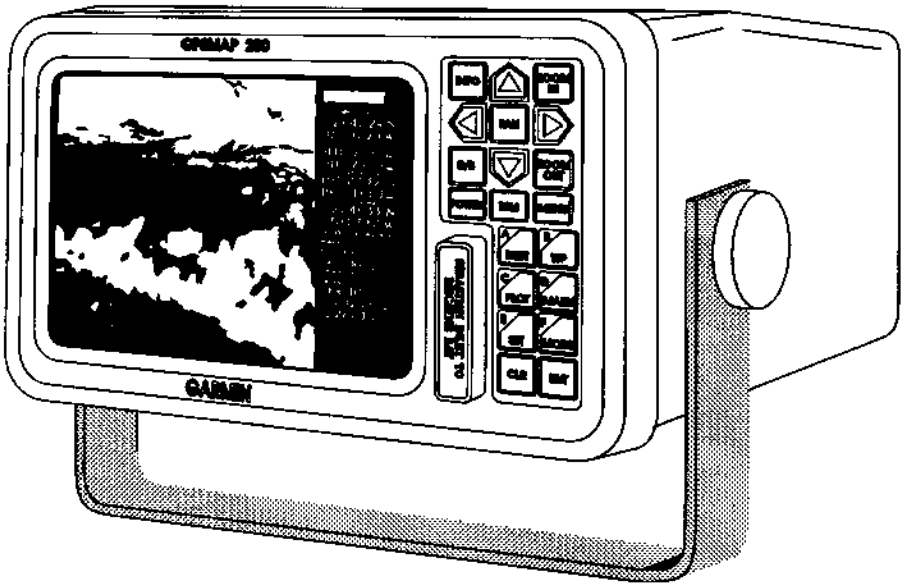
GARMIN SM

COMMUNICATION & NAVIGATION

GPS MAP 200
INTEGRATED GPS NAVIGATOR



USERS MANUAL

IMPORTANT NOTICE

Electronic charts displayed by the GPS MAP 200 are believed to be accurate and reliable, but they are not intended as a substitute for the official charts which should remain your main reference for navigation. A prudent navigator never relies in any single source of navigation information.

WARRANTY STATEMENT

GARMIN International Inc. warrants this unit to be free from defects in materials and workmanship for a period of one year from original retail purchase. During the warranty period, GARMIN International will repair or replace any component which fails in normal use without charge for parts or labor. To receive warranty service, the unit must be returned to a GARMIN Authorized Warranty Service Center, freight charges prepaid along with a copy of the original retail purchase receipt. This warranty is in lieu of all other warranties either expressed or implied. THIS IS THE ONLY WARRANTY. GARMIN INTERNATIONAL EXPRESSLY DISCLAIMS ANY AND ALL OTHER WARRANTIES INCLUDING WARRANTIES OF SUITABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL GARMIN INTERNATIONAL, INC. BE LIABLE FOR CONSEQUENTIAL DAMAGES OR LOSS OF USE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS WHICH MAY VARY FROM STATE TO STATE.

- Please read through this manual before operating the unit. If you have any questions, please contact customer service or your local dealer.
- The unit is not water proof. Please take care to prevent water intrusion into the unit. Water damage is not covered by the warranty.
- Extensive exposure to high temperatures may result in damage to the unit.
- Connection to the power source with reversed polarity will damage the unit severely. This damage may not be covered by the warranty.
- Do not open the unit case. There are no user serviceable parts inside. The GPS MAP 200 contains dangerous high voltage circuits that should only be serviced by an experienced electronic technician.
- Data cartridges are available from your local dealer to suit your cruising area.

May, 1993 190-00052-00 Rev. D

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chapter 1 INTRODUCTION

GPS MAP 200 is a state-of-the-art computerized electronic chart system, designed as a sophisticated navigation aid. User friendly operations make the GPS MAP 200 easy to operate. Operational instructions are displayed in easy to use menus, right on the screen.

All calculations and information necessary for navigation are performed and displayed on the screen quickly and accurately providing unmatched navigation convenience.

A broad range of map data cartridges provide a comprehensive library of navigation information. Please contact your local dealer for these data cartridges, or:

C-MAP USA
P. O. Box 1609
Sandwich, MA 02563
Phone: (508)833-2475
Fax: (508)833-2480

C-MAP ITALY
via Caboto, 9
54036 Marina di Carrara
Phone: 585 630 703
Fax: 585 631 282

FEATURES

- Low power consumption
- Small size
- Optional built-in MultiTrac-8 GPS receiver
- Choice of depth lines and units (feet, meters or fathoms)
- Optional filling of land masses
- Autopilot, tracking and route following features
- Autopilot data output in NMEA 0180 and 0183 formats
- Forward and reverse Route following
- Ship's track plotting
- Distance Table for storing and viewing of multiple reference points
- Small low cost map data cartridges
- Convenient front panel keyboard
- Low profile "Soft-Lock" pivot screws for bracket mounting

Basic Package

Your GPS MAP 200 basic package includes:

- GPS MAP 200 Unit
- Power/Data Cable
- Mounting Bracket w/hardware
- Owner's Manual
- Mounting Template
- Warranty Card

The basic package allows you to use your GPS MAP 200 for fixed mount operations. The unit may be operated from 10-35 volt DC power using the supplied power/data cable.

Optional Accessories

The following optional accessories are available for your specific needs:

- Internal Multi-Trac 8 GPS Receiver
- Marine/RV Remote Antenna
- Magnetic Mount Antenna

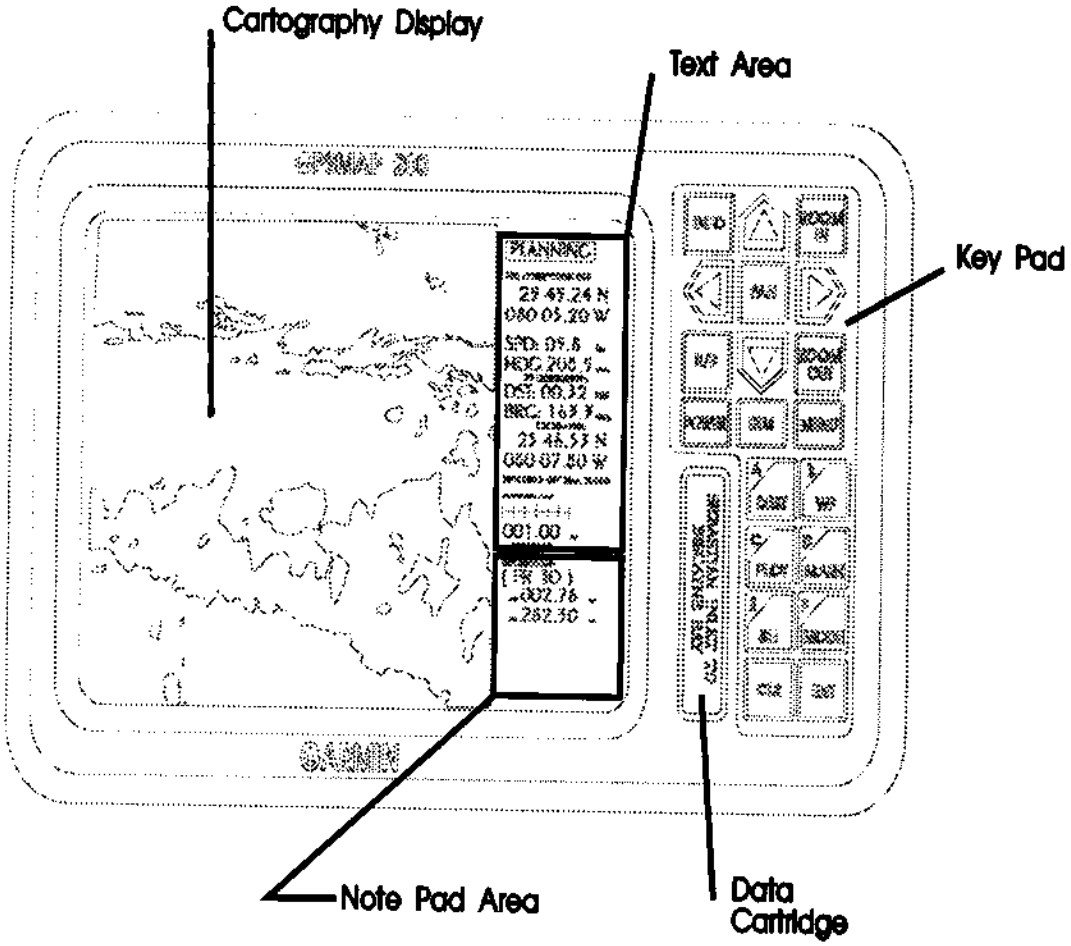
The GPS MAP 200 can be purchased with a built-in GPS receiver. With this receiver board installed, the GPS MAP 200 can operate as a stand-alone navigation device.

A Marine/RV remote antenna is available for permanent mount use in marine or land vehicle applications. If your unit was purchased with the built-in GPS receiver, the Marine/RV remote antenna is also included as part of the package.

The magnetic mount antenna is available for land vehicle use, or applications where a non-permanent antenna installation is desired.

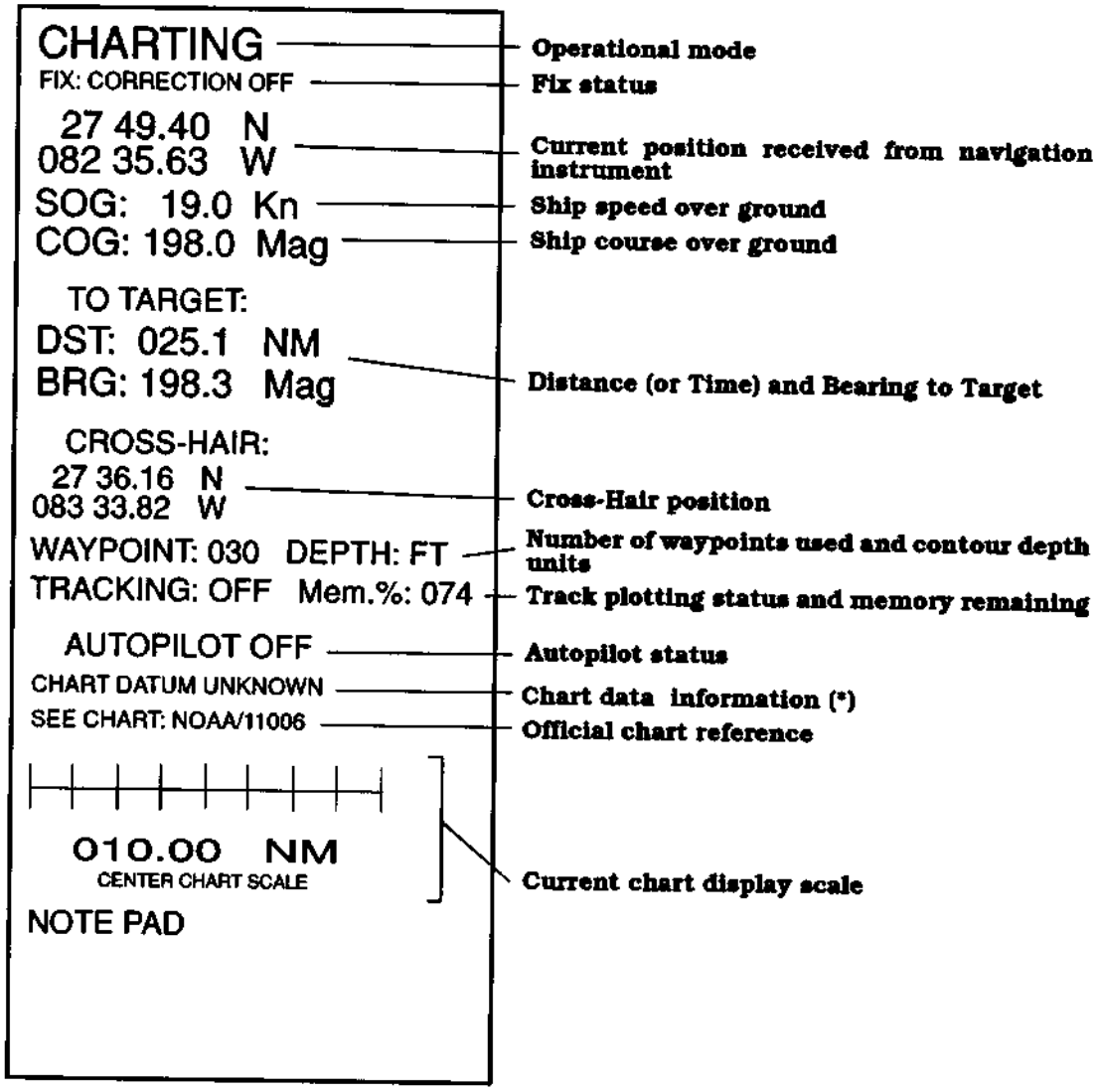
Display screen

The GPS MAP 200 screen is divided into three windows as shown below.



- The left side of the screen (the Cartography display) is used to show the electronic chart.
- The right side displays navigation data (the Text area) and "mini-menus" called Note Pad Menus (the Note Pad area). Routine operations are provided in these smaller menus which do not interrupt the cartography or navigation data displays.

The Text Area of the display screen contains a comprehensive navigation display as shown below.



(*) Here the following message might appear:

"CHART DATUM UNKNOWN"

"WGS 84 NOT AVAILABLE"

"WGS 84 DATUM SELECTED"

"DATUM: <datum name>"

If the positioning instrument is not connected or its data is not properly received, then the POSITION, SPEED AND HEADING data fields in the Text Area will be filled with diamond symbols.

Two operational modes are provided. The "Charting" mode provides for convenient navigation planning using the on screen Cross-Hair as a reference, and the "Navigation" mode provides automatic navigation using the ship's position as a reference. The current operational mode (Charting, Navigation) is indicated at the top right corner of the screen.

If a selected depth line is not present in the data cartridge, then the DEPTH: ** message will flash to indicate that the depth unit displayed is not the one selected by you, but the one present in the data cartridge.

The five possible situations that might occur when receiving data from the positioning instrument on the Loran, Stanav, etc:

- NOT RECEIVED : no data is received.
- 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.
- CORRECTION ON : the format is correct and understood and the fix correction is active.
- CORRECTION OFF : the format is correct and understood, but the fix correction function is not active. This message appears only in cartography off.
  In cartography on the unit substitutes the message "CORRECTION OFF" with one of the following:
  "FIX: CHART DATUM"
  "FIX: WGS 84"
  "FIX: <Datum Name>"

The "WRONG FORMAT" and "NOT RECEIVED" messages appear after about 15 seconds if the respective condition persists.
The "NOT GOOD" message will appear after about 30 seconds. An alarm will sound if a good fix has not been received for 1 minute.

Keypad

All operational functions are accomplished using the unit's convenient keypad. If an improper keystroke is entered, three rapid error tones will sound.

Key descriptions

"INFO"	Selects the Info Note Pad Menu to display the available information on a waypoint, light, buoy.
"ZOOM IN"	Zooms in on the map, showing more detail of a smaller area.
"ZOOM OUT"	Zooms out on map, showing a larger area with less detail.
"PAN"	Moves the displayed screen window so that the Cross-Hair (Charting mode) or ship's position (Navigation mode) is at the center of the screen.
"R/B"	Displays the distance and bearing between any two points selected by the Cross-Hair. In Navigation mode the ship's position is automatically taken as the first point.

"POWER"	Turns unit ON/OFF. To turn the unit OFF, the "POWER" key must be pressed and held for approximately 3 seconds.
"DIM"	Activates the Dimming Note Pad Menu.
"MENU"	Selects the Auxiliary Functions Menu.
"DEST/A"	Selects the Destination Note Pad Menu used to insert or clear target destinations. Also allows selection between "distance to target" or "time to target".
"WP/B"	Selects the Waypoint Note Pad Menu used to add or clear waypoints when building a route.
"PLOT/C"	Selects the Plot Note Pad Menu permitting re-plotting of stored track or chart boundaries.
"MARK/D"	Stores a point of reference and displays a symbol on the chart at the position designated by the Cross-Hair (Charting mode) or at the indicated ship's position (Navigation mode).
"SET/E"	Selects the Set Note Pad Menu permitting changes in screen settings, depth contours, language displayed. Also used when changing data cartridges.
"MODE/F"	Selects the Mode Note Pad Menu to switch the Navigation or Charting mode of operation, to turn Tracking mode ON or OFF, to set WGS 84 ON or OFF, to select the GPS Nav Menu and to display the Navigation Data Page.
"CLR"	Exits the current menu, or activates the Clear Functions Note Pad Menu.
"ENT"	Confirms deletion of stored data as instructed on screen menus and enters new points in the Distance Table.

Data cartridge

The map data cartridges supplied by C-MAP contain a number of charts and sub-charts that cover a wide geographical area with a variety of chart scales. Chart selection is completely automatic when a map data cartridge is installed.

Coastal lines, landmark names, lighthouses, buoys, depth lines, restrictions and other data normally available on nautical maps are all stored in one cartridge.

The map data cartridges are identified as follows:

A XXXX.YY

where:

A	identifies the geographical area
XXXX	identifies the area code
YY	identifies the revision number

For example, the map data cartridge with the code N G 0163.00 covers:

G:	geographical area, West Coast-North America
0163:	area code, Northern Puget Sound
00:	the number of times that this cartridge has been revised

When a map data cartridge is in use, an official chart with a suitable scale is suggested for additional reference. This information is displayed near the bottom of the Text Area on the screen.

"See chart :NOAA/18441" indicates that the National Oceanic and Atmospheric Administration (USA) chart # 18441 is the recommended primary navigation chart. The chart source abbreviations used are:

AA	British Admiralty
ISTIDR	Istituto Idrografico Italiano
NOAA	National Oceanic and Atmospheric Administration (USA)
SHF	Service Hidrographique Francaise
DMA	Defense Mapping Agency

THE MAP DATA CARTRIDGE SHOULD ONLY BE INSERTED OR REMOVED WHEN THE GPS MAP 200 IS TURNED OFF OR THE CHANGE CARTRIDGE FUNCTION IS SELECTED.

The map data cartridge must be inserted into the slot found to the left of the keypad. Insert the cartridge into the slot with the top label facing left, and push gently to engage the connector inside the unit.

Changing data cartridge

The Change Data Cartridge function is selected as follows:

"SET"	to call SET Note Pad Menu
"A"	to change data cartridge

When you have inserted the new map cartridge correctly, press any key to continue. After changing cartridge the system automatically exits from SET Note Pad Menu and returns to cartography.

Using menus

Optional settings of the GPS MAP 200 are accessed by pressing the "MENU" key on the keypad. This activates a large auxiliary functions menu screen which temporarily overlays the cartography display.

In most menus the "CLR" key will bring back the previous screen until exiting to Charting or Navigation mode. In some menus, where stored information is about to be deleted, the "ENT" key is used to confirm the operation.

Power ON/OFF

The GPS MAP 200 is turned ON by momentarily pressing the "POWER" key. To turn the unit OFF, the POWER key must be held for approximately 3 seconds. This prevents accidentally turning the unit OFF in normal operation.

Auto-testing procedure

After connecting the power supply (10-35 volts DC), the GPS MAP 200 is ready to be turned ON, by pressing the "POWER" key.

When turned ON, the GPS MAP 200 starts a self-testing procedure that checks all internal memory and displays any failure detected on the screen. If installed, the map cartridge is also tested. Two abnormal situations may be diagnosed:

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

  - No cartridge is inserted into the slot
  - The cartridge has not been entirely inserted into the slot
  - The cartridge is faulty

- FAULTY: This message indicates that the system has found an error in the data in the cartridge. The reason is usually a damaged cartridge.

When the self-test is completed, the following status screen will be displayed briefly:

SYSTEM UNIT TEST V 3.01 (*)

- KERNEL 8000 : GPS MAP 200
- SYSTEM WORD: 0000 01AO
- EPROM TEST : PASSED
- RAM TEST : PASSED
- DATA CARTRIDGE : MAP CARTRIDGE N. E 0134.00
- CODE CARTRIDGE : GARMIN PLUS/WOR5C V. 3.00 (*)

(*) Your unit may have later software installed as indicated by a different number.

After the auto-test, a CAUTION notice will appear on the screen. After reading the notice, press the "ENT" key to proceed to normal operation.

An extended operational test can be performed by holding down ANY key, while the "POWER" key is pressed to turn ON the unit. When activated, the following Extended Operational Test menu will appear:

SYSTEM UNIT TEST V 3.01 (*)

A EXIT

B SERIAL INTERFACE TEST

C KEYBOARD TEST

D RAM CHIPS TEST

The desired test is selected by either pressing the letter key of the desired test or by using the arrow keys to place the Cross-Hair in the square on the left side of the desired menu selection.

The serial interface test is for technical personnel only.

In the keyboard test, a picture of the keyboard will be displayed on the screen. When a key is pressed, an "x" will appear in the picture of that key on the display, and the unit will beep once. This indicates that the system has properly recognized the key. The arrow and power keys do not present the "x" since their operation is positively confirmed by their operation. To terminate the keyboard test, position the cross-hair on the word EXIT in the lower left corner of the screen.

The RAM-CHIPS test verifies the integrity of unit's internal memory. When a problem with the unit's memory is suspected, the memory test may be executed to confirm the fault. When the RAM-CHIPS test is run, if the "CLR" key is pressed as instructed by the menu the GPS MAP 200 internal memory will be cleared.

Clearing RAM erases ALL internal memory including marks, routes, waypoints, etc., leaving the unit ready to restart with the default settings.

Dimming the CRT display

The brightness of the CRT display is adjustable to allow you to optimize the display for your viewing conditions.

To adjust the brightness of the CRT display, use the following keystrokes:

"DIM"	to activate the DIM Note Pad menu
"A"	to increase the brightness of the display
"B"	to decrease the brightness of the display
"CLR"	to exit when the brightness is set as desired

If the "A" or "B" key is pressed and held with the DIM Note Pad menu displayed, the brightness of the display will change quickly without the need for repeated keystrokes.

The brightness setting of the CRT is retained in memory when the unit is turned OFF. If the brightness is set at a very low level, and the unit then turned OFF, when the unit is next turned ON the brightness will automatically be increased to a moderate level. This prevents being unable to see the display in daylight if, for example, it was dimmed to a very low level the previous night.

Chart boundaries

The best charting results with the GPS MAP 200 are achieved when a map cartridge is inserted. All the chart boundaries stored in the current map cartridge will be displayed on the screen when the unit is first turned ON, or when the data cartridge is changed. If no map cartridge is installed, the chart boundaries displayed are those contained in the internal GPS MAP 200 software. You can zoom out to the maximum allowed level and still display chart boundaries by using the PLOT Note Pad Menu.

The maximum zoom-in level is determined by the data contained in the map cartridge installed and the ship's position (in Navigation mode) or the cross hair (in Charting mode). If pressing a zoom key results in two beeps and no display change, the maximum zoom level has been reached.

Screen settings

Six different types of display information may optionally be displayed on the charting screen to best suit your needs.

Land mass filling

Land masses on the electronic chart may be filled in with a light color. This provides an easier to interpret view of the charts, even when working on large scale maps.

Location names

The display of Location names on the chart can be turned ON or OFF as desired.

Navigational aids

Navigational Aids such as buoys and lighthouses can be displayed on the screen.

Coastal features

Coastal features such as shallow waters, marshes, rocks, former dams, wrecks, etc., may be displayed on the screen.

Restrictions to navigation

Restrictions such as anchoring, fishing prohibited, one way traffic lanes, quarantine anchorage, limit of territorial sea, explosives dumping ground, etc., may be displayed on the screen

Coordinate Grid

A Latitude and Longitude grid with grid line labels may be displayed on the screen to assist in locating known positions.

Each display feature may be individually selected using the following procedure:

"SET"	to call the SET Note Pad Menu
"B"	to call Screen Setting Menu
"A"..."F"	to alternately turn the selected display feature ON or OFF
"CLR"	to return to main charts

The current setting of each selection is indicated by an "*".

Depth line selection

Depth contour lines may be displayed on the charts. In some areas, the number of depth contour lines can be quite large presenting a somewhat cluttered display. The GPS MAP 200 allows you to select 3 ranges of depth contours that you wish to see to optimize the display for your needs. Additionally, you may choose feet (FT), meters (MT) or fathoms (FM) as the displayed depth contour units.

Depth line selection is done on a sub menu of the SET Note Pad Menu as follows:

"SET"	to call the SET Note Pad Menu
"C"	to choose depth contours
"D"	to select the desired depth units
"A"..."C"	to select the desired depth interval
"CLR"	to return to charting

The current depth contour selections are indicated by an "*". Only the depth lines digitized in the installed map cartridge can be displayed.

Symbols and abbreviations

A number of symbols are used in the GPS MAP 200 displays to indicate various navigation features. Below is a table of the symbols used:

SYMBOLS/ABBREVIAT.	DESCRIPTION
	PLATFORM
	LIGHTHOUSE/BUOY
	LOCATION
	PORT
	WAYPOINT (Editing)
	WAYPOINT (Non-editing)
	TARGET
	MARK
	EVENT
5 - - - - - - - - - - - - - - - - - 5	DEPTH LINE (meters)
17 - - - - - - - - - - - - - - - - - 17	DEPTH LINE (feet)
3 - - - - - - - - - - - - - - - - - 3	DEPTH LINE (fathoms)
	VARIOUS RESTRICTIONS - inshore traffic area - danger area - anchoring, fishing trawling prohibited - approach tunnel - precautionary area - dumping ground - quarantine anchorage - harbor limit - submarine exercise area - prohibited area
R . . . . . R L ——————— L H ——————— H C.....C B.-.-.-.-.-.-.-.-.-.-.-.-.-.-.-.-. B	COASTAL FEATURES (R) rock (L/O) low water (H) solid land limit (C) coral (B) boundary

The Cross-Hair and its geographic coordinates

The Cross-Hair can be moved anywhere on the screen by pressing the arrows on the keyboard. In Charting Mode, pressing the "PAN" key automatically moves the screen window so that the Cross-Hair is placed directly in the center of the screen.

By pressing the "PAN" key for more than 1 second, the exact coordinates of that position will appear in the Note Pad Area. Using the "C" and "D" keys to move the cursor, the coordinates may be changed by pressing the "A" and "B" keys.
Press "ENT" to confirm and the new location will istantly appear on the screen.
If some coordinates are entered and the "ENT" key is pressed, the plotter will beeps three times: this means that the requested coordinates are out of the charts available in the current cartridge. Other coordinates must than be stored again repeating all the procedure starting from pressing for more than one second the "PAN" key.

Pan or coordinates is available only in Charting mode.

If the Cross-Hair is not moved for at least one second, the geographic coordinates of the Cross-Hair position will appear in the Text Area of the screen as follows:

CROSS-HAIR:
47 39.40 N
122 26.46 W

While in Charting Mode if the Cross-Hair is moved off the display screen, the GPS MAP 200 will automatically shift screens and re-draw the chart. In Navigation mode, this automatic panning will occur when the ship's position, rather than the Cross-Hair, nears the edge of the screen.

Information about lighthouses and other charted features

Many charted features such as waypoints, lighthouses, buoys, platforms, etc., have more details available from the stored information. This information my be viewed in one of two ways:

- Automatically - the GPS MAP 200 may be set to automatically display stored information when the Cross-Hair is placed over a given point. Set the GPS MAP 200 to automatically display stored information with the following keystrokes:

"INFO"	to call the Info Note Pad Menu
"A"	to turn on Auto Info feature, if not already on
"CLR"	to return to main chart

- Manually, as needed - you may call up stored information manually, and only as needed, by placing the Cross-Hair over the desired feature and pressing the following keys:

"INFO"	to call the Info Note Pad Menu ("Auto Info" should be off)
"B"	to call stored information for given point

If detailed information is available, the international code and details about the feature will be displayed in the Note Pad area.

Zoom functions

The Zoom functions modify the chart scales permitting you to examine a detailed area or view a larger area. Pressing the 'ZOOM IN' key, causes the GPS MAP 200 to zoom in on the charts, showing more detail of a smaller area. By pressing the ZOOM OUT key, the GPS MAP 200 will zoom out on the charts, showing less information and a larger area.

The zoom capability is only limited by the number of charts and amount of detail digitized in the data cartridge. The number of charts per cartridge may vary from two to ninety.

Distance table

The GPS MAP 200 provides a Distance Table, that can store up to five positions. The distance between the stored locations and the Cross-Hair (in Charting mode), or the ship's position (in Navigation mode) can be easily displayed.

Pressing the "ENT" key in Charting or Navigation mode initiates the storage of Distance Table points as indicated in the Note Pad area. The Distance Table entry letter and its present status are displayed:

- If the current entry is unused, the message "NOT USED" is displayed
- If another point has already been stored in that position, the Note Pad will display its name and its coordinates. If the stored point is neither a location name nor a lighthouse on the chart, the name displayed will be "User Point".

By pressing "A", "B", "C", "D" or "E" on the keypad, the GPS MAP 200 will display, in the Note Pad area, the first through fifth Distance Table entries.

Press "ENT" to set a new point in the Distance Table or 'CLR' to exit without changing the entry.

When the "ENT" key is pressed with a distance table entry displayed in the Note Pad area, the current cross-hair position replaces the existing data in that Distance Table Entry, and the old data is lost.

If a name is to be stored, the Cross-Hair must be placed on the mark that identifies it. If there is no mark associated with the name, the Cross-Hair must be placed in the lower-left corner of the name.

Displaying the Distance Table

To display the entire Distance Table at once, press the "MENU" key to display the Auxiliary Functions Menu. Then press the "F" key to select the Distance Table. The screen will display a table showing distances and bearings from the Cross-Hair position (in Charting Mode) or from the ship's position (in Navigation Mode) to the five stored locations as shown below. Press the "CLR" key twice to return to charting or navigation.

DISTANCE TABLE

Pt	Place	Latitude	Longitude	Dist	Brg
A	User point	47 39.40 N	122 26.44 W	1.5 nm	295 mag.
B	SHILSOLE	47 40.65 N	122 24.95 W	2.3 nm	337 mag.
C	WING POINT	47 36.75 N	122 29.18 W	3.3 nm	222 mag.
D	DUWAMISH	47 35.91 N	122 23.27 W	2.5 nm	136 mag.
E	FOURMILE	47 38.28 N	122 24.83 W	0.0 nm	250 mag.

In addition to this Distance Table, you can directly compute distance and bearing between two points on the chart (see page 18).

Deleting the Distance Table

All Distance Table entries can be deleted at one time by pressing the following keys:

"MENU"	to call the Auxiliary Function Menu
"A"	to call the User Points Menu
"D"	to clear Distance Table
"ENT"	to confirm entry (any other key will abort the function)
"CLR"	to return to the Auxiliary Functions menu
"CLR"	again to return to cartography

Introduction

The operating mode is selected by pressing the "MODE" key followed by the "A" key to select the desired mode. If no position fix is available either from the internal MultiTrac-8 GPS receiver or an external navigation instrument, the GPS MAP 200 will reference the last known position and display fix readings only to the nearest tenth of a minute.

Placing marks on the chart

Up to 120 positions can be marked on the map using the Mark function. (This number is reduced by the number of waypoints saved. A total of 120 marks and waypoints combined can be saved.) To mark a position, the Cross-Hair is placed in the desired position and then the "MARK" key is pressed to leave a permanent reference symbol at that position.

By pressing the "MARK" key for more than 1 second, the exact coordinates of the point identified by the Cross-Hair are now displayed, and you now have the chance to modify them. The "C" and "D" keys move the cursor, while the "A" and "B" keys change value, and the 'ENT' key is to confirm the entries.

Deleting marks from the chart

A single mark can be deleted by positioning the Cross-Hair on it and pressing the "CLR" to call the CLEAR Note Pad menu, followed by the "A" key as indicated in the menu.

All Marks can be deleted at once, using the following procedure:

"MENU"	to call the Auxiliary Functions Menu
"A"	to choose User Points Menu
"B"	to choose Clear all Marks (an arrow will appear to the left of the menu entry)
"ENT"	to confirm entry (any other key will abort this function; an "OK" message will be shown replacing "B" after pressing "ENT".)
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to charts

Auto-numbering marks

The GPS Map 200 can automatically number marks in sequence, or you may assign your own numbers to each mark. To automatically number marks as they are stored use the following procedure:

"MENU"	to call the Auxiliary Functions Menu
"A"	to choose User Points Menu
"F"	to turn Auto-number Function ON (if not on already)
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to charts

If manual numbering is selected, the GPS MAP 200 will offer a number when the mark is stored. This number will also appear in the Note Pad area, along with a menu of options to either change this number or save it as is. To select manual numbering do the following:

"MENU"	to call the Auxiliary Functions Menu
"A"	to choose User Points Menu
"F"	to turn Auto-number Function OFF (if not off already)
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to charts

Turning number designations off

At times the number designations may not be desired, or may result in a congested display. To display marks or waypoints without an identifying number do the following:

"MENU"	to call the Auxiliary Functions Menu
"A"	to choose User Points Menu
"E"	to turn User Point Identifier OFF (if not already off)
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to charts

With the number designations turned off, only the mark or waypoint symbol will be displayed for a stored location.

Distance and bearing between two points on the chart

When in Charting mode, the "R/B" key allows fast and easy measurements of distances and bearings between points on the displayed chart:

- place the Cross-Hair on the first point
- press the "R/B" key (an "A" will appear)
- place the Cross-Hair on the second point
- press the "R/B" key again (a "B" will appear)

The two points will appear on the screen connected by a straight line with a "+" identifying each end.

The distance (in nautical miles) and bearing from A to B will be displayed in the Note Pad area.

To clear the line, just press the "CLR' key and when the menu appears in the Note Pad area, press the "C" key to select "A-B": the line and the two points "A" and "B" are deleted from the screen.

Distance and bearing between the Cross-Hair and a Target point

A selected position on the map can be tagged by using the Target function. Navigation information relative to the Target is continuously displayed in the Text Area of the screen. To set a Target:

- place the Cross-Hair on the selected point
- press the "DEST" key to display the Target Note Pad menu
- press the "A" key to insert a Target

Press the "C" key to select display of either Distance or Time to Target.

To clear the Target press the "B" key while the Target Note Pad menu is displayed.

If a Target has been selected, a fourth option appears in the Note Pad menu:
"D" : to set Autopilot ON/OFF

Note: When a target location is defined at a position where a Waypoint does not exist, the GPS MAP 200 will create a waypoint automatically for that position. If the target is deleted, the Waypoint location is still saved.
The engagement of the Autopilot is allowed only when a position fix has been received. If you select option "D" when no valid fix is available, the message "FIX NOT VALID AUTOPILOT NOT ALLOWED" will appear in the Note Pad area.

The Distance between the Cross-Hair and the Target (in Charting mode) or the ship's position and Target (in Navigation mode) will be continuously displayed in the Text Area.

Planning a route

The GPS MAP 200 can plan a route of up to 120 waypoints with the advantage of working directly on the electronic chart. This helps to eliminate possible errors associated with entering waypoints by coordinate position only.
To enter a route:

- Ensure that the GPS MAP 200 is in Charting mode.
  Route planning is disabled in other modes
- place the Cross-Hair on the desired waypoint position
- press the "WP" key to call the ROUTE Note Pad Menu
- press the "A" key to add a waypoint at the cross-hair position
- move the cross hair to the next desired waypoint position
  and continue adding waypoints using the procedure above.
  (Up to 120 combined waypoints and marks may be entered.)

Each waypoint will be marked by a small square. Each subsequent waypoint will be connected to the previous one by a straight line. Each time a waypoint is added, the total number of set waypoints is displayed in Text Area.

The user may also create waypoints at specific points of latitude and longitude. Once in the Route Note Pad Menu, the cursor is moved to any position desired. Now hold down the "A" key more than 1 second and than release it: the coordinates of the point identified will appear on the screen.
Use the "C" and "D" keys to move the cursor, and the "A" and "B" keys to modify values. The acception of the entered coordinates is done by pressing the 'ENT' key.

When building a route, the editing point - or point from which the route will continue - is denoted by a bold circle. If you wish to add waypoints to the opposite end of the route, select "Change Editing End" from the Route Note Pad Menu and continue to add waypoints to the route as described above.

Deleting waypoints

To clear the last waypoint on the route, select Route Note Pad Menu and then press the "B" key. The last waypoint in the route will be deleted along with the line connecting it to the previous waypoint. Waypoints may be sequentially deleted as desired.

Deleting a route

A route may be deleted one waypoint at a time as described above. The Clear Route selection will delete the entire route and all of its waypoints in one operation. To access this option:

"WP"	to call Route Note Pad Menu
"E"	to select Clear Route (route must currently be selected, see "Changing Route to Edit")
"CLR"	to return to Cartography

Changing route to edit

The GPS MAP 200 allows you to build multiple routes, up to a combined total of 120 waypoints (and Marks) among the various routes. To build additional routes, move the cursor to the starting location of the new route, press "C" to select new route to edit and add waypoints to new route with the "A" key as previously described.

Note: The route you are currently editing is denoted by a dashed line between waypoints. All other routes are displayed as a solid line between waypoints.

Deleting all routes

To delete all routes stored in memory do the following:

"MENU"	to call the Auxiliary Functions Menu
"A"	to choose User Points Menu
"A"	to choose Clear all Courses
"ENT"	to confirm entry (any other key will abort this function; an "OK" message will be shown replacing "A" after pressing "ENT".)
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to Cartography

Route data report

For the route selected, a data report can be generated providing latitude/longitude for each waypoint, true heading/compass heading to each waypoint, leg distances and a cumulative route distance, time enroute and fuel consumption based upon user-provided speed and fuel flow figures. Use the following procedure to select the Route Data Report:

- press "WP" key to call the Route Note Pad Menu
- press "F" key to select the Route Data Report
- input speed over ground per instructions at bottom of screen
- input projected fuel flow (consumption) per instructions at bottom of screen
- once "ENT" key is pressed after fuel flow figures are selected, the Route Data Report is displayed as shown below

ROUTE DATA REPORT

SPEED = 18 knots CONSUMPTION = 012 Gall/h

WP NO	LATITUDE DEG MIN	LONGITUDE DEG MIN	TRUE HEAD	CPAS HEAD	LEG DIST	TOT DIST	TIME ENROUTE	FUEL CONS
01	43 01.63N	087 51.73W						
02	42 57.31N	087 42.35W	122.1	124.1	008.1	008.1	000H 27M	0005 Gall
03	42 46.95N	087 42.23W	179.5	181.5	010.3	018.4	001H 01M	0012 Gall
04	42 08.85N	087 34.31W	171.2	173.2	038.5	057.0	003H 10M	0038 Gall
05	41 52.16N	087 30.75W	170.9	172.9	016.9	073.9	004H 06M	0050 Gall

Distance and bearing between two route waypoints

By placing the Cross-Hair on a waypoint and pressing the "INFO" key, if the automatic info option is set off, or simply placing the Cross-Hair on the symbol that identifies the waypoint if the auto info option is set on, the following data is displayed in the Note Pad area:

- waypoint identifier ("RRR.NNN", where "RRR" is the route number and "NNN" is the waypoint sequence number in the route)
- waypoint coordinates
- distance from the first waypoint (if waypoint selected is not the first)
- distance and bearing to the final waypoint (if waypoint selected is not final waypoint)

External waypoints

When the GPS MAP 200 is connected to an external position sensor (see Chapter 10), position and navigation information is derived from that external source. In many cases, the external device may have its own waypoint capabilities. When the external position sensor is navigating to a waypoint that is not stored in the GPS MAP 200's memory, this waypoint may still be displayed on the GPS MAP 200 screen using the External Waypoint feature. To enable the External Waypoint feature, do the following:

"MENU"	to call the Auxiliary Functions Menu
"B"	to select the Fix Functions Menu
"F"	to turn the External Waypoint feature ON
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to charting

The coordinates of the External waypoint, received from the GPS or the 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. The symbol remains on the screen for 30 seconds after the last $BWC valid sentence has been received. The user may save it by placing a waypoint or a Mark on that symbol. As soon as the unit receives another SBWC sentence with the coordinates of a new waypoint, the symbol moves to the new point.

Introduction

Navigation mode is selected by pressing the "MODE" key followed by the "A" key to select "NAV". To use Navigation mode, a navigation position must be supplied to the GPS MAP 200 either by the internal MultiTrac-8 GPS receiver or a suitable external navigation device.

In Navigation mode the screen will PAN so that the position of the last received fix will be near the center of the screen. As the ship moves, the active chart will change as necessary to keep the ships position on the screen. When a fix is not been received, automatic screen scrolling will not occur.

In Navigation mode, all displayed navigation information refers to the ship's position, while in Charting mode it refers to the Cross-Hair position.

Input data signal status

The GPS MAP 200 continuously indicates the status of navigation data in the Text Area of the screen:

- When no fix has been received, a diamond symbol replaces the ship's position coordinates in the Text Area, and the ship's position symbol will not be displayed on the chart. When no fix is received, the GPS MAP 200 will display "NOT RECEIVED" (blinking) above the ship's position in the Text Area.

- When a fix has been obtained, but subsequently becomes invalid, a "diamond" symbol will replace the last character of the last known position in the Text Area. In this case, the ship's position symbol remains fixed on the screen at the last known coordinates.

If the ship is sailing in an area not covered by any chart digitized in the installed data cartridge, the GPS MAP 200 will display "OUT OF MAPS" above the ships position display in the text area.

Ship's position

A blinking symbol on the cartography screen indicates the ship's position in both Navigation and Charting modes. In Navigation mode, when the ship approaches any screen boundary, the GPS MAP 200 will perform an Automatic Pan to keep the ships position on the screen.

When an automatic pan would cause the display window to fall outside of the currently selected chart, the GPS MAP 200 will automatically select the next available chart with a scale as close to the previous chart as possible. Since not all charts are available to the same scale, the actual chart scale in use may change with automatic panning.

Placing a mark at the ship's position

The ship's position can be tagged by using the Mark function. Pressing the "MARK" key, in Navigation Mode, will insert a reference mark at the vessel's position. In Navigation mode, this mark is referred to as an Event.

Up to a total of 120 Events may be placed to mark positions of interest. Note that if an automatic pan occurs (in Navigation mode) or the screen is shifted (in Charting mode) some of the active marks may be off of the current display screen. Also, remember that less than 120 Events may be available if Waypoints and Marks were previously stored. A total of 120 Events, Waypoints and Marks combined are available.

Deleting events from the chart

To delete a single Event, place the Cross-Hair over the Event, then:

"CLR"	to call the Clear Note Pad Menu
"B"	to clear the Event

To delete all marks in a single operation:

"MENU"	to call the Auxiliary Function Menu
"A"	to choose User Points Menu
"C"	to Clear All Events
"ENT"	to confirm entry (any other key will abort the function)
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to cartography

Computing fix error

The GPS MAP 200 can automatically compute and apply a correction factor to fixes received from a navigation sensor with an error in position.

To automatically compute the Fix error, the Cross-Hair must be moved to the ship's actual position on the chart and then the following keys must be pressed:

"MENU"	to call the Auxiliary Functions Menu
"B"	to select Fix Functions Menu
"A"	to select Fix Correction Menu
"B"	to compute Fix Error
"CLR"	to return to the Fix Functions Menu
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to main chart

This operation, calculates and stores the apparent error in position. This calculated error correction can then be automatically applied to the position reported by the navigation instrument. The correction is stored even when the unit is turned OFF.

Correcting fix error

Once a fix correction has been computed as described above, the Fix Correction may be turned On or Off by pressing the following keys:

"MENU"	to call the Auxiliary Functions Menu
"B"	to select Fix Functions Menu
"A"	to select Fix Correction Menu
"A"	to alternately turn Fix Correction ON/OFF
"CLR"	to return to the Fix Functions Menu
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to main chart

For most position sensors the fix correction required varies over time. If used, the fix correction should be updated regularly.

Changing the computed fix error

Although the GPS MAP 200 can automatically compute a correction factor, there may be instances where manual entry of the correction factor is desirable. To manually define the correction factor, use the "Change Fix Error" option as follows:

"MENU"	to call the Auxiliary Functions Menu
"B"	to select Fix Functions Menu
"A"	to select Fix Correction Menu
"C"	to change fix error

Use arrow keys to change latitude/longitude fix correction. Press"ENT" key to confirm new fix correction, or "CLR" key to abort operation.

Once the fix correction has been defined, the correction must be turned on as described above in "Correcting Fix Error".

WGS 84 map datum

WGS 84 is an internationally recognized reference datum from which position coordinates can be derived. When using a data cartridge, position coordinates may be generated from a different (local or regional) map datum. The GPS MAP 200 allows you to display position coordinates using either map datum reference. In some instances the latitude and longitude coordinates displayed using the two datums may differ by several hundred feet, or more. For this reason, it is advisable to select the datum reference that corresponds to the paper chart (or other source) that you are using. Turn the WGS 84 reference datum on or off with the following:

"MODE"	to select the Mode Note Pad Menu
"C"	to turn WGS 84 ON or OFF, as desired
"CLR"	to return to cartography

The current map datum reference is indicated in the text area of the GPS MAP 200 screen, just above the display scale.

Distance and bearing between the ship's position and any point on the chart

In Navigation mode, the R/B (Range and Bearing) function allows fast and easy measurements of distances and bearings between ship's position and any point on the screen:

- position the Cross-Hair at the desired point.
- press "R/B" key. "A" will be attached to ship's position and "B" will be attached to the Cross-Hair position.

The two points will be connected by a straight line and a cross will identify the beginning and the end of the "A-B" line. The distance in nautical miles and bearing from "A" to "B" will be displayed in the Note Pad area. To delete the "A-B" line, simply press "CLR" and then the "C" key.

The "A" position is fixed when the "R/B" key is pressed, and does not move with the movement of the ship.

Distance, time and bearing to a waypoint (Target)

In Navigation mode, the GPS MAP 200 will calculate distance and bearing from the ship's position to a Target point every time a fix is received from the positioning instrument. Either Distance or Time to the Target is displayed along with the Bearing to the waypoint in the Text Area. To change the Distance / Time to be displayed, use the following keystrokes:

"DEST"	to call the Destination Note Pad menu
"C"	to alternately select DISTance or TIME
"CLR"	to exit

For information on designating a Target, see page 18.

Distance table in Navigation mode

To display the Distance Table entries, see page 15. Please keep in mind that in Navigation mode, the distances and the bearings displayed in the Distance Table are those between the ship (instead of the Cross-Hair) and the distance table positions.

GPS MODE

When the optional MultiTrac-8 GPS receiver is installed, the GPS MAP 200 can be operated as a high performance stand alone GPS receiver. In GPS mode, the GPS MAP 200 presents a comprehensive navigation display on the CRT screen which is suitable for viewing at a distance. GPS mode is selected using the MODE Note Pad menu as follows:

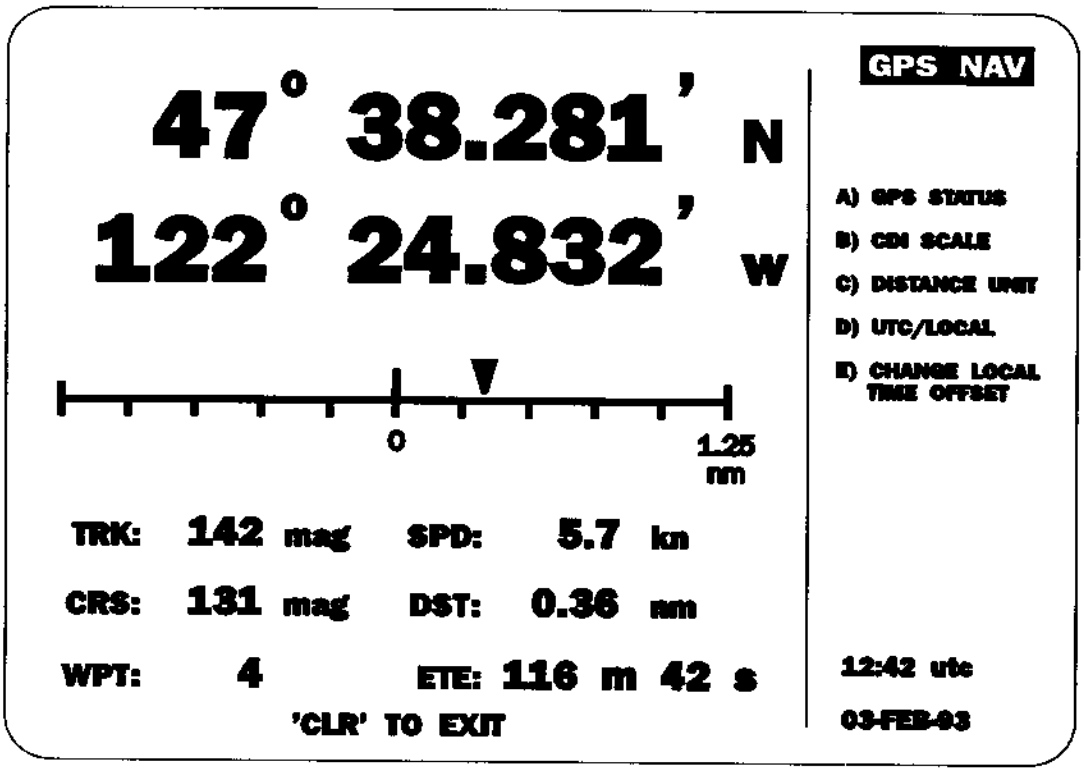
"MODE"	to call the MODE Note Pad menu
"D"	to select GPS mode

If the MultiTrac-8 module is not installed, the GPS option is not available from the MODE Note Pad menu.

To exit from GPS MODE, press the "CLR" key. This will immediately return the unit to cartography.

GPS Navigation Display

When GPS MODE is selected, the GPS Navigation screen will be automatically displayed as shown below.



Present Position display

The GPS NAV display presents the ship's present position in large numbers at the top. If for any reason, the position is unavailable from the MultiTrac-8 module, the present position display will be dashed.

Track and Speed displays

When your ship is moving, and the GPS MAP 200 is tracking satellites, the vessel's actual track over the ground (TRK) and speed (SPD) are displayed on the screen. The TRK and SPD displays are constantly updated as the vessel moves.

Route navigation data

When a Route or Target has been programmed in charting mode, and the autopilot has been turned on, the GPS NAV display presents additional navigation data to guide you along the selected path. If no Target has been designated, the Route navigation information is not displayed.

Course Deviation Indicator (CDI) display

At the center of the GPS NAV screen is a graphic Course Deviation Indicator which displays your position relative to the selected course. The inverted arrow above the scale indicates the ship's position. When exactly on course, the arrow will be over the center of the scale. If the vessel deviates off of the course to the right, the arrow moves to the right to indicate the deviation. If you are steering the boat manually, you would need to make a course correction to the left to bring the indicator back to the center.

Changing the CDI scale

The sensitivity of the CDI scale can be selected as 0.25, 1.25, 5.0, or 10.0 nautical miles (or statute miles, or kilometers) full scale to suit your operational needs. When the GPS NAV screen is displayed, simply press the "B" key to step through the available scales until the desired one is displayed at the right end of the CDI.

Changing Distance Units

You may select the units to be used in displaying navigation information as desired. Speeds and distances may be displayed in Nautical Miles (nm/kn), in Statute Miles (sm/mph), or in Kilometers (km/kph). To change the selected units, press the "C" key when the GPS NAV screen is displayed.

GPS Time display

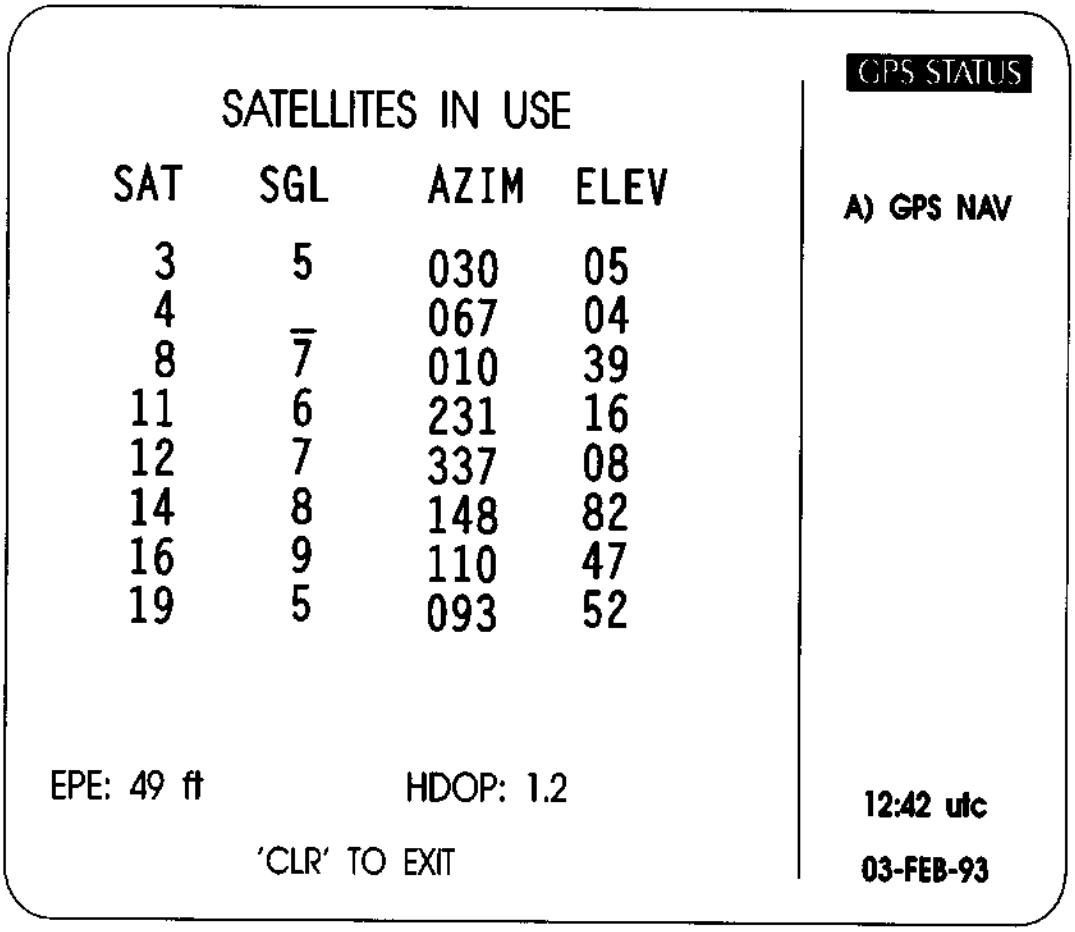
At the lower right corner of the GPS NAV screen is a display of the current time and date. The display is a highly accurate time obtained by the MultiTrac-8 receiver from the GPS satellites. Since the time is maintained by the GPS system, there is never a need to set the clock. The time display may be switched between UTC (Greenwich Mean Time), and Local time as you prefer. Switching between the displays only requires a press of the "D" key on the keyboard.

Local Time Offset

Your local time offset from UTC will vary with your position. To provide for proper local time displays, you must set the offset before using the local time function. To set the Local Time Offset, press the "E" key. When the offset indicator appears, use the up and down arrow keys to adjust the local time offset for your current location. The time zone offset will be negative for locations with West longitude and positive for East longitudes. When the display is correct, press the "ENT" key to store your setting.

GPS Status screen

The optional MultiTrac-8 GPS receiver inside the GPS MAP 200 constantly updates the system with the status of the GPS satellites in use. Detailed information about the status is available on the GPS Status screen as shown below. To display the GPS Status screen, press the "A" key when the GPS NAV screen is displayed.



Satellite information

The GPS Status screen provides information about each satellite currently in view at your location. Included in the table of information is the satellite number (SAT), the signal strength for that satellite (SGL), and the azimuth (AZIM) and elevation (ELEV) of the satellite. The signal strength numbers indicated range from 1 (weakest) to 9 (strongest). The MultiTrac receiver automatically optimizes the satellites in use to provide the best possible performance. If a satellite is not being received, its signal strength is replaced by a "-". If the unit indicates that NO satellites are being received after it has been turned ON for at least 2 minutes, carefully check the placement and connection of the antenna.

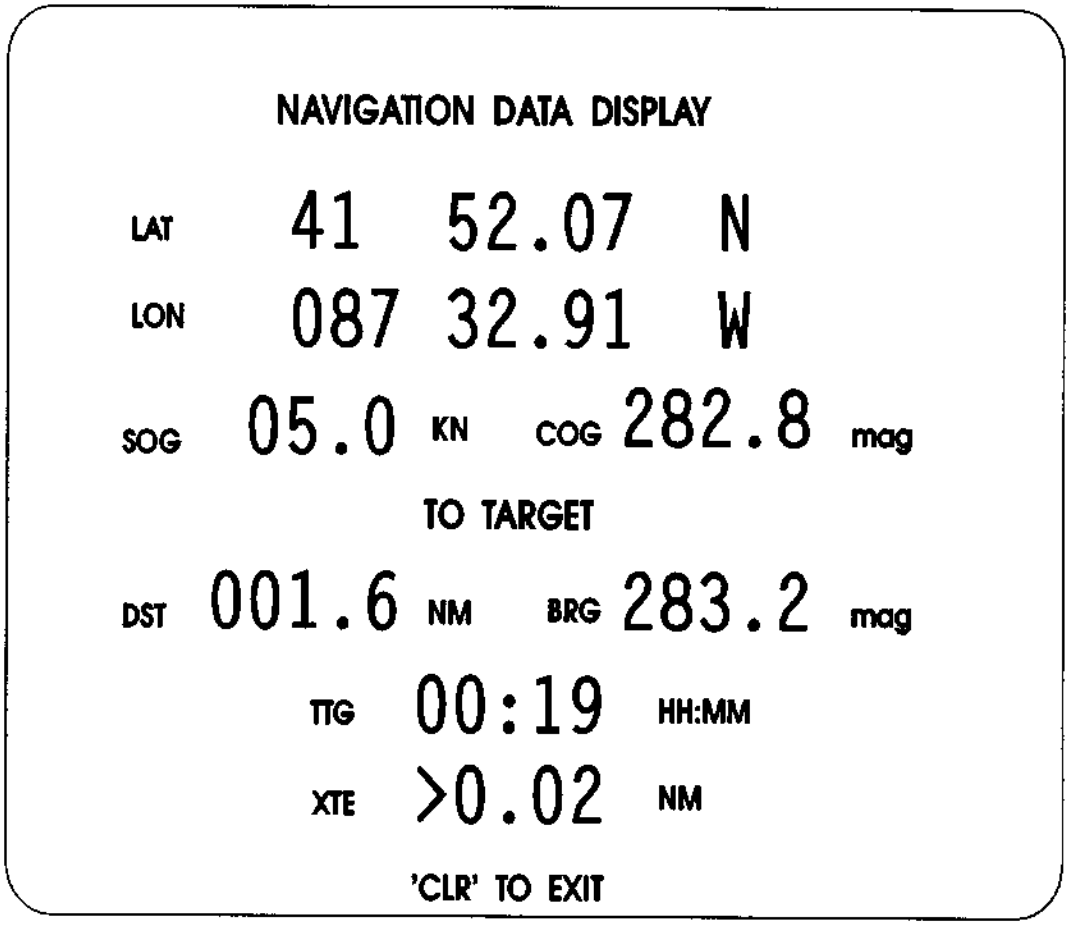
Estimated Position Error

The MultiTrac-8 GPS receiver continually estimates the probable accuracy of the fix obtained based on the signal strengths and geometry of the available satellites. The Estimated Position Error (EPE) is displayed on the GPS Status screen to indicate the approximate accuracy of the fix obtained with the currently available satellites. The EPE is automatically displayed in the same units that you selected for depth contours. Also displayed with EPE is the Horizontal Dilution Of Precision (HDOP). HDOP is a number which indicates the amount of degradation of the available fix due to poor satellite geometry. A large HDOP (greater than 5.0) indicates that the spatial alignment of the available satellites makes obtaining an accurate fix difficult.

The Estimated Position Error displayed may change significantly from one moment to the next. These changes are the result of changes in the current satellite constellation, and more significantly, the U.S. Department of Defense Selective Availability program. Under the Selective Availability (S/A) program, the accuracy all GPS receivers may be intentionally degraded by the Department of Defense up to 100 meters (328 feet). The actual degradation being applied may change from one moment to the next. Short term variations in the displayed EPE are primarily a result of the Selective Availability system and do not indicate a problem with your GPS MAP 200.

Navigation Data Display

In addition to the GPS Navigation Display, a Navigation Data display is available from the "MODE" key. Press the "MODE" key, followed by the "E" key, to select the Navigation Data display shown below:



The Navigation Data display shows your current latitude and longitude position, speed over ground (SOG) and course over ground (COG). When a target has been set, distance (DST) and bearing (BRG) to target, as well as time-to-go (TTG) and cross-track error (XTE), are also displayed.

Introduction

The GPS MAP 200 can be connected to an autopilot through a standard NMEA-0180 or NMEA 0183 interface permitting the GPS MAP 200 to direct the course of the autopilot. The exact extent of the autopilot coupling capabilities depend on the features offered by your autopilot.

The autopilot output can be enabled only when the GPS MAP 200 is receiving a valid position from the positioning instrument, and a Target has been set. If you attempt to activate the autopilot interface, when the fix is not good or not properly received, the message "FIX NOT VALID - AUTOPILOT NOT ALLOWED" will appear in the Note Pad area of the screen.

Once the Target Point is set as a destination (or as the next waypoint along a route), and the autopilot function is activated, the GPS MAP 200 will set the course between the present position and the target and start to transmit the Track Error to the Autopilot.

When arriving at a specified distance (which can be selected as 0.5, 1 or 5 miles; see page 35) from the Target Point, the GPS MAP 200 will sound an autopilot arrival alarm.

Turning Autopilot ON/OFF

Before the Autopilot can be turned ON, a Target must be defined, either alone or on a route (see page 18). When a Target has been set using the "DEST" Note Pad Menu, a fourth option, "AUTOPILOT ON OFF" will appear. Pressing the 'D' key alternately turns the autopilot ON or OFF.

If the ship position is not valid or if the Target point is disabled, the Autopilot function is automatically turned OFF.

Route following

When a route has been planned, a Target may be set on the route to permit a connected autopilot to automatically perform either "forward" route following, "backward" route following, or "stop at target".

When route following has been engaged and the ship reaches the Target, the Target will automatically advance to the next waypoint in sequence on the route. When the last waypoint on the route is reached, the target will remain on the last waypoint, the vessel will continue past the Target on the last course, and the GPS MAP 200 will sound an alarm.

If "Stop at Target" is selected, the Target will not advance to the next route waypoint when the current Target is reached. The Target will remain fixed and an alarm will sound as the vessel approaches the Target waypoint.

Once a route has been planned, you must designate the point at which you want to intercept the route. After planning a route, move the Cross-Hair to the waypoint at which you desire to intercept the route, and then to access route following:

"DEST"	to call the DESTination Note Pad menu
"A"	to set Target
"D"	to turn the autopilot output ON

A new list of options will now appear:

"A"	to set Route Following Forward
"B"	to set Route Following Backward
"CLR"	to stop at the Target (no Route following beyond designated Target)

If coupled to an autopilot, when the vessel reaches the Target it will not automatically stop or circle at the Target. The GPS MAP 200 will sound an alarm, and the vessel will continue beyond the Target on the last course.

Introduction

The GPS MAP 200 can store periodic fixes from positioning instruments and plot those fixes on the chart providing a graphic picture of the ship's track history. The unit contains sufficient memory to store up to 400 individual track points. The interval between track points is user selectable by time or distance increments. Time intervals of .5, 1, 2, and 5 minutes are available. For distance intervals, you may choose between .05, .1, .5, and 1 mile increments. Since the number of track points is fixed, the resolution (plotting interval) determines how long the plotted track can be. As each new point is plotted it is connected to the previous one with a line on the screen providing a continuous track. The text area of the screen displays the amount of tracking memory still available as a percentage of the total. If the track memory becomes full, the oldest points on the track are automatically deleted to make room for the new points. Thus if left ON continuously, the track will display a trail of the most recent 400 data points.

Turning the track plotting ON/OFF

Track plotting is turned ON and OFF using the MODE Note Pad Menu as follows;

"MODE"	to call the MODE Note Pad Menu
"B"	to alternately turn track plotting ON or OFF
"CLR"	to exit from the Note Pad Menu

Choosing the track interval

When tracking is turned ON, the GPS MAP 200 will store track points at intervals which can be selected by distance or time.

To set the Tracking Interval by distance intervals (.05, .1, .5 or 1 nautical mile) press the following keys:

"MENU"	to call the Auxiliary Functions Menu
"D"	to select the Tracking Menu
"B"	to set the interval to "Distance"
"C"..."F"	to set the desired tracking interval
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to main chart

To set the Tracking Interval by time intervals (.5, 1, 2 or 5 minutes) press the following keys:

"MENU"	to call the Auxiliary Functions Menu
"D"	to select the Tracking Menu
"B"	to set the interval to "Time"
"C".."F"	to set the desired tracking interval
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to main chart

Plotting the stored track

Any time the screen is re-painted (due to zooming the display, or panning) the plotted track is temporarily erased from the display. The track plot can be re-drawn as follows:

- Automatically - the GPS MAP 200 may be set to automatically re-draw the track plot when panning or zooming the display. Set the Automatic Re-Plot with the following keystrokes:

"MENU"	to call the Auxiliary Functions Menu
"D"	to select the Tracking Menu
"A"	to turn Automatic Re-Plot ON
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to main chart

- Manually - with Automatic Re-Plot turned off, you may still re-draw the stored plot, as desired, with the following keystrokes:

"PLOT"	to call the Plot Note Pad Menu
"A"	to select Track plotting
"CLR"	to return to cartography

Deleting the stored track

All the stored track points can be deleted from memory by pressing:

"MENU"	to call the Auxiliary Functions Menu
"D"	to call the Tracking Menu
"ENT"	to Reset Tracking Counter
"ENT"	to confirm (any other key will abort the function)
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to main chart

The track is plotted in the same color as Land mass filling. If your application requires plotting a track over coastal land, you must turn off Land mass filling in order to be able to see the plot. (see page 11)

When the GPS MAP 200 sounds an alarm tone, pressing the "CLR" key will display the Clear Note Pad Menu. With the CLEAR Note Pad menu displayed, pressing the "D" key will silence the sounding alarm and display the cause of the alarm

Autopilot Alarm Range selection.

Prior to reaching a target waypoint the GPS MAP 200 will sound an arrival alarm at a pre-selected distance. To select this alarm range (0.5, 1 or 5 miles) use the following keystrokes:

"MENU"	to call the Auxiliary Functions Menu
"E"	to select the Autopilot Menu
"D"..."F"	to set desired alarm range
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to main chart

Fix Alarm settings

When a position fix is not available - due to poor satellite coverage, lost connection with an external sensor, etc. - the GPS MAP 200 will sound an alarm. The audible alarm for an invalid position fix can be turned off as follows:

"MENU"	to call the Auxiliary Functions Menu
"B"	to select the Fix Functions Menu
"D"	to select the Fix Alarm Settings
"A"	to turn the Audible Alarm OFF
"CLR"	to return to the Fix Functions Menu
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to cartography

Note: Information regarding the position fix status is also displayed at the top of the text area on the main chart.

If the loss of position information is temporary, you may set the GPS MAP 200 to automatically cancel the alarm when position information is restored. To set the Alarm to automatically clear, use the following keystrokes:

"MENU"	to call the Auxiliary Functions Menu
"B"	to select the Fix Functions Menu
"D"	to select the Fix Alarm Settings
"B"	to turn the Auto Alarm Clear feature ON
"CLR"	to return to the Fix Functions Menu
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to cartography

If the Auto Alarm Clear feature is turned off, the audible alarm will sound if position information is lost, and continue to sound even if the position fix is restored.

Data retention

The GPS MAP 200 retains your stored setup and navigation data in its internal memory. The following items are retained for future use:

- Serial interface format selected
- Last valid position fix received from the navigation instrument
- Stored routes
- Fix error and auto-correction status (ON/OFF)
- Waypoints and their numbers
- Marks and their numbers
- Target points
- Distance table entries
- Compass calibration
- Stored track points
- Track recording status (ON/OFF)
- Autopilot alarm range setting
- All selected screen setup options

This information is retained even when the map data cartridge is replaced or the unit is turned OFF.

When delivered from the factory, the following standard screen settings are selected and will remain in effect unless you change them:

SCREEN SETTING:	
Land Fill	ON
Nav Aids	OFF
Names	ON
Restrictions	OFF
Coastal Features	ON
Depth Unit	MT
Depth Lines 1 - 5 Mt	ON
Depth Lines 6 - 50 Mt	OFF
Depth Lines > 50 Mt	OFF
LANGUAGE:	English
TRACK RECORDING TYPE:	Distance
TRACK STEP:	1 Mile
COURSE & BEARING:	Mag.
FIX CORRECTION:	OFF
AUTOPILOT:	OFF
AUTOPILOT ARRIVAL ALARM:	1 Mile
INPUT FORMAT:	NMEA-0183*
OUTPUT FORMAT:	NMEA-0180

(*) If the internal MultiTrac-8 GPS receiver is installed, it will be selected when delivered from the factory.

Input format selection

In order to establish an interface link with an external position sensor, the correct input data format must be selected as follows:

"MENU"	to call the Auxiliary Functions Menu
"B"	to call the Fix Functions Menu
"B"	to select Format Selection Menu
"A"..."D"	to select the desired format (or "F" to view additional format options)
"CLR"	to return to the Fix Functions Menu
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to main chart

The current selection is marked by an "*" on the Format Selection Menu. Note that selection of Internal or External GPS (see below) automatically de-selects all input formats.

The GPS MAP 200 maintains the Format selection in memory even when switched OFF.

Autopilot Setup

For proper operation with an autopilot, the output of the GPS MAP 200 must match that required by the autopilot. The GPS MAP 200 can provide data to the autopilot in NMEA 0180, NMEA 0180/CDX, or NMEA 0183 formats. Refer to your autopilot manual to determine the required setting. To select the autopilot output format:

"MENU"	to call the Auxiliary Functions Menu
"E"	to select the AUTOPILOT MENU
"A.."C"	to choose the desired format
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to charting

Internal/External GPS selection

The GPS MAP 200 accepts two special interface formats, the internal MultiTrac-8 GPS receiver or an external GPS receiver.

To select a GPS receiver do the following:

"MENU"	to call the Auxiliary Function Menu
"B"	to select the Fix Functions Menu
"C"	to choose Navigator Port Selection
"A" or "B"	to select Internal GPS or External GPS, as desired
"CLR"	to return to the Fix Functions Menu
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to main chart

Note that selection of Internal or External GPS automatically de-selects any previously selected input format selection.

Selecting true or magnetic compass bearings

The GPS MAP 200 can display course and bearing information from either magnetic or true north references.

In magnetic mode, the courses and bearings displayed by the GPS MAP 200 are automatically modified to compensate for magnetic variation and compass deviation. This allows you to adjust the magnetic readings presented by the GPS MAP 200 to match your compass. The compass error table should be updated before using the magnetic mode.

The bearing mode is selected by pressing the following keys:

"MENU"	to call the Auxiliary Function Menu
"C"	to call the Compass Functions Menu
"A"	to select TRUE or MAGNETIC
"CLR"	to return to the Auxiliary Functions Menu
"CLR"	to return to charting

Updating the compass error table

The compass error table is updated by selecting the Calibrate Compass option from the Compass Functions Menu.

"MENU"	to call the Auxiliary Function Menu
"C"	to call the Compass Functions Menu
"B"	to choose the Calibrate Compass option

The following table will appear on the screen:

DEVIATION TABLE

HEADING	N	N/E	E	S/E	S	S/W	W	N/W
DEVIAT.	00	00	00	00	00	00	00	00

Before the deviation table is updated, your compass installation should be calibrated. If you are not familiar with compass swinging procedures, consult your local marina or instrument shop. The deviation table is updated using the following procedure for each section of the deviation table display:

- press right or left arrow keys to select the desired direction
- press up or down arrow keys to increase or decrease the correction
- press 'CLR' to return to previous menu

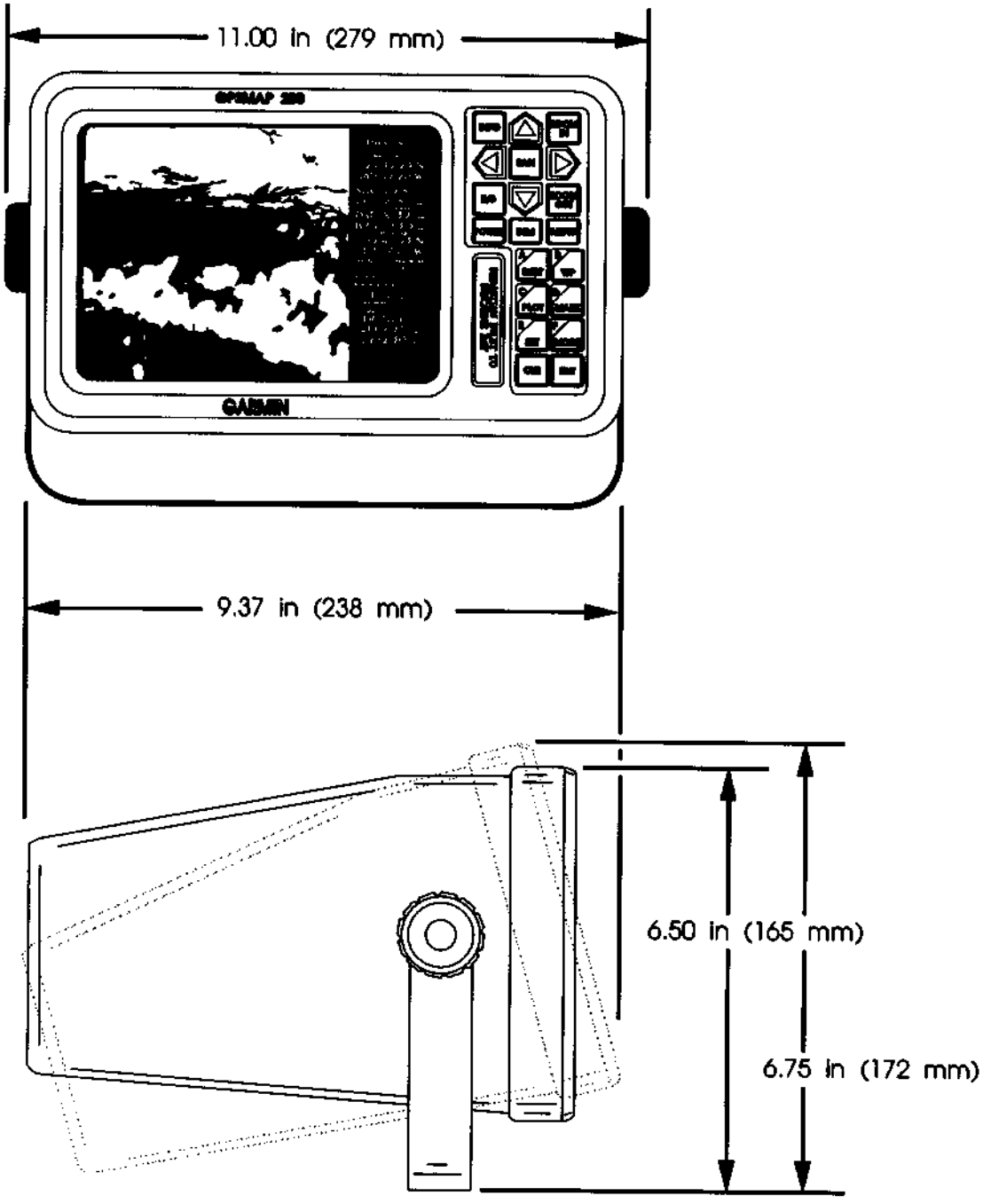
The corrections that you enter are retained in memory even when the GPS MAP 200 is turned OFF.

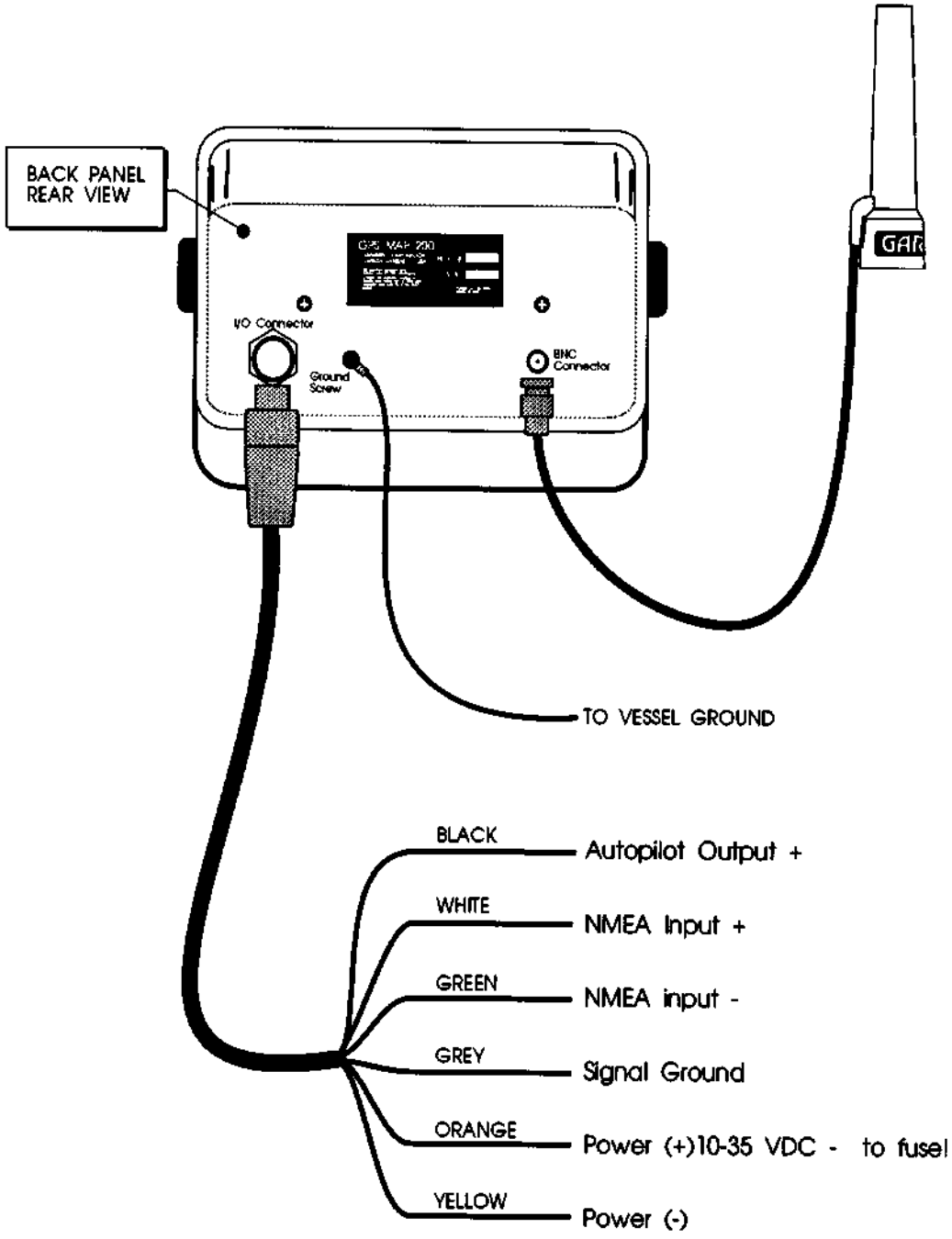
Language selection

Five different languages are available in the software of the GPS MAP 200 for presentation of messages and data. As shipped from the factory, English is selected. To select from among English, Italian, French, German or Spanish, use the following procedure:

"SET"	to call the SET Note Pad Menu
"D"	to choose Language Selection Menu
"A"..."E"	to select the desired language
"CLR"	to return to main chart

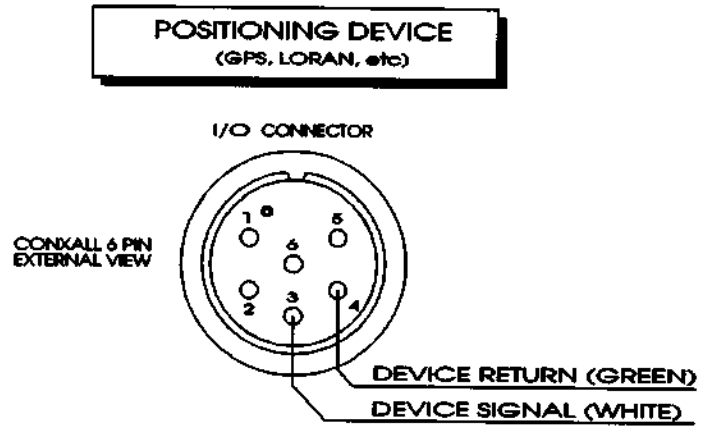
The current selection is indicated by an "*".

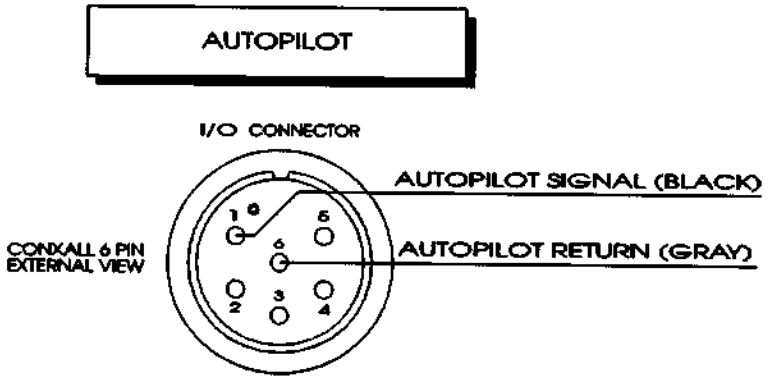

11.00 in (279 mm)
9.37 in (238 mm)
6.50 in (165 mm)
6.75 in (172 mm)


BACK PANEL
REAR VIEW
I/O Connector
Ground
Screw
BNC
Connector
TO VESSEL GROUND
BLACK
Autopilot Output +
WHITE
NMEA Input +
GREEN
NMEA input -
GREY
Signal Ground
ORANGE
Power (+)10-35 VDC - to fuse
YELLOW
Power (-)

GPS MAP 200 typical interface connections

Displayed below are typical interface connections to use the GPS MAP 200 with an external position sensor or to drive an autopilot.





APPENDIX A TECHNICAL SPECIFICATIONS (*)

Power requirement	10-35 VDC, 13W
Navigation interface (input)	NMEA 0183 from Loran, Satnav, GPS, Decca, Omega and others
Autopilot interface (output)	NMEA-0180/0180CDX/0183
Display	7" (diagonal) high-resolution flat monochrome CRT
Display resolution	512 x 672 pixels
Cartography	High-definition C-MAP cartridge
Zoom	From 1 meter to 40 km per pixel
Memory	Non-volatile
Dimension	5.625"H x 9.25"W x 8.25"D (143mm x 235mm x 210mm)
Weight	8 lbs.

(*) Specifications subject to change without notice

Recommended Minimum Navigation Information

$ECRMB,A,x.xx,L,CCC,CCC,LLLL.LL,N,LLLLL.LL,W,xxx.,xx.x,xx.x,V
(1)(2) (3)(4) (5) (6) (7)(8) (9)(10) (11) (12) (13)

(1) Position valid flag (A = valid, V = invalid)
(2) Cross-track error (nautical miles)
(3) Direction to steer (L = left, R = right)
(4) Origin waypoint identifier
(5) Destination waypoint identifier
(6) Destination latitude (degrees and minutes)
(7) Destination latitude direction (N = north, S = south)
(8) Destination longitude (degrees and minutes)
(9) Destination longitude direction (E = east, W = west)
(10) Range to destination waypoint (nautical miles)
(11) Bearing to destination waypoint (degrees, true)
(12) Closing velocity to destination
(13) Arrival flag (A = arrival, V = not arrival)

Bearing and Distance to Waypoint, Great Circle

$ECBWC,,LLLL.LL,N,LLLLL.LL,W,xxx.,T,xxx.,M,xxx.xx,N,CCCC
(1) (2)(3) (4)(5) (6)(7) (8)(9) (10)(11)

(1) Destination waypoint latitude (degrees and minutes)
(2) Destination waypoint latitude direction (N = north, S = south)
(3) Destination waypoint longitude (degrees and minutes)
(4) Destination waypoint longitude direction (E = east, W = west)
(5) Bearing from present position to destination waypoint (degrees, true)
(6) Units (true degrees)
(7) Bearing from present position to destination waypoint (degrees, magnetic)
(8) Units (magnetic degrees)
(9) Distance from present position to destination waypoint (nautical miles)
(10) Units (nautical miles)
(11) Waypoint identifier

Waypoint Closure Velocity (velocity made good)

$ECWCV,xx.x,N,CCCC
(1) (2)(3)

(1) Velocity made good (knots)
(2) Units (knots)
(3) Destination waypoint identifier

Autopilot Sentence "B"

$ECAPB,A,A,x.xx,L,N,V,V,xxx.,M,CCCC,xxx.,M,,M
(1)(2)(3) (4)(5)(6)(7)(8) (9)(10) (11) (12)(13)

(1) Position valid flag (A = valid, V = invalid)
(2) Cycle Lock (A = valid)
(3) Cross-track error (nautical miles)
(4) Direction to steer (L = left, R = right)
(5) Cross-track error units (nautical miles)
(6) Arrival circle entered (A = arrival, V = not arrived)
(7) Past destination waypoint perpendicular (A = past waypoint, V = not past)
(8) Desired track, origin waypoint to destination waypoint
(9) Desired track heading reference (T = true, M = magnetic)
(10) Destination waypoint identifier
(11) Bearing to destination waypoint
(12) Bearing to destination waypoint reference (T = true, M = magnetic)
(13) Steer heading reference (T = true, M = magnetic)

Autopilot Sentence "A"

$ECAPA,A,A,x.xx,L,N,V,V,xxx.,M,CCCC
(1)(2)(3) (4)(5)(6)(7)(8) (9)(10)

(1) Position valid flag (A = valid, V = invalid)
(2) Cycle lock (A = valid)
(3) Cross-track error (nautical miles)
(4) Direction to steer (L = left, R = right)
(5) Cross-track error units (nautical miles)
(6) Arrival circle entered (A = arrival, V = not arrived)
(7) Past destination waypoint perpendicular (A = past waypoint, V = not past)
(8) Desired track, origin waypoint to destination waypoint
(9) Desired track heading reference (T = true, M = magnetic)
(10) Destination waypoint identifier

Cross-Track Error, Measured

$ECXTE,A,A,x.xx,L,N
(1)(2)(3) (4)(5)

(1) Position valid flag (A = valid, V = invalid)
(2) Cycle lock (A = valid)
(3) Cross-track error
(4) Direction to steer (L = left, R = right)
(5) Cross-track error units (N = nautical miles)

Geographic Position, Latitude/Longitude

$ECGLL,LLLL.LL,N,LLLLL.LL,W
(1) (2)(3) (4)

(1) Current position latitude
(2) Current position latitude direction (N = north, S = south)
(3) Current position longitude
(4) Current position longitude direction (E = east, W = west)

Ground Track and Ground Speed

$ECVTG,xxx.,T,xxx.,M,xx.x,N,xx.x,K
(1) (2)(3) (4)(5) (6)(7) (8)

(1) Ground track (degrees, true)
(2) Ground track reference (T = true north)
(3) Ground track (degrees, magnetic)
(4) Ground track reference (M = magnetic north)
(5) Ground speed (knots)
(6) Ground speed, units (N = knots)
(7) Ground speed (kilometers per hour)
(8) Ground speed units (K = Km/hr)

Recommended Minimum Specific GPS/Transit Data

$ECRMC,,A,LLLL.LL,N,LLLLL.LL,W,xx.x,,,
(1)(2) (3)(4) (5)(6)

(1) Position valid flag (A = valid, V = invalid)
(2) Current position latitude
(3) current position latitude direction (N = north, S = South)
(4) Current position longitude
(5) Current position longitude direction (E = east, W = west)
(6) Ground speed (knots)

Bearing, Origin to Destination

$ECBOD,xxx.,T,xxx.,M,CCCC,CCCC
(1) (2)(3) (4) (5) (6)

(1) Bearing from origin waypoint to destination waypoint (degrees, true)
(2) Bearing reference (T = true north)
(3) Bearing from origin waypoint to destination waypoint (degrees, magnitude)
(4) Bearing reference (M = magnetic north)
(5) Origin waypoint identifier
(6) Destination waypoint identifier

APPENDIX C NMEA 0183 INPUT SENTENCES

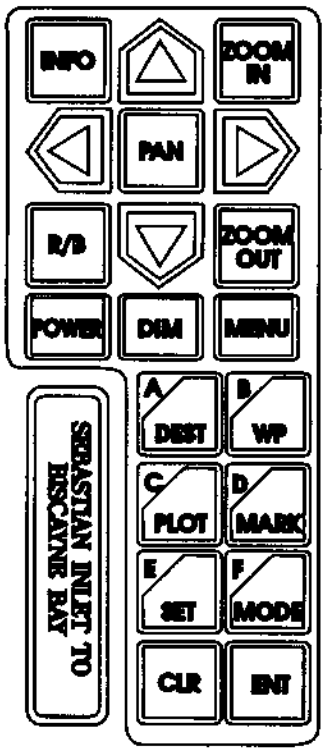
The GPS MAP 200 is compatible with most standard instruments providing NMEA format data.

Accepted NMEA 0183 input sentences:

BWC:	Bearing and Distance to Waypoint
GDP:	Dead Reckoning Positions
GLL:	Geographical Position, Latitude/Longitude
GLP:	Loran-C Positions
GOP:	OMEGA Positions
GXP:	TRANSIT Positions
PKMLC:	Proprietary - King Marine Electronics, Inc.
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

INDEX

GPS MAP 200 - QUICK REFERENCE



INFO - display available information for map feature designated by cursor

ZOOM IN - show smaller portion of map, in greater detail - especially cartridge data

PAN - move map display so that crosshair or ship's position is at center

R/B - Range/Bearing - display R/B between two designated points

ZOOM OUT - show larger portion of map, with less detail

POWER - turn unit on/off - when turning 'off', press and hold for 3 seconds

DIM - adjust brightness of display

MENU - call Auxiliary Functions Menu (no cartography display)

ARROWS - move cross-hair position on map display

(A) DEST* - Destination note pad menu - insert/clear targets, autopilot on/off

(B) WP* - Waypoint note pad menu - insert/clear waypoints, create/edit routes

(C) PLOT* - Plot note pad menu - plot track, show data cartridge boundaries

(D) MARK* - Mark - create mark or event location on map

(E) SET* - Set note pad menu - change data cartridge, screen settings, depth contour

(F) MODE* - Mode note pad menu - chart/nav, track on/off, GPS mode, nav data

CLR - Clear note pad menu, or exit - clear marks, events, A-B, alarms

ENT - Enter - accept/acknowledge displayed operation

* A-F to select desired menu option

Viewing GPS Satellite Status:
* MODE key to select Mode Note Pad Menu
* D-key to select GPS Nav Display
* A-key to select GPS Status Display
* CLR key to exit to cartography or A-key to return to GPS Nav Display

Selecting CHART or NAVIGATION Mode:
* MODE key to select Mode Note Pad Menu
* A-key to select CHART mode or NAV mode, as desired
* CLR key to return to cartography

Placing Marks (Charting Mode):
* Place cross-hair at desired location on screen
* MARK key to place Mark on that location
* If Auto-number feature is turned off, you may renumber the Mark, as prompted

Deleting Marks (Charting Mode):
* Place cross-hair over Mark to be deleted
* CLR key to select CLR Note Pad Menu
* A-key to clear selected Mark
* CLR key to return cartography

Distance/Bearing between points (Charting Mode):
* Place cross-hair on first location
* R/B key to mark first location as "A"
* Place cross-hair on second location
* R/B key to mark second location as "B"
* Once second location is marked, distance and bearing from "A" to "B" is shown in Note Pad Area
* To delete "A" and "B" marks on chart, press CLR key and C-key

Route Planning - Creating Routes (Charting Mode):
* WP key to select Route Note Pad Menu
* Place cross-hair over first waypoint location
* A-key to mark first waypoint on route
* Place cross-hair over second waypoint location
* A-key to mark second waypoint on route
* Continue as above for additional waypoints
* If a waypoint is placed incorrectly, press B-key to clear
* To create additional routes, press C-key to change to new route

Marking Ship's Position - Events (Navigation Mode): * MARK key to place Event marker at ship's current location * If Auto-number feature is turned off, you may renumber the Event, as prompted	**Deleting Events (Navigation Mode):** * Place cross-hair over Event to be deleted * CLR key to select CLR Note Pad Menu * B-key to clear selected Event * CLR key to return to cartography
Distance/Bearing, ship to point B (Navigation Mode): * Place cross-hair at desired "point B" location (ship's position is "point A") * R/B key to mark "A" and "B" locations simultaneously * Once locations are marked, distance and bearing from ship to "B" is shown in Note Pad area * To delete "A" and "B" marks on map, press CLR key and C-key	**Setting a Target Destination (Navigation Mode):** * Place cross-hair over desired Target location * DEST key to select Destination Note Pad Menu * A-key to mark Target location * If Target is placed incorrectly, press B-key to clear * To enable Autopilot, and go direct to target, press D-key
Selecting GPS Navigation Display (with CDI): * MODE key to select Mode Note Pad Menu * D-key to select GPS Navigation Display * CDI scale settings and Distance units are selectable directly from this display * CLR key to return to cartography	**Selecting Navigation Data Display (no CDI):** * MODE key to select Mode Note Pad Menu * E-key to select Navigation Data Display * CLR key to return to cartography
Track plotting (manual): * PLOT key to select PLOT Note Pad Menu * A-key to plot stored Track information * CLR key to return to cartography	**Track plotting (automatic):** * MENU key to select Auxiliary Functions Menu * D-key to select Tracking Menu * A-key to turn Automatic re-plot on * CLR key, twice, to return to cartography
Deleting stored Track plot: * MENU key to select Auxiliary Functions Menu * D-key to select Tracking Menu * ENT key to clear all stored Track information * ENT key to confirm * CLR key, twice, to return to cartography	**Deleting all Routes, Marks, or Events:** * MENU key to select Auxiliary Functions Menu * A-key to select User Points Menu * A..C-key to clear all Routes (course), Marks, or Events * ENT key to confirm * CLR key, twice, to return to cartography
Clearing Alarms: * CLR key to display Clear Note Pad Menu * D-key to simultaneously clear sounding alarm and display cause of alarm	**Changing Data Cartridges:** * SET key to display Set Note Pad Menu * A-key to change data cartridge * Remove data cartridge and install another * Press any key to return to cartography

Notes:

WAYPOINT LOG

N°	LAT	LON	NOTES