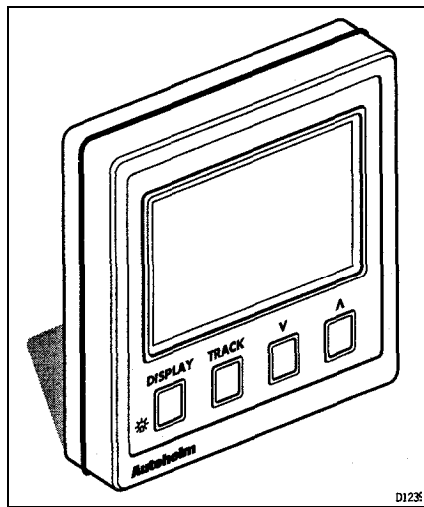# Distributed by

Raymarine

Any reference to Raytheon or
RTN in this manual should be
interpreted as Raymarine.
The names Raytheon and RTN
are owned by the
Raytheon Company.

Autohelm®

ST 50

PLUS

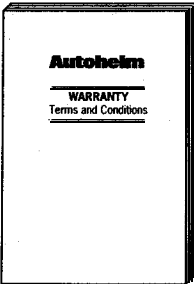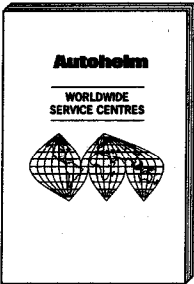### GPS & NAVDATA
Operation and
Installation

Package Contents

The following items are included in the ST50 Plus GPS and Navdata packages:

1. ST50 Plus control head
2. Fixing studs **(2 off)**
3. Thumb nuts **(2 off)**
4. Control head cover
5. Power cable
6. NMEA cable
7. **Security** sticker
8. **Fitting** template
9. Operation and Installation handbook
10. Worldwide Service Centre handbook
11. Warranty document

2-HOLES DRILL 5mm (.197in) DIA — 1-HOLE DRILL 50.8mm (2in) DIA

7000/INSTRUMENT MOUNTING TEMPLATE

Contents

Introduction

The ST50 Plus GPS and Navdata instruments are repeaters that receive positional fixes via either NMEA or SeaTalk, from the GPS satellite system or the Loran/Decca beacon network.

The GPS system comprises of 24 satellites (operating globally 24 hours a day) grouped into six separate orbits. Up to 5 of the 24 satellites are tracked at any one time, and the difference between the unique signal from each satellite is used by the ST50 Plus GPS receiver to calculate your exact posiion.

The ST50 Plus GPS and Navdata units also incorporate a security feature designed to protect instruments mounted in vulnerable areas, such as the cockpit or helm.

Thank you for purchasing an Autohelm product. May we take this opportunity to wish you years of trouble free operation.
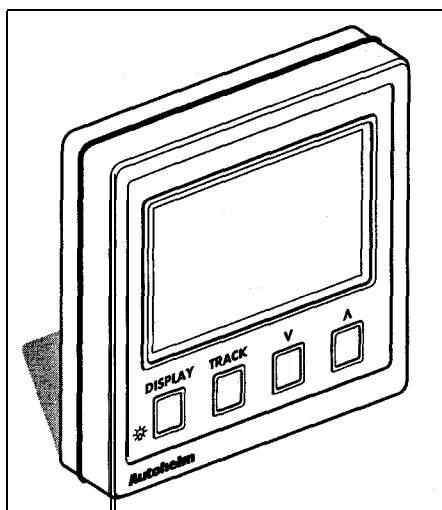
Chapter 1: Control Head Installation
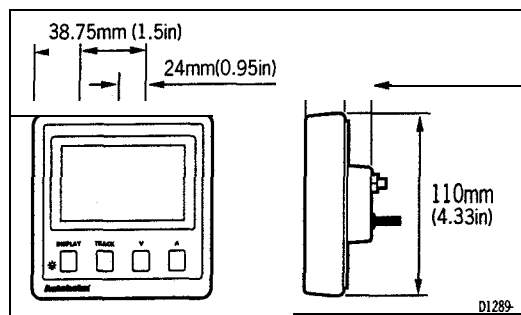
1.1 Sing

The ST50 Plus **GPS/Navdata** is designed for above or below deck installation where it is:

- Easily readable by the helmsman
- Protected against physical damage
- At least 230mm **(9in)** from a compass
- At least 500mm **(20in)** from radio receiving equipment
- Accessible from behind for ease of installation and cable running

Caution:
To prevent moisture forming on the display window, the ST50 Plus GPS/Navdata 'breathes' through a small vent in the cable boss. Therefore, the control head must be sited where the rear case is protected from contact with water.

The rear case is fitted with a foam gasket to form a water-tight seal between the instrument and the selected installation face.
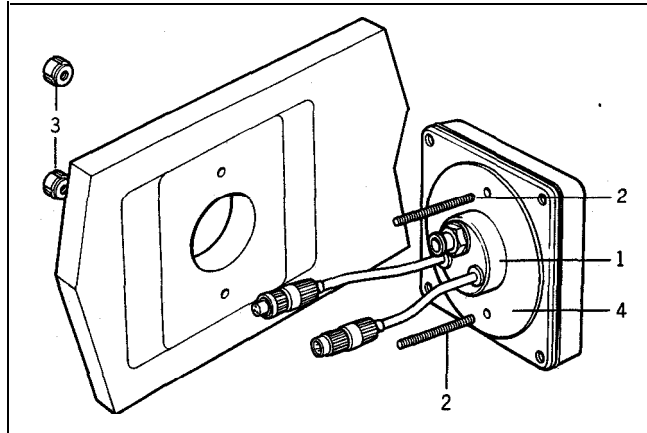
1 Cable boss 2 *Fixing* studs 3 Thumb nuts 4 Gasket

1.2 Mounting Procedure

1. Make sure that the selected location is clean, smooth and flat.

2. Apply the self-adhesive template (supplied) to the selected location and mark the centres for the fixing studs (2) and the cable boss (1).

3. Drill two 4mm (5/32in) clearance holes for the fixing studs (2) through the bulkhead. Remove the template.

4. Cut the clearance hole for the cable boss (1) using a 50mm (2in) diameter cutter.

5. Screw the two fixing studs (2) into the control head.

6. Pass the SeaTalk cable and transducer tails through the cable-boss (1) clearance hole.

7. Assemble the control head to the bulkhead and secure from behind using the thumb nuts (3).

Bracket   Mounting

The ST50 Plus **GPS/Navdata** can, as an alternative, be bracket mounted using the **Autohelm** Mounting Kii **(Catalogue** No. **D130).**
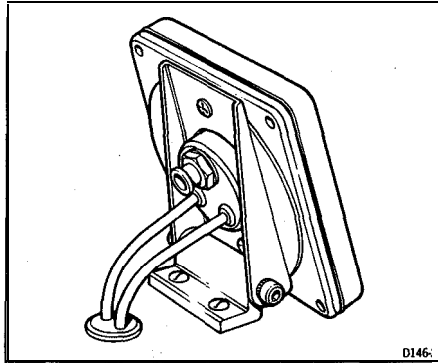
Note: Because the instrument breathes through the vent in the rear case, this bracket is **for** interior use only.

flush Mounting

A flush mounting kii is available for installations where a flush mount is required or more desirable. Full installation instructions are provided with the **kit (Catalogue** No. **D187).**
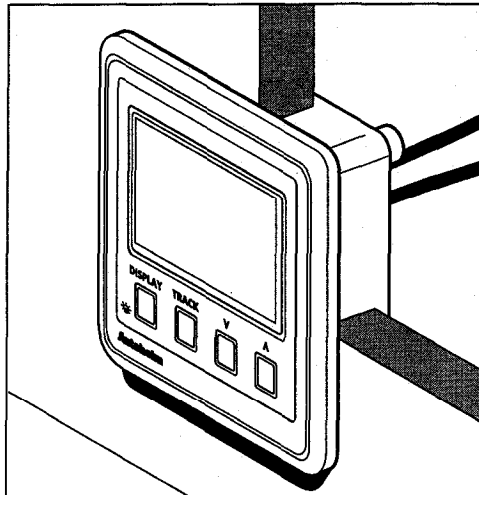
1.3 Power Supply (stand-alone operation)
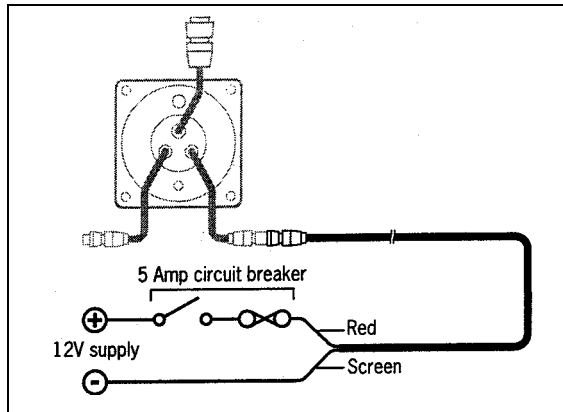
1.   Connect the 2m **(6ft.)** power supply cable to the distribution panel.

2.   Cut the cable to length and connect the red wire to the **+12V** terminal and screen to the OV terminal.

3.   Cut back and insulate the yellow wire.

4.   Protect the circuit with a 5A circuit breaker.

Longer runs to the vessels power **supply** can be made using one of the **SeaTalk** Extension Cables.

1.4 Power Supply **(SeaTalk** operation)

All instruments in a **SeaTalk** system receive power and information from the **SeaTalk** bus. Each instrument has two **SeaTalk** connectors **(3** pin) on 150mm **(6in)** tails. To supply power and information to the instrument simply plug the tails from adjacent instruments into the ST50 **GPS/** Navdata tails.
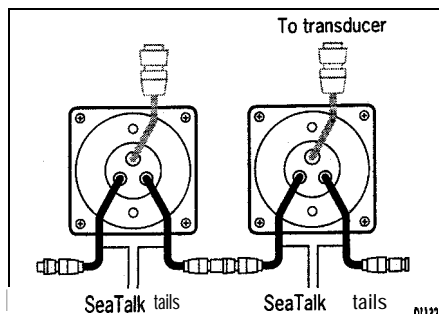
1.5 Connection of Separated Instruments

Separated instruments can be connected using one of the range of SeaTalk Extension Cables. These cables are supplied with a SeaTalk connector fitted to each end. A junction box can be used to join the cable if it is cut for easier routing or shortening.

If preferred, any 2 core, screened cable conforming to the following specification may be used instead of the SeaTalk cable.

- 22 AWG, 2 core screened cable with a minimum copper area of $0.5mm^2$.
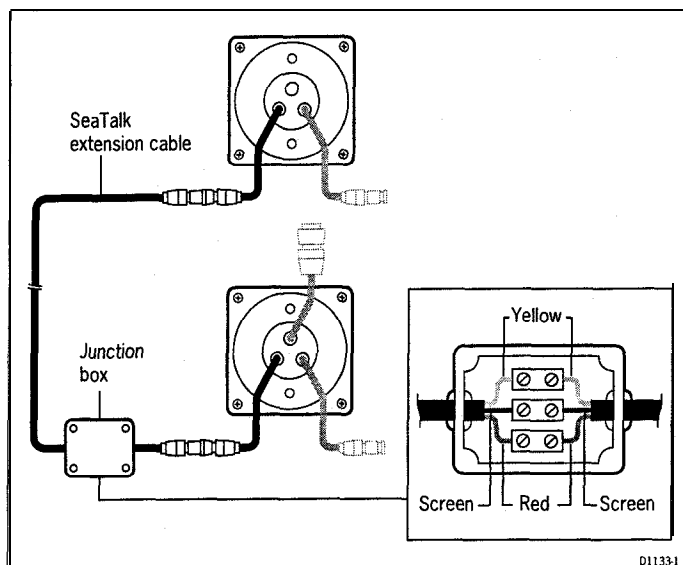
1.6 Ring Connection

Installations with a large number of instruments on a **SeaTalk** bus may require a second **ring-main** connection to the power supply breaker to prevent excessive voltage drops. Whether a second ring main is required can be determined from **the** following:

Cable run upto 10m (33ft)

Single connection: 13 instruments maximum

Second connection: 26 instruments maximum

Cable run upto 20m (66ft)

Single connection: 7 instruments maximum

Second connection: 13 instruments maximum

The second **ring-main** should be connected to the spare lead on the last instrument in the chain and directed back to the circuit breaker.

1.7 Connection to **SeaTalk** Compatible Autopilots

If the installation includes a **SeaTalk** compatible Autopilot, ST50 Plus instruments may be connected to the **SeaTalk** bus at any point. No independent connection to the 12V power supply is necessary as the instruments receive power from the Autopilot course computer.

To autopilot
SeaTalk BUS
Connection

To any further
ST50   Instruments
or Autopilot
Control Units
D1134-1
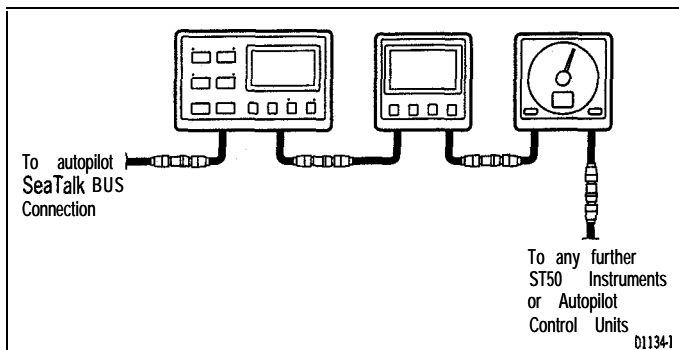
1.8 Connection to a Position Transducer

The ST50 Plus GPS/Navdata receives basic navigation information from a position transducer via NMEA.

The position transducer should be connected to your SeaTalk system in one of the following ways:

1. Directly to the ST50 Plus GPS/Navdata NMEA port.

Position Transducer

NMEA OUT

Red (Data in + ve)   Blue (Data in - ve)

GPS/Navdata

Power   To other SeaTalk instruments or autopilot control units
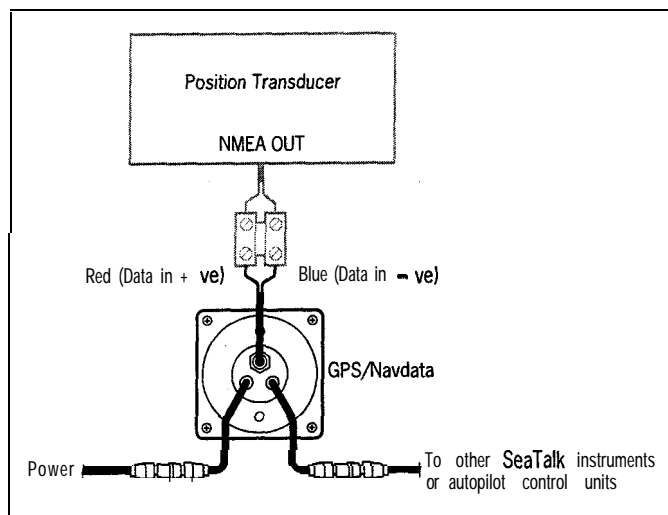
2. Via an Autohelm Navcenter (NMEA 0183 data out port)

Navcenter

Navdata

NMEA
PRINTER SeaTalk

Power

White
(Data in + ve)   Green
(Data in - ve)

Position Transducer

NMEA OUT
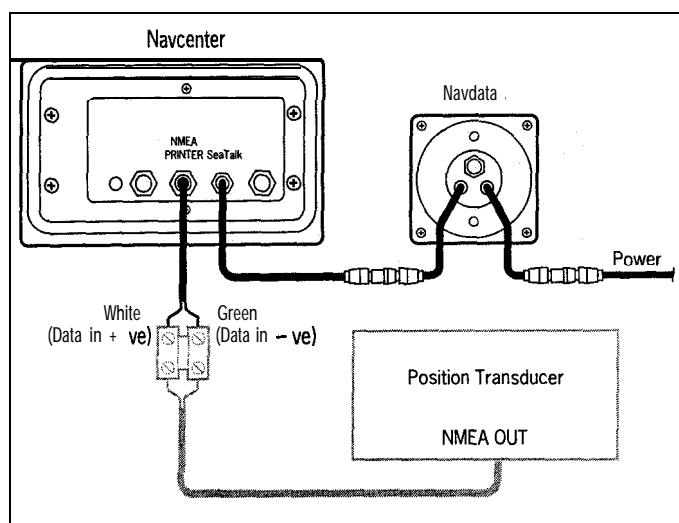
Note: When used with a Navcenter, the ST50 Plus **Navdata/GPS** can only be used in 'Repeater ' mode (refer to Chapter 5, Calibration for details).

Refer to the Navcenter handbook for accepted NMEA sentences.

The Navdata is also capable of receiving navigation information directly from a Navstar 2000D **Decca** system. Connection is identical to NMEA but the instrument must be setup in Calibration to receive the special Navstar data format (refer to Chapter **5).**

Chapter 2: Fault Finding and Maintenance

2.1 Fault Finding

All **Autohelm** products are, prior to packing and shipping, subjected to comprehensive test and **quality** assurance programmes. However, if a **fault** arises with the ST50 Plus **GPS/Navdata,** the following table will help to identify the probable cause and provide the most likely cure.

Fault	Cause	Action
Instrument display blank.	No supply.	Check supply.
		Check cabling and security of **SeaTalk** connectors.
		Check fuse/breaker.
		Return unit for repair.
instrument displays 'CODELOCK set', ENTER CODE	The 'Code Lock' feature has been set.	Enter correct code number.
No navigation information.	Loss off information from position transducer.	Check transducer signal status.
		Check cabling between transducer and **GPS/Navdata** or Navcenter
No exchange of information between **SeaTalk** instruments.	**SeaTalk** cabling problem.	Check security of **SeaTalk** connectors.
		Disconnect instruments one by one to isolate faulty unit.
Failure of a group of instruments in **SeaTalk** chain.	**SeaTalk** cabling/connector problem.	Check security of **SeaTalk** connectors and non-functioning units.

T170-1

2.2 Maintenance

Instrument

Certain atmospheric conditions may cause condensation to form on the control head window. This will not harm the instrument and can be cleared by increasing the illumination setting to Level 3.

Chemical and abrasive materials must not be used to clean the ST50 Plus GPS/Navdata instrument; if it is dirty, clean with a soft, damp cloth.

Transducer

Refer to the Installation and Maintenance instructions supplied with the transducer.

Cabling

Examine all cables for chafing or damage to the outer shield and, where necessary, replace and resecure.

Advice

For advice, or further information regarding the installation of this product, please contact the Autohelm product Support Department or your own National Distributor.

Chapter 3: Operation

The **Navdata/GPS** allows you to enter and store **upto** 99 waypoints. A route can be constructed as any number of sequential waypoints **(1, 2, 3 4)** or, alternatively, a single sail plan of up to 10 waypoints selected in any order (e.g. **2, 4, 1).**
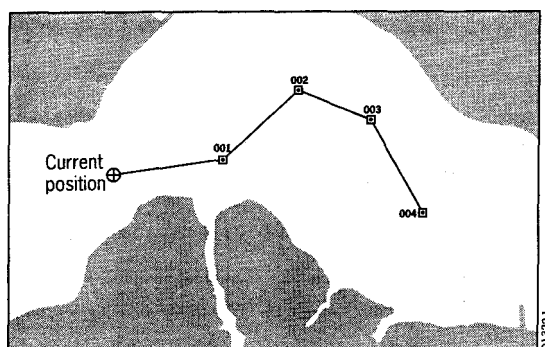
Waypoints tracked sequentially
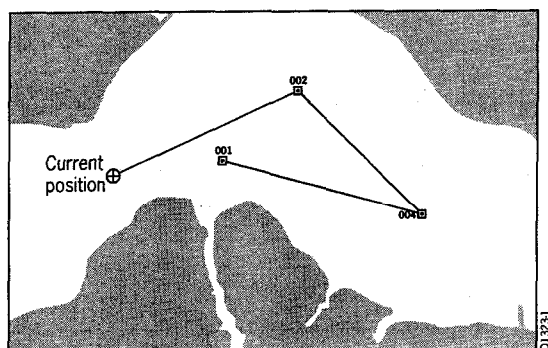
Waypoints tracked using Sail Plan

The features described above, together **with** all the other operational features of this instrument, are covered in this section.

The primary displays are cycled using **DISPLAY** or **TRACK** and related functions selected using the V and A keys.

3.1 Display key
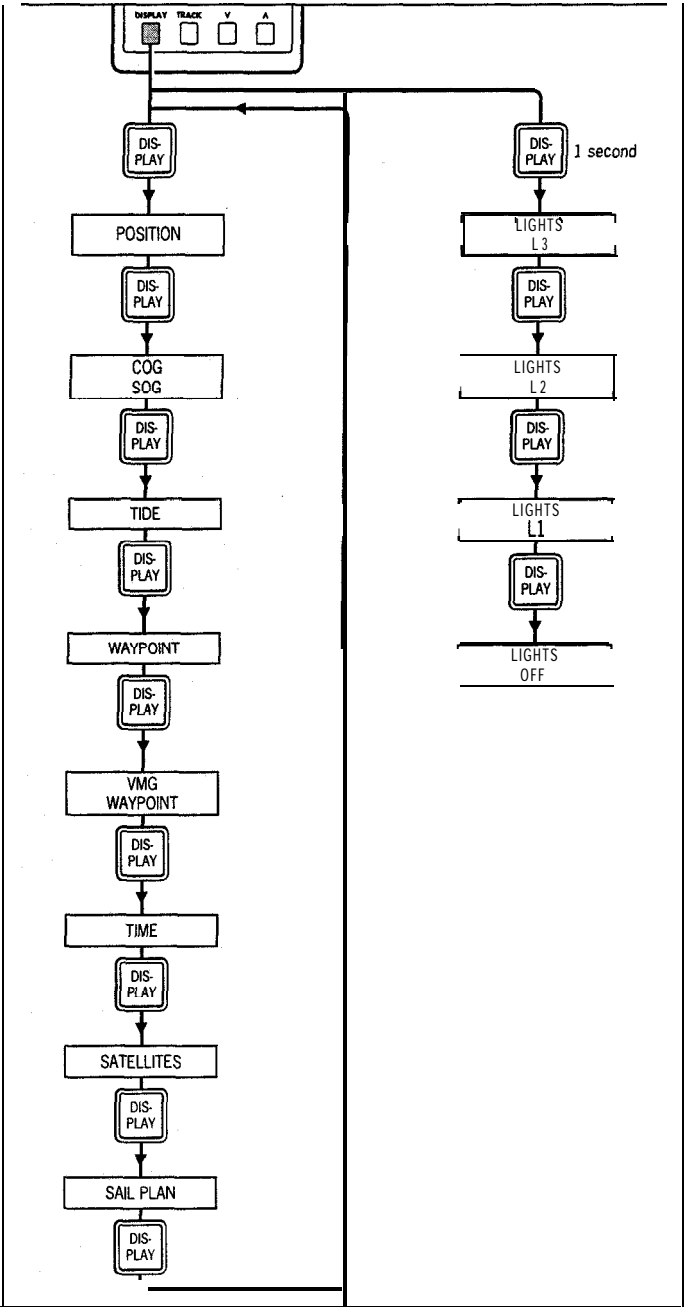
Display Key Notes

Position

To toggle longitude and latitude, press **V** or A.

Longitude and latitude can be displayed at the same time by pressing V and **∧** together momentarily.

To return to the individual longitude and latitude displays, press V or **∧**.

COG/SOG

Press V or **∧** to toggle between COG/SOG (Course Over Ground/Speed Over Ground) and COG/BTW (Course Over Ground/Bearing to Waypoint).

Tide

Tidal information can only be displayed if SeaTalk speed through the water and compass data is present on the SeaTalk bus.

Waypoint

This display is only available when the instrument is in master mode, a Latitude and Longitude is present on the SeaTalk bus or NMEA and the unit is tracking to a valid waypoint.

In repeater mode this display is only present if a valid bearing and distance to waypoint is available on the SeaTalk bus or NMEA.

When the waypoint display is active, providing a target waypoint has been entered, ETA (Estimated Time of Arrival) and XTE (Cross Track Error) can be selected by pressing **V** or **A.**

VMG to Waypoint

The VMG-WP^ (velocity Made Good to Waypoint) display can be toggled with VMG-GD^ (Velocity Made Good over Ground) by pressing V or A.

Time

The time display may be toggled with the current date by pressing **V** or **∧**.

Satellites

The satellite (SATS) display shows the number of satellites currently being tracked and can be toggled with horizontal dilution of position (HDOP) by pressing **V** or A.

3.2 **Waypoint** Display and Entry

This section describes how to: set up a waypoint, select a waypoint as a target waypoint, change a target waypoint, reverse a route of waypoints for a homeward journey and, finally, how the instrument can automatically or manually advance to the next waypoint.

Waypoint Entry

	Action	Display Shows
1	Press TRACK	LAT (Latitude) and waypoint number
2	Select the desired waypoint number by pressing and holding UP or DOWN to scroll through the numbers (1 to 99)	LAT/LON and waypoint number
3	Once you have selected a waypoint number, press Up and DOWN together momentarily	Flashing indicator N, S, E or W
4	Press UP or DOWN to change selection	N to S or W to E
5	Press UP and DOWN together momentarily	Degrees flash
6	Press UP or DOWN to enter degrees	
7	Press UP and DOWN together momentarilv	Minutes flash
8	Press UP or DOWN to enter minutes	
9	Press UP and DOWN together momentarily	Seconds flashing
10	Press UP or DOWN to enter seconds	
11	Press UP and DOWN together momentarily to store waypoint Latitude	
12	Press UP	LON (Longitude)
13	Repeat actions 3 through 11 to setup waypoint Longitude	
14	Repeat actions 2 through 13 for each wavooint	

3.3 Sail Plan

Sail Plan allows you to select upto 10 of a possible 99 waypoints and arrange them in any order, e.g. 7, 10, 15 etc. Once sail plan has been selected and track engaged (refer to Chapter 3.21, the vessel will follow the selected waypoints.

Setting Sail Plan

	Action	Display Shows
1	Cycle DISPLAY until PLAN is displayed	PLAN (0 or 1)
2	Press the UP or DOWN key to turn Sail Plan on or off	PLAN 0 (off) or PLAN 1 (on)
3	Press DISPLAY	SEL WPT, 1 (selection) followed by 1 (Waypoint number)
4	Press the UP and DOWN keys together momentarily	Waypoint number flashes
5	Press the UP or DOWN key to select a waypoint number between 1 and 99	SEL WPT 1 '5'
6	Press UP and DOWN momentarily to save waypoint number	SEL WPT 1 5
7	To make additional selections, press the UP key to change selection and then repeat actions 4, 5 and 6 to enter a waypoint number.	
8	To return to normal operation, press DISPLAY or TRACK	Normal display

T180-2

Note: After DISPLAY has been pressed to return to normal operation, the next time sail plan is viewed it will default to the first waypoint in the plan.

Changing an Existing Sail Plan Waypoint Number

The waypoint number assigned to a selection can be changed at any time by carrying out the following actions:

1. Cycle **DISPLAY** until SEL and WPT is displayed

Note: Plan must be set to 1 to view this display.

2. Press ∧ to choose the required SELection.
3. Carry out actions 4, 5 and 6 above.
4. Press **DISPLAY** or **TRACK** to return to normal operation.

Turning Off a Sail Plan Waypoint Selection

A Sail Plan waypoint selection can be turned off as follows:

1. Go to the Sail Plan SELection containing the waypoint you wish to turn off.
2. Press V and ∧ momentarily so that the waypoint number flashes.
3. Cycle V or ∧ until the waypoint number changes to '--"(before 1 and after 99).
4. Press V and ∧ momentarily to store the setting.

Note: If, for example, you turn a waypoint off at selection 5 out of 10, the vessel will track from 1 to 4 only (a Sail Plan always starts at selection 1).

At the end of a Sail Plan
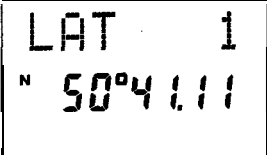
At the end of a sail plan route, the display will change to show the bearing and distance to the last waypoint.

Track Control

Selecting a Target *Waypoint*

Once the latitude and longitude of a waypoint has been entered, or a sail plan has been setup, the waypoint can then be selected as a target waypoint:

1. Press **TRACK** to display waypoint information.

```
LAT      1
N  50°41.11
D142.33-1
```

2. Display the intended target waypoint number UT or LONG) using V o r h .
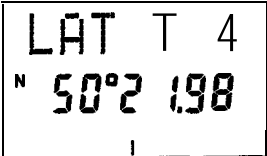
Note: If the sail plan is selected, the first waypoint will automatically be displayed.

```
LAT       4
N  50°2 1.98
D142.35-1
```

3. Press **TRACK** to select track control.

```
LAT T 4
N  50°2 1.98
D142.34-2
```

This defines a track from the current position to the displayed waypoint.

The following navigation information will be displayed on the GPS/Navdata and transmitted onto the SeaTalk bus:

- Cross Track Error (XTE)
- Bearing to Target Waypoint
- Distance to Target Waypoint
- Target Waypoint Number
- ETA at Target Waypoint
- VMG to Target Waypoint

Press TRACK to exit track control. Transmission of cross track error (XTE) onto the SeaTalk bus will stop, but waypoint distance, bearing and number will continue.

Changing Target Waypoint

The target waypoint can be changed as follows:

1. Press TRACK to enter waypoint display mode.

2. Press TRACK again to exit track control.

3. Press V and Λ to select the new waypoint number (LAT or LONG).

4. Press **TRACK** to enter track control and select the displayed waypoint as the target.

Navigation information relating to the new target waypoint will now be displayed and transmitted onto the SeaTalk bus.

Waypoint Advance

The GPS/Navdata will automatically advance to the next adjacent waypoint when it is within a pre-defined distance of a target waypoint. Waypoint advance can also be manually selected to join a route part way through, or simply cut a corner, by advancing the target waypoint.

1. Press **TRACK** to select track control.

2. Press **TRACK** for 1 second to advance the target waypoint by one.

The display will show the new target waypoint. This procedure can then be repeated until the desired target waypoint is reached.

At the end of a route the GPS/Navdata will automatically exit track control.

Note: In Sail Plan mode waypoint advance is to the next waypoint in the plan (e.g. 10, 7, 12 etc.), whereas normal track mode advances to the next sequential waypoint (e.g. 5, 6, 7 etc.).

Route Reversal

Once a passage is complete the route or sail plan can be reversed for use on the homeward passage.

To reverse a route:

1. Press **TRACK** to enter the **waypoint** display.

2. Select the last **waypoint** number in the route or sail plan using V and A.

3. Press TRACK to enter track control.

4. Press V within 2 seconds to reverse the route or sail plan direction.

The display will show ROUTE/REVERSE for 10 seconds.

The **GPS/Navdata** will now automatically advance through the route in reverse order and end up back at the start of a route.

3.4 Man Overboard
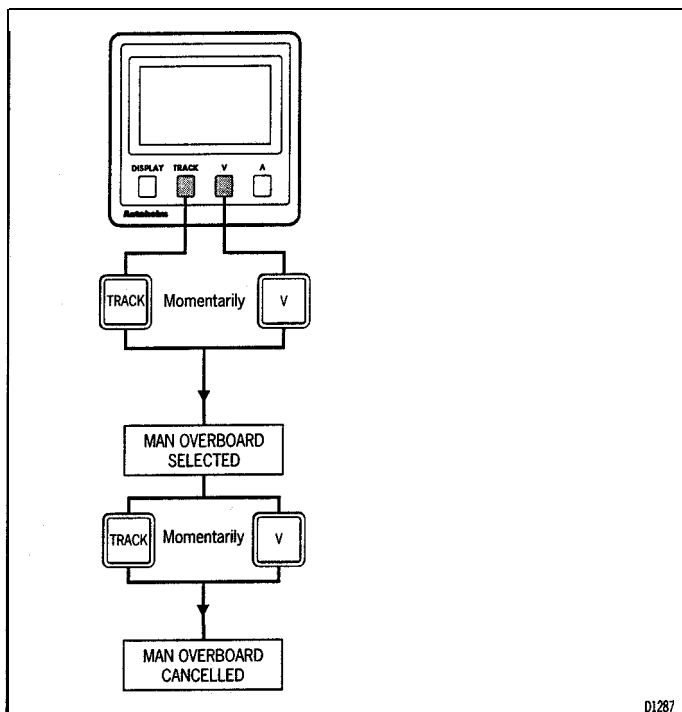
Man Overboard stores the current position and calculates the distance and bearing to return to that point.

The distance and bearing to the 'Man Overboard' position will replace the target waypoint distance and bearing display.

WARNING:
REMEMBER THAT, IF **SELECTIVE AVAILABILITY** (REFER TO GPS TRANSDUCER HANDBOOK FOR FULL **DETAILS)** IS **ACTIVE,** THE **POSITIONAL** ERRORS CAN BE AS LARGE AS **150M (500FT)** AND, IF THERE IS A **TIDE,** THE PERSON OVERBOARD **WILL** BE CARRIED AWAY FROM THE MAN OVERBOARD POSITION. FOR THESE REASONS, IN A MAN OVERBOARD **SITUATION,** ALWAYS NOMI-NATE SOMEONE TO KEEP **CONTINUOUS VISUAL** CONTACT **WITH** THE PERSON OVERBOARD.

3.5 Anchor Watch
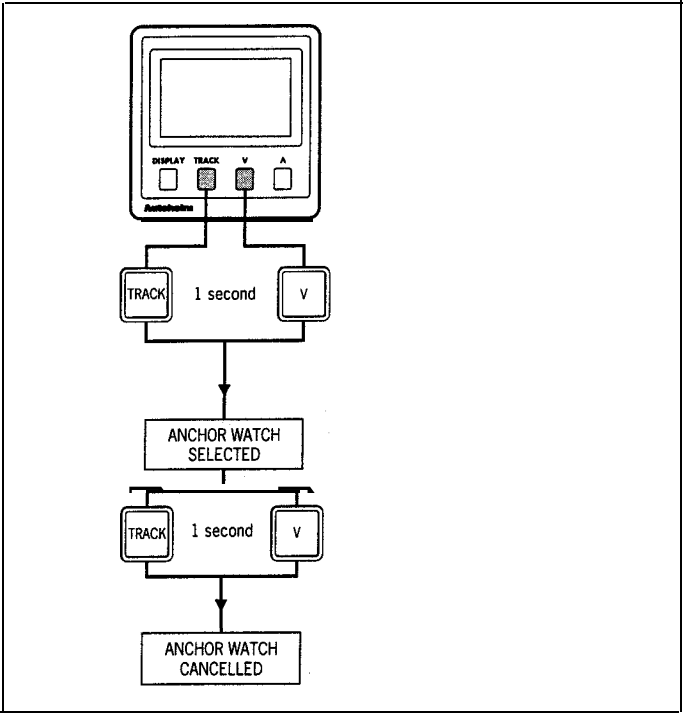
Anchor Watch stores the current position and calculates the distance and bearing to that point.

The distance and bearing to anchor replaces the waypoint distance and bearing display.

Note: Remember that, when selective availability (refer to the GPS position transducer handbook for details) is active, the alarm range should not be set to less than 0.08nm as positional errors will trigger the alarm.

3.6 Dead Reckoning Mode

If the ST50 Plus **GPS/Navdata** fails to receive a position signal it will sound an alarm and display 'NO DATA for 10 seconds.

```
NO DATA

- - -  - - - -
```
D142.32-1

If the vessels speed and heading is available on the **SeaTalk** bus, the **GPS/** Navdata will automatically calculate a 'dead reckoned' position using the **SeaTalk** data. The display will automatically change to display a **'DR'** (dead reckoned) message.

```
LAT DR^

N  50°50.63
```
D340-l
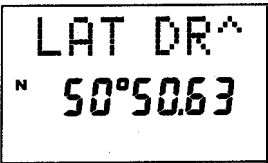
If the position signal returns, the **GPS/Navdata** will automatically start to operate normally.

When there is no posiion signal, all transmissions of **waypoint** information will stop and the selection of track control is prevented.

3.7 Operation with **SeaTalk** Autopilots

When a **SeaTalk** autopilot is included in the system, track control is available in the cockpit using the autopilot control unit.

The autopilot control unit allows you to:

. put the **GPS/Navdata** into track control

- redefine your desired track from the current position to the target **waypoint**

- advance your target **waypoint** along your preplanned route

- look at the bearing and distance to target waypoint, target **waypoint** number and cross track error.

The **GPS/Navdata** has an automatic **waypoint** advance feature that allows you to sail a complete preplanned route under autopilot control without leaving the cockpit.

Autohelm have combined the **GPS/Navdata** and autopilot together with safety uppermost in mind.

When the autopilot is in track mode and the **GPS/Navdata** advances to the next **waypoint** the following will happen:

- **the** autopilot **waypoint** advance alarm will sound

- the bearing to the next **waypoint** and direction in which the vessel will turn will be displayed on the autopilot control unit.

Once you have made sure that it is safe to turn, press TRACK on the autopilot to turn the vessel onto the new bearing and start tracking to the new target waypoint.

3.8 Operation with a Navcenter

The Navcenter is a much simpler and more powerful way of setting waypoints and routes. This is due to its ability to display them graphically on an electronic chart.

For this reason, all waypoints and route planning should be done on a Navcenter whenever there is one included in the system.

When a Navcenter is included, the ST50 Plus GPS/Navdata should be set to REPEAT mode (refer to Chapter 5, Calibration).

In REPEAT mode the waypoint display and enter functions of the GPS/ Navdata are turned off. The SeaTalk system then uses the waypoints and routes set on the Navcenter. The GPS/Navcenter TRACK key can then be used to control the Navcenters track functions as follows:

1. Put the Navcenter onto track control
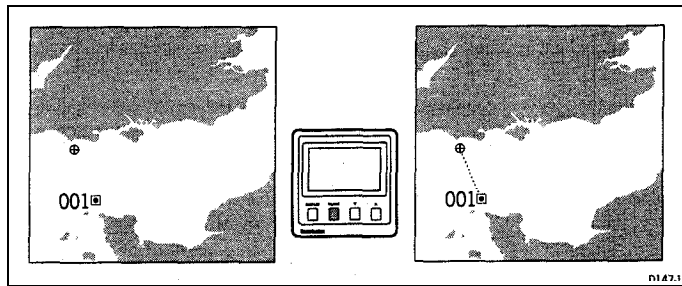
Track may be redefined at any time from the vessels current position to the target waypoint by a single press of the TRACK key. This will reset cross track error to zero.

2. Advance Navcenter to the next waypoint
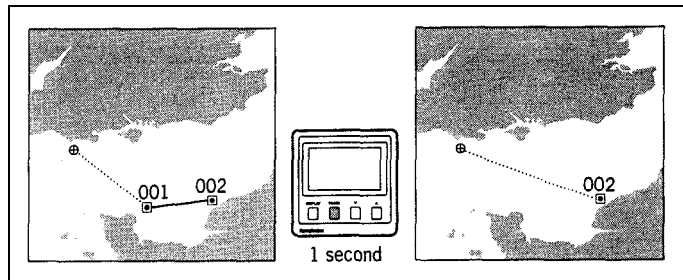
To advance the Navcenter to the next waypoint in a route, press and hold TRACK on the GPS/Navdata for 1 second.

3.9 Position Correction

If you plot your current position on a chart that uses a different datum to that set in the position transducer you may notice an error. If an accurate current position is known a correction can be entered to allow for the different chart datum.

Radio position transducers (Decca and Loran) suffer from radiowave interference which can be caused by atmospheric changes, local land masses and time of day. This interference produces positional errors. If an accurate current position is known, a correction can be entered. It is important that this is only used to correct for land mass induced errors. It should only be set up during the middle of the daylight period and when atmospheric conditions are fairly stable.

Position Correction Setting

1. Press and hold DISPLAY and **TRACK** together for 2 seconds.

2. Cycle **DISPLAY** until COR OFF is displayed.

3. Press **V** or **∧** to select COR ON.

4. Press **DISPLAY** to show LAT (Latitude). Use the V or **∧** keys to adjust the displayed position.

5. Press **DISPLAY** to show LON (Longitude). Use the **V** or **∧** keys to adjust the displayed position.

6. Press and hold **DISPLAY** and **TRACK** for 2 seconds to store the adjusted **Latitude** and Longitude.

The instrument will now display the corrected position.

3.10 Display Contrast

The display contrast can be adjusted to achieve optimum legibility at any angle.
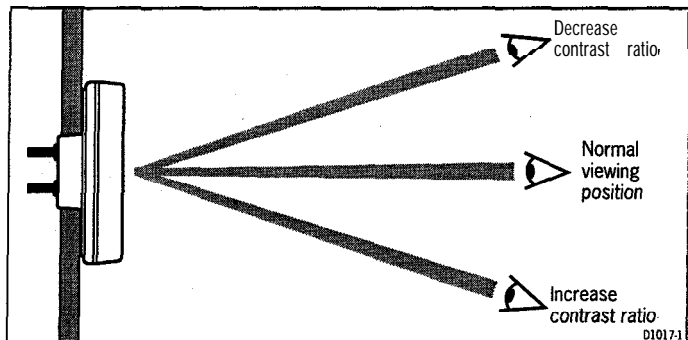
1. Momentarily press **DISPLAY** and TRACK together.

2. **Press** V or **∧** to increase or decrease the contrast setting (the range is between I and **15).**

3. Press DISPLAY and TRACK together momentarily to store the selected contrast setting.

A high setting will suit installations where the control head will be viewed from above.

Chapter 4: CODE Lock Security

The ST50 Plus range incorporates an anti-theft feature called 'CODE Lock. Designed to protect individual instruments or complete systems in vulnerable areas, 'CODE Lock is a four digit number that you programme into the permanent memory of a selected 'master' instrument.

Note: A 'master' instrument is a digital unit on which the code number can be entered, and then, if part of an integrated system, transmitted to other ST50 Plus intruments.

This facility means that, should a CODE Locked instrument be removed from the vessel without your permission, it cannot be operated without the four digit **security** number.

'CODE Lock can be used in one of three modes:

Mode 1: Off

As it leaves the factory 'CODE Lock is set to off. In this mode the **instrument** will operate normally when it is switched on, however, the unit will not be protected by the **anti-theft** feature.

Mode 2: 'CODE Lock' Once-Only **Entry** (page 29)

This mode is designed for systems with *a* digital ST50 Plus instrument in a safe, belowdecks location. This instrument can then be used as a 'master' to enter the four digit code number and, when the power is switched on, automatically transmit the code to all the instruments in the system. The advantage of this mode is that, with the master safely below deck, code entry via the keypad is a **once-only** operation on installation.
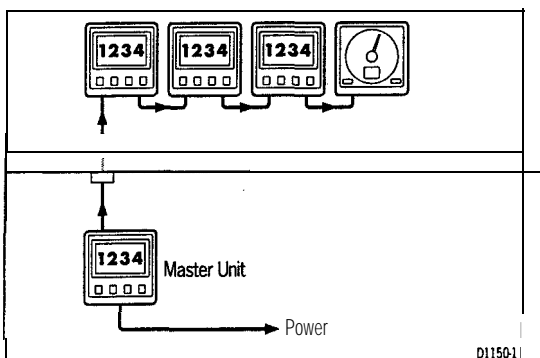
Once 'CODE Lock is set the system operates normally as soon as the power is switched on. In other words, the 'CODE Lock system is invisible.

Mode 3: 'CODE Lock' input at Power-On (page 30)

In the 'Power-On mode', the ST50 Plus is configured so that you have to enter the four digit number on a 'master' digital instrument every time the system is switched on. **Until this number is entered the instrument(s) will not operate.**

This mode is particularly useful when you are unable to position a 'master instrument below decks and, therefore, all the vessels valuable instrumen tation is left in a vulnerable area.
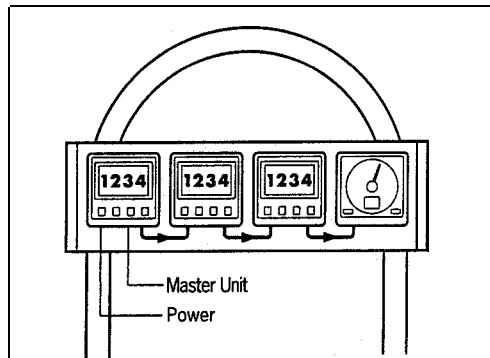
Should a CODE Locked instrument be removed from the system, it will not operate until the correct four digit securii number is entered or received.

If your selected master instrument fails for any reason, the security code number can be entered via another ST50 Plus instrument in the system. However, until another instrument is set as a master or the existing master is replaced, the security code will have to be entered every time the system is switched on.

Note:
A warning sticker is provided with each instrument. If you have set 'CODE Lock', position this warning sticker in a prominent location to deter potential thieves.

Setting Up the Security Code

When the ST50 Plus GPS/Navdata is switched-on for the first time the security feature is set to off. To turn the 'CODE Lock feature on, proceed as follows:

Once Only Entry

	Action	Display Shows
1	Press and DISPLAY and TRACK together for 4 seconds	CAL after 2 seconds and Z146VXX after 4 sec.
2	Press DISPLAY	CODELOCK OFF
3	Press TRACK	'_' - - -
4	Press UP or DOWN to select first number	1 _ _ _
5	Press TRACK to accept number	1'_ _ _
6	Press UP or DOWN to select second number	1 2 _ _
7	Press TRACK to accept number	1 2'_ _
8	Press UP or DOWN to select third number	1 2 3 _
9	Press TRACK to accept third number	1 2 3'_'
10	Press UP or DOWN to select fourth number	1234
11	Press TRACK to accept code	'1 2 3 4
12	Press TRACK	PWR ON?
13	Leave PWR ON? flashing for 10 seconds	CODELOCK SET
14	To exit CODELOCK, press DISPLAY and TRACK together for 2 seconds	Normal operation

If you do not exit 'CODELOCK SET' within 10 seconds the display will change to CANCEL CODE. You now have the option of cancelling the code, by pressing TRACK to return to the _ _ _ display, or exit as described in action 14 above.

Your Code Number

For future reference, enter your chosen code number into the box below.

For obvious reasons, please store this handbook in a safe place.

Operation

Once only 'CODE Lock' entry is invisible once it has been set.

On Power-Up

	Action	**Display** Shows
1	Press and DISPLAY and TRACK together for 4 seconds	CAL after 2 seconds and Z146VXX after 4 sec.
2	Press DISPLAY	CODELOCK OFF
3	Press TRACK	ı⌐ - - -
4	Press UP or DOWN to select first number	1 _ _ _
5	Press TRACK to accept number	1ı-ı- -
6	Press UP or DOWN to select second number	1 2 _ _
7	Press TRACK to accept number	1 2ıˌı_
8	Press U P or˙DOWN to select third number	1 2 3 _
9˙	Press TRACK to accept third number	1 2 3ıˌı
10	Press UP or DOWN to select fourth number	1 2 3 4
11	Press TRACK to accept code	´1 2 3 4
12	Press TRACK	FWRON?
13	Press TRACK within 10 seconds	CODELOCK SET
14	To exit CODELOCK, press DISPLAY and TRACK **together for** 2 seconds	Normal operation

T101-2

If you do not exit 'CODELOCK SET' within 10 seconds the display will change to CANCEL CODE. You now have the option of cancelling the code, by pressing TRACK to return to the display, or **exit** as described in action 14 above.

Your Code **Number**

For future reference, enter your chosen code number into the box below.

For obvious reasons, please store this handbook in a safe place.

Operation

When the unit is powered on you are prompted to enter the code number. To enter the number, carry out actions 4 to 12 above and press TRACK.

Chapter 5: Calibration

The ST50 Plus **GPS/Navdata** can be set to account for local time differences, position correction, magnetic variation, and other setup and installation related parameters.

5.1 Initial Calibration

DISPLAY TRACK ▽ △

DIS-PLAY   2 seconds   TRACK

CAL

DIS-PLAY

OPERATING MODE

DIS-PLAY

DATA PORT FORMAT

DIS-PLAY

VARIATION

DIS-PLAY

LOCAL TIME CORRECTION

DIS-PLAY

ANCHOR WATCH DISTANCE

DIS-PLAY

WAYPOINT ARRIVAL CIRCLE

DIS-PLAY

POSITION CORRECTION

DIS-PLAY

D12831
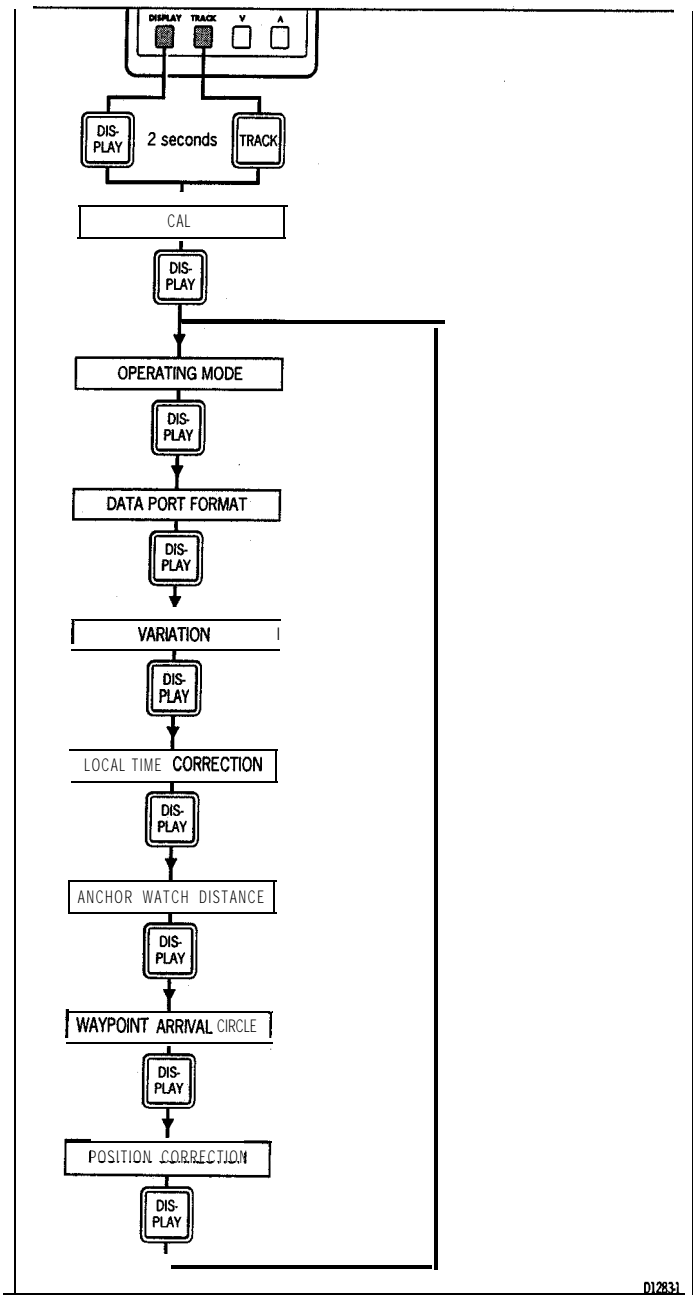
Initial Calibration Notes

Operating Mode

For normal operation the operating mode should be set to 'MASTER'; this allows waypoints to be entered.

If the system includes a Navcenter, or you wish to use waypoints entered into another manufacturers equipment, the operating mode should be set to 'REPEAT'. In this mode the **GPS/Navdata** provides cockpit repeater capability only.

Data Port Format

This should be set to NMEA for use with the **Autohelm** GPS receiver or Navstar if using the Navstar 2000D **Decca** receiver.

Variation

This allows the **GPS/Navdata** display to calculate and display **waypoint** bearings in degrees magnetic. The variation taken from a local chart should be used.

Local Time Correction

The position transducers generally transmit Greenwich Mean Time. The local time **difference** should be entered in hours.

Anchor Watch Distance

This sets the alarm distance for the anchor watch. If selective availability is active, it should be set to no less than 0.08nm, 160m (520ft).

Waypoint Arrival Circle

The **waypoint** arrival circle defines the distance from the target **waypoint** at which the arrival alarm sounds.

Position Correction

If you plot your current position on a chart that uses a different datum to that setup in the position transducer you may notice an error. If an accurate position is known, a correction can be entered to allow for the **different** chart datum (refer to Chapter 3.8 for setting details).

Exit initial Calibration

Press and hold **DISPLAY** and **TRACK** for 2 seconds to return to normal operation.

5.2   Intermediate   Calibration

D1285-
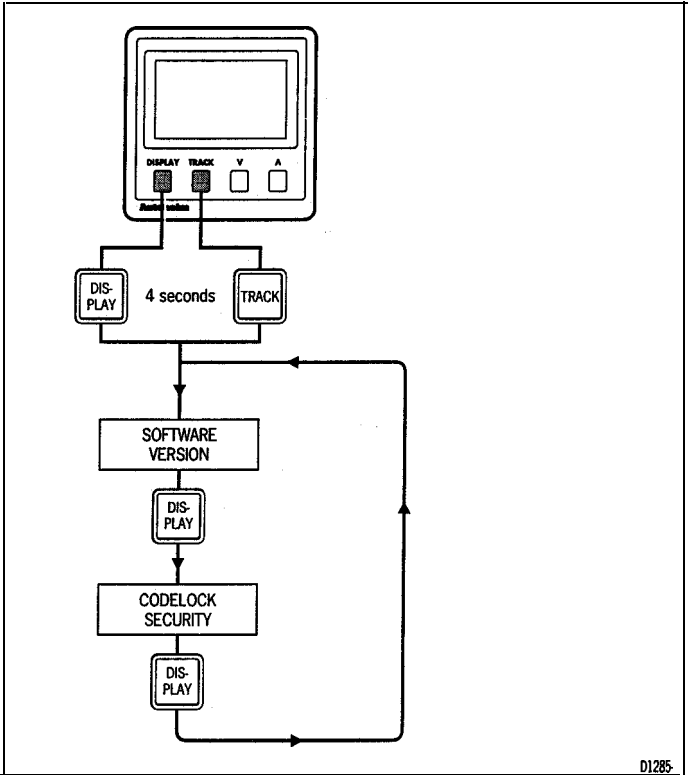
Intermediate Calibration Notes

Software Version

This display shows the unit part number followed by the software version number.

Security Code

Full details on how the 'CODE Lock' security feature works, is set-up, and stored are given in Chapter 4.

Exii Intermediate Calibration

Press and hold **DISPLAY** and **TRACK** for 2 seconds to return to normal operation.

5.3   Extended   Calibration

```
                    DISPLAY  TRACK   V    A


        ┌────┐                         ┌─────┐
        │DIS-│  14 seconds             │TRACK│
        │PLAY│                         └─────┘
        └────┘

            ┌──────────────────┐
            │   CALIBRATION     │
            ├──────────────────┤
            │        I          │
            └──────────────────┘

        ┌────┐                         ┌───┐
        │ V  │    momentarily          │ ^ │
        └────┘                         └───┘


    ┌────────────────────┐              ┌────┐
    │CALIBRATION ON/OFF  │              │DIS-│
    └────────────────────┘              │PLAY│
         ┌────┐                         └────┘
         │DIS-│                    ┌──────────┐
         │PLAY│                    │  BOAT    │
         └────┘                    │  SHOW    │
                                   └──────────┘
    ┌────────────────────┐              ┌────┐
    │  SPEED  DAMPING    │              │DIS-│
    └────────────────────┘              │PLAY│
         ┌────┐                         └────┘
         │DIS-│                    ┌──────────┐
         │PLAY│                    │   TIDE   │
         └────┘                    │ DAMPING  │
    ┌────────────────────┐         └──────────┘
    │   HEADING          │              ┌────┐
    │   DAMPING          │              │DIS-│
    └────────────────────┘              │PLAY│
         ┌────┐                         └────┘
         │DIS-│                    ┌──────────┐
         │PLAY│                    │   VMG    │
         └────┘                    │ DAMPING  │
    ┌────────────────────┐         └──────────┘
    │  WIND  SPEED       │              ┌────┐
    │  DAMPING           │              │DIS-│
    └────────────────────┘              │PLAY│
         ┌────┐                         └────┘
         │DIS-│                    ┌──────────┐
         │PLAY│                    │   COG    │
         └────┘                    │ DAMPING  │
    ┌────────────────────┐         └──────────┘
    │   WIND             │              ┌────┐
    │ ANGLE  DAMPING     │              │DIS-│
    └────────────────────┘              │PLAY│
         ┌────┐                         └────┘
         │DIS-│                    ┌──────────┐
         │PLAY│                    │   SOG    │
         └────┘                    │ DAMPING  │
                                   └──────────┘

                                              D12821
```
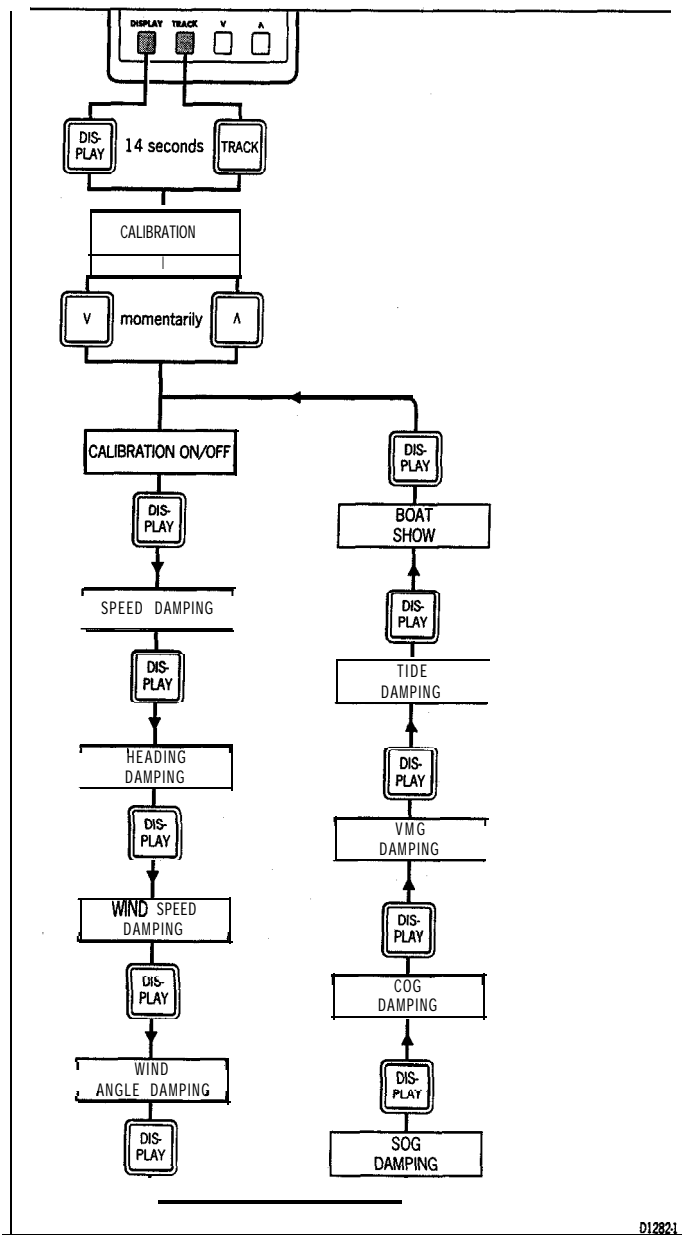
Extended Calibration Notes

All of the extended calibration screens are adjusted using the
V and/or Λ keys.

Calibration   On/Off

This feature allows you to protect your selected settings against acciden-
tal change. When lock is enabled the initial and intermediate calibration
settings cannot be modified.

CAL 1 = Calibration unlocked, i.e. normal access

CAL 0 = Calibration locked, i.e. no access

Once locked, calibration can only be unlocked by entering extended
calibration and selecting calibration unlocked.

Damping

Damping controls the averaging applied to the displayed data. The range
is 1 to 15, with the factory default set to 4. The damping displays
contained in extended calibration are:

- Speed (D SPEED)
- Heading (D HEAD)
- Wind speed (D WIND S)
- Wind angle (D WIND Al
- Speed Over Ground (D SOG)
- Course Over Ground (D COG)
- Velocity Made Good (D VMG)
- Tide (D TIDE)

The damping displays are adjusted using the V and Λ keys.

Boat Show Mode (BSHOW)

'Boat Show' mode is a dealer demonstration program only. Under no
circumstances must this program be engaged when this unit is installed
on-board your vessel. The display must, therefore, be left set to
'BSHOW 0'.

Exit   Extended   Calibration

To exit extended calibration and return to the main GPS/Navdata display,
press and hold DISPLAY and TRACK for 2 seconds.

Chapter 6: General Specification

Dimensions:	110 x 110mm (4.33 x 4.33in)
Power supply:	10 to 16V
Power consumption:	30ma (normal) 1 00ma (illumination on)
Temperature range:	0 to 70 deg.C
Illumination:	3 levels plus off
Display:	Custom dot matrix (7 segment liquid crystal)
Computer:	8 bit Intel microprocessor +32K Rom

Autohelm@

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