 characters to max).
3. Press (ENTER) to confirm the name.
4. Press (MENU) to select another function.

5.4 - DELETING MARKS/EVENTS OFF THE CHART

A single Mark can be deleted following the procedure:

Selection of DELETE A SINGLE MARK function

1. Press (MENU) until "MARKS" appears in the status window.
2. Press (CLEAR) to delete the Mark indicated by the Cross-Hair.

To erase an Event the procedure is quite similar:

Selection of DELETE A SINGLE EVENT function

1. Press (MENU) until "EVENT" appears in the status window.
2. Press (CLEAR) to delete the Event indicated by the Cross-Hair.

If all the Marks or Events placed on the electronic chart have to be cancelled:

Selection of DELETING ALL MARKS/EVENTS function

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

User Points Menu will appear.

7. Use up or down arrow keys to highlight the deleting of desired user points option (to delete all the Mark ⧖; to delete all the Mark ⋈; to delete all the Mark ✳; to delete all the Event ⅄).
8. When you have highlighted that option, press (ENTER) to select the desired deletion.
9. Press the (ENTER) key again to confirm the choice. On the screen the message "Please waiting ..." is shown until the deleting is ended.
10. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

5.5 - INFORMATION ABOUT AN USER POINT

To obtain the coordinates of a Mark or Event, simply place the Cross-Hair on the desired Mark or Event. On the screen the user point identifier and its coordinates are displayed.

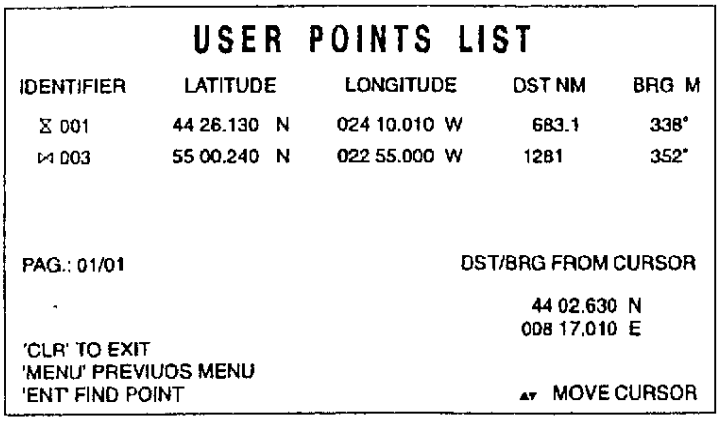
5.6 - USER POINT LIST PAGE

The User Points List Page gives information about all stored user points: latitude and longitude, distance and bearing from the cursor (if the system is in Charting mode) or the ship's position (if the system is in Navigation mode, in Navigation Area Amplifier or in Auto Zoom on Target) are displayed for each point. In the bottom right side of the screen the coordinates of the cursor (if in Charting) or the coordinates of the ship (if in Navigation, in Navigation Area Amplifier or in Auto Zoom on Target) are shown.

To display the User Points List follow the procedure:

Selection of USER POINTS LIST PAGE display

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the User Points List page (N. 4).
4. When you have highlighted that option, press (ENTER): the User Points List Page will appear.



5. Press the up and down arrow key to select the desired user point in the list, and then press the (ENTER) key if you want to display the selected user point. After pressing the 'ENTER' key, the chart plotter exits from the User Points List Page and the chart redraws, shown the selected point with the Cross-Hair placed on it: a window containing the coordinates and the identifier of the user point is opened on the screen. If the Page contains more than 16 user points, the list follows in the next page(s): press the (ZOOM OUT) key to display the next page(s) and the (ZOOM IN) key to return to the previous page(s).

6. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

5.7 - MOVING USER POINT

The chart plotter allows the user to move on the screen already existed Marks to place them in new positions.
To move user point follow the procedure:

Selection of MOVING MARKS

1. Press (MENU) until "MARKS" appears in the status window.
2. Placing the Cross-Hair on an existing Mark and pressing the (ENTER) key, it is possible to move Mark on the screen, with its identifier, to place in the desired position. After pressing the 'ENTER' key, the Mark indicated by the Cross-Hair changes its icon: moving the Cross-Hair by the arrow keys, on the screen a dot line that connects the Mark with the new position is shown on the screen.
3. When the desired position is obtained, press the (ENTER) key again: the Mark is placed in the new position.

Note

If the Mark has been placed, pressing the 'ENTER' key (as indicated in 2.) it is possible to change the Mark icon without changing its position. To move a Mark , move the Cross-Hair and replace it on the Mark : pressing 'ENTER' makes it possible to modify the position.

To move a Mark on the screen changing the identifier follow the procedure:

Selection of MOVING MARKS CHANGING IDENTIFIER

1. Press (MENU) until "MARKS" appears in the status window.
2. Placing the Cross-Hair on an existing Mark and pressing the (ENTER) key for more than 1 second, it is possible to modify the position and the identifier of the Mark .
3. On the screen a window showing the Mark coordinates is displayed: using the left or right arrow keys it is possible to move the cursor to the left or to the right, and by using the up or down arrow key it is possible to change the coordinates displayed in reverse video.

Press the (ENTER) key to confirm or the (CLEAR) key to abort operation.

4. Again pressing the 'ENTER' key, a window containing the Mark identifier is shown: using the left or right arrow keys it is possible to move the cursor the left or to the right, and using the up or down arrow key it is possible to modify the character displayed in reverse video. Press the (ENTER) key to confirm or the (CLEAR) key to abort operation.
5. Press the (MENU) key to select another function.

chapter 6
AUTOPILOT MODE

6.1 - INTRODUCTION

The chart plotter can be connected to an autopilot through a standard interface NMEA-0180, NMEA-0180/CDX or NMEA-0183.
The autopilot function can only be used when the chart plotter is correctly receiving the ship's position from the positioning instrument, the Navigation mode is selected and the Target Point is properly inserted.
Once the Target Point is set (see par. 4.6) and the autopilot function is activated (see par. 6.2), the chart plotter computes the course between the current position and the Target to be sent to the Autopilot, and starts to transmit the Cross Track Error to the Autopilot.
After arriving at a certain distance (which can be selected among 0.1, 0.25, 0.5, 1, 2, 3, 5 nm/km/sm) from the Target Point, the chart plotter gives an audible alarm.

Note

If the Target destination has changed, a new course from which the Cross Track Error is calculated, is set.

6.2 - TURNING THE AUTOPILOT ON/OFF

To enable the Autopilot function follow the procedure:

Selection of AUTOPILOT ON FUNCTION

1. Press (MENU) until "GOTO" appears in the status window.

2. Press (ENTER). There are two possible cases:

   2.1. if the Target is placed on a single Waypoint, when you press the 'ENTER' key , the screen message is "ACTIVE NAVIGATION, 'ENTER' TO CONFIRM" . Pressing the (ENTER) key again the autopilot will activate.

   2.2. if the Target was placed on a Waypoint in a route, when you press the 'ENTER' key it is possible to choice the route direction: the (ZOOM IN) key activates to sail the Waypoints forward, the (ZOOM OUT) key activates to sail the Waypoints in reverse, the (ENTER) key enables stop at Target.

3. Press (MENU) to select another function.

The autopilot on is shown on the screen with a dotted line connecting the Target with the ship.

To disable the autopilot follow this procedure:

Selection of AUTOPILOT OFF FUNCTION

1. Press (MENU) until "GOTO" appears in the status window.
2. Press (CLEAR) to disable autopilot.
3. Press (ENTER) to confirm "disable of autopilot": the autopilot is turned Off and the dotted line is deleted from the screen.
4. Press (MENU) to select another function.

Note

If the ship's position is not correctly received or if the Target point is disabled, the Autopilot function is automatically turned Off.

6.3 - SETTING AN AUTOPILOT ALARM RANGE

To select the Autopilot alarm range, (0.1, 0.25, 0.5, 1, 2, 3, 5 nm/km/sm - releted to the unit selected, see par. 2.7.2) press the following keys:

Selection of AUTOPILOT ALARM RANGE

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press (ENTER): the Auxiliary Functions Menu will appear.
5. Use up or down arrow keys to highlight the Autopilot Menu (N. 6).
6. When you have highlighted that menu, press (ENTER): the Autopilot Menu will appear.
7. Use up or down arrow keys to highlight the autopilot arrival range option (N. 2).
8. When you have highlighted that option, press (ENTER) to select the desired range. Every time the 'ENTER' key is pressed, one of the possible ranges is selected.
9. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

6.4 - AUTOPILOT INTERFACE SELECTION

The chart plotter can be connected to an autopilot throught a standard interface NMEA-0180, NMEA-0180/CDX or NMEA-0183.
To select the desired interface follow this procedure:

Selection of AUTOPILOT INTERFACE

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press (ENTER): the Auxiliary Functions Menu will appear.
5. Use up or down arrow keys to highlight the Autopilot Menu (N. 6).
6. When you have highlighted that menu, press (ENTER): the Autopilot Menu will appear.
7. Use up or down arrow keys to highlight the autopilot output format option (N. 1).
8. When you have highlighted that option, press (ENTER) to select the desired output format. Every time the 'ENTER' key is pressed, one of the three possible output format is selected.
9. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

chapter 7
USER DATA MENU

7.1 - USER DATA REPORT

Selecting this menu all used marks, events, routes and tracks (User Data Report) are displayed on the screen:

USER DATA REPORT

MARK ⧖ : 001	EVENT: 000	TOTAL : 010
MARK ✳ : 000	WAYP : 005	REMAIN : 490
MARK ⋈ : 004	ROUTES: 001	

TRACKING MEMORY FREE: 100%

7.2 - USER CARTRIDGE

The optional user cartridge is used by the chart plotter to save user data: it is a convenient medium for storing and retrieving your information.
The user cartridge may be inserted in one of the two available slots.
Before a new user cartridge can be used, you must format it, by selecting the "Format User Cartridge" option provided by the chart plotter.
This function initializes the user cartridge and prepares it for storing information.
Remember that if an user cartridge is not blank, formatting it will destroy 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, this operation means all old data memorized on the cartridge will be lost.

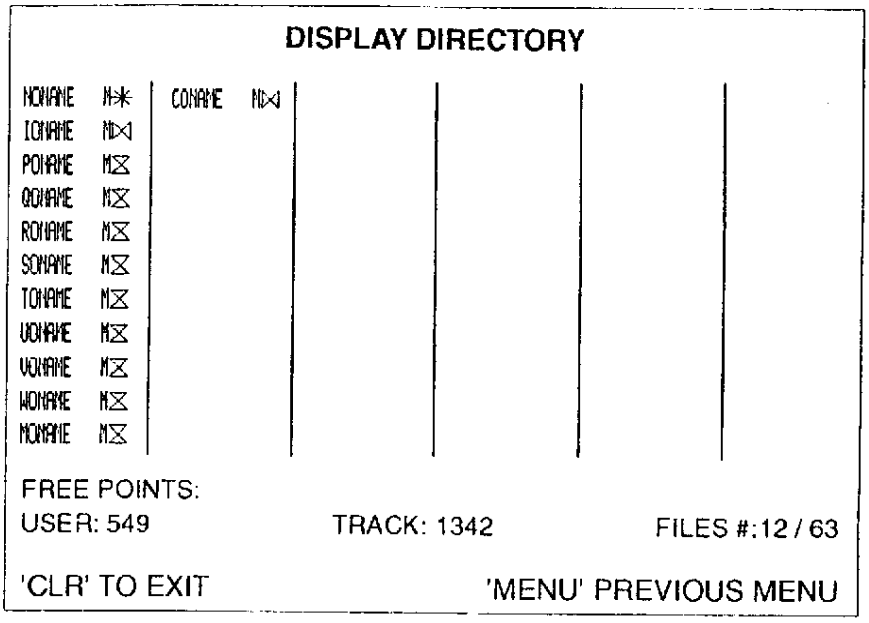
7.2.1) Display User Cartridge directory

Data stored on user cartridge are 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. 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 following commands (after inserting the user cartridge into the slot):

Selection of DISPLAY DIRECTORY

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press (ENTER): the Auxiliary Functions Menu will appear.
5. Use up or down arrow keys to highlight the User Data-Group Selection Menu (N. 7).
6. When you have highlighted that menu, press (ENTER): the User Data-Group Selection Menu will appear.
7. Use up or down arrow keys to highlight the display directory option (N.1).
8. When you have highlighted that option, press (ENTER) to select the directory display. After pressing the 'ENTER' key, the di-

rectory will appear on the screen.



By pressing the ZOOM IN and ZOOM OUT keys it is possible to select the previous or next page (if existing).

9. Press MENU to return to previous menu or CLEAR to exit to charts.

63 files are available, which are grouped on screen organized in six columns each of 11 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 extensions are M⧖, M⋈, M✳ for the three types of Marks, EVT for Events, RTE for routes and TRK for tracks.

If there is no user cartridge present in the slot, the warning message "USER CARTRIDGE NOT PRESENT" will appear.

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

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press (ENTER): the Auxiliary Functions Menu will appear.
5. Use up or down arrow keys to highlight the User Data-Group Selection Menu (N. 7).
6. When you have highlighted that menu, press (ENTER): the User Data-Group Selection Menu will appear.
7. Use up or down arrow keys to highlight the Save File Menu (N.2).
8. When you have highlighted that menu, press (ENTER) to select the Save File Menu (N. 2).
9. Use up or down arrow keys to highlight the type of data to save.
10. Press (ENTER) to select the type of data to save on user cartridge.
11. Press (ENTER) again to confirm the type of data to save. After selecting the group, 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 arrows key to change the

character highlighted and use the left and right arrow keys to advance cursor to previous or next letter. Once finished, press (ENTER) to confirm: on the screen will be displayed the message "SAVING DATA ..." followed by the number of saved points (For example, saving a file of Events, displayed is the number of stored Events points).

12. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

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 a desired group of user points, for example a file of routes. To access this function:

Selection of LOAD FILE

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

5. Use up or down arrow keys to highlight the User Data-Group Selection Menu (N. 7).
6. When you have highlighted that menu, press (ENTER): the User Data-Group Selection Menu will appear.
7. Use up or down arrow keys to highlight the Load File Menu (N. 3).
8. When you have highlighted that menu, press (ENTER) to select the Load File Menu.
9. Use up or down arrow keys to highlight the type of data to load.
10. Press (ENTER) to select the type of data to load from user cartridge. After pressing the 'ENTER' key, the first filename of this group is shown on the screen. When you have found the desired filename, press (ENTER) to confirm: on the screen will be displayed the message "LOADING FILE: <file name>" and soon after "LOADING DATA ..." followed by the number of stored points (For example, loading a file of Events, displayed are the number of Events points present into the file).
11. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

Note

Loading a file of Marks of a type different from the three available types, the chart plotter shows this file as a file of Mark of type 1. Loading a file of user points of unknown type, the plotter displays this file with extension ".???".

7.2.4) Delete a file

Just as you may need to save 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

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press (ENTER): the Auxiliary Functions Menu will appear.
5. Use up or down arrow keys to highlight the User Data-Group Selection Menu (N. 7).
6. When you have highlighted that menu, press (ENTER): the User Data-Group Selection Menu will appear.
7. Use up or down arrow keys to highlight the Delete File Menu (N. 4).
8. When you have highlighted that menu, press (ENTER) to select the Delete File Menu.
9. Use up or down arrow keys to highlight the type of data to delete.
10. Press (ENTER) to select the type of data to delete from user cartridge. After pressing the 'ENTER' key, the first filename of this group is shown on the screen. When you have found the desired filename, press (ENTER) to confirm: on the screen will be displayed the message "ARE YOU SURE ?", press the (ENTER) key again or another key to abort the deletion. After pressing the 'ENTER' key, the message "DELETING FILE: <file name>" is shown on the screen.
11. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

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

Selection of FORMAT USER CARTRIDGE

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press (ENTER): the Auxiliary Functions Menu will appear.
5. Use up or down arrow keys to highlight the User Data-Group Selection Menu (N. 7).
6. When you have highlighted that menu, press (ENTER): the User Data-Group Selection Menu will appear.
7. Use up or down arrow keys to highlight the Format User Cartridge option (N. 5).
8. When you have highlighted that option, press (ENTER) to select the format operation.
9. Press (ENTER) again to confirm the formatting (any other key aborts the 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: the message "USER CARTRIDGE FORMATTED" is shown.
10. Press any key to return to previous menu.

Be sure to label it; the label will remind you that you have formatted the

user cartridge, and will help you identify its contents.
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.

7.2.6) Change User Cartridge

To change the user cartridge follow this procedure:

Selection of CHANGE USER CARTRIDGE

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press (ENTER): the Auxiliary Functions Menu will appear.
5. Use up or down arrow keys to highlight the User Data-Group Selection Menu (N. 7).
6. When you have highlighted that menu, press (ENTER): the User Data-Group Selection Menu will appear.
7. Use up or down arrow keys to highlight the Change Cartridge option (N. 6).
8. When you have highlighted that option, press (ENTER) to select the change operation. Insert the desired user cartridge and then press any key when ready to return to previous menu.

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 file (See par. 7.2.4) and retry, or use another user cartridge.

CARTRIDGE NOT FORMATTED
The inserted user cartridge 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 file (see par. 7.1.4) 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 sounding, the (CLEAR) key resets it. The reason for the alarm is displayed on the screen (See par. 8.3).

8.2 - FIX ALARM SETTING

The user can enable or disable the fix alarm, in case of no fix from GPS, and the auto alarm clear.
To select these options, press the following keys:

Selection of AUDIBLE ALARM

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

7. Use up or down arrow keys to highlight the Fix Alarm Setting Menu (N. 5).
8. When you have highlighted that menu, press (ENTER): the Fix Alarm Setting Menu will appear.
9. Use up or down arrow keys to highlight the audible alarm option (N. 1).
10. When you have highlighted that option, press (ENTER) to set the audible alarm on or off. Every time the 'ENTER' key is pressed, the audible alarm is enabled or disabled.
11. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

Selection of AUTO ALARM CLEAR

1. Press (MENU) until "MENU" appears in the status window.
2. Press (ENTER) to select the Main Menu.
3. Use up or down arrow keys to highlight the Auxiliary Functions Menu (N. 2).
4. When you have highlighted that menu, press (ENTER): the Auxiliary Functions Menu will appear.
5. Use up or down arrow keys to highlight the Fix and Compass Functions Menu (N. 4).
6. When you have highlighted that menu, press (ENTER): the Fix and Compass Functions Menu will appear.
7. Use up or down arrow keys to highlight the Fix Alarm Setting Menu (N. 5).
8. When you have highlighted that menu, press (ENTER): the Fix Alarm Setting Menu will appear.
9. Use up or down arrow keys to highlight the auto alarm clear option (N. 2).

10. When you have highlighted that option, press (ENTER) to set the auto alarm clear on or off. Every time the 'ENTER' key is pressed, the auto alarm clear is enabled or disabled.
11. Press (MENU) to return to previous menu or (CLEAR) to exit to charts.

8.3 - ALARM MESSAGES

There are five different alarm messages.
Three of them are related to the receiving 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 do 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.

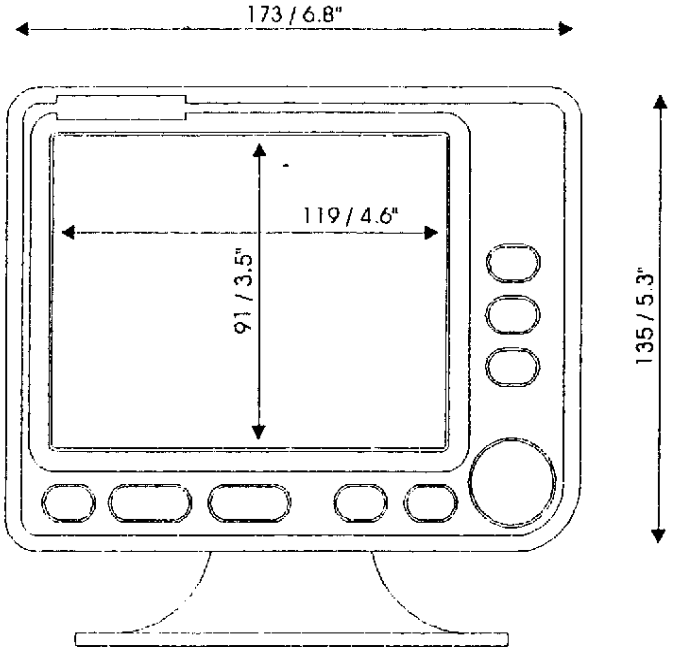
The fifth alarm message is the following:

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

Appendix A
TECHNICAL SPECIFICATIONS

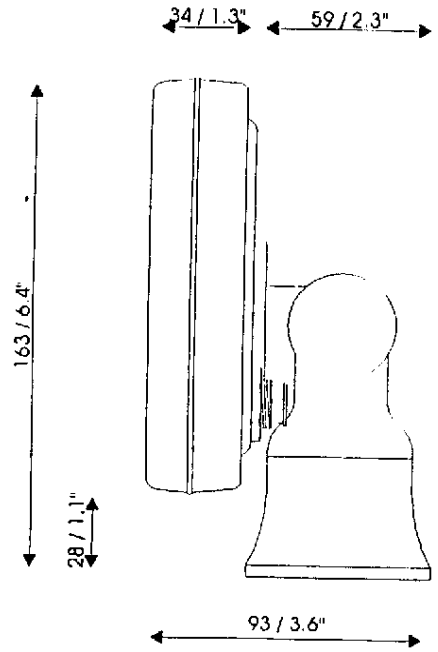
Power consumption	7 Watt, 10 - 35 Volt dc
Navigation interface	From Loran, Satnav, GPS, Decca, omega via NMEA 0182/0183 and others
Autopilot interface	NMEA-0180 NMEA-0180/CDX NMEA-0183 (#)
Display	LCD 7"
Display resolution	320 x 240 pixels
Cartography	C-MAP NT G-CARD
Operational temperature range	-10/+50 degrees Celsius
Memory	Non volatile with battery back-up
Keyboard	Silicon rubber backlighted
Weight	560 gr.

Dimensions: (mm/inch)



Note

#) In accordance with Standard NMEA 0183 v. 2.00.


34 / 1.3"
59 / 2.3"
163 / 6.4"
28 / 1.1"
93 / 3.6"

Appendix B
SOFTWARE SPECIFICATIONS

USER POINTS

GROUPS(*):		1
RECORDABLE INDIVIDUAL POINTS(**):Waypoints + Marks +Events		500
ROUTES:	Routes	10
	Waypoints per Route	500
	Target	1
TRACKING:	Track	1
	Points per Track	500
	Steps by Distance	1, .5, .1, .05 (NM)
	Steps by Time	5, 3, 1 (min)
		5, 10, 30 (sec)
MARK/EVENT:	User point alphanumeric identifier	
	Type of Marks	3
	Type of Events	1

FUNCTIONS

CARTOGRAPHIC FUNCTIONS:
- Worldwide Chart Coverage
- Lat/Lon Grid
- Depth unit selection (MT, FT, FM)
- Natural Features, Rivers & Lakes, Cultural Features, Landmarks, Water turbolence, Depth Areas, Spot Soundings, Bottom type, Ports & Services, Attention Areas, Tracks & Routes, Lights, Buoys & Beacons, Signals, Cartographic Objects, Names, Compass, Chart Generation, New objects, Info Level.
- WGS84 Coordinates System
- Full Screen Cartography
- Thousand Handling Coordinates

FIX FUNCTIONS:
- Fix Correction
- Display Headings True or Magnetic
- Keypad Entry to Modify Fix Correction

	. COG Vector . Magnetic variation user selections
REPORT FUNCTIONS:	. Route Data Report with selectable units, fuel consumption and estimate time arrival . Navigation Data Display (LAT, LON, COG, SOG, BRG, XTE, TTG) . User points list page . GPS Data display
SPECIAL FUNCTIONS:	. External waypoint . M.O.B. . Simulate mode . Automatic info on Nav aids and User points
AUXILIARY MEMORY:	. User cartridge 16K, 32K, 64K (63 files max)

INTERFACE

I/O SUPPORT:	. Two serial in/out port . Autopilot output
INPUT FORMATS:	. NMEA-0183 (#) [Strings: BWC, GLL, SBK, SCY, SNU, XTE, GXP, GDP, GOP, GLP, VTG, RMA, RMC, GGA, PKMLC, PKMAP] . NMEA-0182/TAIYO . KODEN 717 . KODEN 757 . FURUNO CIF . TRIMBLE-200 . DECCA MK3 . IIMORROW AVENGER . MICROLOGIC VOYAGER . NAVSTAR 2000D . TEXAS TI9900 I/II
SPECIAL NAVIGATORS:	. MICROLOGIC ML 8000T . AP NAV-MK4 . GPS NMEA-0183 . GPS ROCKWELL
OUTPUT FORMATS:	. NMEA-0180 . NMEA-0180/CDX

- NMEA-0183 (#) (***) GLL, VTG, BWC (void)
  with Autopilot On: APB, XTE, GLL, VTG, WCV, APA, BWC, BOD, RMC, RMA

Note

(*) Groups: number of memory pages.
(**) For each page. The total number of points is this number times the number of pages.
(***) These sentences are continuosly sent only if a fix is received.
(#) In accordance with Standard NMEA 0183 v. 2.00.

Appendix C
OUTPUT NMEA-0183 SENTENCES

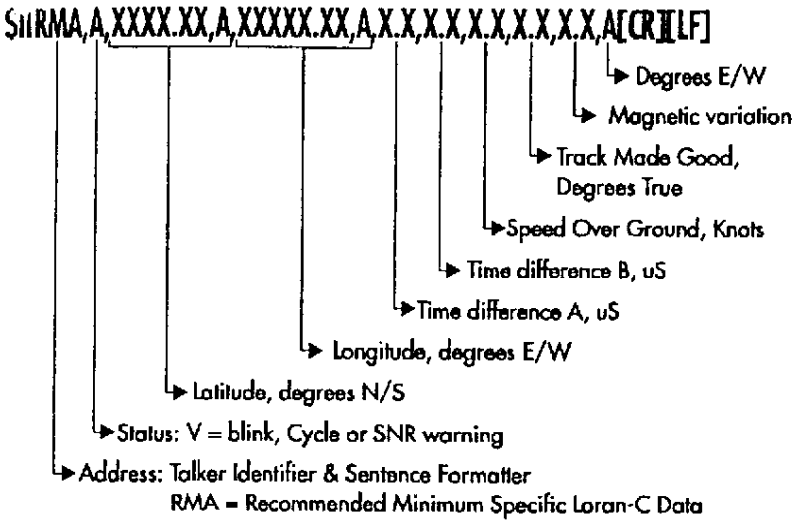
Common information:
$ = Start of Sentence
II = Integrated Instrument
[CR][LF] = Sentence Terminator

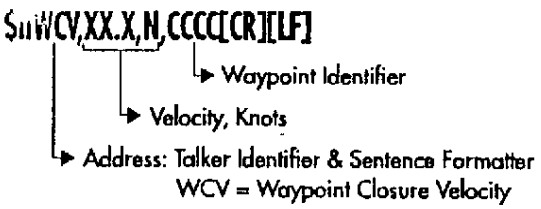
$IIAPA,A,A,X.XX,L,N,A,A,XXX.,M,CCCC[CR][LF]

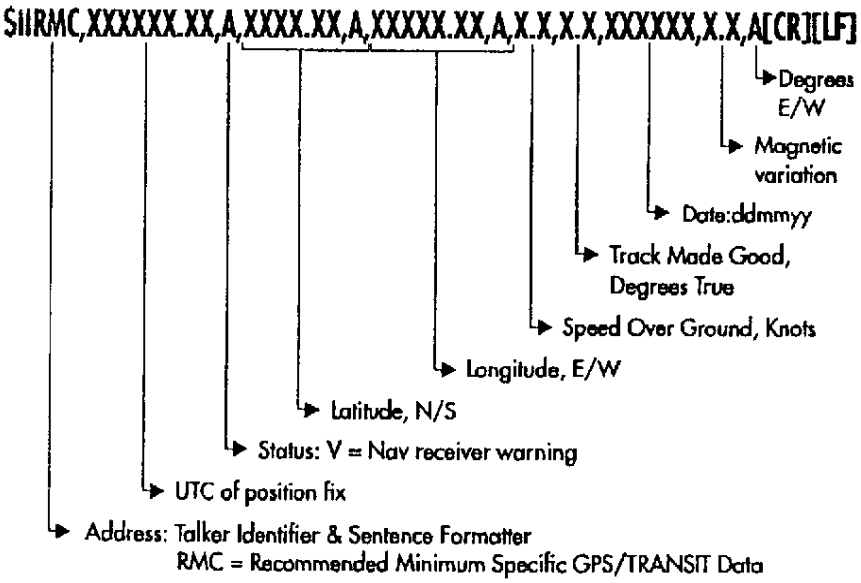
- Destination Waypoint Identifier
- Bearing Destination Waypoint from Origin Waypoint, Magnetic
- Arrival Perpendicular
- Arrival Circle
- Units (N. Mi.)
- Sense (L or R)
- Cross track error
- Cycle lock
- OR'ed Blink and SNR
- Address: Talker Identifier & Sentence Formatter
  APA = Autopilot Sentence "A"

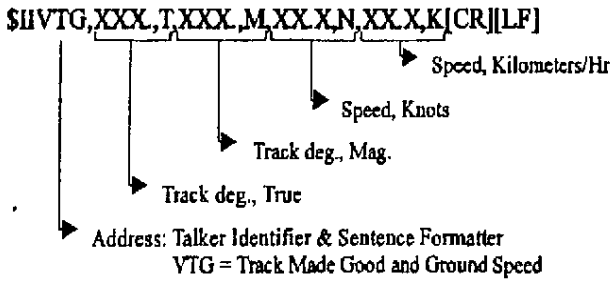
$IIXTE,A,A,X.XX,L,N[CR][LF]

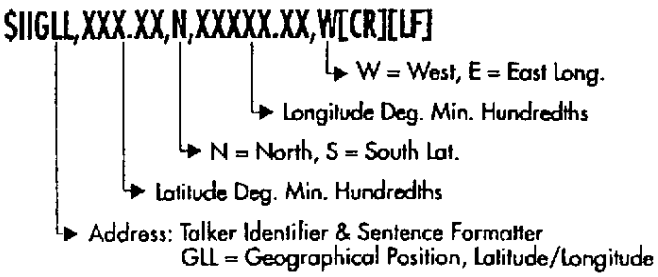
- Units (N. Mi.)
- Steer Left or Right (L = Left, R = Right)
- Cross Track Error
- Cycle Lock (A = valid, V = invalid)
- OR'ed value Blink and SNR (A = valid, V = invalid)
- Address: Talker Identifier & Sentence Formatter
  XTE = Cross Track Error

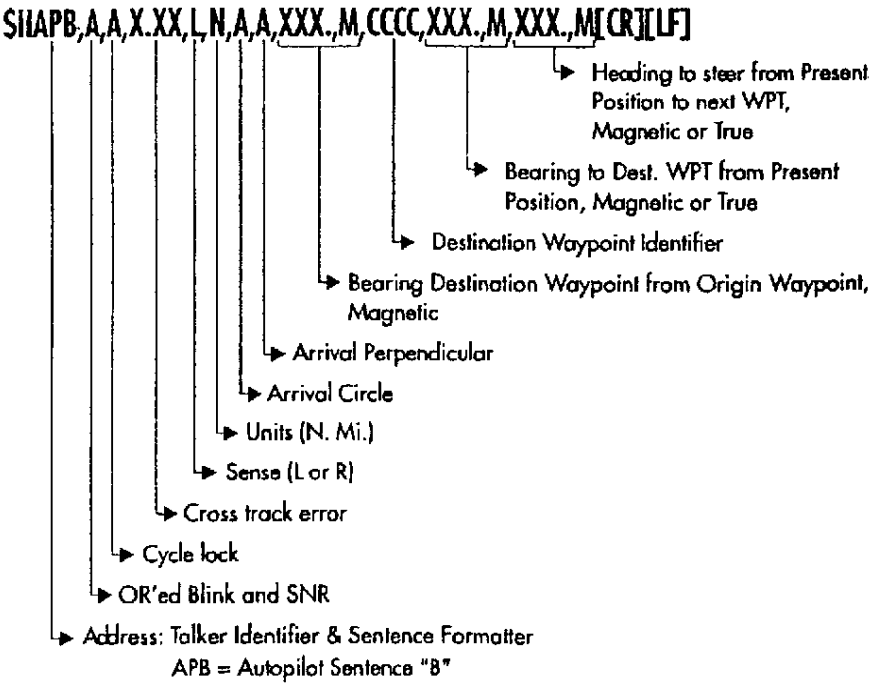

$IIRMA,A,XXXX.XX,A,XXXXX.XX,A,X.X,X.X,X.X,X.X,X.X,X.X,A[CR][LF]
Degrees E/W
Magnetic variation
Track Made Good, Degrees True
Speed Over Ground, Knots
Time difference B, uS
Time difference A, uS
Longitude, degrees E/W
Latitude, degrees N/S
Status: V = blink, Cycle or SNR warning
Address: Talker Identifier & Sentence Formatter
RMA = Recommended Minimum Specific Loran-C Data

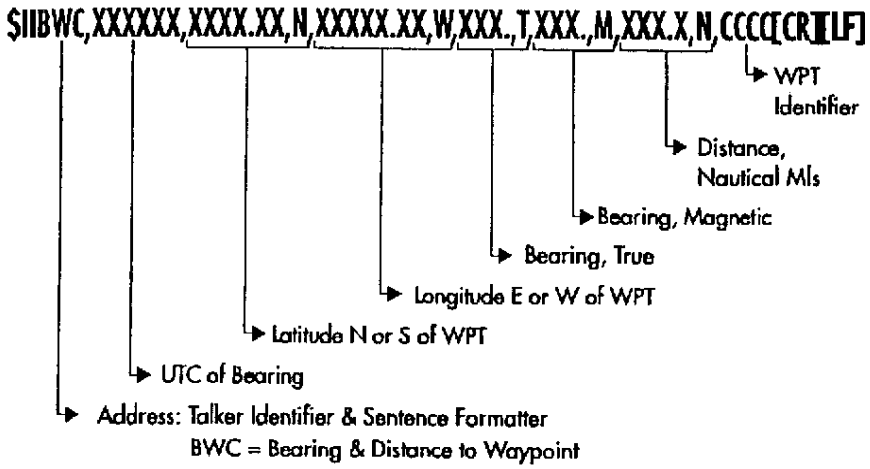

$IIWCV,XX.X,N,CCCC[CR][LF]
Waypoint Identifier
Velocity, Knots
Address: Talker Identifier & Sentence Formatter
WCV = Waypoint Closure Velocity

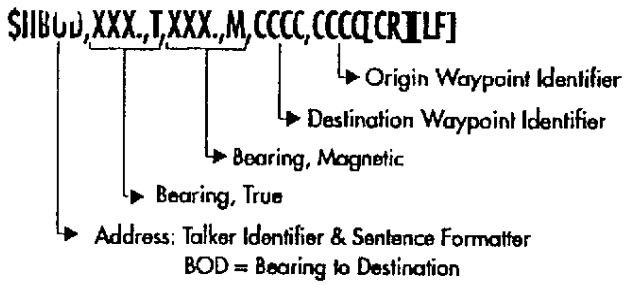

$IIRMC,XXXXXX.XX,A,XXXX.XX,A,XXXXX.XX,A,X.X,X.X,XXXXXX,X.X,A[CR][LF]
Degrees E/W
Magnetic variation
Date:ddmmyy
Track Made Good, Degrees True
Speed Over Ground, Knots
Longitude, E/W
Latitude, N/S
Status: V = Nav receiver warning
UTC of position fix
Address: Talker Identifier & Sentence Formatter
RMC = Recommended Minimum Specific GPS/TRANSIT Data


$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


$IIGLL,XXX.XX,N,XXXXX.XX,W[CR][LF]
W = West, E = East Long.
Longitude Deg. Min. Hundredths
N = North, S = South Lat.
Latitude Deg. Min. Hundredths
Address: Talker Identifier & Sentence Formatter
GLL = Geographical Position, Latitude/Longitude


$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 Position, Magnetic or True
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"


$IIBWC,XXXXXX,XXXX.XX,N,XXXXX.XX,W,XXX.,T,XXX.,M,XXX.X,N,CCCC[CR][LF]
WPT Identifier
Distance, Nautical Mls
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


$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

Appendix D
INPUT NMEA-0183 SENTENCES

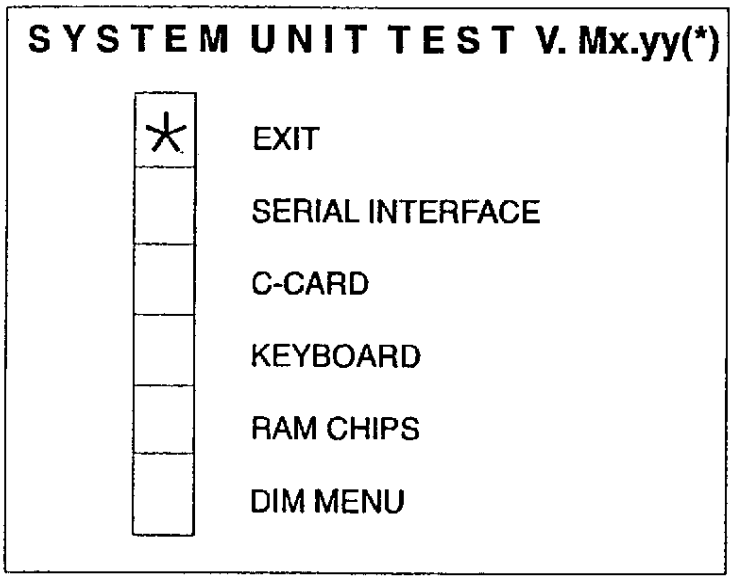
Components of accepted sentences:

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	:	Property of King Marine
PKMLC	:	Property 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 E
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 extended auto-test should help determine the problem.

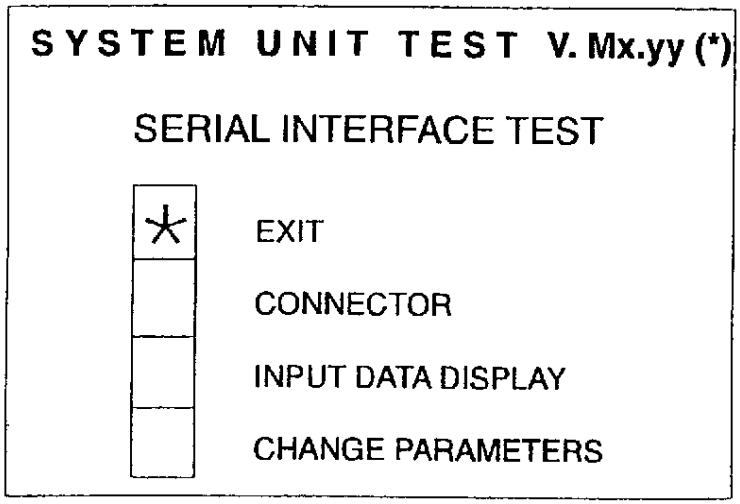
Make sure the chart plotter is turned off. While pressing and holding any other key, press the POWER key to turn the chart plotter on until you hear two beeps. A new menu will appear on the display:



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 ZOOM IN and ZOOM OUT keys to move the cursor up and down and the ENTER key to make the selection.

E.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:



E.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.

E.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-0182 instead of NMEA-0183. 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.

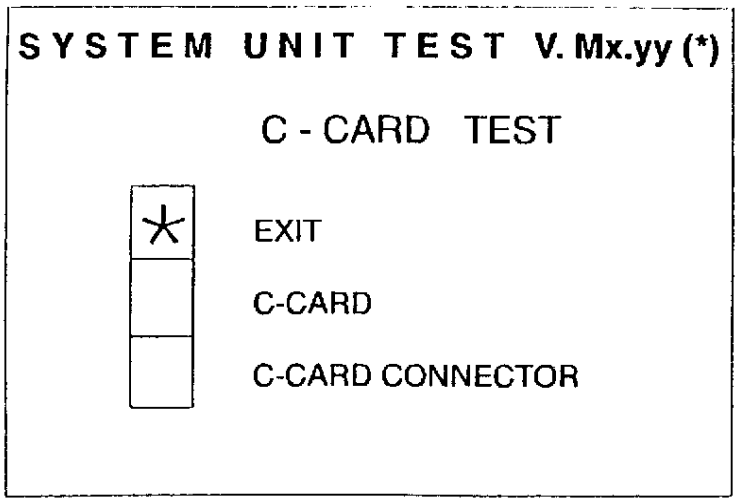
Use the MENU key to stop (or continue after pause) data displaying, the ENTER key to show data in hex or ASCII mode (normal or small) and the CLEAR key to exit from "Input Data Display" page.

E.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.

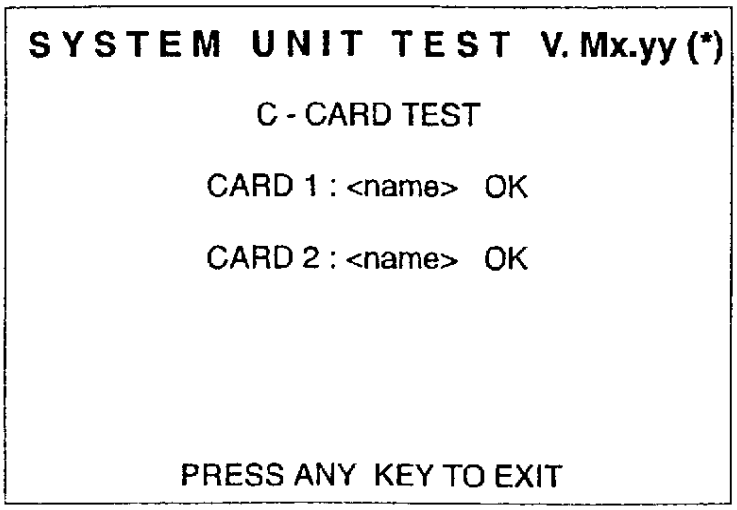
E.2 - C-CARD TEST

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:



E.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.

E.2.2) Connector Test

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

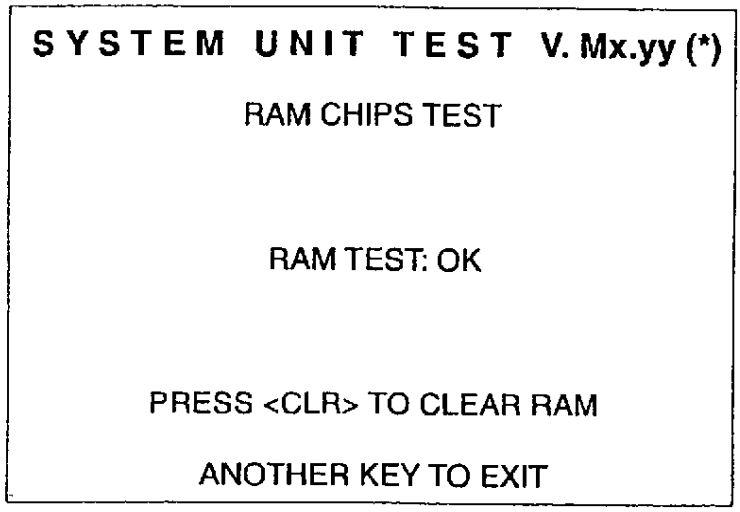
E.3 - KEYBOARD TEST

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.

E.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

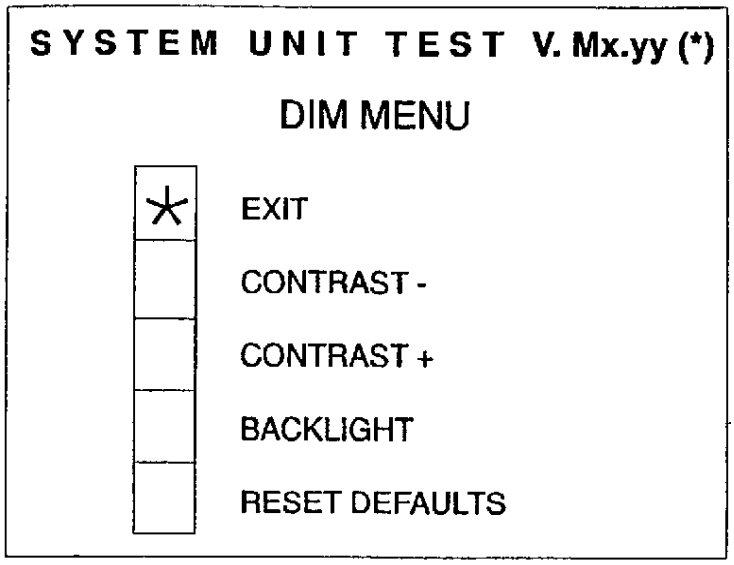
and destinations. It will also return all selections (Input Data Format, Autopilot selection, etc.) to original default values.
To clear system RAM, select the "RAM Chip Test" option from the "System Unit Test" menu. The chart plotter will run an automatic test; on the screen the following menu will appear:



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

E.5 - DIM TEST

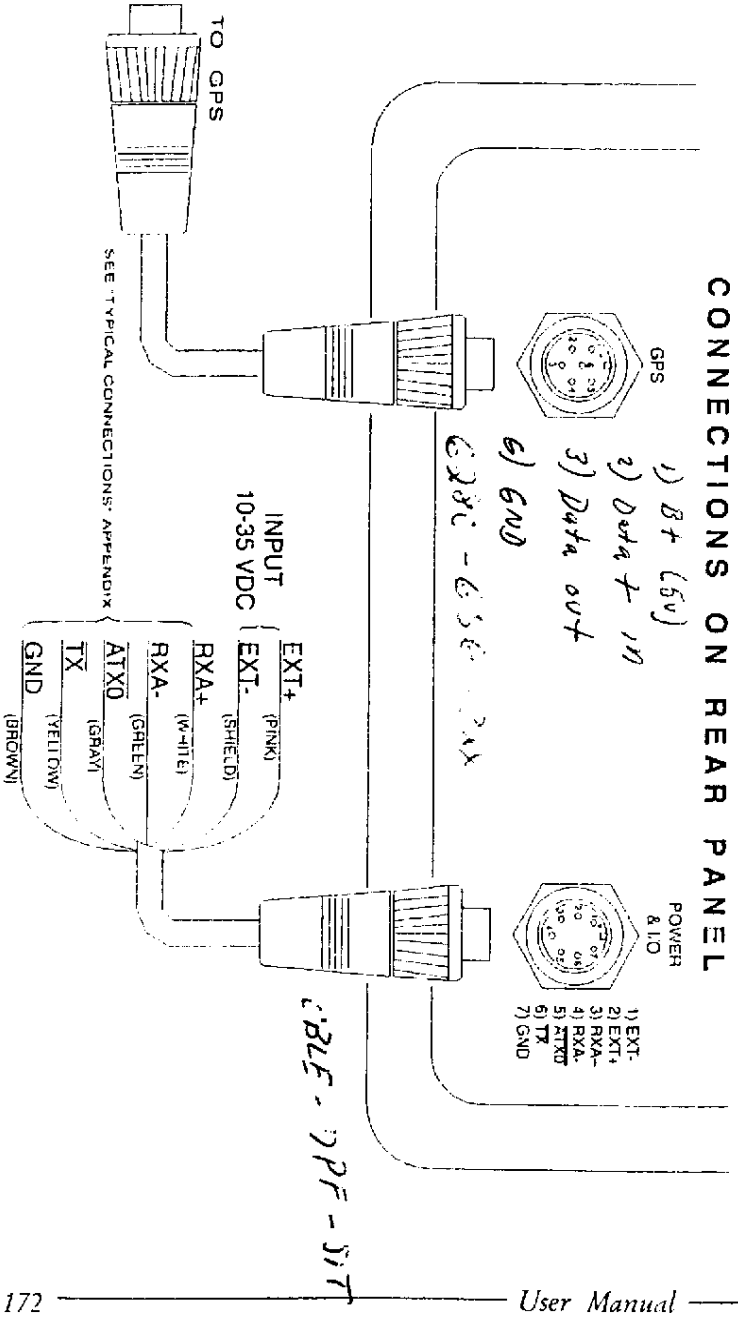
When you select Dim menu, the following menu will appear:



Note (*)

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

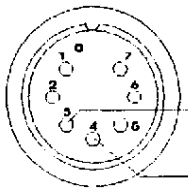
Appendix F
EXTERNAL WIRING



Appendix G
TYPICAL CONNECTIONS

POSITIONING DEVICE

I/O



7 PIN CONNECTOR
EXTERNAL VIEW

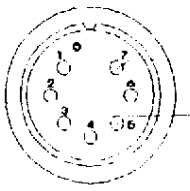
DEVICE TX SIGNAL (WHITE)

DEVICE TX RETURN (GREEN)

NOTE. POSITIONING DEVICE = GPS, LORAN, ECC.

AUTOPILOT

I/O



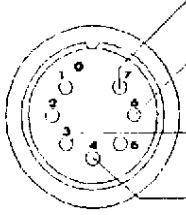
7 PIN CONNECTOR
EXTERNAL VIEW

DEVICE TX RETURN (BROWN)

DEVICE TX SIGNAL (GRAY)

BIDIRECTIONAL COMMUNICATION

I/O



7 PIN CONNECTOR
EXTERNAL VIEW

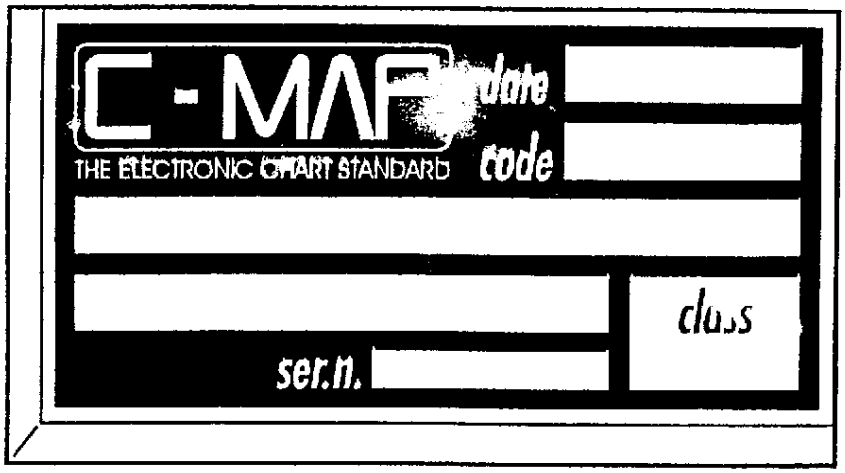
DEVICE RX RETURN (BROWN)

DEVICE RX SIGNAL (YELLOW)

DEVICE TX SIGNAL (WHITE)

DEVICE TX RETURN (GREEN)

Appendix H
NOTE ON DATA CARTRIDGE



where:

date : appears on the cartridge and in the plot catalog. It identifies the last date to which the cartridge has been updated.

code : the code number that indicates the geographic area covered. In the following two rows there is a descriptive title of this area.

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. The size identifies the price class of the cartridge.

ser.n.: indicates the cartridge serial number.

GLOSSARY

BEARING (BRG): *the horizontal direction of one terrestrial point from another, expressed as the angular distance from a reference direction, usually measured from 000° at the reference direction clockwise through 360°.*

CHARTING: *mode of operation in which all operation refer to the position of the Cross-Hair.*

COURSE OVER GROUND (COG): *iterm used to refer to the direction of the path over ground actually followed by a vessel.*

CROSS TRACK ERROR (XTE): *the distance from the vessel's present position to the closest point on a line between the origin and destination waypoints of the navigation leg being travelled.*

DEFAULT: *indicates a value when the user has not defined a particular value.*

DEPTH LINES: *lines that connect points at the same depth.*

DEVIATION: *the angle between the magnetic meridian and the axis of a compass card, expressed in degrees east or west to indicate direction in which the northern end of the compass card is offset from magnetic north.*

DIRECTORY: *list of file names on the user cartridge.*

EVENT: *user point refers to the ship's position.*

FILE: *collection of information (of the same type) stored on user cartridge.*

FORMATTING: *function to initializes user cartridge and prepares it for storing information. Remember that if an user cartridge is not blank, formatting it destroys any data already on the user cartridge.*

FULL SCREEN: *screen mode that displays maps at full screen.*

GEOMETRIC DILUITION OF PRECISION (GDOP): *a value representing all geometric factors that degrade the accuracy of a position fix which has been derived from a navigation system.*

GPS: *Global Positioning System.*

HEADING: *the horizontal direction in which a ship actually points or heads at any istant, expressed in angular units from a reference direction, usually from 000° at the reference direction clockwise through 360°.*

HORIZONTAL DILUTION OF PRECISION (HDOP): *similar to GDOP, expect elevetion factors are ignored.*

MAGNETIC BEARING: *bearing relative to magnetic north; compass bearing corrected for deviation.*

MAGNETIC HEADING: *heading relative to magnetic north.*

MARK: *user point refers to the Cross-Hair position.*

NAVIGATION: *mode of operation in which all operation refer to the ship's position.*

PAN: *function that automatically shifts screen to desired Cross-Hair position (if in Charting Mode) or ship's position location (if in navigation Mode).*

ROUTE: *sequence of waypoints connected by segments.*

SIGNAL TO NOISE RATIO (SNR): *the ratio of the magnitude of a signal to that of the noise (interference).*

SPEED OVER GROUND (SOG): *the speed of a vessel along the actual path of travel over the ground.*

TARGET: *special Mark point that indicates the position to the ship goes.*

TRACKING: *past course represented by a line that connects the stored positions.*

TRUE BEARING: *bearing relative to true north; compass bearing corrected for compass error.*

TRUE HEADING: *heading relative to true north*

USER CARTRIDGE: *convenient medium for storing and retriving your information.*

USER POINT: *point placed permanently on the chart with a graphic symbol (Mark, Event, Waypoint).*

UNIVERSAL TIME COORDINATED (UTC): *a time scale based on the rotation of the earth which is disseminated by most broadcast time services.*

VARIATION: *the angle between the magnetic and geographic meridians at any place, expressed in degrees and minutes east or west to indicate the direction of magnetic north from true north.*

WAYPOINT: *any point on earth to which one intends to navigate at some time.*

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NOTES