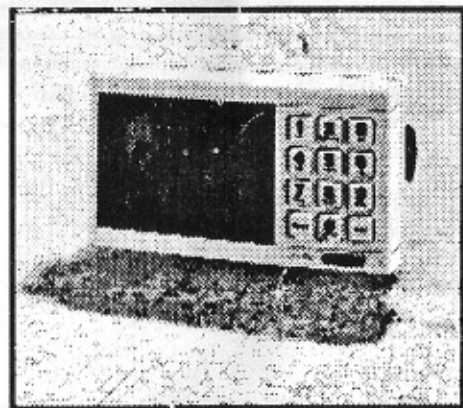


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98 Mile Bouy

**West Marine**

500 Westridge Rd.  
Watsonville, CA 95076  
PH: 408-728-2700  
FAX: 408-728-2736

**West Marine**



***Vector*<sup>II</sup>**

Full Function Loran-C  
Operation Manual

Dear Customer:

Thank you for purchasing the **Vector II** Loran-C receiver. Throughout the development of this fine product, we have concentrated on producing a product which is easy to use, while providing the best possible value for the money. Selection of features, superior performance, and outstanding reliability were the benchmarks upon which all important design decisions were made. We are proud of the **Vector II** and your satisfaction is guaranteed by **West Marine**. To this end, we welcome any comments or suggestions that you might have in regard to this product.

For the fastest possible repair service, please complete the warranty registration card and return it as soon as possible.

Sincerely,

West Marine  
500 Westridge Dr.  
Watsonville, CA 95076  
(408) 728-2700

*Warning: Don't be foolish and trust your life to only one means of navigation. Loran-C is a valuable navigation tool, but it should only assist you, not make all your decisions for you. It must be supported by your knowledge of navigation, and other aids to navigation. There are limitations to all methods of navigation and you need to be aware of the limitations of Loran-C absolute accuracy as well as repeatability.*

## Table of Contents:

General Overview of Loran-C .....	4
Latitude and Longitude .....	4
Accuracy and Repeatability .....	5
Warranty Information .....	6
General Information .....	7
Installation .....	8
Power Connection .....	8
Grounding .....	8
Antenna Considerations .....	9
Parts List .....	9
Basic Operation .....	10
Getting Started .....	11
Displaying your Present Position .....	13
Waypoints .....	14
Storing Present Position .....	14
Entering/Changing Waypoints .....	15
Navigating to a Waypoint .....	17
Course and Steering (C/S) .....	19
Time to go (TTG) .....	19
Course Over Ground (COG) .....	20
Storing a Home Location .....	20
Important Notes on Waypoint #00 .....	21
Storing Waypoints as TDs .....	22
Using the Special Key .....	23
Commonly Used Specials .....	23
Infrequently Used Specials .....	29
Completely Obscure Specials .....	33
Frequently Asked Questions .....	35
NMEA 0183 Interface Data .....	38

# General Overview of Loran C

## What is Loran C?

Loran-C (short for LONG RANGE aid to Navigation) is a system of land-based stations which transmit precise signals to computerized radio receivers like the Vector II. These receivers convert the radio signals into a "position fix". In North America, the Loran-C system covers all of the coastal waters, the Great Lakes, and recently, across the middle part of North America as well. In the rest of the world, Loran-C coverage includes parts of Europe, the Mediterranean, the British Isles, S.E. Asia and Saudi Arabia. Loran-C stations are grouped together in "chains" consisting of three to six stations. Loran-C receivers must receive at least three of the stations from a chain to provide you with a fix. The identification number of the chain is called the Group Repetition Interval (GRI). You will normally use a single GRI for all of your navigational needs. For example, if you are located in Oregon, you will always use GRI 9940, or the West Coast chain.

The radio signals from the Loran-C transmitters are precisely timed. Each pulse of energy that they transmit travels at the speed of light away from the station. The Loran-C receiver on your boat receives these pulses and accurately measures the time difference between each pulse it "hears". Using a complicated math formula, the Loran-C receiver can calculate your position using the time delays (TDs) between the pulses. When your boat moves to a new location, the TDs change as well, and the receiver calculates a new position.

Offshore charts will commonly have series of lines that represent the TDs from different pairs of stations. You can use these charts and the TDs that your Loran-C receiver displays to plot your position, but most navigators find it easier to use Latitude and Longitude displays instead.

There are several good government and private books on Loran-C, as well as informational videos. There are even videos on specific Loran-C models. For more information, you should consider starting with The Loran-C User Handbook, (our part #229799) published by the US Coast Guard. To order this book, contact West Marine or the Superintendent of Documents, Order Section, US Government Printing Office, Washington DC, 20402. Their # is 050-012-00171-5 and it costs \$4.75.

## What is Latitude-Longitude?

Latitude-Longitude (Lat-Long) is the universal system for describing where anything on earth is located. Every point on the Earth's surface can be pinpointed with two numbers: Latitude, which denotes how far North or South of the Equator the point is; and Longitude, which denotes how far East or West the point is. One advantage of using Lat-Long is that the lines drawn on a map (chart) representing Latitude are horizontal, while the lines representing Longitude are vertical. This makes it much easier for navigators to plot their positions.

Both Latitude and Longitude are measured in degrees (360 degrees around the world) and minutes (60 minutes in a degree). For even more precision, minutes are broken up into one hundred sub-parts. The West Marine Headquarters is located at 36 degrees 54.65 minutes North and 121 degrees 46.98 minutes West. This pair of coordinates describes our position to a square about 60 feet by 60 feet on the Earth's surface. Read the next section on accuracy for more information.

## Accuracy and Repeatability

These two terms are often confused and used interchangeably, but they are different concepts. Loran-C users should be familiar with the meanings of these words and the factors which contribute to the accuracy and repeatability of the Loran-C system, and your Loran-C set and usage.

"Accuracy" means the "absolute accuracy" or the difference between the Loran-C receiver and the known set of coordinates for a position. Another expression, Absolute Charted Accuracy, is the correlation between chart information and the Loran-C measurements. Since all charts have some error, and all Loran-C receivers have some error, these effects make the absolute accuracy of the Loran-C system about +/- 0.5 miles.

There are many factors which contribute to error, most of which have to do with terrain, intervening land and water paths, weather induced errors, chart inaccuracies, signal spreading and signal geometry. These factors have little to do with the quality or inherent accuracy of the Loran-C receiver. NEVER rely on obtaining better than +/- 1/2 mile accuracy as compared to a chart and NEVER extend Time Delay lines into inland areas where the lines are not printed. Such extensions can be highly inaccurate.

Repeatability is the ability of a Loran-C receiver to give the same location information when at the same place. If you were to place your Vector II in your car, and store your driveway's location; then drive for one hundred miles and return to your driveway, the display would generally be within .02 nautical miles of your starting point. Thus, places (waypoints) stored in memory can be returned to much more accurately than places the set has never been to. Typically, the repeatability or ability to return to a previously stored location is +/- 120'. Once the receiver has stored a buoy location, or hot fishing spot, you should be able to return to that spot to within several boat lengths. Repeatable accuracy is one of Loran-C's strengths. Don't be disappointed if the Vector II or any other Loran-C receiver's position does not agree exactly with your charts - learn to store waypoints in memory as you go to fully utilize the receiver's and the system's potential.

4 LAT 36° LONG 122°

## Warranty Information

West Marine provides a limited two-year warranty on the Vector II. Please note that there are a few limitations to our warranty. We strongly urge you to read our warranty, and to follow its terms and conditions should your Vector II require repair. Please note that all repair work must be done by West Marine, or an approved West Marine Service Center for the unit to be repaired under warranty.

We have found that many apparent problems experienced by Loran-C users aren't caused by a defect in the receiver, but are due to a faulty installation or misunderstanding of the instructions.

Therefore we strongly recommend that should you experience a problem with your Vector II, that you first call West Marine and ask to speak to our Electronics Repair Center or Customer Service Department. We will be happy to discuss your symptoms and suggest the likely causes. If it sounds like you have a broken Loran, we will tell you how to get it repaired as easily as possible.

West Marine has a team of trained Loran-C technicians who can quickly repair and return your set to its original specifications. We strongly recommend that you send your set to us for repair, after you have called us. Mark the outside of the box "Attn: Repair Center."

### West Marine Limited Warranty

West Marine warrants this product to be free from defects in material and workmanship for two years from the date of purchase.

Any unit that fails during the warranty period will, at West Marine's option, be repaired or replaced at no charge to the customer provided it is returned to West Marine, freight prepaid, with proof of date of purchase and a description of the malfunction. Repair or replacement during the warranty period will not extend the basic warranty period.

This warranty does not apply to a West Marine product that has failed due to improper installation, misuse, or accident, nor does it apply to products which have been repaired or altered outside West Marine Electronics Repair Center unless authorized in writing by West Marine.

This warranty does not include incidental or consequential damages and West Marine disclaims any liability for any such damages. All implied warranties, if any, are limited in duration to the above stated two year warranty period. Some states and provinces do not allow the exclusion or limitation of incidental or consequential damages, therefore, the above limitation may not apply to you. The completion and return of the enclosed registration card is a condition precedent to the warranty coverage. This warranty gives you specific legal rights which may vary from state to state and province to province.

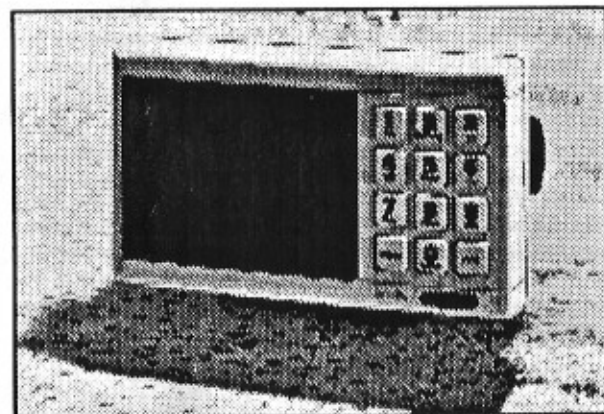
The warranty is limited only to the original purchaser of the unit.

West Marine  
500 Westridge Rd.  
Watsonville, CA 95076  
408-728-2700

## General Information

Congratulations on your selection of the West Marine Vector II Loran C receiver. Its rugged, splash-proof design makes it ideal for installation on nearly any type of boat.

The Vector II features many advanced functions, possible because of its powerful microprocessor design. All of the necessary navigational information is shown on a high visibility LCD display. Illumination can be turned on for night time use.



The Vector II's design is compact and water-resistant. Its keypad is made from silicon rubber for long life and water-tight integrity. The Vector II's internal buzzer will sound when the keypad is used to tell you that it has received your input.

The Vector II is fully automatic: you need only enter your approximate Latitude-Longitude location. The Vector II will then acquire and track up to six secondary stations on any current Loran-C chain. After the first-time start-up, the Vector II will remember your last position and be ready to start navigating in a few minutes after being powered up.

The Vector II will store up to 100 positions (waypoints) and full navigational information can be calculated and displayed from the boat's current position, or from any waypoint to any other waypoint. Your position can be displayed in Lat-long, or Time Delays. The signal strength of all Loran-C stations can also be displayed.

Navigational information includes the distance to the destination in nautical miles, the magnetic bearing to the waypoint, how far off-course you are, approximately how fast you're going and what your course over the ground is, and how long it will take to reach your destination. When you reach your destination, or drift from your anchored location, the Vector II will sound its alarm to warn you. An NMEA 0183 output provides data to many autopilots and track-plotters.

The Vector II's very low power consumption (typically less than 70 millamps at 12 Volts DC with the backlight off) makes it ideally suited for many of today's smaller boats with limited power availability.



# Installation

## Power Connection

The Vector II requires a power source with a voltage between 12 and 15 volts DC. Low voltage may cause a dim display, reduced response, a weak beeper or slow turn-on. High voltage may eventually result in failure of some internal part. The nominal voltage found on boats with their engines operating is 13.8 volts DC. If your Vector II has any of the above symptoms, you might check the voltage at the set to see if it is too low.

Connect the two-pin plug on the end of the power cable to the power supply jack on the back of the set. Connect the RED wire to the positive terminal and the BLACK wire to the negative terminal of the boat's battery. We realize that it may not be possible or desirable to connect the Vector II directly to the battery, but it is very important that the power source for the Vector II be as direct as possible. Route the power cable away from your depth sounder's transducer cable, engine, refrigerator, bilge pumps or other critical wiring.

**WARNING:** It should come as no surprise that you have to be careful that the RED wire connects to the POSITIVE side of the battery, and the BLACK wire connects to the NEGATIVE side of the battery. Also, the Vector II's power cable has a built-in fuse holder with a 1.6 amp fuse. If this should burn out, don't replace it with a fuse with a capacity greater than 1.6 amps. A 1 or 1.5 amp fuse will work nicely.

## Grounding Considerations

A good ground will improve your Vector II's performance, in the same way that a good antenna location will help. A ground connection minimizes the effects of electrical noise on the boat, and improves the set's performance in weak signal areas.

A ground consists of a heavy wire (#10 stranded) run from the ground post on the back of the set to a good water ground. The wire should be run as directly as possible, and is run in addition to the power cable. A water ground is any large metal object located low in the boat that makes contact with the water. Good examples are the boat's engine, water tanks, metal through-hull fittings and keel bolts. If your boat has a grounding system installed, it may certainly be used. All connections should be physically clean for best conductivity.

**NOTE:** If you travel to an area of reduced Loran-C signal strength, you may need to improve the ground connection of your set, even if the set worked fine in its prior location.

## Antenna Considerations

The Vector II's antenna coupler is designed specifically for this unit and will not work with others. It is designed to be used with a variety of antennas: either four or eight foot fiberglass Loran C whips, or three to five foot stainless steel whips. The coupler has standard 3/8"-24 threads for the antenna, and 1"-13 threads for the antenna mount. These items are available from West Marine or your local marine dealer.

The antenna coupler comes with 25 feet of coax cable that connects to the set. Try not to cut the wire and re-splice it: numerous problems with Loran-Cs have been traced to a poor splice or connector installation. If you have too much cable, simply coil it in a convenient location. If you need to lengthen the cable, make sure that the connections are performed correctly or have a technician do it.

**NOTE:** The Vector II has a signal strength display that can be used to help you determine the best antenna location, as well as diagnose interference from onboard sources. We always recommend that you connect your set's power cord, but do not install the antenna or lead-in wire until you have tried different locations. By referring to the signal strength display (GRI key) you may find that one location is far superior than another. See page 12, Status Display.

The location of the antenna is very important to the success of your Vector's performance. Height, although beneficial, is not as important as having the antenna away from other objects like the mast, tuna tower or flying bridge. Parallel wires or metal items will adversely affect the antenna's reception. Don't mount the antenna in a nest of other antennas. Sailors will want to tilt the antenna away from their backstays if mounted on the stern rail. Often a 4' antenna extension will improve performance.

Most Loran-C interference problems stem from electronic noise generated from video fishfinders, televisions, fluorescent lights, etc. Moving the antenna away from these sources of noise will reduce their effect on the set. Often times, if a horizontal distance is not feasible, the antenna can be located above the offending item.

We have had good success with Railfast antenna mounts on the stern pulpit of sailboats. These mounts also work well on small to midsize powerboats like Boston Whalers and Bayliners.

## Parts List

QTY:	Description:	Part #
1	Vector II Loran Receiver	_____
1	Mounting Bracket	425934
2	Mounting Knobs	425942
1	Power Cord	386250
1	Operator's Manual	425959
1	Antenna Coupler, West Coast	425967
1	Antenna Coupler, East Coast	501015

## Basic Operation

### The Vector II Keypad

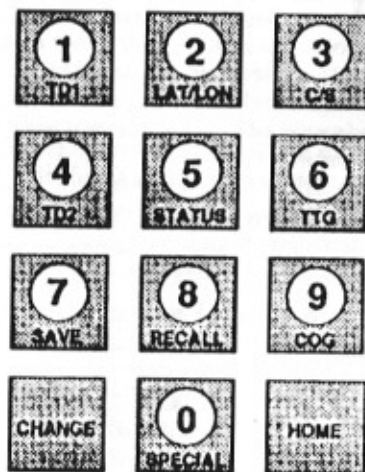
Every effort has been made to ensure that the Vector II is easy to learn and operate. The large push button keys are clearly labeled and have been kept to a minimum. The Vector II comes pre-programmed for most common uses, and with the use of the Special Commands described later, you can "customize" the operation to suit your requirements.

The Vector II is equipped with a special silicon rubber "sure touch" keypad. This keypad is designed to be absolutely waterproof and last for years. The keypad consists of 12 push-buttons. Each button is labeled with a number or letter. The numbered buttons also have words or series of letters on them identifying the other functions they control.

During operation, the meaning of each key will become obvious. When the Vector II is operating, pressing any key will be interpreted by the Loran as a command (words or letters printed on each button). The Vector II will then typically respond with a request to enter a number(s).

If you make a mistake when entering a number, the CHANGE key is used to "erase" a previous entry, or to "go back a step".

Once you start to use the Vector II in actual conditions the use of the keypad should become very easy. If the Vector II appears to miss a key entry, press the key again or hold down the key slightly longer.



## Getting Started

### Pre-check

Check to see that all of the components listed in the Installation Section were included with your Vector II. If a part is missing, obtain the appropriate part number from the parts list and contact your nearest West Marine store, West Marine headquarters (408) 728-2700, or electronics dealer to request replacement parts.

*NOTE: DO NOT operate the Vector II with parts missing or with parts other than those obtained through West Marine; doing so could cause major navigation errors. Any malfunctions to the Vector II resulting from unauthorized parts, including antenna couplers, will not be covered by your warranty.*

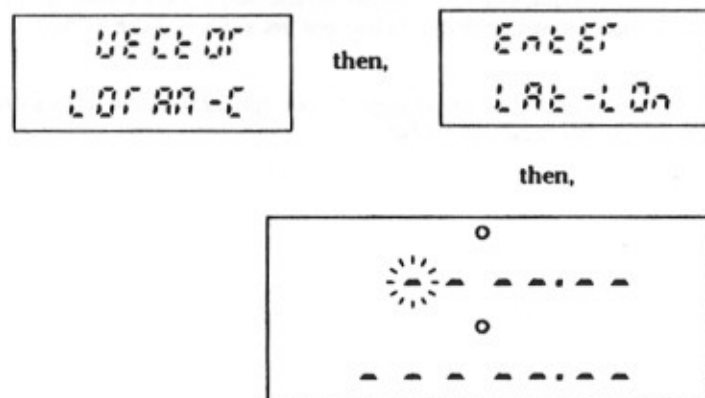
### Turning The Vector II On

The Vector II has two turn on modes: FIRST TIME TURN-ON and NORMAL TURN-ON. In a FIRST TIME TURN-ON, you give the Vector II a new approximate location so it can search for the correct Loran-C stations for your area. The FIRST TIME TURN-ON should be used the first time you start the Vector II, or if you have travelled over 60 miles away from where you last used the Vector II. Use a NORMAL TURN-ON when the Vector II is in the same approximate area where it was last operated (within 60 miles).

#### First Time Turn-On

When you first receive your Vector II Loran you will need to let it know your approximate location so that it has some reference to start computing from. We recommend that you try to enter your position within 30 miles if possible. You can ask a fellow boater who has a Loran or GPS, or examine a local chart for your current Lat-long.

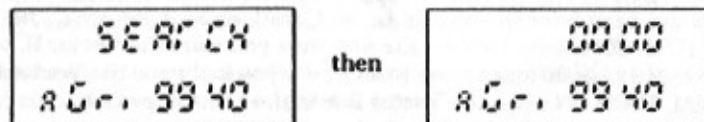
To turn the Vector II on, slide the power switch located on the lower right corner of the unit to the ON position. The Vector II should respond with a BEEP, then display:



You'll notice that the upper left dashed line is flashing. This is to let you know where the data will be entered. Using the keypad, enter your approximate location. If you accidentally enter the wrong number, press the CHANGE key to erase the last number entered and enter in the correct number. Each time you press the CHANGE key, the display will erase the previous key entry.

If you are located where the longitude is less than 100°, you will have to enter a leading 0 before the longitude. The Vector II automatically assumes all entries are in North Latitude (nLat) and West Longitude (wLon). If you are in East Longitude, you may request E Lon at any time during the Longitude entry by pressing the HOME key on the lower right of the keypad. It makes no difference when you press the HOME key as long as it is between the 1st and 7th longitude digit entry. When East Longitude is chosen it will show up as a blinking nLat and wLon label to the right of the Lat/Lon numbers on the screen.

As soon as you complete the Lat/Lon entry of your approximate position, the Vector II display will show:



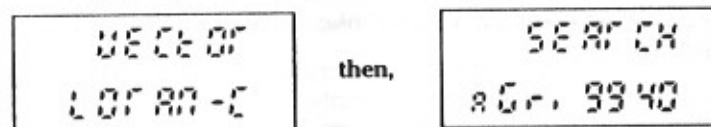
### Status Display

The top line of the display indicates the status of the signals being received. The bottom line indicates the Loran Chain the Vector II has chosen based on the Lat/Lon you have just entered. The small letter "A" in the lower left of the display lets you know that the Vector II is in the Automatic mode. It will take a few minutes for you to "lock-on" to the loran signals. At first the top line of the display will show all Cs. After approximately 5 minutes, several of the Cs should change to numbers, with 9 being the best. When you have at least three of the Cs change to numbers, press the Lat/Lon key and watch for the word READY to appear on the left side of the display. If the READY is not showing, you will note that two of the digits on the display are blinking. This is an additional warning that the Vector II has not yet achieved the READY condition.

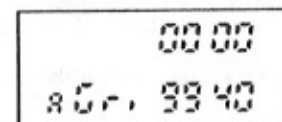
**WARNING:** You cannot rely on the Vector II's position information unless the READY indicator on the display is visible.

### Normal Turn-On

If you are in the same approximate location where you last turned the Vector II off, you need only to slide the power switch to the ON position and the Vector II's display should first show:



The VECTOR II will finally show:



It should take no more than 5 minutes for the Cs to change to numbers. Press the Lat/Lon key and look for the READY to show on the left side of the display.

If you press the Lat/Lon key before the READY shows, don't be alarmed if the Lat/Lon numbers are changing. Wait for the READY to show and the Lat/Lon numbers will stabilize.

## Present Position in Lat/Lon, TDs

Your present position can be expressed in both Lat/Lon and TDs (Time Delays). To view your Lat/Lon, press the Lat/Lon key once. It will show you your current position in degrees, minutes and hundredths of minutes.

To view the TDs that correspond to your present position, press the TD1 or TD2 key. This will show you the TDs being used for Lat/Lon conversion for your present position. To view other TDs, press the TD1 key to change the upper display line, and the TD2 key to change the lower display line.

*Note:* As with all navigation screens, if the READY label is not shown, then the navigational information is likely to be incorrect.

## Waypoints

What is a waypoint? A waypoint can be a starting point, destination, buoy or channel marker, or any location you wish the Vector II to remember. When fishing, it can be a favorite fishing spot, harbor entrance, location of a reef, rocks, or other important bottom structure. Sailors commonly record racing marks or navigational buoys.

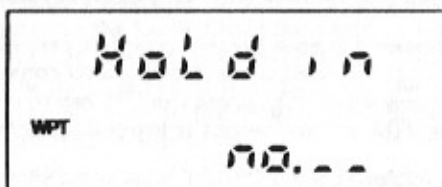
The Vector II can store up to 100 waypoints numbered from 00 to 99. Waypoints #00 and #99 have special uses however, and should not be used to store normal waypoints. Waypoints #00 and #99 are described later in the manual, so use waypoint #s 01-98 for your use.

Waypoints can be stored using either of two methods. You can STORE your boat's present position, or you can ENTER the Latitude/Longitude of any position you want by using the keypad.

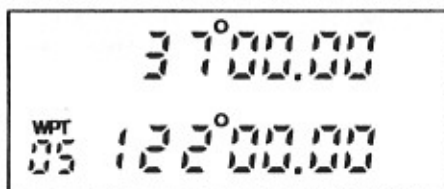
### Storing Current Position in a Waypoint:

The easiest and most accurate means of capturing a waypoint in the Vector II's memory is to STORE it. Here are the steps involved:

1. Make sure the READY indicator is on.
2. Go to the location to be stored in memory.
3. Press the SAVE key. The Vector II will respond with the following display:



4. Enter in a TWO DIGIT number for the waypoint. For example, 05 would store the present location in waypoint 05. The Vector II will then display your current position in Lat/Lon and in the bottom left of the display show the two digit number of the waypoint just stored.



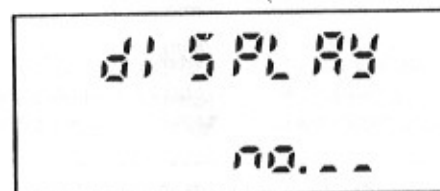
Press any other key to resume normal operation.

**NOTE:** This will have the effect of erasing the waypoint that was previously stored in Waypoint 05.

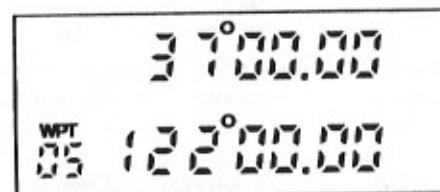
## Entering Waypoints from the Keypad

If you know the Latitude/Longitude coordinates of a position you wish to use as a waypoint, or you wish to change a waypoint to different coordinates, you can enter the coordinates as follows:

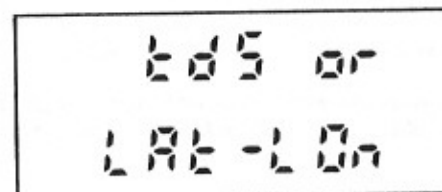
1. First, make sure the READY indicator is showing.
2. Press the RECALL key. The Vector II will then display:



3. Enter in a TWO DIGIT number for the waypoint. The Vector II display will show the current Lat/Lon coordinates currently occupying that waypoint.



4. Now, press the CHANGE key. The Vector II display will show:

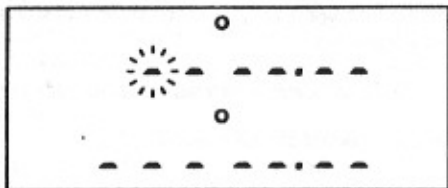


5. Sometimes you will want to enter waypoint coordinates using Time Delays or TD#s. If so, press TD1. When you enter waypoints using Time Delays, you must use the TDs that are used for Lat/Lon conversion, or follow the instructions on Page 22.

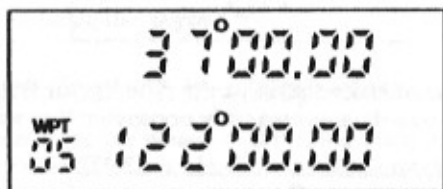
*Continued next page*



Normally, you will use Lat/Lon to enter waypoints, in which case press the **Lat/Lon** key. If you press the **Lat/Lon** key, the display will show:



6. Enter the desired Lat/Lon coordinates you wish to store. The Vector II then shows the Lat/Lon position you have entered and in the bottom left of the display shows the two digit waypoint number where it is now stored.



*Remember: If you are entering a waypoint where the longitude is less than 100°, you will have to enter a leading 0 before the longitude. The Vector II automatically assumes all entries are in North Latitude (nLat) and West Longitude (wLon). If you are entering a waypoint in East Longitude, you may request E Lon at any time during the Longitude entry by pressing the HOME key on the lower right of the keypad. It makes no difference when you press the HOME key as long as it is between the 1st and 7th longitude digit entry. When East Longitude is chosen it will show up as a blinking nLat and wLon label to the right of the Lat/Lon numbers on the screen.*

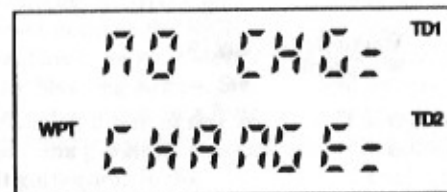
You can now press any key and return to normal operation.

*Note: When you enter a waypoint with this technique, it automatically becomes the destination waypoint when in **Navigation Mode**, described below.*

## Navigating to a Waypoint

The Vector II has been designed to be an easy to use Loran-C receiver. There are three screens available to help you navigate to your destination. When you are using one of these three screens, you are in **Navigation Mode**. Before you use the C/S (Course/Steering), TTG (Time To Go), or COG (Course Over Ground) keys, you need to have stored a waypoint in one of the waypoint memories, using one of the two waypoint storage techniques described previously.

You can enter and exit the navigation mode at any time while the Vector II is operating and the READY indicator is showing. All the navigational information will be available for display by pressing either the C/S (Course/Steering), TTG (Time To Go), or COG (Course Over Ground) keys. The Vector II display will then respond:

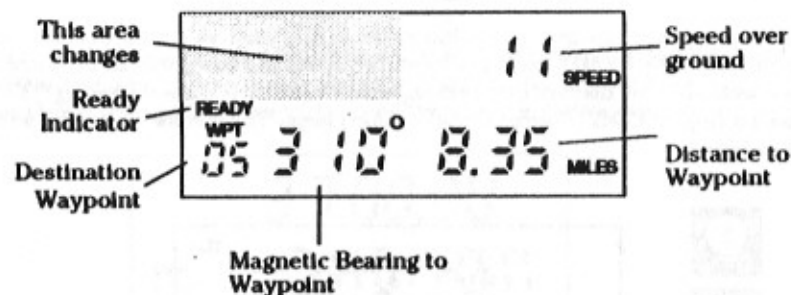


This screen is asking you if you want to change the destination waypoint that is currently selected. If you press TD1, you will continue to navigate to the previously-selected waypoint. If you press TD2, you can select a new destination waypoint. This will also have the effect of storing your present position in waypoint 00, and resetting you Miles Off Course to zero (described more fully on page 21).

*Continued on next page.*

## Navigating to a Waypoint, cont.

The three navigation screens (C/S, TTG and COG) share basic navigation information. They include the distance and magnetic course to your destination, your boat's speed over the ground, and the waypoint # to which you are navigating. The upper left hand section of the display changes, depending on which key you have pressed. The information common to all screens is shown below:



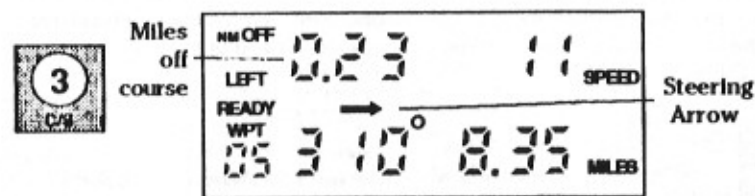
This is the critical information that allows you to find a destination. We find the most useful information to be the **Magnetic Bearing** and the **Distance to the Waypoint**. Generally, Lorans do a better job of computing this information than computing speed and course information. **Magnetic Bearing** is the direction you should steer to get to the destination, corrected for magnetic variation. This should correspond to your compass course, if your compass does not have excessive deviation. The **Distance** is the number of nautical miles that the destination is from your current position. In other words, using the example above, if you steer on a course of 310° for 8.35 miles, you should arrive at your destination.

The **Speed Over Ground** information is not as reliable as most of the other **Vector II** information, because Lorans have to average your boat's speed for several minutes as you travel to compute this information. This can be confusing, especially when you come to an abrupt stop and the Loran shows you travelling at 10 knots! The **Speed Over Ground** (and **Course Over Ground**) displays will always lag behind the boat's current velocity, unless you have been on a steady course for several minutes. And remember, if you are travelling with, against, or across a strong current, the **Speed** and **Course** information may not agree with your knotmeter or compass due to the effects of current. While knotmeters show your speed *through the water*, Lorans show your speed *over the ground*. And while compasses display your *magnetic heading*, Lorans display your course *over the ground*.

Finally, remember that the three navigational screen are more similar than different in the information that they display. Only the upper left corner of the display will change as you select the C/S, TTG and COG screens. The other information remains the same.

## Course and Steering (C/S)

Press the C/S key to display Course and Steering Information. The C/S screen is probably the most commonly used screen. It looks like this:

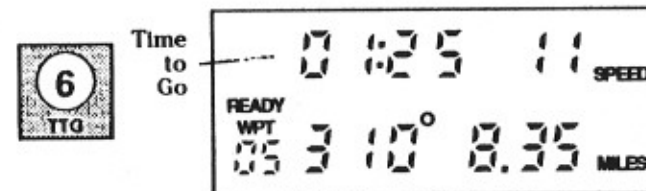


The upper left-hand section displays your **Miles Off Course**. This is the distance that you have wandered off your original course line since selecting the current waypoint. The **Steering Arrow** below the **Miles Off Course** display points in the direction that you should steer to get back onto the original course line. For example, when the **Miles Off Course** shows 0.23 miles **LEFT** of course, the arrow will point to the **RIGHT** to show you the direction to steer to get back on course. Fine tune your steering by observing the **Miles Off Course** displayed above the **Steering Arrow**. Steer a slight amount for a small distance off course, and a larger amount for a further distance off course. *Even if you are heading directly towards your destination, you can still be off the original course line.*

Use your ship's compass to steer the to the waypoint. In the C/S screen, as well as the TTG and COG screens, the magnetic bearing and the distance to the waypoint are very useful. The **Vector II** will let you know of any changes that develop to the proper course. See additional information, page 21.

## Time To Go (TTG)

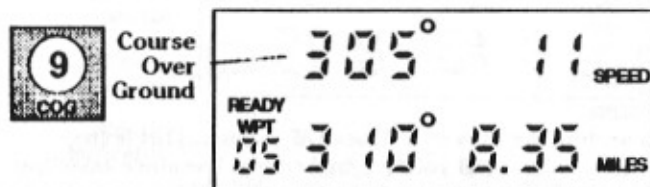
Press the TTG (**T**ime **T**o **G**o) key to display how long it will take you to get to your selected waypoint. This assumes that you travel at a constant speed, and that you have been travelling at a constant speed for a few minutes. The display will look like this:



**NOTE:** If the time needed to get to your selected waypoint exceeds 99 hours, the time display will display 99:99. Data displayed is averaged over several minutes. Since the **Time To Go** is based on your **Speed Over Ground**, it is subject to the same errors due to averaging. It will be more accurate when the boat's speed and course have been steady for several minutes.

## Course Over Ground (COG)

Press the COG key to display the average course that the boat has been travelling over the bottom. Loran-C measures movement relative to the ground, so if you are operating in an area of strong currents, your track over the bottom may be very different from the direction that the boat is headed. As with the speed and TTG functions, the data displayed is averaged over several minutes.



*NOTE: You may switch between any of the navigational displays along your route by simply pressing either the C/S, TTG or COG keys.*

## Storing a "Home" Location

The Vector II uses waypoint #99 as a special "Home" location. We recommend that you use this waypoint for a convenient location, such as the entrance to your harbor channel or an important navigational buoy. The best procedure to store a "Home" location is to go to the location you wish to store and use the STORE WAYPOINT method previously described in this section of the manual.

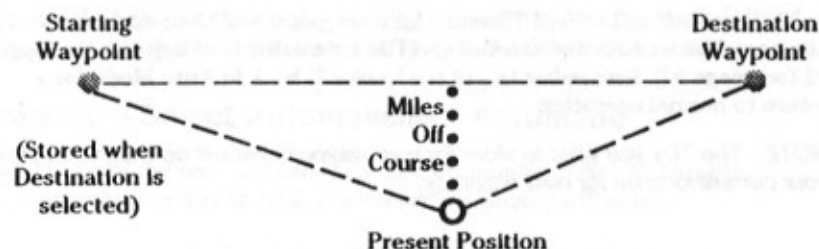
To review, you would maneuver your boat to the desired "Home" location, then press SAVE and then 99, for waypoint 99.

By doing this simple procedure when you are at a "Home" location, the Vector II will remember "Home". Then, at the end of the day when you want to head back to the harbor, press the HOME key and the Vector II will give you all the navigational information you need to return to waypoint 99.

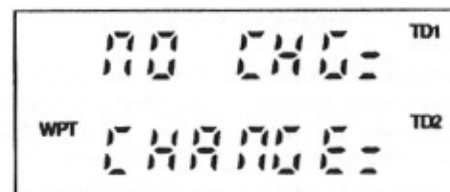
## Important Notes About Waypoint #00

The Vector II has a full-function navigational computer that will calculate and display course to steer, distance, miles off the desired course (cross track error), time to go, boat speed, and actual course made good between your present location and any of your stored waypoint positions.

You should understand how the Vector II calculates a course line from a starting position (WPT #00) to the destination waypoint. Your present position is stored as WPT#00 when you change or select your destination waypoint. This waypoint is important to navigation because the line connecting WPT#00 and your destination waypoint is used to compute Miles Off Course. Miles Off Course is the distance you have wandered off-course, perpendicular to the course line. At times, you will find it convenient to change WPT #00 to your current position when underway. This has the effect of resetting your Miles Off Course to 0.00 miles.



The Vector II has two methods to reset WPT#00 to your present position. If you are in Navigation Mode, (that is, you are viewing either the C/S, TTG, or COG screen) press the Change key. If you are not in Navigation Mode, press one of the Navigation keys. This will bring up the screen below:



The Vector II is asking whether you want to change the destination waypoint to another location. If you want to continue navigating to the same waypoint, press the TD1 key. If you want to navigate to a new destination, press the TD2 key. And if you want to reset waypoint #00 to your present location, but continue to the same waypoint, press the TD2 key and re-enter the original waypoint.

## Storing Waypoints using TDs

When storing waypoints using TDs, we recommend that you use the optimum TDs which the **Vector II** chooses in **Auto Mode** whenever possible. They will result in the most accurate positioning. These are the TDs that appear on the display when you are in **Auto Mode** and press a TD key for your current position.

If you have a pair of TDs that you wish to store in a WPT #, and one or both of them are not "optimum" TDS (or you are not sure), use the following steps:

1. Place the **Vector II** in **Non-Auto Mode** (**Special 01**, page 23).
2. Press one of the TD keys. The display will show you two TDs. Scroll the TDs (repeat pressing the TD keys) until you see two TDs that are in the series that you wish to use. Leave these TDs showing in the display, then press **Recall**, and enter your waypoint using TDs as described on page 16.
3. The **Vector II** will accept TD entry for a waypoint and then convert it to Lat-Lon coordinates. In order to recall the TDs for a selected waypoint, use **Special 22** (see page 30). Remember to put the **Vector II** back in **Auto Mode** for a return to normal operation.

*NOTE: The TDs you want to store for your waypoint should be within 50 miles of your current location for best accuracy.*

## Using the SPECIAL Key

The **Special** key allows you to use additional features of the **Vector II** which do not get used as frequently as the features with a labeled key. The most common special functions are numbered 00-09, and you will probably want to become familiar with them. To activate them, press the **Special** key followed by the two digits indicated. The **Special** functions listed below are the basic ones to use for ease of operation without getting too carried away in the advanced theories of Loran C. These **Specials** are listed on the waterproof card.

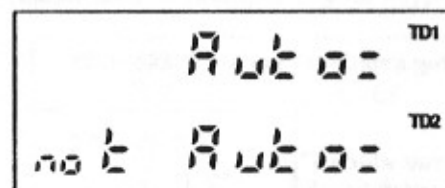
*NOTE: We recommend that you use these Special features only after a careful reading of this section of the manual, since some of the Special functions, if incorrectly executed, could result in incorrect navigational data.*

### Special 00— Backlight On/Off

Press **Special 00** to turn the display backlight On or Off. This **Special** acts like a "Toggle Switch"; that is, it alternates turning the backlight On and Off.

### Special 01— Select Automatic/Not Automatic

**Special 01** allows the user a choice of either **Automatic** or **Not Automatic** mode. Upon entering this **Special**, the **Vector II's** display will show:



We recommend that you operate the **Vector II** in the **Automatic** mode, since this will ensure that the **Vector II** will always choose the best stations for use in navigation. In the **Not Automatic** mode, you must choose the GRI (Loran Chain) and the secondary stations. We include **Not Automatic** mode for experienced users who wish to override the **Vector II's** choices in specialized situations. The **Vector II** will use these stations even if they are not optimum for your present position. This could lead to inaccurate navigational data.

To select the stations that the **Vector II** will use for Lat-long calculations, press the **TD1** and **TD2** keys until the desired TD pair appears in the display. The **Vector II** will continue to use this pair for its calculations until a different pair is selected, or until **Automatic Mode** is selected.

To tell what mode you are using, look in the lower left hand corner of the display. You will see an "A" for **Automatic**, or an "nA" for **Not Automatic**.



## Special 02— Linking Waypoints into Routes

**Special 02** allows you to create and edit routes. A route is a list of waypoints that you want to navigate to in sequence. You might want to follow a route when you take a trip down the coast, or when you want to navigate up a particular channel. Before you create a route, you need to have entered the desired waypoints in the Vector II before the route is created. We suggest that you create a list of stored waypoints using the waypoint # and a brief description.

For example, your list might say:

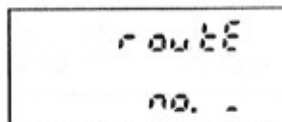
Waypoint 03	Mile buoy
Waypoint 04	Four fathom bank
Waypoint 05	Channel marker 7
Etc. . . .	

The reason to use routes is that the Vector II will give you navigational data to the first waypoint, until you either pass by it or approach to within the arrival alarm distance. At that point, it will automatically change the destination waypoint to the next one in the route - thus you can travel from point to point without touching the keypad.

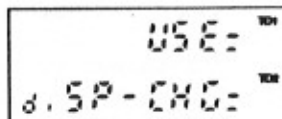
The Vector II can store 10 routes, numbered 0 through 9, of nine waypoints each. You might use route 0 to store a series of waypoints leading from your berth, out the channel to open water. Other routes could store fishing, racing or navigational paths.

The first step in creating a route is to select **SPECIAL 02**.

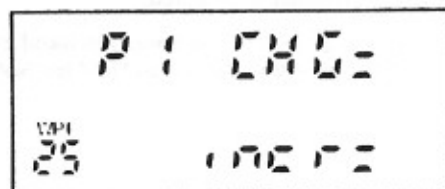
The Vector II will ask you which route, 0 through 9, you wish to use.



When you enter a route number, the display will respond with:



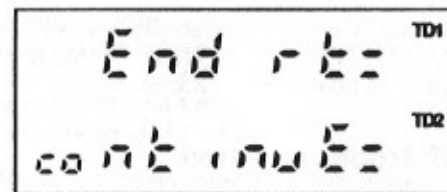
If you press **TD1 (USE)**, the Vector II will begin navigating to the first waypoint in the selected route. As indicated above, each waypoint will change to the next in the route as it is passed. If you press **TD2 (DISP-CHG)**, you can enter or modify the chosen route. The screen will show:



The waypoint # in the lower left of the display is the waypoint in the first position (P1) of the selected route. If you press **TD1 (CHG)**, you can and entering a new two-digit waypoint. If you do not want to change it, press **TD2** to increment to P2, the next waypoint in the route. Continue through all of the stored points, P1-P9 until you have the desired waypoints in the desired order. To stop entering waypoints, press **CHANGE**, then **TD1**.

## Special 03 – End Auto-Routing

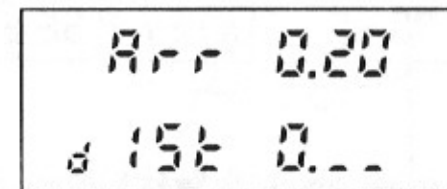
If you want to stop following a route, enter **Special 03**. The display will show:



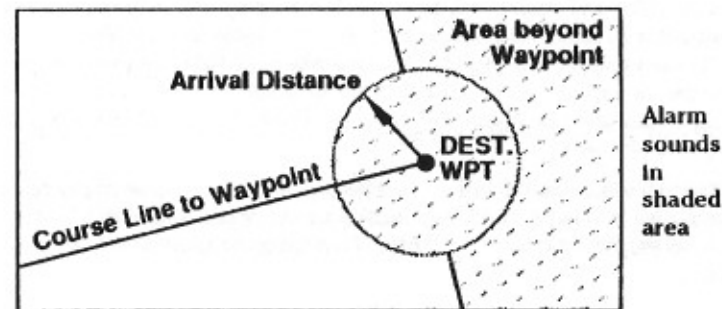
Choose **TD1** to end Auto-routing or **TD2** to continue with the route.

## Special 04— Arrival Alarm

**Special 04** allows you to define a warning distance that will cause an alarm to sound when you get closer than this distance to your waypoint. The initial screen shows:



The top line shows the current arrival alarm distance and the bottom line permits you to enter a different distance from 0.01 to 0.99 of a mile. The alarm will sound when you are within the arrival alarm distance, or when you pass by the waypoint. Press **CHANGE** to silence the alarm. To exit this function, press the **CHANGE** key.



## Special 05— ASF Status

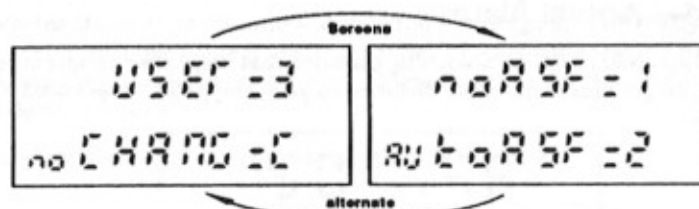
### What Are ASF Corrections?

Loran C radio signals are subject to minor errors as they travel over varied terrain before they reach your location on the water. These errors have been documented by the Coast Guard, and are known as ASF Corrections. The Vector II's memory has a set of ASF Corrections for all coastal and Great Lakes waters of the U.S. These corrections are applied when the Vector II is in Auto ASF mode and are based on the average values calculated for an area one degree square.

Special 05 displays whether or not ASF corrections are being applied. The Vector II will display "AUTO ASF", "ASF ENTERED" or "NO ASF ENTERED". See Special 06 for information on how to select ASF modes.

## Special 06— ASF Mode Selection

Special 06 allows you to select the ASF mode. When you enter this special, the Vector II display will first show "SELECT ASF". After a moment the display will show two alternating screens:



If you want No ASF operation, press 1. The Vector II will not take advantage of the ASF corrections stored in its memory. It will be less accurate in most cases that when in Auto ASF mode.

If you want Auto ASF operation, press 2. The Vector II will use the ASF corrections stored in memory and will be more accurate as a result. When in doubt, use Auto ASF mode.

If you want USER ASF operation, press 3. The display will prompt you for your exact latitude and longitude. After entering your location, the Vector II will display "Error Possible" to caution you to make sure that the position you have entered is correct. If you change your location by more than 50 miles, we recommend that you use Auto ASF mode until you can re-enter a new exact location, when known.

*Note: Although the Vector II has ASF corrections for most parts of the country, there are areas for which no ASF corrections exist. If you select AUTO ASF in areas where they don't exist, the Vector II will show NO ASF when you use Special 05.*

**WARNING:** The ASF mode selection entered will remain in the Vector II memory and can only be changed by using SPECIAL 06. If you have User ASF entered and travel some distance (approximately 50 miles), considerable error is possible.

## Special 07— Display Magnetic Variation

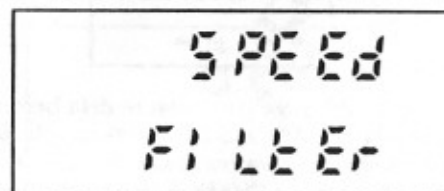
What is Magnetic Variation? Magnetic variation is the difference in degrees between True North and Magnetic North. This difference varies widely by location. Navigation charts are based on True North.

However, charts indicate the magnetic variation so that navigators can calculate magnetic courses to permit steering by compass. The Vector II automatically corrects its course calculations to show courses relative to Magnetic North. Therefore, the Vector II's directional readings should closely match your boat's properly installed and compensated compass. The Vector II will be within 3° of what your local chart indicates, except in rare instances.

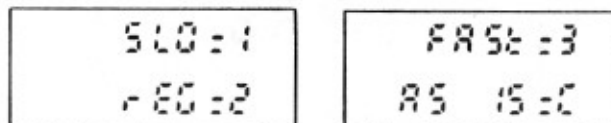
Special 07 displays the amount of magnetic variation being used by the Vector II in its navigational calculations.

## Special 08— Speed Factor

Special 08 allows you to select the setting of the Vector II's Speed Averaging Filter. The Vector II calculates the speed and course of your boat by averaging its change in position over a period of time. Upon entering this special the display will first show:



After a moment it will show the Speed Factor currently set. To select a different setting, press the CHANGE key and the display will then alternately show:



Press key 1, 2, 3 or C (for CHANGE) to select the appropriate averaging period.

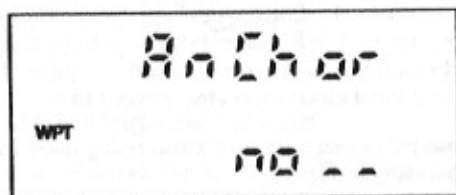
If your speed and course are changing quickly, as when following a shoreline, you should select FAST averaging. On a straight leg of a trip when travelling at a constant speed, SLOW averaging will provide more accurate information.

## Special 09— Anchor Watch

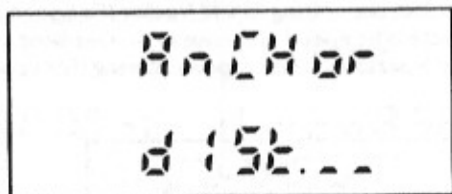
**Special 09**, called the Anchor Watch, alarms you when your boat has drifted outside an imaginary circle surrounding your anchor waypoint.

1. When you drop your anchor, press **SAVE** and select a waypoint number for your anchoring position.

2. When you select **Special 09**, the **Vector II** will first ask you for an anchor waypoint. Enter the waypoint number you have saved for your anchoring position.



3. The **Vector II** will ask for an "anchor distance".



This is the limit that the **Vector II** will allow your boat to drift before sounding the alarm. Enter any distance between 0.01 and 0.99 nautical mile. If your boat drifts beyond this distance from your anchor waypoint, the **Vector II** will beep. Press **CHANGE** to exit the function. Press **CHANGE** also to cancel the alarm.

## Special Features— Group 2

The functions below are used less frequently than Specials 00-09.

### Special 20— Plan Special

**Special 20** allows you to pre-store waypoints without receiving Loran C signals. This is useful when pre-programming trips and routes, as well as when providing instruction and Loran operation demonstrations.

When you first enter this Special, and the **Vector II** is receiving signals, the display will ask for you to confirm that you want to continue. If **YES**, press the **TD1** key and the display will show "PLAN SPECIAL". When no signals are being received, pressing **Special** will automatically select Plan Special.

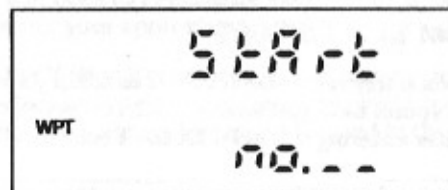
You can enter waypoints that you intend to use in the future using the **ENTER** waypoint method described previously.

To exit the **PLAN MODE** turn the **Vector II** Off and then On.

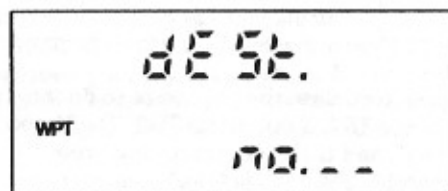
*NOTE: Using the PLAN MODE while the Vector II is receiving signals will result in having to re-enter your approximate position upon returning to normal operation.*

### Special 21— Bearing/Distance Between Waypoints

This is a convenient way to calculate the true bearing and distance between any two waypoints stored in the **Vector II** memory. The display will first ask you:

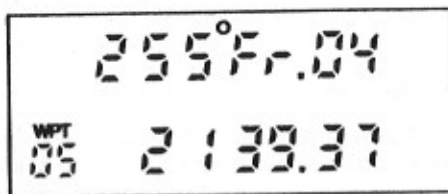


Enter the Start Waypoint #, and the display will then ask:



*Continued on next page.*

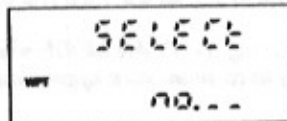
Enter your Destination Waypoint # and the display will show:



The information displayed gives you the true Great Circle bearing Fr (From) the Start Waypoint (04), to the Destination Waypoint (05) and the distance between them. *Note: The bearing is given in TRUE degrees, not MAGNETIC. Add or subtract magnetic variation to calculate the MAGNETIC course between the points.*

### Special 22— Convert Waypoint #s from Lat/Lon to TDs

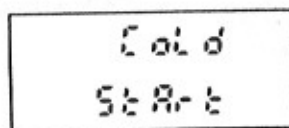
Special 22 will convert a selected waypoint's Latitude/Longitude to TDs. When you enter this Special, the Vector II display will show:



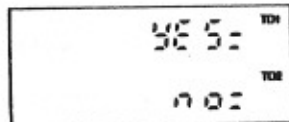
After entering the waypoint number, the display will show you two TDs. Push the CHANGE key to display any remaining TDs that can be used for that location. There may be 0, 1 or 2 additional TDs, depending on which GRI you are using.

### Special 23— Reset to Cold Start

Special 23 is used to completely reset the Vector II to factory specs. Everything, except for the waypoint data you have stored, is reset to the factory specified conditions. After entering a Special 23, the Vector II will first show:



And then:



The Vector II is asking you to confirm that you want to do this special. If you wish to do a Cold Start, press TD1. If not, press TD2. The Vector II display will first show "Vector II LOrAn", and then ask you to enter your Lat/Lon. Enter your present location to within about 30 miles of your current position.

## Specials in Software Revision 1.6

Your Vector II may contain a new software program with several improvements over previous versions. It is designed to allow the Vector II to take advantage of the new Loran-C stations in the Central US, to improve on its performance in areas covered by multiple Loran chains, and to add more navigation functions to the product.

### Special 80 - Display Software Revision

To tell which software version your Vector II has, press Special 80. The first line will say VERSION and the second line will say VECTOR -XX, where XX is the version of software. If the second line says VECTOR -16, then the following notes apply. If it does not, you can have your Vector II upgraded to this version for \$25.00 by sending it to West Marine in Watsonville, CA.

Here are the changes in software Version 1.6:

### NOCUS and SOCUS Station Information

One of the most exciting improvements in the Loran-C system in the U.S. is the addition of the NOCUS and SOCUS stations. Software Version 1.6 contains information about the NOCUS (North Central US) chain, GRI 8290; the SOCUS (South Central US) chain, GRI 9610; and a new secondary which has been added to the Great Lakes chain, GRI 8970. These new stations allow operation of the Vector II virtually anywhere in the Continental U.S. By entering your start-up position, the Vector II will select the correct GRI and secondary stations to use. If you need to re-initialize your Vector II, press Special 23 and select YES. Then enter your approximate position.

To make room in the Vector II's memory for the new stations in the Midwest, the Japanese and Korean stations have been removed from the software. Vector IIs with software revision 1.6 cannot be used in these areas.

### Special 24 - Use Waypoint as a Starting Location

As is explained on page 20 of your manual, the Vector II uses a "starting position" and a "destination waypoint" to calculate its navigation information. When you select a destination waypoint, the Vector II saves your current position in WPT #00 which becomes your starting position. As you navigate towards your destination, your off-course error is measured by how far away you are from the line between your starting position and your destination waypoint.

There may be times when you want to define your course to be between two waypoints, and not from the point that is stored when you select the destination. Special 24 allows you to select any existing waypoint as your "starting position". What it actually does is to copy the coordinates from the waypoint you specify into WPT #00. This Special is used infrequently, but does allow users to define their course lines with greater versatility.



## Special 25 - Velocity Made Good

The Vector II normally expresses speed in the navigational displays as speed over the bottom, or Ground Speed. As an alternative, you may instruct the Vector II to display Velocity Made Good (VMG). VMG is the rate at which your boat is travelling down the course line towards the destination waypoint. If your boat is on course and pointed directly at the waypoint, then VMG is the same as speed over the bottom. If you are headed 90° to the waypoint, then your VMG will be 0 knots. If you are between 0 and 90° off-course, your VMG will be between 0 knots and your speed over the bottom.

Special 25 allows you to select between "Course Speed" which is VMG and "Ground Speed" which is speed over the bottom. Both displays are averaged over 3 to 5 minutes, depending on the speed averaging selected with Special 08.

Most users will want to use Ground Speed for all navigation, but sailors will find VMG useful when navigating to an upwind or downwind mark. As with speed displays, VMG readings will not accurately represent your current VMG after rapid course changes (tacking, for example) due to the long averaging time.

*NOTE: The Vector II display does not distinguish between Course Speed and Ground Speed, so you need to know which function you are using.*

## Special 26 - Alternate GRI

With so many Loran-C chains across the U.S., many areas of the country are served by two or more chains. The new software lets you select an "alternate" GRI - different from the one that the Vector II will automatically select. You will probably find that one of the two GRIs is substantially more accurate, or has better signal strength. For example, if you are in Central Washington state, the Vector II will select GRI 9940. If you would like to see an optional GRI you might use, press Special 26. This will list the Primary and Alternate GRIs for your area (in this case it will show the Primary GRI is 9940 and the Alternate GRI is 5990). To select the Alternate GRI, press the STATUS key, then CHANGE, then YES, then the number of the Alternate GRI. This will start the machine searching for the newly-entered GRI.

The Vector II will retain this new GRI when it is turned off and then on again. In other words, it will operate in Automatic Mode using the alternate GRI.

*Advanced User Note: The Vector II with Version 1.6 software contains ASF information for multiple chains for the same location. In other words, if you change from one GRI to another in an area served by the two GRIs, you should have ASF corrections for both chains. In addition, the best TDs for Lat/Lon conversion are also stored for the overlapping chains.*

## Really Optional Special Functions

*Note: The following Specials (40-44 and 81-85) are sort of confusing and not required at all for Vector II operation. They are included because several of our customers have inquired about them. If you're not interested, feel free to skip this section.*

### Specials 40-44 - Signal Strength

Pressing the STATUS key provides information on the signal strength of each of the stations that the Vector II is tracking. Using the numbers 0-9, the STATUS display indicates the signal strength for each station received, with 0 being the lowest, and 9 being the highest. For more precise information, you can use Specials 40-44. Special 40 displays information about the Loran-C Master signal, while Specials 41-44 display information about the Secondary signals. On the West Coast of the U.S., Special 41 corresponds to the W secondary, Special 42 corresponds to the X secondary and Special 43 corresponds to the Y secondary. Most of the information shown on the display is useful only to technicians, but two of the digits can help you in positioning your antenna and coupler in a good location.

When you select Special 40 (41, 42, 43 or 44) the numbers which concern you are in the upper left hand corner of the display. The first number is the station ID and will be 0 for the Master signal (Special 40), 1 for the W secondary (Special 41), 2 for the X secondary (Special 42), 3 for the Y secondary (Special 43) and 4 for the Z secondary (Special 44). The second and third digits are the signal strength for the signal, measured in arbitrary units from 00 to 99. A reading of 99 is the strongest signal you can get. Readings should be in the nineties for the strongest stations under good conditions. Weaker stations are usually in the seventies or eighties. You may find that these numbers drop when your engine is on, or when you operate fluorescent lights. This indicates on-board sources of interference. Select the weakest station in your area, and move your antenna and coupler to try to maximize the reading. This technique will also help you analyze the effectiveness of the ground on the back of the Vector II case.

## Specials 81-85 - ASF Corrections

ASF corrections (page 25) are stored for most areas of the United States in the Vector's memory. These corrections make the Vector II more accurate when it converts TDs to Lat/Lon. These corrections are expressed in small increments of TDs, which are added or subtracted from the actual TDs before conversion to Lat/Lon. When you select the NO ASF option in Special 06, these Time Delay corrections are ignored, and the actual TDs are used for conversion. When you select the USER ASF option in Special 06, you temporarily create new corrections which are held in memory until you choose one of the other ASF options with Special 06.

Specials 81-85 allow you to examine the ASF corrections which are stored in the Vector's memory. They also allow you to see the effect of your USER ASF corrections, if you have entered them. Special 81 corresponds to the lowest-number TD in your area, Special 82 corresponds to the next lowest TD, and so forth. In locations served by Loran chains with three secondary stations, there will only be data in Specials 81-83. Other areas which are served by more secondaries will have correspondingly more Specials.

When Special 81 is selected, the upper line of the screen will say something like ASF -1.6, while the lower line will say STAT no. 1. This means that the ASF correction for the lowest-number TD is -1.6 microseconds. Specials 82-85 will appear similarly.

## Frequently Asked Questions About the Vector II Loran

Q. What should my boat's voltage be?

A. The normal boat electrical system is 13.8 V DC with the engine on. When the engine is off, it will gradually drop to between 12.5 and 12.8 volts. The Vector II will operate from 12 to 15 Volts DC.

Q. In what temperatures can the Vector II be operated?

A. 0 to 50 degrees C—or about 32 to 132 degrees F. The display may be sluggish in cold weather.

Q. Will the Vector II work in Mexico, South America and Australia?

A. No. Loran signals only cover the Northern Hemisphere and extend only marginally into Mexico. You may find that the new SOCUS chain of stations works in the Northern Sea of Cortez, where Loran coverage was previously non-existent. New models will not work in Japan or Korea.

Q. What does the antenna coupler do?

A. The coupler amplifies the incoming Loran-C signals so that the Vector II operates with a strong signal. It also has a notch filter built-in to reduce the competing signals from other radio stations.

Q. My Vector II works fine until I turn on my fluorescent lights, TV, video fishfinder or VHF radio. How come?

A. Some devices emit high levels of electronic "noise". This "noise" cannot be eliminated by the notch filters built into the Vector II. Electronic noise filters, installed in the power line of the offending item, may help the problem.

Q. Why are some letters in the display missing parts?

A. The display is made of a seven segment LCD display which usually displays numbers. There is no problem with the display. There are only seven segments available to form each letter, so some letters may appear a bit odd. Below is the alphabet as formed by the seven segment display:

A	B	C	D	E	F	G	H	I	J	n/a	L	n/a
A	B	C	D	E	F	G	H	I	J	K	L	M
n	o	p	q	r	s	t	u	n/a	n/a	n/a	n/a	n/a
N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Q. How close can you return to a stored waypoint?

A. Under the best conditions, in areas with good Loran signals, about 60 feet.

Q. Why does my Vector II give me inaccurate locations when I enter TDs?

A. In Auto Mode, your Vector II uses the optimum pair of TDs as designated by U.S. Coast Guard maps. If TDs other than the optimum pair are to be used, the Vector II will calculate approximate location which will not be as accurate as the optimum pair of TDs. See Page 22.

Q. Will the Vector II interface to all autopilots and fishfinders?

A. Unfortunately, no. The Vector II has a NMEA 0183 output which sends data to devices like autopilots, track plotters and computers. There is poor standardization among marine electronics manufacturers, however, and it will not work with all devices. We keep track of those devices that the Vector II works with correctly, and our Electronics Repair Center technicians can answer specific questions about "interfaceability". Specifically, products from Apelco, Interphase, Autohelm and Navico work fine with the Vector II.

Q. Why are there models of the Vector II that are specifically designed for various geographic locations?

A. At the time of this writing, there are two models of the Vector II available. Geographic differences in the Vector II relate to the notch filters. These are filters that are tuned to "notch out" specific interfering signals coming from other transmitters (usually Military). There are four to six such transmitters on each coast of the U.S., with two of the worst being in Annapolis, MD and on Vancouver Island, BC. The West Coast Vector II has all of the West Coast transmitters "notched out", while the East Coast Vector II has all of the East Coast transmitters notched. Either Loran will work fine on either coast if you are not in the vicinity of one of the offending transmitters.

Q. After I select "AUTO ASF" with Special 06, Special 05 still indicates that I have no ASF corrections applied. What's going on?

A. This will occur if you are in an area where there are no ASF corrections in the Vector II's memory, primarily in inland waters. You can still enter manual ASF corrections, however. If you have selected AUTO ASF, ASF corrections will be applied when you reach a location for which ASF corrections exist.

Q. After I received my Vector from your Repair Center, it operates differently than before. What gives?

A. As a service to our customers, we routinely update all Vectors received by our Repair Center to the most recent software version. We will also include new Owner's Manuals. Unfortunately, this will erase all of your waypoints in the process. We apologize for the loss of data.

Q. All my Vector shows on the display is SEARCH. What is the probable cause?

A. The SEARCH message occurs when the Vector cannot get a signal, or the signal is extremely weak, or interference is high. Try the following:

1. Try a Cold Restart using Special 23. Make sure to enter your present position carefully.
2. Turn off all potentially interfering circuits, especially those with CRT screens, fluorescent lights, or alternators.
3. If the set still says SEARCH, it is likely that the coupler or antenna wire is damaged. Remove the antenna connector and inspect for damage or strain. There should be an open circuit between the center conductor and outer shield.
4. If you still have no luck, return the coupler with the Loran to our Electronics Repair Center and we'll fix it.

Q. My Range and Bearing are right on the money, but the Miles Off Course is always way off. Even when I point right at the waypoint, my Miles Off Course is several miles right or left. Why is this?

A. This is one of the most common questions we get. Remember that to compute how far off-course you are, the Vector stores a "starting" waypoint when you select your "destination" waypoint. The imaginary line between the starting and destination waypoints is the reference from which Miles Off Course is measured. Let's say that you select a waypoint that is 10 miles south of your present position. As you travel towards your waypoint, you alter course to avoid a large kelp bed. When you have passed the kelp bed, the Miles Off Course shows 0.25 Left of Course and the arrow points to the right. This means that the straight line between your starting and destination waypoints is 0.25 miles to your right. Even if you point the bow of your boat directly at your waypoint, you are still 1/4 mile from the original course line.

To re-set your Miles Off Course to 0.00, press Change, then re-enter the same waypoint. This will save your present position in Waypoint #00, and allow you to measure your Miles Off Course from the new location. See page 21 for more information.

Q. My Status display shows 94898 for signal strength. Is this good? Would a longer antenna work better? Will this be accurate?

A. The first "nine" in this sequence is the approximate signal strength for the Master station, while the other numbers refer to the Time Delays in your area. While 9 is the highest reading, good results can be obtained from lower numbers. The critical numbers are the Secondary stations used for Lat-long conversion. In the example above, if the lowest number Time Delay (represented by the 4 in the Status display) is not being used for Lat-long conversion, then strong signals are being used since the other stations are either 8 or 9. Regardless of the signal strength, the Vector software does a good job of selecting the optimum Time Delays for Lat-long conversion, and does not have to be over-ridden using Non-automatic mode. A longer antenna is helpful in fringe areas, but it doesn't make much difference. The best solution is to reduce noise sources on board.

Accuracy is affected by geometry more than by signal strength. Areas where Time Delays intersect at nearly right angles will have better accuracy.

## NMEA 0183 Interface Information

The Vector II transmits four electronic sentences which are of use to other electronic gear. The data sentences are as follows:

\$LCGLL,\_\_\_\_\_,N,\_\_\_\_\_,W

\$LCBWC,\_\_\_\_\_,N,\_\_\_\_\_,E,\_\_\_\_\_,T,\_\_\_\_\_,M,\_\_\_\_\_,N,\_\_\_\_\_,

\$LCAPA,A,A,\_\_\_\_\_,R,N,V,V,\_\_\_\_\_,T,\_\_\_\_\_,

\$LCVTG,\_\_\_\_\_,M,\_\_\_\_\_,N,\_\_\_\_\_,

The first sentence is the Latitude and Longitude of the Loran receiver.

The second sentence is the range and bearing to the destination waypoint.

The third sentence is autopilot steering data.

The fourth sentence is velocity data (speed and course).

