Magellan GPS Satellite Navigator

Reference Guide

Trailblazer XL

Welcome from the Magellan crew.

With the purchase of a Magellan Trailblazer XL GPS satellite receiver, you have joined the thousands of people who enjoy using GPS in their professional and recreational activities.

Since we introduced our first product more than six years ago, Magellan has established a reputation for product excellence and customer support. Our customers include sailors, commercial fishermen, pilots, geologists, explorers, surveyors, and the Allied Forces in Desert Storm. Your receiver represents the next generation of GPS technology—technology that is combined with our hallmark durability and ease of use, which have evolved over years of field experience.

With your receiver are two documents: the *Reference Guide* and the *Field Guide.*

> Like the Magellan Trailblazer XL, the *Field Guide* is tough and ready to go where ever your adventures take you. Printed an waterproof "paper", its purpose is to explain how to operate the receiver— in any weather. When not in use, the *Field Guide* fits neatly in the carrying case that is provided with the receiver.

> The *Reference Guide,* which you are reading now, provides Background information that will give you a deeper technical appreciation of the receiver and the GPS technology in general.

Where ever your outdoor recreation excursions take you, we hope your Magellan receiver will add to your fun and safety.

So that your experiences contribute to the next generation of Magellan receivers, I need to hear from you. All comments will be considered for incorporation into future products. Address your letters to me at Dept. 3-A.

Yours truly,
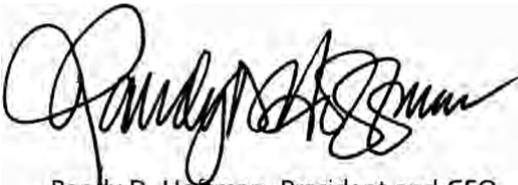
Randy D. Hoffman, President and CEO
Magellan Systems Corporation
Dept. 3-A
960 Overland Court
San Dimas, CA 91773

Certificate of Registration — Trailblazer XL

❏ Mr.   ❏ Mrs.   ❏ Ms.   ❏ Miss

Serial Number

Last Name	MI	First Name

Street Address

City	State	Zip Code

Purchased From	Date of Purchase

* * * To help us serve you better, please complete the following * * *

How do you plan to use your GPS Satellite Navigator? _____

Your age: ❏ 18-29   ❏ 30-39   ❏ 40-49   ❏ 50-59   ❏ 60-69   ❏ «70

What is your approximate annual household income?

❏ Less than $20K   ❏ $20K — $29.9K   ❏ $30K — $39.9K   ❏ $40K — $49.9K

❏ $50K — $59.9K   ❏ $60K — $74.9K   ❏ $75K — $99.9K   ❏ $100K

Where did you hear of Magellan GPS Satellite Navigators?

❏ Magazine   ❏ Dealer   ❏ Friend   ❏ Other _____

Which magazines do you read regulary? _____

Type of boat: ❏ Power   ❏ Sail   ❏ Commercial   ❏ N o n e   S i z e : _____

Have you participated in any of the activites listed below in the last 12 months?

If so, please indicate the number of days you spent an each activity.

	1-9	1-39	>40 (days)		1-9	10-39 ›	40
Auto rallying	❏	❏	❏	Hunting	❏	❏	❏
Backpacking	❏	❏	❏	Pilot - private plane	❏	❏	❏
Bicycling	❏	❏	❏	Power boating	❏	❏	❏
Cross country skiing	❏	❏	❏	Sailing	❏	❏	❏
Dirt/trail biking	❏	❏	❏	Saltwater fishing	❏	❏	❏
Freshwater fishing	❏	❏	❏	Scuba diving	❏	❏	❏
Hiking	❏	❏	❏	Snowmobiling	❏	❏	❏

Tape Here

Fold Here
— —

| Place |
| Postage |
| Here |

Magellan Systems Corporation

960 Overland Court

San Dimas, California 91773

Registration Card

QUICK START

This brief section provides the key presses required to access some features and to perform some basic operations. Quick Start does not replace other instructions contained in this guide.

To get the fullest use out of your receiver and to interpret the displays, read the Reference Guide thoroughly.

POWER: The Trailblazer XL requires three AA batteries for operation and to maintain memory. The receiver can also be operated from external power (batteries are still required to provide memory backup). Installing batteries and using external power is described in *General Maintenance.*

TURN THE RECEIVER ON: Press and release [ON/OFF] .

If batteries are installed correctly or if external power is being used, three displays quickly appear.

MEMORY Screen   LOGO Screen   POWER Screen

These start-up screens are then replaced with the LOCATION 1 screen.

The receiver will automatically start looking for satellites to compute a location fix. This will take up to 20 minutes unless you initialize the receiver.

LOCATION 1 Screen

INITIALIZE THE RECEIVER:

Press [SETUP] [◄] [ENTER] .

① Using the [▲] or the [▼] to enter numbers and the [►] to move the cursor, key in your latitude (use the coordinates of the nearest city from the City Reference Chart.) Use the [▲] [▼] to select the correct hemisphere (N or S). Press [ENTER] .
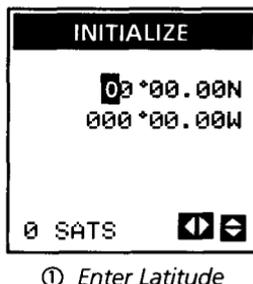
① *Enter Latitude*

② Repeat to enter longitude and select the correct hemisphere (E or W). Press **ENTER**. Next, press **ENTER** to accept the default elevation. ③ Key in the current time and press **ENTER**. ④ Key in the current date and press **ENTER**.

```
┌─────────────────┐   ┌─────────────────┐   ┌─────────────────┐
│   INITIALIZE    │   │   INITIALIZE    │   │   INITIALIZE    │
│   34°03.00N     │   │   34°03.00N     │   │   34°03.00N     │
│ █90°00.00W      │   │   118°14.00W    │   │   118°14.00W    │
│                 │   │   +00000FT EL   │   │   +00000FT EL   │
│                 │   │ █2:35AM         │   │   10:35AM       │
│                 │   │                 │   │ █6JAN80         │
│ 0 SATS   ◄►⇅    │   │ 0 SATS   ◄►⇅    │   │ 0 SATS   ◄►⇅    │
└─────────────────┘   └─────────────────┘   └─────────────────┘
```
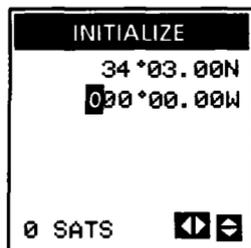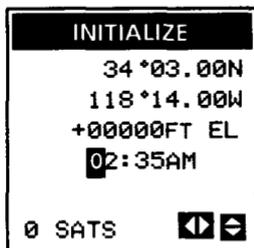
② *Enter Longitude*   ③ *Enter Current Time*   ④ *Enter Current Date*
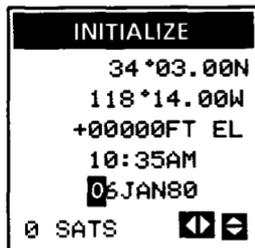
The receiver is now ready to get a location fix.

GET A LOCATION FIX:

You must be outside to get a location fix. Rotate the antenna so it is vertical, and hold the receiver at a comfortable angle.

The receiver automatically displays the last-known coordinates an power-on while it looks for satellites to compute a new fix.

A current fix is displayed when the time and date appear near the bottom of the screen.

```
┌─────────────────┐   ┌─────────────────┐   ┌─────────────────┐
│   LOCATION 1    │   │   LOCATION 1    │   │   LOCATION 1    │
│   34°03.00N     │▶  │   34°03.00N     │▶  │   34°03.25N     │
│   118°14.00W    │   │   118°14.00W    │   │   118°14.41W    │
│        0FT EL   │   │        0FT EL   │   │        0FT EL   │
│  SEARCHING      │   │ ████████        │   │   10:42:53 AM   │
│ 0 SATS   ◄►⇅    │   │ 2 SATS   ◄►⇅    │   │ 4 SATS   ◄►⇅    │
└─────────────────┘   └─────────────────┘   └─────────────────┘
```
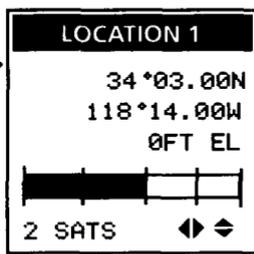
"SEARCHING" for   *Receiving Data*   *Location Fix Computed*
Satellites
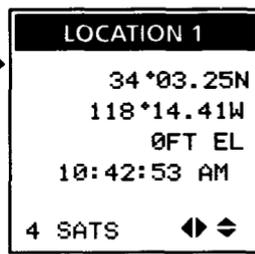
To return to the Location screen from another feature, press **LOC**.

SAVE THE LOCATION FIX AS A LANDMARK:

From the location screen, press **ENTER** **ENTER** **ENTER**

Once the receiver has a fix and the first location fix has been saved as a landmark, start moving around. When you are at least 100 meters from your first location, try saving another location fix as a landmark.

CREATE A GOTO ROUTE:

Press **GOTO** **GOTO** . Use the arrow keys to move the highlight bar to one of the stored land-marks.

Press **ENTER** . If the selected landmark is 100 meters or more from the current location, the receiver creates a 1-leg route from the current location to the selected landmark and displays the Pointer screen.

```
┌─────────────────────┐
│        GOTO         │
│ ▌MOB                │
│ ⚲LM001              │
│ ⚲LM002              │
│                     │
│ 5 SATS        ◧◩    │
└─────────────────────┘
```

The Pointer screen Shows the destination (the icon) and your heading (the arrow). The icon's location varies in relation to your heading. Keep the icon and the arrow aligned to stay an course.

```
┌─────────────────────┐
│      TO ⚲LM001      │
│        ⚲            │
│      S ╱▲╲    W      │
│      ╱ TTG ╲        │
│     │ 00:01:37 │    │
│      226ᴹ    0.13ᴹ  │
│     5 SATS    ◀▶ ◆  │
└─────────────────────┘
```

Table of Contents

WARNINGS

USE GOOD JUDGEMENT
This product is an excellent navigation aid, but does not replace the need for careful orienteering and good judgement. Never rely solely on one device for navigating.

USE CARE
The Global Positioning System (GPS) is operated by the U.S. Government, which is solely responsible for the accuracy and maintenance of GPS.

The accuracy of position fixes can be affected by the periodic adjustments to GPS satellites made by the U.S. Government and is subject to change in accordance with the Department of Defense civil GPS user policy and the Federal Radionavigation Plan.

USE CAUTION
Accuracy can also be affected by poor satellite geometry. When the accuracy warnings appear on the screen, use the data with extreme caution.

USE PROPER ACCESSORIES
Use only Magellan cables and antennas; the use of non-Magellan cables and antennas may severely degrade performance or damage the receiver, and will void the warranty.

Using Your Magellan Receiver 1

Your Magellan GPS receiver has the advanced navigation features that experienced navigators expect, yet is easy enough for the novice navigator to use. This chapter is broken into four sections. The first section describes the conventions used in this guide. The others describe the features accessed by the three function keys: SETUP, LOC, and GOTO. A *Quick Find* Index is also included, to help you locate a specific topic quickly.

GENERAL INFORMATION

Conventions Used in this Guide. This guide includes both explanation and procedure. The explanation provides information. The procedure describes which keys to press to produce a specific result.

When an explanation refers to the receiver's keys, the key name appears in normal type. When the key is referred to in a procedure, the key's name will be appear in **bold** text. *The key must be pressed to complete the procedure being described.*

WARNING: Warning messages are intended to alert you to potential problems that may occur if you do not follow the directions carefully.

NOTE: Note messages provide important information that will help you understand how your Trailblazer XL operates.

The receiver has several types of keys. The function keys access the receiver's functions. They are the three keys immediately below the ON/OFF key. The ON/OFF, ENTER, and CLEAR keys are are operation keys. They turn the receiver an and off and save and delete information. The last group of keys are the arrow keys, which are described below.
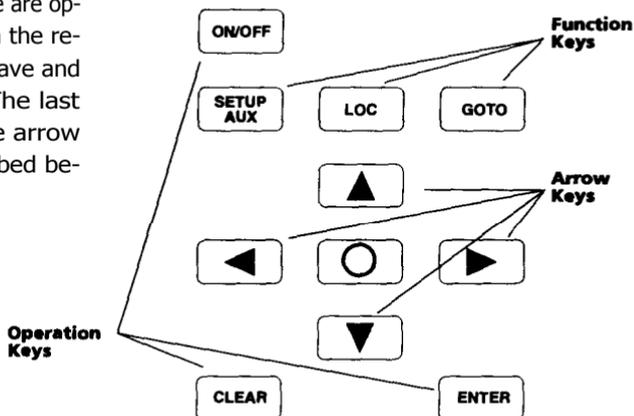
Using the Arrow Keys. The arrow icons in the lower corner of the screen indicate that additional screens are available. To resch these screens, just press one of the indicated arrows.

Try pressing the **SETUP** key. This accesses the Time display. Notice that the current date and time is followed by a short menu. If you press the **LEFT ARROW,** you will get the SETUP MENU. If you press the **RIGHT ARROW,** you will access the AUX MENU.

```
┌─────────────────┐
│      TIME       │
│   12:00:31AM    │
│     06JAN95     │
│ ▶AUX MENU       │
│ ◀SETUP MENU     │
│                 │
│ 0 SATS      ◀▶  │
└─────────────────┘
```

Most screens do not display a menu. Just remember if an arrow appears in the lower corner of the display, other screens are available.

Sometimes the arrow icons are inverted. These are called "input" or "edit" arrows.

They appear when the arrow keys can be used to make selections in a menu or enter data.

If the inverted UP/DOWN ARROWs appear an a menu display...

```
┌─────────────────┐
│   SETUP MENU    │
│                 │
│ INITIALIZE      │
│ COORD. SYSTEM   │
│ NORTH REF.      │
│ TIME DISPLAY    │
│                 │
│ 0 SATS       ⬍  │
└─────────────────┘
```

pressing the UP ARROW or the DOWN AR-ROW will move the highlight bar from one line to the next.

```
┌─────────────────┐
│   SETUP MENU    │
│                 │
│ INITIALIZE      │
│ COORD. SYSTEM   │
│ NORTH REF.      │
│ TIME DISPLAY    │
│                 │
│ 0 SATS       ⬍  │
└─────────────────┘
```

> ⚠️ To exit a menu with edit arrow icons, press the center key (⬤), then press the displayed arrow. You can also press CLEAR to exit the Edit Mode.

If the RIGHT/LEFT ARROW is inverted, the highlight bar will move from right to left.

```
┌─────────────────────┐
│     MAP SCALE       │
│                     │
│ 1:▓22,000           │
│ MAP UNITS           │
│ ▓▓▓▓▓▓▓    CM        │
│                     │
│ 4 SATS        ◀▶⬍   │
└─────────────────────┘
```
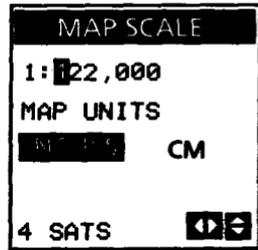
When the edit arrow icons appear on a screen that is not a menu, the arrows will enter data and move the cursor.

Use the UP/DOWN ARROW to step through letters and numbers or numbers only at the cursor location. The RIGHT/LEFT ARROW will move the cursor right or left one space.

```
┌─────────────────────┐
│     INITIALIZE      │
│                     │
│      ▓0°00.00N      │
│      000°00.00W     │
│                     │
│                     │
│ 0 SATS        ◀▶⬍   │
└─────────────────────┘
```

To save the information you have selected or entered, press ENTER. The receiver will automatically move the highlight to the next item in the menu, or move the cursor to the next line.

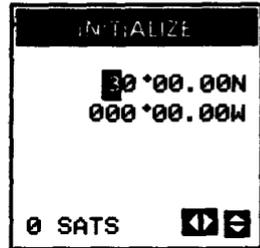**Help Menus.** Help is always one key press away! When you aren't sure where the arrow keys will take you, press the ⬤ key. This is the help key, and it accesses a help page for the current screen. Here, all of the arrow keys are active and will access additional screens.

```
┌─────────────────────┐
│         ▲           │
│   LMK PROJECT       │
│                     │
│ ◀ LAST      LMK  ▶  │
│   LOC      MENU     │
│                     │
│   RCVR STATUS       │
│         ▼           │
│ 4 SATS        ◀▶ ⬍  │
└─────────────────────┘
```

Help screens aren't available for the SETUP and AUX menus. To exit these features, just press any function key.

The Status Line. Most screens have a status line at the bottom of the display. (It does not appear on the help screens.) The status line provides information about the status of the location fixes being computed, the power supply, which arrow keys are active, and which arrow keys are in the Edit Mode.

We've already discussed the arrow icons, which appear in the far right of the status line. The number of satellites being used to compute the current location fix appears on the left. Between the number of satellites and the arrow icons, several other icons or messages may appear.

◼ *Low Geometric Quality.* Appears when the Geometric Quality (GQ) of a position fix is below a set value and the accuracy of the position fix is questionable. Location information displayed may not be accurate enough to be used for navigation.

⌛ *Old Data.* The Old Data icon (" hour glass") appears when the receiver has been unable to update the location fix in the last 10 seconds. The location and navigation information displayed is based an the last location fix computed.

> Location and navigation information displayed while the Low Geometic Quality and Old Data icons are being displayed may be inaccurate and should not be used for navigation.

≟ *Poor Signal Quality.* This icon will appear should the Signal Quality (SQ) of one or more satellites that is being used to compute a location fix drops below a minimum level. This has a minimal effect an accuracy, and is intended only to alert you that a Signal may soon be lost.

⅗ Two *Dimensional.* The 2D icon indicates that the receiver is not receiving Signals from enough satellites (at least four) to compute elevation information. The 2D icon is also displayed when you have selected 2D in the ELEV. MODE portion of Setup.

♀ *Light On.* Indicates that the display light is on. This icon is not be visible if the 2D icon   is being displayed.

LOW BAT *Battery Warning.* Indicates that the batteries have only about 20 minutes of power remaining (less if the light is on). The receiver will turn itself off before there is a risk of losing data. This warning will replace the number of satellites on the status line.

> You may use rechargeable batteries in your Trailblazer XL, but you should be aware that they may drop to an unusable level very rapidly. For that reason, if you are using rechargeable batteries be prepared to replace the batteries as soon as possible after the LOW BAT warning is displayed.

SETUP

The Setup function allow you to control how the Trailblazer XL displays information. You may select, for example, which coordinate system will be used, or whether elevation is shown in meters or feet. Setup also includes the Initialize feature. *You should use this feature to enter an initial location when using the Trailblazer XL for the first time after purchase.*

SETUP			

TIME
04:56:02PM
18AUG94
▶ AUX
◀ SETUP

SETUP MENU ◀ ▶ **AUX MENU**

UTM		INITIALIZE		SOFTLOCK
LAT/LON		▼▲		▼▲
OSGB	◀	COORD. SYS.		DGPS
USER GRID		▼▲		▼▲

NORTH REF. → TRUE / MAGNETIC   **SIMULATOR**

LOCAL 24 HR		TIME DISPLAY		BREADCRUMB		OFF
LOCAL AM/PM	◀	▼▲		▼▲		10 MINUTES
UT		MAP DATUM	→ WGS84	LAST LOC		20 MINUTES
		▼▲	(71 others	▼▲		30 MINUTES
AUTO		ELEV. MODE	plus user)	SAMPLING	→ OFF	1 HOUR
3D	◀	▼▲		▼▲		10 MINUTES
2D		DIST. UNITS	→ NM/KNOTS	NMEA		20 MINUTES
		▼▲	ST MILES/MPH	▼▲	OFF	30 MINUTES
METERS		ELEV. UNITS	KM/KPH	VEL. AVG.	0183A	1 HOUR
FEET	◀	▼▲		▼▲	0183B	OFF
		LIGHT BRT.	→ OFF	CLR MEMORY	0183C	20 SECONDS
		▼▲	LOW	▼▲		60 SECONDS
		CONTRAST	HIGH	ERASE LMKS		

ELEV. MODE

DIST. UNITS → NM/KNOTS / ST MILES/MPH / KM/KPH

ELEV. UNITS

LIGHT BRT. → OFF / LOW / HIGH

CONTRAST

GOTO SORT → ALPHA / NEAREST

UTM GRID PLOT → OFF / ON

LMK PROJ		LMK PROJECT
MAP PROJ	◀	▼▲
TRIANGULATE		MAP SCALE

ARRIVAL		ALARM
ANCHOR	◀	▼▲
XTE		

VEL. AVG. → OFF / 20 SECONDS / 60 SECONDS

CLR MEMORY

ERASE LMKS

ERASE LLOC

ERASE TRACK

Press **SETUP.** The receiver displays the *Time* screen, which displays the current date and time. Both the Setup and AUX menus are accessed from this display.

```
      TIME
   12:00:31AM
     06JAN95
 ▶AUX MENU
 ◀SETUP MENU

 0 SATS      ◀▶
```

The time displayed by the Trailblazer XL is received from the satellites, then converted to your local dock. Since each satellite carries an atomic clock, the receiver's time is extremely accurate.

If the receiver has not yet acquired a satellite, the time and date shown may be incorrect. As soon as a satellite is acquired, this display will be updated.

⚠ Some Setup and AUX functions display alerts or warnings to confirm the action.

The SETUP Menu. The Setup menu contains features that affect the way information is displayed by specifying a certain setting or unit of measure. Once made, a selection is saved until you change it again.

From the Time display, press the **LEFT ARROW.** The first four functions of the Setup menu are displayed, with the first feature ("INITIALIZE") highlighted. The arrow icons are reversed, which means that pressing the UP/ DOWN ARROWs will move the highlight bar.

```
   SETUP MENU

 INITIALIZE
 COORD. SYSTEM
 NORTH REF.
 TIME DISPLAY

 0 SATS       ⬍
```

Initialize. Initialize provides the receiver with a starting location so it can refer to its internal almanac to determine which satellites it should look for. The starting location must be within 300 miles of your true location. If you don't know your location coordinates, refer to the City Reference Chart at the back of this guide. Find the city that is closest to you, and use that city's coordinates to initialize. If you like, write the city narre and coordinates in the space below.

City: _____

Latitude: _____   Longitude: _____

The following sample uses the coordinates for Los Angeles, California (34.03N latitude and 118.14W longitude). Do not use these coordinates unless you are within 300 miles of Los Angeles. Use the coordinates for a City within 300 miles of your location.

> ⚠️ Using latitude and longitude will satisfy most users, but you may prefer to use another coordinate system (UTM, OSGB, or a user-entered grid). To initialize in a different coordinate system, select the desired system for Location 1, then initialize. You will be prompted to enter data in the selected system.

Highlight "INITIALIZE" and press **ENTER.** The first character of latitude is highlighted. This is the cursor. Press the **UP/DOWN ARROW** to select the first character. When the desired number is displayed, press the **RIGHT ARROW** to move the cursor to the next space.

```
INITIALIZE

   30°00.00N
  000°00.00W


0 SATS      ◄►⇕
```

Your display should be similar to the one shown here. Remember that the **UP/DOWN ARROW** steps up or down through the list of characters, and the **RIGHT/LEFT ARROW** moves the cursor to the right or left.

```
INITIALIZE

   30°00.00N
  000°00.00W


0 SATS      ◄►⇕
```

Continue entering the latitude. When it matches the latitude you found in the City Reference Chart, press the **RIGHT ARROW** to move the cursor over the hemisphere, then use the **UP/DOWN ARROW** to select "N" or "S." Once the latitude and hemisphere are correct, press **ENTER.**

```
INITIALIZE

   34°03.00N
  000°00.00W


0 SATS      ◄►⇕
```

The cursor jumps down to the next line. Follow the same procedure to enter the longitude and select "E" or "W." Press ENTER. (If you notice a mistake, it can be corrected on the current line before **ENTER** is pressed; if the mistake is on the previous line or if ENTER has been pressed, press **SETUP,** select INITIALIZE, and start over.)

```
INITIALIZE

   34°03.00N
  000°00.00W


0 SATS      ◄►⇕
```
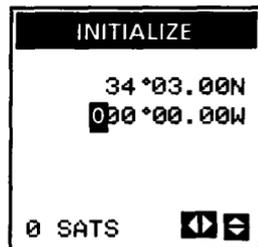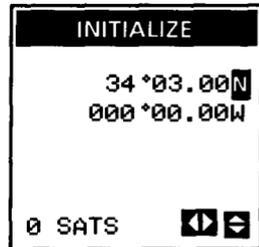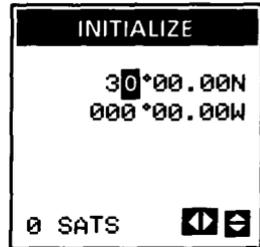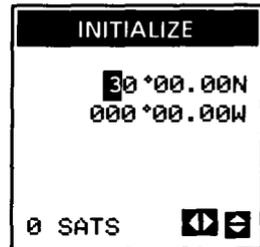
The receiver now prompts you for the elevation. You do not have to enter this information right now. Press **ENTER** to use the default elevation of 0 feet.

```
   INITIALIZE
    34°03.00N
   118°14.00W
   +00000FT EL

 0 SATS
```

⚠ By the time you reach this point, the receiver may already have acquired time from a satellite. If it has, the time and date entry described next will not be displayed. Resetting the time is done in TIME DISPLAY.

Key in your local time in a 12-hour (AM/PM) clock. Take extra care to enter the time correctly, including the AM/PM designation. Entry is the same as for latitude and longitude. Once the correct time is displayed, press **ENTER.**

The last bit of information the receiver needs is the date. Use the **UP/DOWN ARROWs** to key in the current date. (Your display should resemble the one shown.) If everything is correct, press **ENTER.** If there is a mistake, press **SETUP, LEFT ARROW, ENTER,** and rekey the information.

```
   INITIALIZE
    34°03.00N
   118°14.00W
   +00000FT EL
   10:35AM
   08JAN95
 0 SATS
```

You should not have to re-enter an initial position unless you clear the receiver's memory or move the receiver more than 300 miles from its last location while it is off.

Coordinate System. This feature allows you to select the coordinate system that you will use to enter and view location information. The system you select will depend an the maps or charts that you are using with your receiver.

The most commonly used system is Lat/Lon, which uses the imaginary lines of latitude and longitude. Other coordinate systems used by the Trailblazer XL are UTM and OSGB. You may also enter any grid system manually. These systems are described in Chapter 4.

Trailblazer XL has two location coordinate screens: Location 1 and Location 2. You may select a different coordinate system for each display.

Highlight "COORD. SYSTEM" and press **EN-TER.** Select "LOCATION 1" or "LOCATION 2." (The system selected for Location 1 is also used for all landmark coordinate displays.) Press **ENTER.**

```
┌─────────────────────────┐
│   COORD. SYSTEM         │
│                         │
│  LOCATION 1             │
│  LOCATION 2             │
│                         │
│                         │
│  0 SATS            ⬍    │
└─────────────────────────┘
```

Select the desired coordinate system and press **ENTER.** If you select LAT/LON, you will be asked to select DEG/MIN or DEG/MIN/SEC. Highlight the desired format and press **EN-TER.**

```
┌─────────────────────────┐
│   COORD. SYSTEM         │
│                         │
│  UTM                    │
│  LAT/LON                │
│  OSGB                   │
│  USER GRID              │
│  0 SATS            ⬍    │
└─────────────────────────┘
```

The default coordinate system for Location 1 is Lat/Lon, DEG/MIN. The default coordinate system for Location 2 is UTM.

North Reference. Maps and charts indicate the direction of the geographic or true north pole. Your compass indicates the direction of the magnetic north pole. Depending on where you are, the difference between true north and magnetic north can be very large. If you rely on your map and compass to plot your course without compensating for the difference, you may find yourself very far off your planned path.

The Trailblazer XL can reference information to either true north or magnetic north. The default is MAGNETIC.

Time Display. Your Magellan receiver can display time in one of three formats: local 24-hour (military), local 12-hour (AM/PM), or UT (Universal Time or Zulu). UT is the time that is current at the Prime Meridian (0° longitude), which runs through Greenwich, England. The default Time Display is LOCAL AM/PM.

```
┌──────────────────────────────────────────────────────────┐
│  ⚠   If the receiver does not have a computed position    │
│      fix the receiver displays a warning to alert you     │
│      that an initial time has not been set in INITIALIZE. │
│      After inputting an initial time you may change the   │
│      format that time is displayed in.                    │
└──────────────────────────────────────────────────────────┘
```
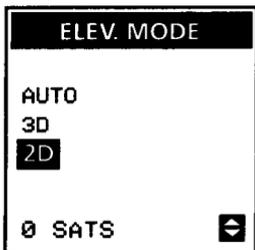
Map Datum. You may need to change the Map Datum that the receiver will use to agree with the datum your maps and charts use. The datum required will be printed on the map or chart. The most common datums in North America are NAD27 and WGS84; WGS84 is the default Map Datum. If you select "USER", the receiver will prompt you to enter datum constants.

```
┌─────────────────────┐
│     MAP DATUM       │
│ ▐WGS84▌    ALASK    │
│  NAD27     ARC50    │
│  NAD83     ARC60    │
│  ADIND     ASTRO    │
│                     │
│  0 SATS      ◀▶ ▲▼  │
└─────────────────────┘
```

Elevation Mode. The receiver uses Signals from at least three satellites to compute horizontal location. When at least four satellites are visible, the receiver can also compute elevation. A location-only solution is a "2D" fix. A location and elevation solution is a "3D" fix. You may set the receiver to compute either 2D or 3D fixes. The default is 2D.

You may also select "AUTO", which allows the receiver to switch between 2D and 3D. When the AUTO Elevation Mode is selected, the receiver computes 3D solutions when at least four satellites are visible.

> When 2D is selected, the receiver will ask for the current elevation. Key in the elevation and press **ENTER.** If you don't know the current elevation, press **ENTER** without making an entry.

```
┌─────────────────────┐
│     ELEV. MODE      │
│                     │
│  AUTO               │
│  3D                 │
│ ▐2D▌                │
│                     │
│  0 SATS         ▲▼  │
└─────────────────────┘
```

Distance Units. DIST. UNITS (Distance Units) allows you to select the unit of measure used to display distance and velocity. You may select NM/KNOTS, ST.MILES/MPH, or KM/KPH. ST.MILES/MPH is the default setting.

Elevation Units. ELEV. UNITS (Elevation Units) is the unit of measure that will be used to display your elevation, Select METERS or FEET. The default setting is FEET.

Light Brightness. LIGHT BRT. allows you to select the brightness level (OFF, LOW, or HIGH) of the display. The light can also be switched on and off by holding down the "0" key. (Remember that the light will run down your batteries fairly quickly.) The default is OFF.

Contrast. CONTRAST allows you to adjust the contrast level of the display to allow you to select the best contrast level for the particular environment you are in. The default is 80%.

GOTO Sort. As you use your receiver, you will begin to collect a large number of landmarks. These are location fixes that you have named and saved for future use. Very soon you may collect so many landmarks that it may be difficult to find and highlight the landmark you are looking for in the landmark library. To simplify these searches, you may select the order that they are displayed, either ALPHABETICAL or

Using Your Magellan Receiver

NEAREST (nearest to furthest from your present location). This selection will not affect the landmark search display. The default sort is ALPHABETICAL.

UTM Grid Plot. This feature adds a UTM grid overlay to the Plotter screen when UTM coordinates have been selected for the Location 1 screen. Select "ON" or "OFF." The default is OFF.

Landmark Projection. In the Setup menu, Landmark Projection specifies the technique used to estimate the coordinates of an unknown location, based on the coordinates of a stored landmark.

Select:

LMK PROJECT	to project coordinates using bearing and distance. (Default)
MAP PROJECT	to project coordinates on a map using inches or centimeters N or S and E or W. (The unit used is selected in Map Scale.)
TRIANGULATION	to project coordinates using bearing from two landmarks.

Map Scale. Map Scale allows you to enter the scale used by your map and select a convenient unit of measure (inches or centimeters). The selections you make here affect the Map Project feature of Landmark Project. The default setting is 1:24,000.

Since Map Project uses measurements taken from your map to estimate coordinates for an unknown location, the scale entered here must match the scale used by your map. Which scale your map uses can be found in the legend.

Highlight "MAP SCALE" and press **ENTER.** Key in the scale of your map. The scale will be "1:" and some number. Key in the number and press **ENTER.**
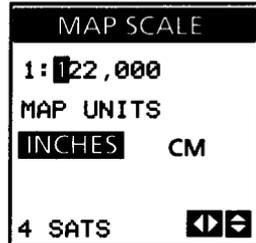
Use the **RIGHT/LEFT ARROW** to select "INCHES" or "CM." (Use the units you are most comfortable with.) Press **ENTER.**
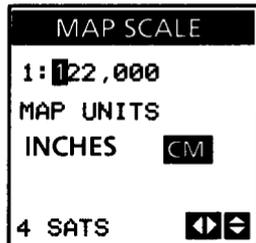
Alarm. Your Magellan receiver has the ability to sound an external alarm when you arrive at your destination (ARRIVAL); have moved a predefined distance from the place where you set your anchor (ANCHOR); and/or if your cross track error is greater then

the defined distance (XTE). With the alarm menu displayed, you can turn an alarm on or off by pressing the **ENTER** key. If you turn on the ANCHOR or XTE alarms, may change the displayed radius by pressing **CLEAR** while the selected alarm is highlighted. The arrival alarm is set at 500 feet and cannot be changed. If an alarm is turned on, it will be preceded by a check mark. To exit the ALARM MENU, press any function key.

```
   ALARM MENU
    ARRIVAL
    ANCHOR
     XTE
 RADIUS:0500FT

 0 SATS        ⬍
```
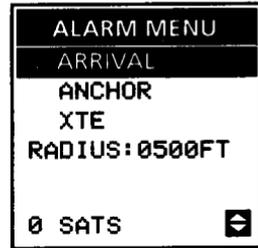
THE AUX SCREENS

The AUX features are functions that don't have a specific key assigned to them. They are usually functions that you set once and leave on, or functions that you won't want to use all the time.

AUX functions can be found in the AUX menu. Press **SETUP, RIGHT ARROW** to access the AUX menu.

```
   AUX MENU

   SOFTLOCK
    DGPS
   SIMULATOR
   BREADCRUMB

 0 SATS        ⬍
```
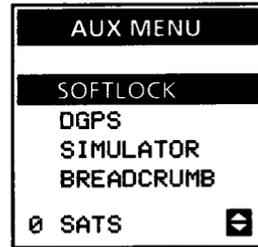
Softlock™. Softlock prevents the receiver from being turned on unless a specific key sequence is pressed during power-up. It is used to prevent the receiver from being turned on while it is being store or transported to prevent unnecessary use of the batteries.

When Softlock is on, the required key sequence is displayed during power-on.

Highlight "SOFTLOCK" and press **ENTER.** A check appears, indicating that the function is on. To turn Softlock off, press the ENTER key again.

```
   AUX MENU

 ✓ SOFTLOCK
    DGPS
   SIMULATOR
   BREADCRUMB

 0 SATS        ⬍
```

DGPS. "DGPS " means "Differential GPS." Differential is a method that reduces the effects of SA to produce highly accurate location fixes. (SA is described in Chapter 5.) The Trailblazer XL can use broadcast differential corrections. This requires the use of a differential radio beacon receiver. Contact your dealer to find out if DGPS is for you and what additional equipment you will require.

Highlight "DGPS" and press **ENTER.** A check appears, indicating that the function is on. To turn DGPS off, press the **ENTER** key again.

```
   AUX MENU

   SOFTLOCK
 \ DGPS
   SIMULATOR
   BREADCRUMB

 0 SATS      ⬍
```

The Trailblazer XL can accept broadcast differential corrections only when it is connected to a compatible differential radio beacon receiver and DGPS is turned on.

Simulator. The Simulator is a practice mode that creates an imaginary route from your location to three imaginary landmarks. This mode allows you to view simulated movement on the location and navigation displays. It is very useful when you want to review or practice using your receiver at home.

Highlight "SIMULATOR" and press **ENTER.** A check appears on the menu, indicating that the function is on. Also the icon appears in the bottom right of all displays. To turn the Simulator off, press the **ENTER** key again.

```
   AUX MENU

   SOFTLOCK
   DGPS
 \ SIMULATOR
   BREADCRUMB

 0 SATS      ⬍
```
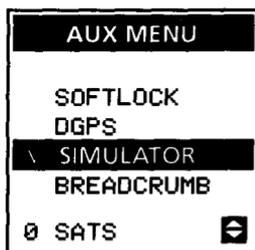
> ⚠ After using the Simulator, be sure to turn it off again. If you turn the receiver off while the Simulator is on, the imaginary landmarks and route will be saved.

Breadcrumb. Breadcrumb is used with the Last Location buffer. When turned on, Breadcrumb automatically duplicates every landmark you save with ENTER, ENTER, ENTER to the Last Location buffer. (The duplicated landmark will have an +LLC name in the buffer.) This is in addition to the locations that are automatically saved to the buffer with the Last Loc feature. (In fact, Breadcrumb will save fixes even when Last Loc is turned off.)

Highlight "BREADCRUMB" and press **ENTER. A** check appears, indicating that the function is on. To turn Breadcrumb off, press the **ENTER** key again.

When your path has a lot of turn or junctions, save a landmark at key locations. You can then create a Backtrack route that includes all of the key junctions at the end of the day.

Last Loc. This feature allows you to set how often location fixes are automatically saved to the Last Location buffer.

Highlight "LAST LOC" and press **ENTER.** Use the **UP/DOWN ARROW** to select a save rate. To turn Last Loc off, select "OFF." A check appears next to "LAST LOC" in the menu when any setting other than "OFF" is selected. Default is 10 minutes.

```
      LAST LOC
OFF
10 MINUTES
20 MINUTES
30 MINUTES
1 HOUR

0 SATS        ⬍
```

Sampling. Sampling turns the receiver on every so often to compute a location fix, save the fix to the buffer, then turn itself back off. You may set the receiver to turn on every 10 minutes, every 20 minutes, every 30 minutes, or every hour. You may also turn Sampling off.

Sampling is useful when you are travelling a simple route (one you don't really need the receiver's help to navigate) and don't want to run down the batteries by operating the receiver continuously, but you would like some location fixes you can use to create a return route with the Backtrack Route feature.

To use Sampling, the receiver's antenna must remain uncovered and fully visible to the sky. If the antenna is blocked and cannot acquire enough satellites to compute a fix, the receiver will remain on until a fix can be computed.

Highlight "SAMPLING" and press **ENTER.** Use the **UP/DOWN ARROW** to select a sampling rate. To turn Sampling off, select "OFF." A check appears next to "SAMPLING" in the menu when any setting other than "OFF" is selected.

```
      SAMPLING
OFF
10 MINUTES
20 MINUTES
30 MINUTES
1 HOUR

0 SATS        ⬍
```

When Sampling is on, a reminder appears on the POWER DOWN screen.

NMEA. NMEA is the communication standard for electronic marine navigation equipment such as autopilots. Your receiver can output location and navigation information in the NMEA 0183 format. (Refer to *Output NMEA Data* in Chapter 3 to determine which message set to use.) This feature turns the output dataport on and off.

To output data, the Trailblazer XL must be connected to a compatible NMEA device with the Power/Data Cable. The receiver must be on and computing location fixes before the dataport and the NMEA device are turned on.

Highlight "NMEA" and press **ENTER.** Use the **UP/DOWN ARROW** to select OFF, 0183A, 0183B, or 0183C. Press **ENTER.** A check appears next to "NMEA" in the menu when any setting other than "OFF" is selected.

```
        NMEA
OFF
0183A
0183B
0183C

0 SATS        ⬍
```
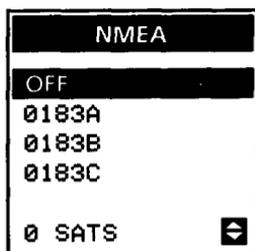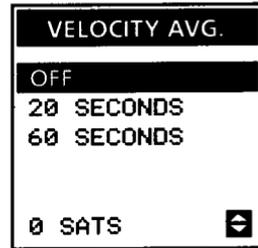
> ✋ Keep in mind that to support an NMEA device, your receiver must operate continuously. Since this can be a very heavy drain on the Trailblazer XL's batteries, we suggest using external power.

Velocity Average. As you use your receiver, you may notice fluctuations in the velocity (speed) displays. Like elevation, velocity is susceptible to Selective Availability. Velocity Averaging minimizes this effect by displaying an averaged speed measurement. There are three settings to choose from: OFF (no averaging) would be used where rapid velocity updates are required; 20 SECONDS would be selected at fairly low velocities where rapid velocity updates are not necessary; 60 SECONDS would be used where getting immediate velocity information is relatively unimportant, such as when hiking.

> Highlight "VELOCITY AVG." and press **ENTER.** Use the **UP/DOWN ARROW** to select a setting, then press **ENTER.** A check appears next to "VELOCITY AVG." in the menu when any setting other than "OFF" is selected.

```
┌─────────────────────────┐
│   VELOCITY AVG.         │
├─────────────────────────┤
│ OFF                     │
│ 20 SECONDS              │
│ 60 SECONDS              │
│                         │
│ 0 SATS           ⬍     │
└─────────────────────────┘
```

Clear Memory. Clear Memory is a system reset that will erase all of the receiver's memory and reset all Setup and AUX functions to their default settings.

> ✋ A system reset will erase all of the landmarks and routes in your receiver's memory. We suggest that you review the locations in your landmark library and record any landmarks you may want to reenter before clearing memory.

> Highlight "CLEAR MEMORY" and press **ENTER.** The screen displays the four keys (SETUP, GOTO, CLEAR, ENTER) that must be pressed at the same time to clear the receiver's memory. Press any function key to exit without Clearing memory.

The receiver's memory can be cleared at any time without entering the AUX menu, even when the receiver is off, by pressing these four keys.

Erase LMKS. This feature will erase all of the landmarks in your landmark library.

> Highlight " ERASE LMKS." and press **ENTER.** Next, press **CLEAR** to continue erasing, or press any function key to exit without erasing landmarks.

Erase LLOC. Erase LLOC will erase everything in the Last Loc buffer. We suggest erasing the buffer before starting on a trip if you think you may want to use the Last Location fixes to create a Backtrack route.

Highlight "ERASE LLOC." and press **ENTER.** Next, press **CLEAR** to continue erasing, or press any function key to exit without erasing the buffer.

Erase Track. Track is the actual course you have travelled, which is not always the same as the course you planned to travel. As you use the receiver, you may soon notice the Plotter screen becoming cluttered with your track history. Track erase allows you to erase the track history.

Highlight "ERASE TRACK" and press **ENTER.** Next, press **CLEAR** to continue erasing, or press any function key to exit without erasing the track.

LOC

The Location screens are accessed with the LOC key. They show location coordinates and monitor the receiver's status.

Getting a Location Fix. To get a location fix, you must be outside with a clear view of the sky. You must also be away from any large obstructions such as buildings and large trees.

This illustration shows a good site for acquiring satellite signals. The hiker is standing far enough away from the stand of trees to get a clear view of the sky.

Rotate the receiver's antenna upward, and hold the receiver in a comfortable position. If the receiver is oft press the ON/OFF key to turn it on.

Location 1. Press the **LOC** key. The Location 1 screen appears with the coordinates of the last-known location. (This will be either the last location fix or the initial location, whichever is more recent.)" SEARCHING " is displayed, indicating that the receiver is searching the sky for satellites.

```
┌─────────────────────┐
│    LOCATION 1       │
│    34°03.00N        │
│   118°14.00W        │
│       0FT EL        │
│    SEARCHING        │
│ 0 SATS      ◆▶ ◆▼  │
└─────────────────────┘
```

LOC Flow Chart

```
┌─────────┐
│  LOC    │ ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄
└─────────┘       ┄┄┄┄
```

```
┌──────────────┐
│  MAP PROJ.   │
│     OR       │
│  LMK PROJ.   │    Selected
│     OR       │
│   TRIANG.    │    in SETUP
└──────────────┘
       ▼▲
```

```
┌──────────────┐  ►      ┌──────────────┐
│  LOCATION 1  │  ◄───── │   LMK SRCH   │          ┌────────┐
│  00°00.00N   │         │ ⊕ DOCK       │          │ ENTER  │
│  000°00.00W  │  ┌─────┐│ ♀ WP001      │          └────────┘
│  000FT EL    │  │ LOC ││ ♀ WP002      │
└──────────────┘  └─────┘└──────────────┘              ╲
                                                    ╭──────────╮
╭──────────╮                                        │   to     │
│   to     │  ◄                                     │ LANDMARK │
│ LAST LOC │                                        ╰──────────╯
╰──────────╯
```

```
       ▼▲
┌──────────────┐
│  LOCATION 2  │
│ 11 423962E   │
│   3774474N   │
│  000FT EL    │
└──────────────┘
```

```
┌──────────────┐  ►   ┌──────────────┐  ►   ┌──────────────┐
│   SAT STAT   │  ◄── │  RCVR STAT   │  ◄── │   SUN/MOON   │
│      ▪  ▪    │      │    ▂▅█        │      │   18JAN95    │
│        07    │      │   ▁▅█         │      │ SUN▲         │
│   09         │      │  002100      │      │ SUN▼         │
│              │      │  954247      │      │ MOON         │
└──────────────┘      └──────────────┘      └──────────────┘
```

LAST LOC
from
LOCATION

TRIP SUM
ODOM
TIME
MAX VEL
MIN VEL
AVG VEL

ENTER

FROM:
TO:

```
00°00.00N
000°00.00W
000FT EL
```
Prev. Last Loc

```
00°00.00N
000°00.00W
000FT EL
```

```
00°00.00N
000°00.00W
000FT EL
```
Next Last Loc

POINTER
N
000°   000mi
Prev. Last Loc

POINTER
N
000°   000mi

POINTER
N
000°   000mi
Next Last Loc

SUN MOON
18JAN95
SUN▲
SUN▼
MOON

LANDMARK
from LMK
SEARCH
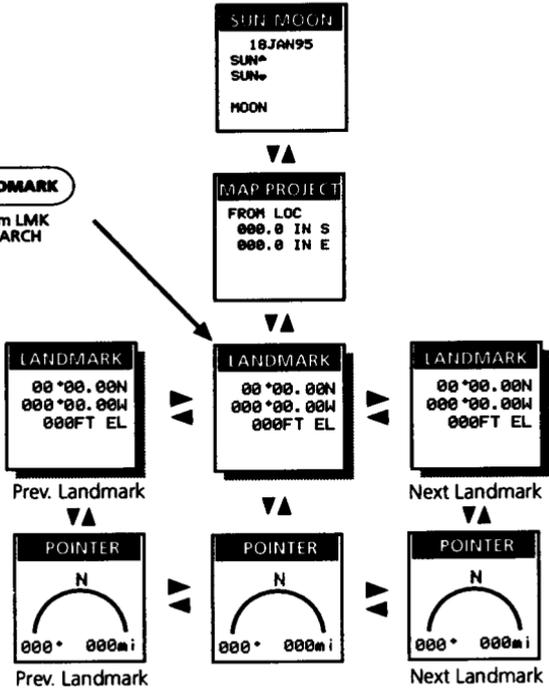
MAP PROJECT
FROM LOC
000.0 IN S
000.0 IN E

LANDMARK
```
00°00.00N
000°00.00W
000FT EL
```
Prev. Landmark

LANDMARK
```
00°00.00N
000°00.00W
000FT EL
```

LANDMARK
```
00°00.00N
000°00.00W
000FT EL
```
Next Landmark

POINTER
N
000°   000mi
Prev. Landmark

POINTER
N
000°   000mi

POINTER
N
000°   000mi
Next Landmark

In a short period of time, the receiver will locate satellites and begin to receive information. "SEARCHING" is replaced with a bar graph that indicates how close the receiver is to acquiring GPS data.

```
┌──────────────────────┐
│    LOCATION 1        │
│   34°03.00N          │
│  118°14.00W          │
│        0FT EL        │
│  ████▌               │
│  2 SATS        ◀▶ ◆  │
└──────────────────────┘
```
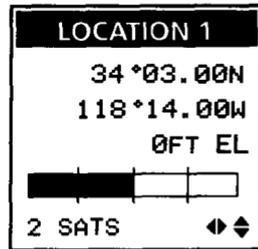
Within a few minutes, the bar graph is replaced with the local time. This indicates that your receiver is obtaining GPS information and has computed your present location. Everything you do from now on is based on the location information received.

```
┌──────────────────────┐
│    LOCATION 1        │
│   34°03.00N          │
│  118°14.00W          │
│       927FT EL       │
│  10:42:33AM          │
│  4 SATS        ◀▶ ◆  │
└──────────────────────┘
```
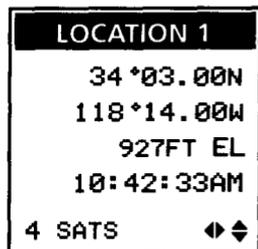
Location 2. To view the Location 2 screen, press **LOC** a second time. The Trailblazer XL uses two coordinate systems at the same time, so you can display the present location in both Lat/Lon and UTM (these are the defaults) or in whichever systems you selected in Setup.

Press **LOC** again to return to the Location 1 screen.

```
┌──────────────────────┐
│    LOCATION 2        │
│   11  423714E        │
│     3774599N         │
│        0FT EL        │
│  10:42:35AM          │
│  4 SATS              │
└──────────────────────┘
```
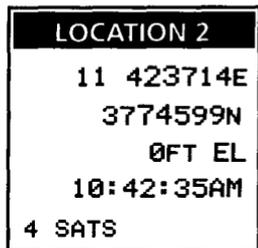
Receiver Status. The Receiver Status screen is a graphical representation of the signal strength of the satellites being tracked by the receiver.

Press the **DOWN ARROW** from the Location screen. Every GPS satellite has been assigned a unique number. The numbers of the satellites being tracked appear below the vertical bars. Read the numbers vertically; the number of the first satellite in this example is 24. The bar above the number indicates the signal strength. The higher the bar, the stronger the signal from that satellite is.

```
┌──────────────────────┐
│  RECEIVER STAT       │
│      █               │
│     ██ █             │
│    ▐██ █             │
│  █ ███ █             │
│  2210102             │
│  4376656             │
│  4 SATS        ◀▶ ▲  │
└──────────────────────┘
```
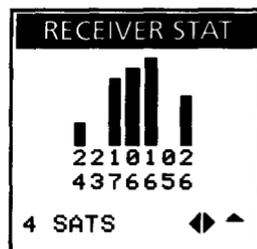
Satellite Status. Satellite Status displays the locations of each available satellite, relative to your location.

> Press the **DOWN ARROW. LEFT ARROW** from the Location 1 screen. The satellites whose numbers are highlighted are the ones being used for location fixes.

```
┌─────────────────────┐
│    SAT. STATUS      │
│         ↑           │
│         N           │
│         ┆  22  16  24│
│       17  06        │
│      23  26    05   │
│                   ▶ │
└─────────────────────┘
```
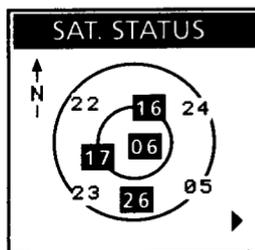
Satellite location is described by height above the horizon, or elevation, and location relative to north, or azimuth. Both values are expressed in degrees. The outer circle represents the horizon, or 0° elevation. The next circle is 45° elevation. The center of the two circles is 90° elevation, or directly above your location. Azimuth is measured from north (at the top of the screen) in a clockwise direction. In the example shown, satellite 26, which is being used in the location fix, has an elevation of about 20° and an azimuth of 180° (true or magnetic; depending on which you selected in SETUP). Satellite 5 is at 0° elevation and 135° azimuth.

Sun/Moon Cycle. The receiver will compute the sunrise/sunset and lunar cycle for the present location on the date you select.

> Press the **DOWN ARROW, RIGHT ARROW** from the Location 1 screen. The cursor is active on the date. Key in the desired date and press **ENTER.** After a moment, the receiver displays the time of sunrise and sunset, and which phase the moon will be in on the selected date.

```
┌─────────────────────┐
│    LOCATION 1       │
│     02JAN95         │
│  SUN▲   06:40A      │
│  SUN▼   07:22P      │
│  MOON    ◗          │
│  5 SATS         ◀   │
└─────────────────────┘
```
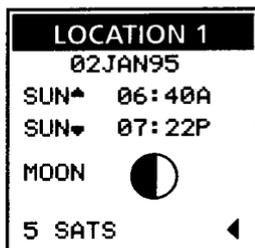
Last Location Buffer. Fixes are regularly saved to the Last Location buffer — how often they are saved you select in Setup. The fixes in the buffer are called the Last Loc fixes. They can be viewed and saved as landmarks. They can also be used to compute how far you've travelled between two selected locations.

> Press the **LEFT ARROW** from the Location 1 screen. Last Loc fixes are given temporary names in the format +LLC plus a number. The higher the number, the older the Last Loc fix is. Fix +LLC18 is older than +LLCO2.

```
┌─────────────────────┐
│     LAST LOC        │
│  +LLC01             │
│        34°06.59N    │
│        118°49.57W   │
│          950FT EL   │
│  03:39P 02JAN95     │
│  4 SATS       ◆◆    │
└─────────────────────┘
```

Use the **RIGHT/LEFT ARROW** to scroll through the fixes in the buffer.

```
      LAST LOC
+LLC12
        34°06.32N
        117°49.56W
          950FT EL
01:56P 02JAN95
4 SATS        ◆◇
```

⚠️ You may save any Last Loc fix as a landmark by pressing ENTER three times or by pressing ENTER and selecting a display icon and name.

When the buffer is filled, incoming Last Loc fixes replace the oldest fixes in the buffer.

Last Location Pointer. The Last Location Pointer indicates where the Last Loc fix is in relation to the present location.

Press the **DOWN ARROW** from any Last Lo-cation fix. The present location is at the bot-tom center of the arc. The "+" icon repre-sents the LLC fix. The letters represent com-pass points. Bearing and distance to the LLC fix from the present location is at the bottom of the screen.

```
   TO +LLC12
        N
  +
              E
 292°      0.01M
4 SATS      ◆◇
```

Trip Summary. The Trip Summary is a brief review of the distance travelled from any Last Loc fix to the present location (LOC) or to another Last Loc fix, the time to travel from one location to the other, and your speed.

Scroll to the desired "from" location (use +LLCO3 or older) and press the **UP ARROW.** "LOC" is automatically displayed as the "to" location; press the **RIGHT/LEFT ARROW** to use a recent Last Loc fix as the "to" location instead of LOC. The selected "to" location must be more recent than the "from" loca-tion.

Press **ENTER.**

```
   TRIP SUMMARY
FROM  +LLC12
01:36P 02JAN95

TO     LOC
03:43P 02JAN95
4 SATS      ◆◇
```

```
   TRIP SUMMARY
+LLC05▶LOC
ODOM      0.92MI
TIME      6:51HR
MAX VEL   999MPH
MIN VEL   999MPH
AVG VEL   999MPH
4 SATS        ▼
```

Press the **DOWN ARROW** to return to the LLC buffer. To return to the Location 1 screen, press ⬤ then the **RIGHT ARROW,** or press **LOC**.

Saving Locations as Landmarks. As you use the receiver, you will realize that some of the location fixes the receiver computes represent places you would like to go back to. They may be a deer stand, a fishing hole, or where you left your truck. *Any location fix or last location fix can be saved as a landmark.*

Landmarks allow you to return to a specific site at any time. Two hours from now. Next week. Next month. Whenever you want to return.

So you can locate a landmark easily, they are assigned unique names. They are also assigned an icon that will be used to represent the landmark on the Pointer, Plotter, and Road screens.

⚠️ You may save a landmark from either the Location 1 or the Location 2 screen. You may also save a landmark from the Last Loc screen.

The fast way to save a location as a landmark is to press **ENTER, ENTER, ENTER**. This saves the location with the default icon (φ) and a receiver-generated name. A receiver-generated name is "LM" and a sequential number from 001 to 200.

You may personalize the landmark name by selecting an icon and name that describes the location being saved. (This will allow you to identify a specific landmark more easily later.) To select an icon and enter a name, press **ENTER.** Use the **UP/DOWN ARROW** to select a display icon. Select **X**, **Y**, **▲**, **∅**, **±**, **◊**, **⚑**, **⚐**, or **🐾**. Press the **RIGHT ARROW** to move the cursor to the next space.

```
┌─────────────────────┐
│     LOCATION 1      │
│ ▣                   │
│         34°06.58N   │
│        117°49.58W   │
│          927FT EL   │
│                     │
│ 4 SATS      ◀▶⬍     │
└─────────────────────┘
```

Enter the landmark name (up to 5 characters) by pressing the **UP/DOWN ARROW** to select letters or numbers, and the **RIGHT/LEFT ARROW** to move the cursor. When the name is complete, press **ENTER.**

```
┌─────────────────────┐
│     LOCATION 1      │
│ XCAM■               │
│         34°06.58N   │
│        117°49.58W   │
│          927FT EL   │
│                     │
│ 4 SATS      ◀▶⬍     │
└─────────────────────┘
```
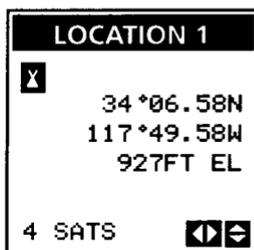
You may enter a message or description that will be saved with the landmark. The message can be displayed when the landmark is viewed from the Landmark Menu and from the navigation screens when the landmark is used in a route. Use the **RIGHT/LEFT ARROW** to highlight "YES" and press **ENTER.** Key in up to 26 characters. Of you do not enter a message now, one can be added later.)

```
   CREATE MSG

MESSAGE?
YES/NO

4 SATS      ◀▶⬍
```

Press **ENTER.** The landmark (and message) is saved and the receiver returns to the location screen.

```
   LOCATION 1
    34°03.00N
   118°14.00W
       927FT EL
   10:42:33AM
4 SATS      ◀▶⬍
```

Entering Landmarks Manually. There is another way to create a landmark. Besides saving location fixes and last location fixes, you can manually enter a landmark without having to visit the site. You would do this when you find an interesting place on a map, or when a friend gives you coordinates for a location.

To enter a landmark, press **CLEAR** from the Location screen. Select a display icon and landmark name and press **ENTER.**

```
   DEFINE LMK
X
       34°05.13N
      118°43.72W
       930FT EL

5 SATS      ◀▶⬍
```

Now you will edit the displayed coordinates. The cursor has jumped down to the first coordinate line. Make any necessary changes, using the UP/DOWN ARROWs to select characters and the **RIGHT/LEFT ARROWs** to move the cursor. When the first line appears the way you want, press **ENTER.**

```
   DEFINE LMK
⌂BUCK
       34°05.13N
      118°43.72W
       930FT EL

5 SATS      ◀▶⬍
```

Next, edit the second line and press **ENTER,** then edit elevation and press **ENTER.** You may enter a message (follow the prompts as before), or save the waypoint without a message by pressing **ENTER.**

The Landmark Menu. The Landmark Menu is an alphanumeric list of all of the stored landmarks. It also allows you to view a landmark's coordinates, message, distance from the present location, the sun/moon cycle at the landmark on any given date, and to compute a landmark's distance from any location..

All landmarks are saved in the coordinate system selected for Location 1. If the coordinate system is changed, the landmarks will automatically be displayed in the new coordinate system.

From the Location 1 screen, press the **RIGHT ARROW.**

```
┌─────────────────────┐
│    LMK SEARCH       │
├─────────────────────┤
│ xCAMP   ϙLM003      │
│ ♟BUCK               │
│ ϙLM001              │
│ ϙLM002              │
│                     │
│ 5 SATS      ◀▶⬍     │
└─────────────────────┘
```

Use the arrow keys to move the highlight bar through the menu. To view landmark coordinates, press **ENTER.**

```
┌─────────────────────┐
│     LANDMARK        │
├─────────────────────┤
│ XCAMP               │
│        34°06.58N    │
│       117°49.58W    │
│         927FT EL    │
│   03:42P06JAN95     │
│ 4 SATS      ◀▶ ⬍    │
└─────────────────────┘
```
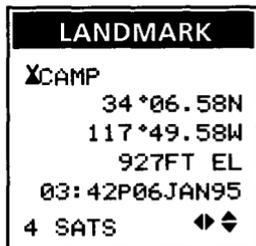
Press the **RIGHT/LEFT ARROW.** The receiver steps through the stored landmark coordinates.
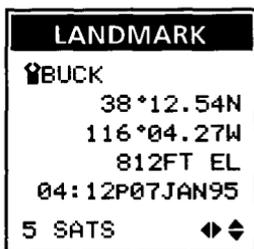
```
┌─────────────────────┐
│     LANDMARK        │
├─────────────────────┤
│ ♟BUCK               │
│        38°12.54N    │
│       116°04.27W    │
│         812FT EL    │
│   04:12P07JAN95     │
│ 5 SATS      ◀▶ ⬍    │
└─────────────────────┘
```

⚠️ SMART SCROLL. Instead of stepping through each landmark, press CLEAR, then use the arrow keys to enter the desired icon and name.

Press the **DOWN ARROW** to display the Landmark Pointer. This screen is the same as the Last Location Pointer; the only difference is the display points you toward a saved landmark.

```
┌─────────────────────┐
│    TO ♟BUCK         │
├─────────────────────┤
│       N ♟           │
│    ╱       ╲        │
│   ╱         ╲E      │
│  026ₘ✦   14.9ᴹᵢ    │
│  5 SATS     ◀▶ ⬍    │
└─────────────────────┘
```
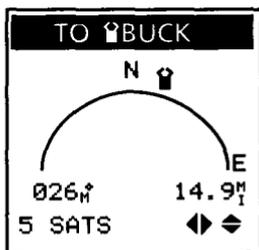
Press the **DOWN ARROW** again to view the landmark's message. If no message was saved, you may press **CLEAR** to enter one now.

```
🛎 BUCK          MSG

NO MESSAGE




5 SATS        ◀▶▲
```

Press **UP ARROW, UP ARROW** to return to the Landmark screen, then press the **UP ARROW** again. The receiver can display the landmark's distance from another location using the map scale and unit of measure you entered in Setup. "LOC " is automatically displayed as the "from" location.

```
    TO 🛎BUCK


FROM   LOC



5 SATS        ◀▶⬍
```

Use the **RIGHT/LEFT ARROW** to select the "from" location and press **ENTER.** The receiver computes the number of inches (or centimeters) N or S and E or W from the landmark to the selected location.

```
    TO 🛎BUCK


FROM  ⌖LM001
 001.3 IN S
 000.5 IN W

5 SATS        ⬍
```

Press the **UP ARROW.** The receiver can display the sunrise/sunset and lunar cycle at the selected landmark for the date you enter. Key in the desired date and press **ENTER.**

```
      🛎 BUCK
     14JAN95
SUN▲   06:08A
SUN▼   05:02P

MOON   ◖

5 SATS        ▼
```
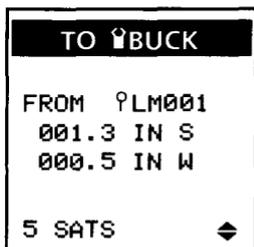
Deleting Landmarks. What about landmarks you no longer need? Any landmark can be deleted, as long as it is not being used in a route. (Routes are described a little later.) The receiver will display a warning if you attempt to delete a landmark that is being used.

The landmark's coordinates must be displayed to delete it. Highlight the landmark in the Landmark Menu and press **ENTER.** Next, press **CLEAR.** The receiver gives you a chance to change your mind and keep this landmark. To continue erasing the landmark, highlight "YES" and press **ENTER.** The landmark is deleted, and the next landmark is displayed.

```
    WARNING
ERASE ⌖LM001

 NO
 YES


5 SATS        ⬍
```

Landmark Projection. There is one more option available with the LOC key: Landmark Projection. Landmark Projection allows you to estimate location coordinates of another site. Exactly how this is done is determined by which option you selected in Landmark Projection from Setup.

If you selected "LMK PROJECT", you will select a "from" location and enter a distance and bearing. The "from" location is the point from which the distance and bearing will be "measured" to compute the estimated location coordinates.

Press the **UP ARROW** from the Location screen. The receiver automatically displays the current location (LOC). Use the **RIGHT/LEFT ARROW** to select a different "from" location. When the desired location is displayed, press **ENTER.**

```
╔══════════════════╗
║    LMK PROJECT   ║
╠══════════════════╣
║                  ║
║  FROM  LOC       ║
║  DIST            ║
║  BRG             ║
║                  ║
║  6 SATS    ◀▶▾   ║
╚══════════════════╝
```

Next, key in the distance from the selected location and press **ENTER.** Key in the bearing and press **ENTER.**

```
╔══════════════════╗
║    LMK PROJECT   ║
╠══════════════════╣
║                  ║
║  FROM LOC        ║
║  DIST 030.0ᴹᵢ    ║
║  BRG  120°M      ║
║                  ║
║  6 SATS    ◀▶⬍   ║
╚══════════════════╝
```
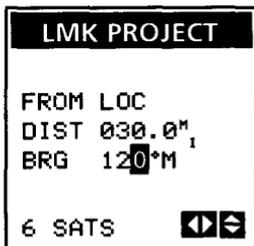
The receiver computes and displays the projected coordinates. If you want to save these coordinates as a landmark, press **ENTER** and key in a name.

```
╔══════════════════╗
║   LMK. PROJECT   ║
╠══════════════════╣
║                  ║
║      33°48.50N   ║
║     117°26.98W   ║
║        922FT EL  ║
║                  ║
║  6 SATS      ▾   ║
╚══════════════════╝
```
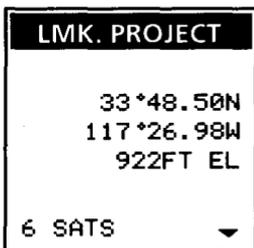
If you selected "MAP PROJECT" in Setup, you will select a "from" location and enter distance in inches (or centimeters) N or S and E or W an a map to compute the estimated location coordinates. The map scale and unit of measure used will be the ones selected in MAP SCALE, also in Setup.

Press the **UP ARROW** from the Location screen. The receiver automatically displays the current location (LOC). Use the **RIGHT/LEFT ARROW** to select a different "from" location. When the desired location is displayed, press **ENTER.**

```
╔══════════════════╗
║    MAP PROJECT   ║
╠══════════════════╣
║                  ║
║  FROM  LOC       ║
║                  ║
║                  ║
║                  ║
║  6 SATS    ◀▶▾   ║
╚══════════════════╝
```

Next, key in the distance north or south from the selected location, then press the **RIGHT ARROW** to move the cursor to the hemisphere. Use the **UP/DOWN ARROW** to display "N" or "S" and press **ENTER.**

```
   MAP PROJECT

FROM LOC
000.05   IN N
000.10   IN E

6 SATS      ◄►⬍
```
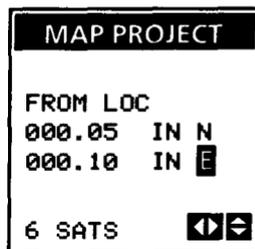
Repeat to key in distance east or west of the "from" location and select "E" or "W", then press ENTER. The receiver computes and displays projected coordinates. To save the coordinates as a landmark, press **ENTER.**

```
   MAP PROJECT

       34°06.66N
      117°52.47W
         923FT EL

6 SATS        ▼
```
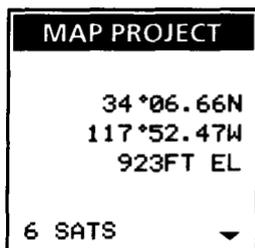
If you selected "TRIANGULATE" in Setup, you will select two "from" locations and enter a bearing from each location to compute the estimated location coordinates.

Press the **UP ARROW** from the Location screen. The receiver automatically displays the current location (LOC). Use the **RIGHT/LEFT ARROW** to select a different "from" location. When the desired location is displayed, press **ENTER.**

```
  TRIANGULATION

FROM   LOC
BRG

6 SATS      ◄►▼
```
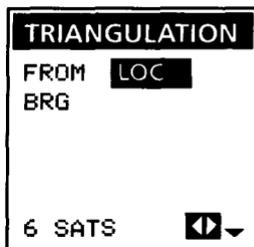
Next, key in bearing from the selected location and press **ENTER.**

```
  TRIANGULATION

FROM LOC
BRG   010°M

6 SATS      ◄►⬍
```

Select the second location and press **ENTER,** then enter bearing from the second location, and press **ENTER** again.

```
  TRIANGULATION

FROM LOC
BRG   010°M
FROM  XCAMP
BRG   005°M

6 SATS      ◄►⬍
```

The receiver computes and displays projected coordinates, which can be saved as a landmark by pressing **ENTER**.

```
 TRIANGULATION

     34°06.66N
    117°52.47W
       923FT EL

 6 SATS
```

GOTO

The GOTO screens include all of the navigation displays and the route features. You can display some navigation information without having a route, but not all. Basically, only speed and heading can be computed if you haven't entered a route and turned it on.
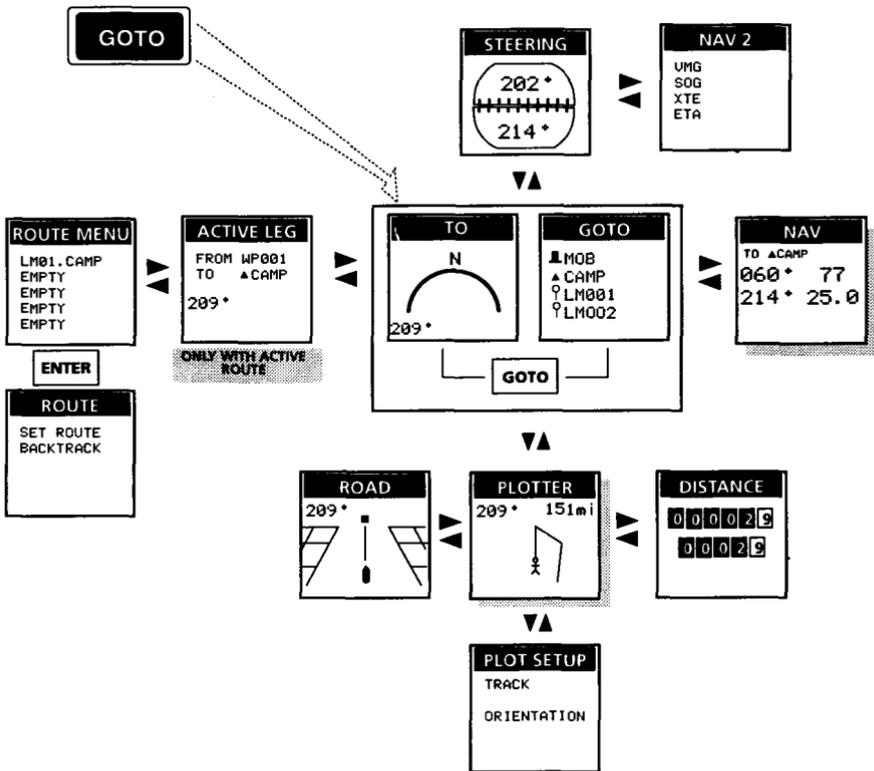
GOTO Flow Chart

A route is a planned course of travel that is often broken into smaller "mini-routes" called legs. If you've ever gone on a car trip with planned stops along the way, you have travelled on a multileg route. (Each of the stops was the end of a leg.)

The Trailblazer XL has several types of routes. You can create a multileg route, then reverse the order of the landmarks you used to create it. You can create a one-leg route from the present location to any landmark (we call that a GOTO route). You must have landmarks saved to create a multileg route or a GOTO route.

We'll talk about GOTO routes first, then multileg routes. We will also discuss a special kind of route called a Man Overboard route.

Creating a GOTO Route. A GOTO route is a planned course of travel that goes from the present location to any stored landmark. Creating a GOTO route automatically turns off any other route that is may be on.

Press **GOTO, GOTO,** then use the **UP/DOWN ARROWs** to highlight the destination.

Press **ENTER.** The receiver displays the *Pointer* screen. This pointer is like the pointer in Last Location and Landmark. Your current location is at the bottom of the arch, directly below the arrow. The arrow indicates your heading. The landmark's icon and the compass headings move to indicate their location in relation to your current location and heading. *When you are on course, the icon and the arrow are aligned.* Bearing and distance to the landmark are at the bottom of the arch.
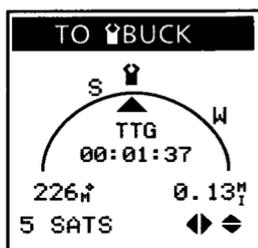
The difference between this pointer and the Last Location and Landmark pointers is the TTG (time to go) information. If you are moving at least 1 mph, the receiver computes how much time is remaining until the destination (the landmark named at the top of the screen) is reached and displays the heading arrow.

The pointer is also displayed by pressing **GOTO** once.

Viewing Navigation Information. The Trailblazer has seven different screens to help you navigate to the destination. Some of these screens can be modified and set for your particular needs.

You are currently viewing the Pointer screen, which is described above.

Within 200 feet (0.038 miles) the message CLOSE is replaced by ARRIVED. You will now be within visual distance of ⚑CAMP. Due to SA, the navigation information may fluctuate.

```
TO ⚑CAMP
      N⚑
      ▲
     TTG
    00:00:14
002⚡   0.03 MI
ARRIVED        ▲
```

When you are within 500 feet (0.10 miles) of your destination the message CLOSE appears.

Make note of the direction to steer and the TTG once you get within 500 feet to the destination as the effects of SA become more pronounced. (Refer to Chapter 4 for a description of SA.) More experienced navigators will note the way to walk and start counting down their paces (or the direction to steer and count down the seconds).

```
TO ⚑CAMP
      N⚑
      ▲
     TTG
    00:00:46
008⚡   0.08 MI
CLOSE          ▲
```

Should your destination be exactly north of your present position the pointer and the ⚑ will align and the N (or S if travelling south) will disappear under the icon.

When you are in a direct line to the destination the ⚑ will be directly at the top of the arch.

As you move, the ⚑ indicates the direction to the destination. The distance ticks down, as does the TTG.

When ⚑ is at the base of the semicircle, the destination's bearing is between 90° and 270°. Turn at least 90° to the left or right to correct your steering.

REMEMBER:
Always aim the pointer in the direction of travel in order to get a true heading.

Begin moving. *As soon as you reach a speed of 2 mph, the display changes.* The pointer icon (▲) and the TTG field appears, and the N/S indicator moves to the actual direction of N or S. The ⚑ icon also moves, keeping its relationship to N or S. You can now steer in the direction of the ⚑ to find your way to camp.

Press the DOWN ARROW from the central Navigation display. Note that the Pointer screen looks like the pointers in Landmark and Last Location. The landmark's icon graphically shows the bearing of the destination with respect to north or south (N/S), which is centered at the top of the arch.

You cannot use this screen for direction information unless you also have a compass to orient yourself to north or south.

Navigation at its simplest. After turning the receiver on, set a GoTo route to the previously saved landmark, ⚑ CAMP.

Press the **RIGHT ARROW.** This is the *Navigation* screen. This screen displays the destination's bearing, distance to the destination, heading, Speed, and a CDI (course deviation indicator).

```
┌──────────────────────┐
│     NAVIGATION       │
│ TO ❡BUCK             │
│ 350↕      0.26ᴹᵢ     │
│ 121↕     25.0MPH     │
│                      │
│ [ . ≝ . . ] 4.0ᴹᵢ    │
│ 5 SATS        ◀▶◆    │
└──────────────────────┘
```

The CDI graphically indicates your cross track error (XTE; how far to the left or right of course you are). The planned courseline is the vertical line at the center of the CDI. Your current location is indicated by the ≝ icon. The number to the right of the CDI is the scale, or the distance from the center of the CDI to either edge.

Press **CLEAR,** then use the **UP/DOWN ARROWs** to change the CDI scale. Press **CLEAR** again to exit from the Edit Mode.

Return to the Pointer screen (by pressing the **LEFT ARROW).** Now press the **UP ARROW.** This is the *Steering* screen. The destination's bearing is shown on the top half of the compass. The bottom half shows your heading. *When the two compass arrows are aligned, you are on course.* The arrow in the lower right of the screen appears when you are off course (the compass arrows are not aligned), and indicates the direction you need to steer to return to course.

```
┌──────────────────────┐
│     TO ❡BUCK         │
│ ᴮᴿG⟋  205 ↕          │
│    │ᔆ⊤│  ᵂ           │
│ ⊥⊥⊥⊥⊥│⊥⊥⊥⊥           │
│      ᔆ    ᵂ          │
│ ᴴᴰG⟍  202 ↕     →    │
│ 4 SATS        ▶▼     │
└──────────────────────┘
```
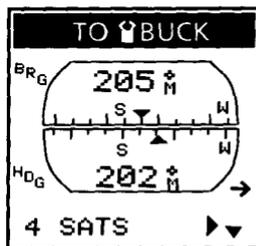
From the Steering screen, press the **RIGHT ARROW.** This is the *Navigation 2* screen. Like Nav 1, Nav2 displays numerical components of the current navigation data. The four data lines VMG, SPD, XTE, and ETA) can be changed to display information you might find more useful.

```
┌──────────────────────┐
│   NAVIGATION 2       │
│ TO ❡BUCK             │
│ VMG    25.0MPH       │
│ SPD    25.0MPH       │
│ XTE ▶   0.0ᴹᵢ        │
│ ETA  01:12PM         │
│ 346↕    3.00ᴹᵢ       │
│ 4 SATS        ◀      │
└──────────────────────┘
```
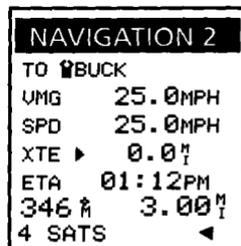
Press **CLEAR.** Use the **LEFT/RIGHT ARROWs** to change the first line. You may select VMG, VMG/SPD bar, XTE, HDG, ETA, DMG, SOA, SPD, STE, TTG, or a blank line. (All of these abbreviations are defined in the glossary.) Press **ENTER** to move the highlight to the next line. When you have configured the display, press CLEAR again.

```
┌──────────────────────┐
│   NAVIGATION 2       │
│ TO ❡BUCK             │
│ STE   000.0°         │
│ VMG ▆▆▆▆▆▆▆▆▆▆       │
│ HDG   013↕           │
│ DMG  001.9ᴹᵢ         │
│ 346↕    3.00ᴹᵢ       │
│ 4 SATS        ◀      │
└──────────────────────┘
```

Press **LEFT ARROW,** then the **DOWN AR-ROW** twice to reach the *Plotter* screen. The Plotter screen displays your planned course (the route) and the course you actually travelled (the track), which may not always match. This allows you to follow your movement in relation to the course. The Plotter also displays your current location (as a person icon) and any nearby landmarks.
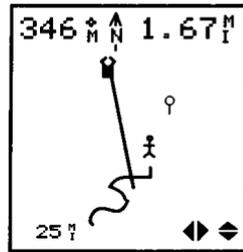
Pressing **ENTER, ENTER, ENTER** in the Normal Mode saves the present location as a landmark. You may also press **ENTER** once to select an icon and key in a name and message.

Press **CLEAR.** The Plotter's Edit Mode lets you change the display scale and identify the landmarks shown. Press the **UP/DOWN ARROWs.** A scale appears on the right side of the display. The scale shows the relative size of the screen, and can also be used to help judge your range to a landmark. Use the **UP/ DOWN ARROWs** to change the scale, then press **CLEAR** to display the plotter at the new scale.
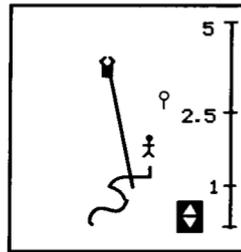
Press ⬛🔘, then press any arrow. A crosshair cursor appears on the screen. Move the cursor with the **RIGHT/LEFT ARROWs.** When the cursor is over a landmark icon, press **EN-TER** to display the landmark's name in the lower left corner. (Press **ENTER** a second time to create a GOTO route to the selected landmark.) The cursor will disappear 5 seconds after it stops moving.
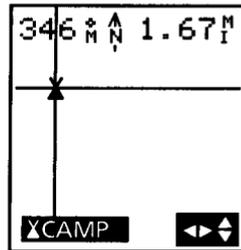
The receiver does not update its location while the cursor is displayed.

You may customize the Plotter screen. Press **CLEAR** to leave the Edit Mode. Press the **DOWN ARROW** to access the *Plotter Setup,* then press **CLEAR** to enter the Edit Mode again. Now the **LEFT/RIGHT ARROWs** will change the track history. This is the duration of time for which your actual course travelled will be displayed. If you select "30M", track for the past 30 minutes will be displayed. (" M" represents minutes, and "H" is hours.) You may also select "OFF" to display no track.

Press the **UP/DOWN ARROWs** to change the orientation of the Plotter from NORTH UP to HEADING UP.

Press **CLEAR** to exit the Edit Mode, then press the **UP ARROW** to return to the Plotter.

Press the **RIGHT ARROW.** This is the *Distance* screen. It works just like the odometer in your car. "Odometer" is the total distance travelled (with the receiver on) since you first turned the Trailblazer XL on. The "trip odometer" shows the distance travelled since the last reset. Reset the trip odometer by pressing **CLEAR.**

```
   DISTANCE
    ODOMETER
 0 0 0 6 1 8 ᴹ
              ᴵ
  TRIP ODOMETER
    0 0 2 8 ᴹ
            ᴵ
 4 SATS        ◄
```
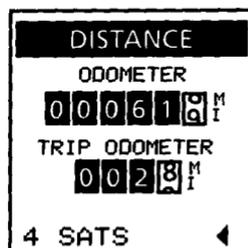
Press the **LEFT ARROW** twice. This is the *Road* screen. It is a dynamic CDI. Cross track error is shown in relation to the destination and surrounding landmarks, which appear and disappear as they come into range. The center line represents the planned course, and the sides of the "road" are the limits of the CDI. Bearing and distance to the destination are above the road.

```
  TO ♟BUCK
 229 ᴹ    0.13 ᴹ
     ᴮ         ᴵ
 4 SATS        ►
```
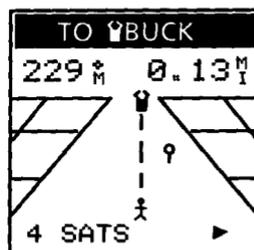
Press **CLEAR.** You can now use the **UP/DOWN ARROWs** to change the scale of the Road screen. Press **CLEAR** again to exit the Edit Mode.

Multileg Routes. Multileg routes require a little more time to enter, but they can provide more flexibility than a single leg GOTO. If you are planning a trip that involves several changes in heading or stops, or covers a long distance, you will probably be happier with a multileg route.

Also, a multileg route can be set ahead of time, and turned on only when you need it. The Trailblazer XL allows you to create up to five multileg routes. Each multileg route may contain up to 24 legs.

Press **GOTO, LEFT ARROW.** (If you already have an active multileg route, the *ACTIVE LEG* screen is displayed, and you will need to press the **LEFT ARROW** again.)

```
  ACTIVE LEG 01
 FROM ♟LM001
 TO   ♟LM002
 346°M  3.00MI
 ◄ROUTE MENU

 5 SATS    ◄►↕
```

The receiver displays the *Route Menu.* Empty (unused) routes are indicated with "EMPTY." Routes that are in use show the start and destination landmarks. This example shows that Route 5 goes from **X**CAMP to **🐾**BUCK. Use the **UP/DOWN ARROWs** to select an EMPTY route and press **ENTER.**

```
ROUTE MENU
1 EMPTY
2 EMPTY
3 EMPTY
4 EMPTY
5 XCAMP 🐾BUCK
5 SATS        ▶ ⬍
```

Two choices are displayed; SET ROUTE and BACKTRACK. Leave the highlight an SET ROUTE and press **ENTER.**

```
ROUTE 1
SET ROUTE
BACKTRACK



5 SATS          ⬍
```
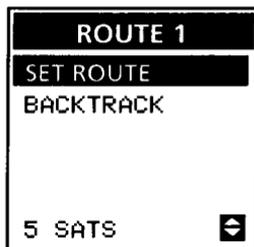
First, you will select the starting location for the route. The receiver automatically displays the current location as the FROM location. labelled as "♀STRT1." (The "1" is the number of the route that is being created.) This is a temporary landmark that will be saved only if the present location is selected as the starting location. To use a different location, press the **RIGHT/LEFT ARROW** until the desired landmark is displayed.

```
SET ROUTE
LEG 01
FROM ♀ STRT1
TO

5 SATS         ◀▶
```

⚠ SMART SCROLL. Instead of stepping through each landmark, press CLEAR, then use the arrow keys to enter the desired icon and name.

Press **ENTER.** The highlight moves down a line. Now you will select the destination of the first leg using either the **RIGHT/LEFT ARROW** or Smart Scroll. Notice that as different landmarks are displayed, the screen shows the landmark's bearing and the distance from the FROM location.

```
SET ROUTE
LEG 01
FROM ♀STRT1
TO    ♀LM001

114°M    3.05ᴹᵢ
5 SATS         ◀▶
```

> ⚠ The receiver will not accept TO landmarks whose coordinates are within 0.1 NM of the FROM landmark.

Press **ENTER.** The receiver automatically uses the destination of the first leg as the start of the second leg. Once the first leg is established, you will select only the destination of the following legs. Use the **RIGHT/LEFT ARROW** to display the destination for leg 2 and press **ENTER.**

```
    SET ROUTE
 LEG 02
 FROM ♀LM001
 TO
 241°M   4.02"ₗ
 5 SATS        ◀▶
```

Continue to add legs to the route. (You may have up to 24 legs.) When you are ready to end the route, just press **ENTER** while TO is blank. If you use all 24 legs, the route will automatically end when the destination of the last leg is entered.

```
    SET ROUTE
 LEG 01
 FROM ♀LM001
 TO
 346°M   3.00"ₗ
 5 SATS        ◀▶
```

In this example, we used an EMPTY route. If we had selected a defined route, the receiver would have displayed a warning asking if we wanted to replace the existing route with a new one.

Activating and Deactivating Routes. Only one route (multileg, BACKTRACK, GOTO, or MOB) can be active (in use) at any time. A multileg route is automatically activated when you create it; so are the BACKTRACK, GOTO, and MOB routes. Any route that is active when another route is created will automatically be deactivated.

Multileg routes can also be activated and deactivated through the Route Menu.

Press **GOTO, LEFT ARROW.** If a multileg route is active, press the **LEFT ARROW** again to reach the Route Menu.

Use the **UP/DOWN ARROW** to highlight the desired route and press **ENTER.** Notice that this menu has more options than the one we saw earlier. Once a route has been created, additional options become available.

```
    ROUTE 1
 SET ROUTE
 BACKTRACK
 EDIT ROUTE
 DEACTIVATE RT
 REVERSE ROUTE
 CLEAR ROUTE
 5 SATS        ⬍
```

"DEACTIVATE RT" is an option when the se-
lected route is active. "ACTIVATE RTE" is dis-
played if the selected route is not active. Since
we just created Route 1, it is an active route;
highlight "DEACTIVATE RT" and press **ENTER**
to deactivate it.

```
    ROUTE 1
 SET ROUTE
 BACKTRACK
 EDIT ROUTE
 DEACTIVATE RT
 REVERSE ROUTE
 CLEAR ROUTE
 5 SATS      ⬍
```

Activating one route automatically deactivates any other routes that may be active.

The Active Leg Screen. The Active Leg is the part of the active route that is currently
being navigated on. All navigation information displayed by the receiver is referenced
to the course defined by the leg's FROM and TO landmarks.

In addition to activating a route, you may activate a specific leg in a multileg route.

The Active Leg screen is accessed by pressing
GOTO, LEFT ARROW when a multileg route
is active. Press the **UP/DOWN ARROW** to
scroll through the route. When the desired
leg is displayed, press **ENTER** to activate it.

```
  ACTIVE LEG 01
 FROM ?LM001
 TO   ?LM002
 346°M  3.00MI
 ◄ROUTE MENU

 5 SATS    ◆⬍
```

Clearing a Route. Sometimes you need to remove a route from the Route Menu to
make room for a new one.

First, determine which route you will no longer need. Next, press **GOTO, LEFT
ARROW.** If necessary press the **LEFT ARROW** again to reach the Route Menu.

Press **GOTO, LEFT ARROW.** If a route is active (the Active Leg screen is dis-
played), press the **LEFT ARROW** again. Use the **UP/DOWN ARROW** to high-
light the desired route and press **ENTER.**

Highlight "CLEAR ROUTE and press **ENTER.**
Next, verify that you want to erase the selected
route. Highlight "YES" and press **ENTER.**

```
    WARNING
    ERASE
 CURRENT RTE?
 NO
 YES

 5 SATS      ⬍
```

Although you can "overwrite" an existing route, Clearing is a much safer way to
remove an unneeded route from the receiver's memory. We recommend that you
make a habit of using Route Clear, to help prevent accidentally replacing an impor-
tant route.

Editing a Route. Any multileg route can be edited by adding a leg. This is done by inserting a landmark between the "from" and "to" landmarks of an existing leg, which has the effect of dividing an existing leg into two legs.

Press **GOTO, LEFT ARROW** (and another **LEFT ARROW** if necessary). Highlight the route you want to edit and press **ENTER,** then highlight "EDIT" and press **ENTER.**

Decide where you want to put the new landmark; between which landmarks already in the route will the new one be inserted? Press the **UP/DOWN ARROWs** until both of the existing landmarks are displayed. Press **ENTER.**

```
+------------------+
|     LEG 01       |
|                  |
| FROM  ⚲LM001     |
| TO    ⚲LM002     |
|                  |
| 346°M   3.00MI   |
|                  |
| 5 SATS        ⬍  |
+------------------+
```

A blank appears at the TO landmark. Use the **RIGHT/LEFT ARROWs** or Smart Scroll to display a new landmark. Press **ENTER** when the new landmark is displayed.

```
+------------------+
|     LEG 01       |
|                  |
| FROM  ⚲LM001     |
| TO    ▮BUCK      |
|                  |
| 295°M   1.85MI   |
|                  |
| 5 SATS        ◀▶ |
+------------------+
```

Now press the **DOWN ARROW** to view the next leg. The new leg has been added that starts at the "new" landmark and ends at the old TO landmark.

```
+------------------+
|     LEG 02       |
|                  |
| FROM  ▮BUCK      |
| TO    ⚲LM002     |
|                  |
| 039°M   0.31MI   |
|                  |
| 5 SATS        ⬍  |
+------------------+
```

Clearing Leg. Another way to change an existing route is to delete any leg. You will now clear the leg you just added, returning the route to its original configuration.

First, you must display the route. Press **GOTO, LEFT ARROW.** If the route you want is not active, highlight in the Route Menu and press **ENTER,** then highlight "EDIT" and press **ENTER.** Use the **UP/DOWN ARROWs** to display the leg you want to remove.

Press **CLEAR.** Press **CLEAR** again to delete the leg, or press any function key to exit without deleting.

```
+------------------+
|     LEG 02       |
|                  |
| PRESS CLEAR      |
| TO CLEAR         |
| DEST ▮BUCK       |
|                  |
|                  |
| 5 SATS           |
+------------------+
```

Reversing a Route. Reverse Route allows you to take an existing route and reverse the order of the landmarks used to create it. For example, if you were to set a route that went from point A to point B and ended at point C, Reverse Route would change the route to go from point C to point B and end at point A.

To access Reverse Route, press **GOTO, LEFT ARROW** (press the **LEFT ARROW** twice if necessary), then highlight the route you want to reverse and press **ENTER.** Next, highlight "REVERSE ROUTE" and press **ENTER** again.

Backtrack. Another type of route is the Backtrack route. Backtrack uses the Last Location fixes in the buffer (up to 25 of the most recent Last Locations) to create a route that "backtracks" the course you took. This way you could leave point A, travel for a couple of hours, then set a backtrack route and let the receiver guide you back to point A following the same path you just took.

Press **GOTO, LEFT ARROW** (and another **LEFT ARROW** if necessary). Highlight the route number you want to use and press **ENTER.** Highlight "BACK-TRACK" and press **ENTER** again.

(+LLC08)   (^BCK08)

(+LLC07)   (^BCK07)

(+LLC06)   (^BCK06)

(+LLC05)   (^BCK05)

(+LLC04)   (^BCK04)

```
TO ^BCK04
   N ʌ
   ▲
   TTG
 02:08:34
003 ·ᴛ   5.47 ᴍɪ
          ◄► ▲
```

(+LLC03)

(+LLC02)   (^BCK02)

(+LLC01)   (^BCK01)

Set
Backtrack
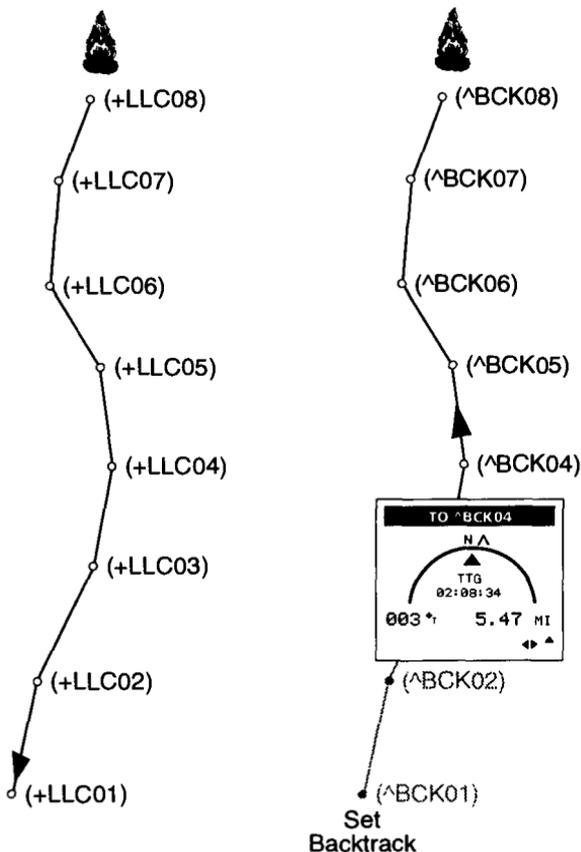
The Last Location used to create the Backtrack route are saved as temporary landmarks. You'll see them in the Landmark Menu indicated with the ^{A} icon. These landmarks will be saved until the existing Backtrack route is replaced with a new one.

MOB. MOB is the Man Overboard route. The MOB route is similar to the GOTO route, but differs from it in some very important ways.

MOBs were first used by boaters, so they could quickly locate someone who fell into the water while the boat was moving. The important thing with an MOB route, then, is to save the location you need to get back to and create a route to that location as quickly as possible.

MOB saves the location that is current at the time the function is first accessed as the "to" landmark. The "from" landmark is not saved as a landmark; it is always the current location.

> Think of it this way: you're out with some friends in your speedboat when you hear a splash. You immediately press **GOTO, GOTO, ENTER.**

The location that was current when these keys were pressed is saved as the "to" landmark. But you're still moving, and by the time you can cut Speed and turn around, you may be some distance from the "to" landmark. The current location is no longer the same as the location saved as the "to" landmark. Since the "from" landmark is the current location (as updated with each location fix update), the navigation screens will always point you directly to the "to" landmark.

Many fishermen use this feature as "bite" function. When trawling, they use MOB to mark and return to the spot where the fish were biting.

The receiver will save the MOB location until the MOB feature is accessed again. At that time, the receiver will ask if you want to replace the existing MOB with a current one.

The coordinates of the MOB location cannot be displayed from the Landmark Menu.

QUICK FIND

Now that you know what the receiver's features are, how do you make them work for you?

Suppose you were on a fishing trip in the area shown below. You want to go from the camp site to the island in the middle of the bay. Before you start, turn the receiver on and let it get a location fix. Once you have a fix, save it as a landmark. That way you'll be able to create a route back to camp at the end of the day, even if darkness or weather conditions make it difficult to use your own navigation skills.
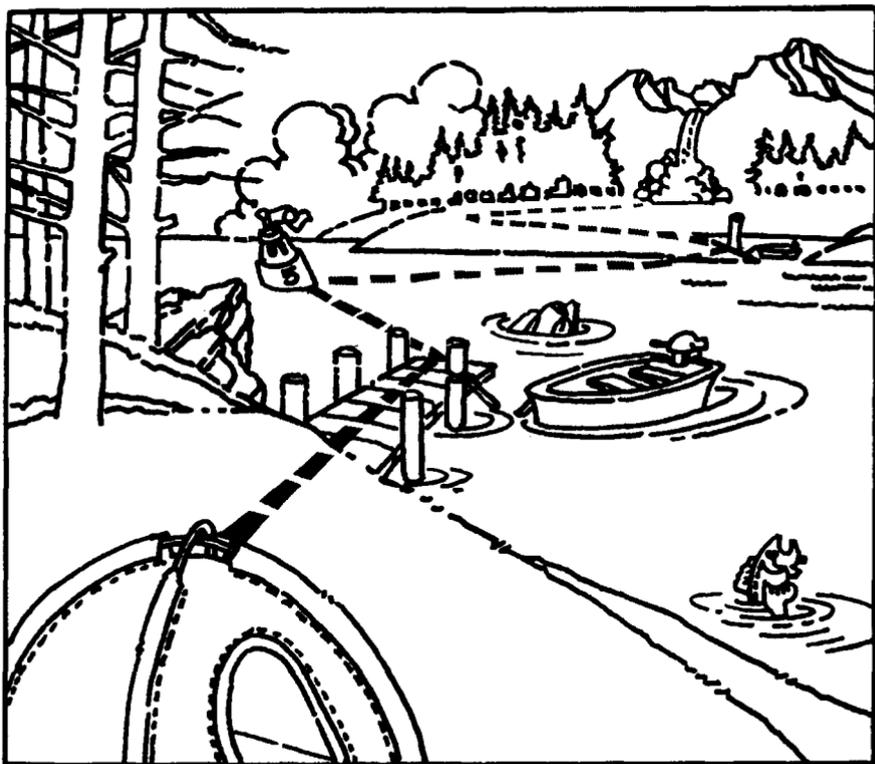
You know from Chapter 1 that to save a location fix as a landmark, you display the fix (on Location 1 or Location 2) and press ENTER. if you want to let the receiver name the landmark, press ENTER again, or key in a name. You *are more likely to recognize a landmark when the name refers to or describes the location than when a generic "LM" name is used.*

With that in mind, we'll assume that you keyed in the name "�CAMP" for your first landmark.

Next, you can add a message, which may include information about the landmark or the approach to the landmark. You might key in "WATCH FOR ROCKS", for example, or something else you might need to be reminded about as you approach the landmark. Press ENTER again to save the landmark.

Now you walk down to the dock, where you save the location as landmark "‡DOCK."

The most direct route to the island will take you through an area that is too shallow for your skiff, so you detour to the buoy (where you save another location as landmark "▲BUOY"). Next, you go to the continue to the island, where you leave your skiff at landmark "SKIFF."

After exploring for a while, you decide to return to camp. There are several ways you can do this. You can press GOTO, GOTO and select SKIFF to go to the skiff, then set a multileg route to go from the skiff to the dock, then to the camp. You could set a backtrack route by selecting any route in the menu, then selecting BACKTRACK. If both the receiver and the Last Location buffer were on, the receiver can generate a route that "backtracks" the route you took to get to the current location.

Carrying this a little further, you could stay out on the water to do a little more fishing, and drop an anchor to keep from drifting. The receiver's anchor alarm will alert you (with an alarm icon) should your boat drift out of an area you define. The receiver can even be connected to an external alarm. When the alarm is triggered, the receiver will sound the external alarm.

These are just a few of the options now at your fingertips. As you use your receiver more, you will find uses for the receiver that we haven't even thought of. The more you use the receiver, the more you will discover about what it can do for you.

NAVIGATION SCREENS
The navigation screens are accessed with the GOTO key. They provide information about your current speed and heading. If a route (multileg, GOTO, MOB, or Backtrack) is active, the navigation screens also provide information about the route and your location in relation to the planned path.

Each of the navigation screens provide this information in different ways. Two screens display numeric values (Navigation and Nav2). The others are graphic displays.

The *NAVIGATION* screen shows numeric values for bearing and distance to the destination, speed, and heading. It also shows your cross track error (XTE) as a graphic CDI (course deviation indicator).

Labels around the NAVIGATION screen:
- Destination Landmark Name
- Bearing to Destination
- Heading
- CDI
- Distance to Destination
- Speed
- CDI Scale
- CDI Icon
- CDI Centerline

Screen text:
NAVIGATION
TO ✕CAMP
350°   0.26$_I^M$
121°   25.0MPH
HDG   SPD
[. ■ . .] 4.0$_I^M$
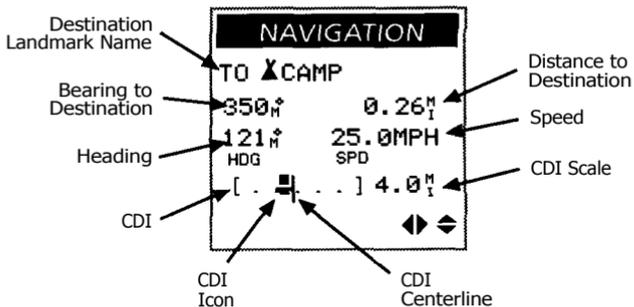
XTE (cross track error) is the distance to the left or right of the planned path. Keeping the XTE to a minimum helps maintain the most direct (and fastest) path to your destination. Look at the illustration below. The boat is to the left of the courseline. The arrow between the courseline and the boat shows XTE; the boater has to steer right to "close" the XTE to get the destination (the buoy) faster.
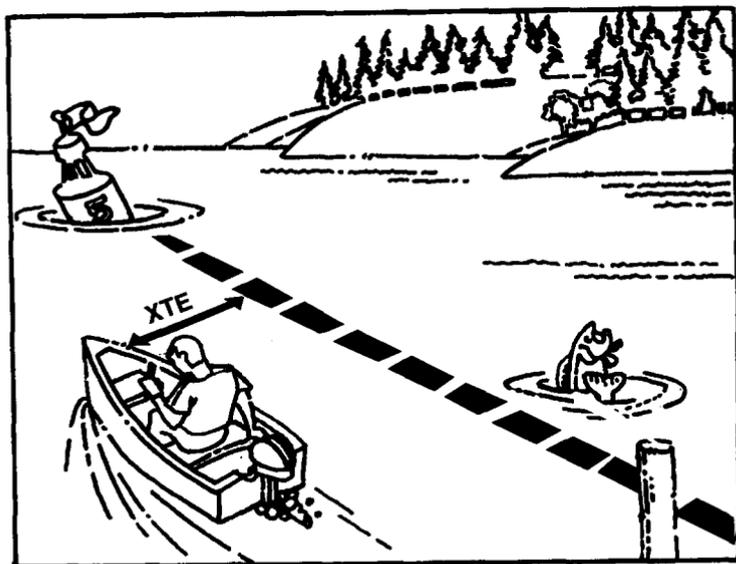
The **CDI** (course deviation indicator) is a graphic representation of XTE. The straight line at the center of the course marker, and the current location is the icon to the left of the marker. *When you are on course, the icon is over the courseline.* The number next to the CDI is the CDI scale, or the distance represented from the courseline to either end of the CDI. (Remember that this scale can be changed by pressing CLEAR and the UP/DOWN ARROWs.)

Bearing (BRG) is a measurement of direction in relation to north (either true or magnetic, whichever you selected in Setup), measured in degrees and in a clockwise direction. North is 0°; south is 180°.

Heading (HDG) is your direction of movement measured as bearing, which may not be the direction you're facing. Your direction of movement may be affected by other factors, such as strong winds and currents. If you are facing north, for example, and a strong current is passing from left to right, your heading could be anything between 0° and 90°.
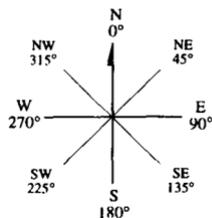
Speed (SPD) is the velocity at which the vehicle or vessel is moving in respect to the earth. This is sometimes referred to as ground speed. Speed is measured in knots, miles per hour, and kilometers per hour.

The *Nav2* screen displays additional information. You may change some of the features displayed here. (Bearing and distance to the destination cannot be changed.) Press CLEAR, then use the arrows to select different values. The default values are shown here.
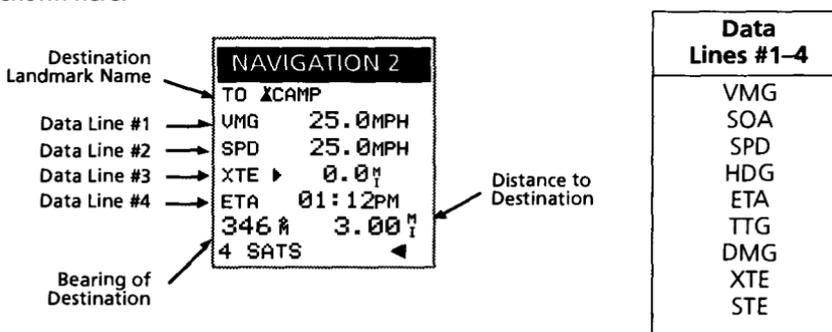
SOA is speed of advance. Understanding SOA can be a little tricky, so we'll use a slightly exaggerated example here.

The boat in this Illustration is heading toward the buoy and is currently at point A. If the boat had followed the planned course, it would be somewhere on the line A_1 and B_1. (The XTE for this example is the distance between points A and A_1.) In 30 minutes the boat is at point B and has travelled 17 NM (this is equivalent to a speed of 34 knots). Now, projecting to planned courseline, we find point B_1. Comparing the line between points A and B with the line between points A_1 and B_1 we see that when projected back to the planned courseline, the 17 NM travelled moved the boat only 15 NM toward the destination. *Since it took 30 minutes to travel from A_1 to B_1 at 34 knots, SPD is 34 knots and SOA is 30 knots.*
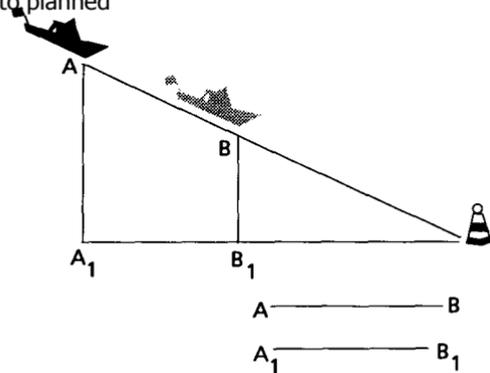
DMG is distance made good. The same example illustrates DMG. Even though the boat moved 17 NM, because of the cross track error only 15 NM can be applied to arriving at the buoy. *The distance that is applied to the original course (A_1-B) is referred to as DMG.* In this example, DMG is 15 NM.

VMG is the velocity made good. It is the portion of the velocity (speed) that is in the direction of the destination. In the examples above, the boat is travelling directly toward the buoy, even though it is not on the planned course. All of the boat's velocity is being applied toward arriving at the destination (here, VMG = SPD).

If the boat travels parallel to the planned course as in this illustration (from A to B), the boat's track would not intercept the destination. As the boat moves along, less and less of its velocity would be applied toward arriving at the destination. At point D, no velocity is applied to reaching the buoy. At point E, VMG is a negative value since the boat is moving away from the destination.

Courseline
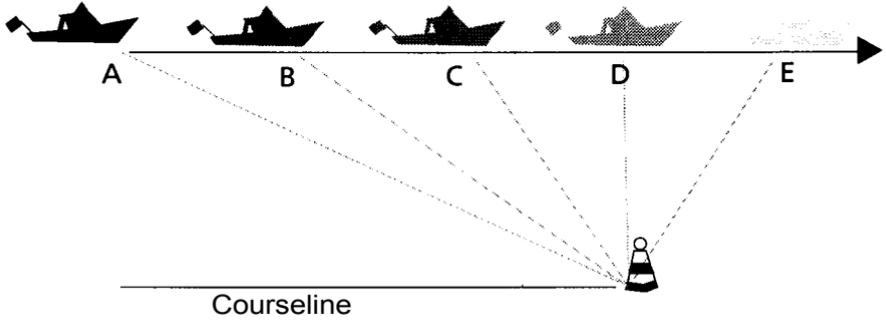
STE is steering. Steering is the correction in heading that must be made to return to course. It is expressed as bearing.

TTG is time to go. **ETA** is estimated time of arrival. These are the only measurements that output a time value. TTG is the time remaining to reach the next destination landmark (the leg's destination), based on the current SOA and distance remaining. If SOA is 30 knots and there are 45 NM remaining to the destination landmark, TTG is 01:30:00 (1 hour, 30 minutes).

ETA also uses SOA and distance remaining, but it computes the clock time at which you can expect to arrive at the route's destination. Using the figures above and a current time of 02:30 PM, the ETA would be 4:00 PM.

The other navigation screens provide information graphically. The *STEERING* and *POINTER* screens, for example, both provide the bearing and heading.

Destination Landmark Name
Bearing Indicator
Heading Indicator
Direction to Steer

TO X CAMP
BRG 205 M
HDG 202 M
4 SATS

Destination Landmark Name
Destination Icon
South Marker
Time To Go
Bearing of Destination
Heading Indicator
West Marker
Distance to Destination

TO X CAMP
TTG 00:01:37
226 M   0.13 MI
5 SATS
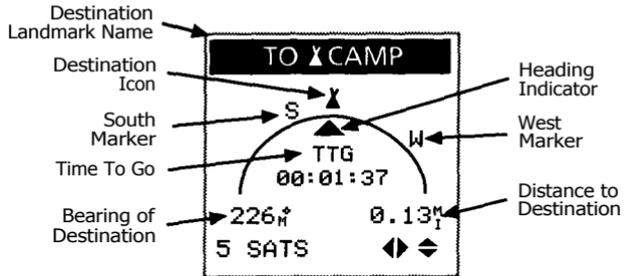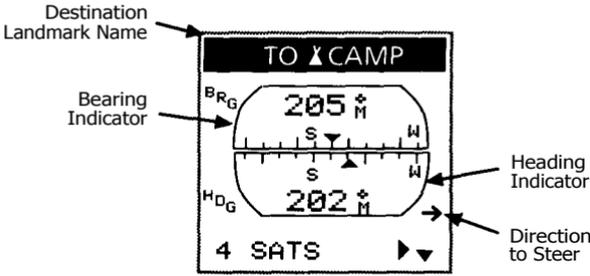
You are on course when the arrows on the Steering screen or the arrow and icon on the Pointer screen are aligned.

The PLOTTER screen is a graphical overhead view of your location and the surrounding landmarks. It also shows your planned and actual course. The display scale can be adjusted with CLEAR and the UP/DOWN ARROWs. The display orientation and how much track history is shown can be selected in PLOTTER SETUP; press the DOWN ARROW from the Plotter to reach the Plotter Setup.

The ROAD screen is a pictorial CDI. The destination (using the destination landmark's icon) is at the top of the road, between bearing and distance. The courseline is the dash line at the center of the screen, and the edges of the "road" are the CDI limits. Any nearby landmarks are also shown.
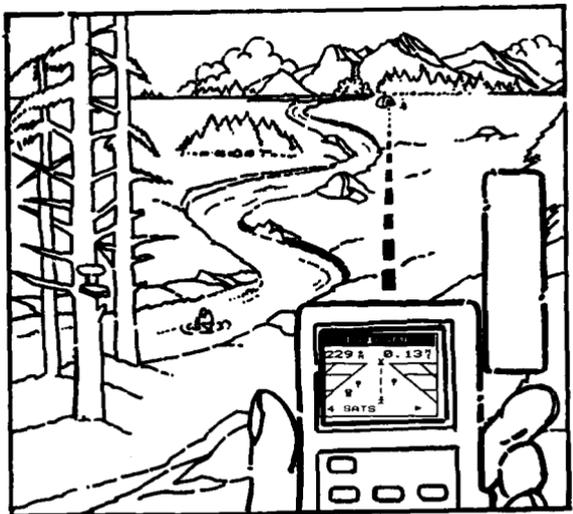
If you are on course, the person icon is on the center line. If you are to the left of course, the icon is to the left of the center line. The grids on either side of the road move toward the bottom of the display in relation to your SOA. If SOA is a negative value or if you are stationary, the grids will not move and the person's feet will face the destination icon.
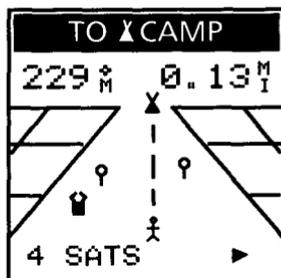
The distance represented by the road's width (the horizontal scale) is changed by pressing CLEAR and using the UP/DOWN ARROWs. The grids are .5 units deep, which cannot be changed.

COORDINATE SYSTEMS

We've mentioned several different "coordinate systems" the Trailblazer XL can use to display your location, but what exactly are they?

Coordinates describe a location on the earth's surface in a unique way. The format used to describe the location is called a coordinate system. Using coordinate systems allows us to describe locations in ways that cannot ever be confused with a similar location. Think about it for a minute. "Fifth and Main" describes a lot of places. So does "the clearing two miles from the highway." A location at 34°10N and 118°23W is always one location and one location only.

The Trailblazer XL displays coordinates in three of the most commonly used coordinate systems. A fourth selection, User Grid, lets you enter the constants for a local grid, such as state plane coordinates.

Your Trailblazer XL can use two coordinate systems at one time: one for Location 1 and the other Location screens, and one for Location 2. Which system you select for Location 1 will be determined by the maps and Charts you are using. You *will want to display information on the receiver in the same system that is used by your maps.*

You will select a coordinate system for Location 2 based on the system used by your secondary maps or by the system used by the people you are coordinating your movements with.

LAT/LON Coordinate System

Lat/Lon is the most commonly used coordinate system today. It projects lines of latitude (parallels) and lines of longitude (meridians) onto the earth's surface. Lines of latitude are the equator and the horizontal lines that are parallel to it. Lines of longitude are the vertical lines that are perpendicular to the equator and pass through the poles. A location is described as being the intersection of a line of latitude and a line of longitude.

Specifically, a location is so many degrees north or south of the equator (up to the poles, which are 90°N and 90°S; the equator is 0° latitude), and so many degrees east or west of the Prime Meridian, which is 0° longitude. (The Prime Meridian passes through Greenwich, England.) Parts of a degree are minutes; there are 60 minutes (written as 60') to a degree. Minutes can also be divided into smaller units. Fractions of a minute can be expressed as decimals or as seconds. (There are 60 seconds to one minute, written as 60"). So a Lat/Lon position coordinate can be expressed in two ways, which your Magellan GPS receiver displays as 25°47.50 or 25°47'30.

UTM Coordinate System

Another commonly used coordinate system is UTM (Universal Transverse Mercator), which is generally found on land-based maps and quad sheets that are produced by government map providers. On land, you may find that UTM coordinates are easier to use than Lat/Lon.

UTM coordinates are easy to use, but since the model it is based on is somewhat abstract, this section is a very simplified introduction to UTM.

Instead of projecting an imaginary grid of intersecting lines onto the globe, UTM projects sections of the globe onto a flat surface. Each of these sections is called a "zone." There are 60 zones to cover the entire earth between 84°N and 80°S (polar areas are not described by UTM). Each zone is 6° wide as projected from the earth's center.

A UTM location is described by three elements; the zone it is in, the easting, and the northing. Eastings and northings measure how far into a zone a position is in meters. Eastings are an east/west measurement, and correspond roughly to longitude. Northings are a north/south measurement, and correspond to latitude.

This chart shows the location of Magellan Systems described in both Lat/Lon and UTM coordinates.

LAT/LON		UTM
DEG/MIN	**DEG/MIN/SEC**	
34°06.58N	34°06'35"N	11 4 23 818 E
117°49.56W	117°49'34"W	37 74 624 N

NOTE: The area described by the UTM coordinate system extends to 84°N and to 80°S.
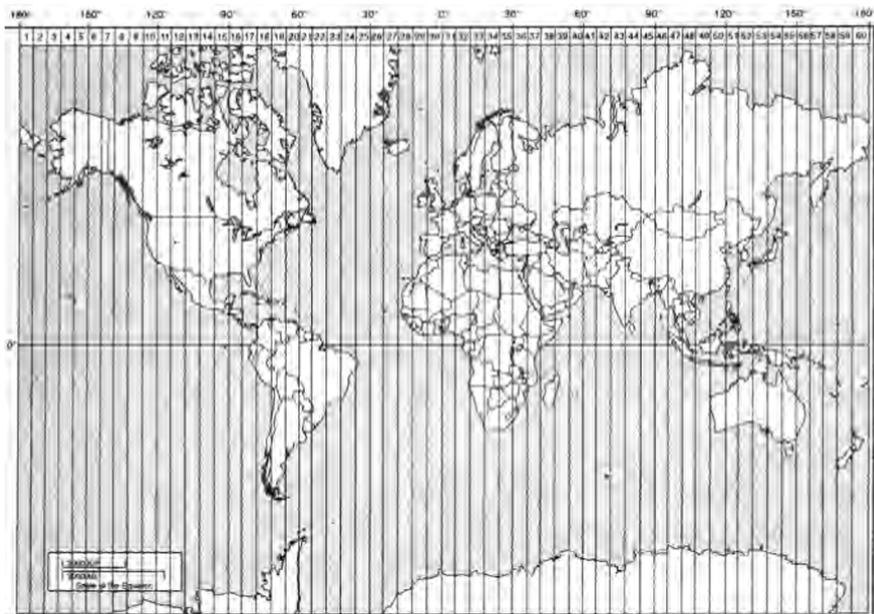
OSGB Coordinate System

OSGB coordinates are similar to UTMs, but they describe only Great Britain. They are generally used with the GBR36 datum, which also describes Great Britain. This coordinate system cannot be used in any other part of the world. The Trailblazer XL automatically selects the GBR36 datum when the OSGB coordinate system is selected in Setup. (While OSGB coordinates must be used with the GBR36 datum, the GBR36 datum can be used with Lat/Lon coordinates; just be sure the map you are using uses both Lat/Lon and GBR36.)

> ⚠ If you select OSGB in the COORD. SYS. portion of the Setup Menu, be sure to change the map datum back to the one you will be using (WGS84 is the default) when changing to another coordinate system.

User Grid Coordinates

There are many grid coordinate systems in general use, but most have highly specialized applications. Just in case you need to use one of these coordinate systems, the Trailblazer XL allows you to enter one. Just select " USER GRID" and follow the prompts to enter the necessary constants.

POWER SOURCES

The Trailblazer XL is powered by three AA batteries. It can also be powered from an external DC power source by using the optional Power/Data Cable.

Batteries. We suggest using AA alkaline batteries to power the receiver. (Magellan Systems recommends Eveready Energizer™ batteries.) Alkaline batteries will power the receiver for 5 hours or more of continuous Operation.

To install the batteries, hold the receiver as shown in the illustration at the right. At the same time, press down slightly on the battery compartment cover and pull the cover toward you. (The compartment is sealed against moisture, and will not move easily.) Insert batteries as indicated in the compartment and replace the cover.
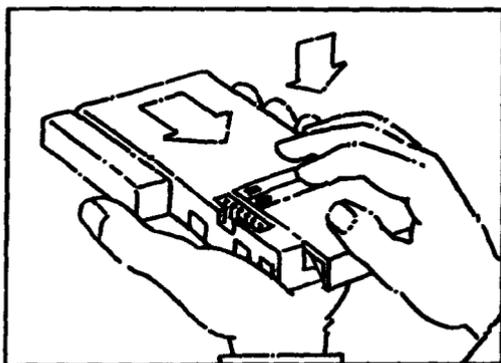
When the battery power level drops, a warning message (LOW BAT) will appear on all displays. The receiver should still have sufficient power to operate for up to 30 minutes if alkaline batteries are being used.

When the batteries no longer hold enough power to operate the receiver, the receiver turns itself off. The batteries will still be able to maintain the memory for a time, but the receiver can be operated only if external power is supplied or if fresh batteries are installed.

> ⚠️ Batteries are not recharged in the receiver.

It is possible to use rechargeable batteries, but there are a couple of things you should be aware of when using them. Commercially available NiCad batteries typically have poor power performance after repeated use, and rechargeable alkaline batteries maintain only 50% of the useful life of standard alkaline batteries. Rechargeables also have a very sudden power drop at the end of their charge. The drop may be so sudden that the battery warning is not displayed, although memory will be maintained for a while.

External Power. The Trailblazer XL can also be operated from an external DC power source. This requires the Power/Data Cable that is included with the optional mount-

ing kit. (Even when operating from external power, the receiver must have batteries; the batteries will be used to maintain memory when the receiver is off.)

The cable converts DC power to a level usable by the receiver. It can also be used to output location data to electronic navigation equipment that conforms to NMEA standards, and to import broadcast differential corrections from a differential beacon receiver.

> ✋ The use of a non-Magellan cable or an altered Magellan cable may damage the receiver and will void the warranty.

THE ANTENNA

The receiver has an attached quadrifilar antenna, which rotates 360°. Using the extension cable and suction cup provided with the optional Mounting Kit, the antenna can also be detached from the receiver and temporarily mounted to any convenient surface. (The antenna is detached by rotating it until its base is parallel with the display, then pulling it away from the receiver.) Since it can be used separated from the receiver, the antenna can be placed wherever it has the clearest view of the sky.

In order to provide the best signal reception possible, the antenna must be vertical. If attached to the receiver, rotate the antenna from its storage position to the upright position. If detached from the receiver, the antenna should be mounted as vertically as possible with the connecting cable at the bottom.

GPS signals will pass through glass and canvas (such as bimini tops); however, you may experience some signal loss in areas of heavy foliage. (Do not stand under a tree in full leaf when attempting to take a fix.) Signals will not go through metal, and you are unlikely to obtain signals in a permanent structure.

Signals can be temporarily blocked by trees, masts, and people. If you are unable to obtain satellite signals when out of doors, try moving slightly to get a better view of the sky. If the receiver is being operated in a covered location (such as a navigation station), you may want to use the optional External Antenna Kit. (Use only a Magellan antenna; the use of a non-Magellan antenna may greatly degrade the performance of the receiver.)
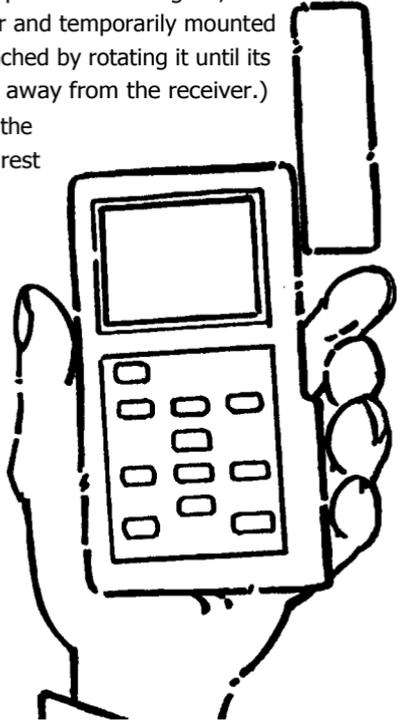
TROUBLESHOOTING

receiver is not producing a fix	Make sure the antenna is in the upright position and has a clear view of the sky. Try changing your location slightly to get a better Signal

<div align="center">OR</div>

The receiver has not been initialized (the Initialize screen in Setup shows the null location) or it has been moved more than 300 miles from its last known location. Initialize the receiver with the current location, or let the receiver self-initialize. (Do a four-finger reset and use the 3D elevation mode. Place the receiver where the antenna has a clear view of the sky. Self-initializing can take up to 20 minutes.)

frozen display, keypad does not respond	Remove and reinsert batteries. Turn power back on and press ENTER.

<div align="center">OR</div>

Use the four-finger reset (SETUP, LOC, CLEAR, and ENTER, pressed together).

> ✋ The reset will clear the receiver's memory.

no power	Check how the batteries were inserted into the tray; are they oriented correctly? The batteries may also have run down completely.
location fix doesn't change	If the old data icon (⊠) is displayed, the signal from one or more satellites has been lost, and the receiver has been unable to reacquire or replace it. The displayed fix is at least 10 seconds old, and should not be used for navigation.

If there is no old data icon, the display may be frozen. Try pressing any key to change the display. If the display cannot be changed, refer to "frozen display."

location fix fluctuates	Small changes in the location coordinates and elevation are normal. They are caused by several variables, including the geometric quality of the fix and the effects of SA. Geometric quality is a measurement of the probable accuracy of a fix based on the location of the satellites being used in relation to each other. SA is decribed in Chapter 5, GPS.
NMEA device is not responding	The receiver may be outputting an NMEA data message that is not compatible with the NMEA device; check the message format selected with SETUP. Also check the connection between the receiver and the device, and be sure the device is on. If supporting an autopilot, be sure that a route has been set and activated.
dashes appear in NAV displays	The receiver must compute three location fixes before navigation data can be calculated. You must also be navigating on a route. To display velocity-related information such as speed and course over ground, you must be travelling at least 1 mph.

OR

You are 200 feet (61 meters) or less from your destination. The effects of SA become pronounced at small distances. Any navigation information the receiver could display would be misleading.

SPECIFICATIONS

Physical Characteristics

Size	6.125" x 3.5" x 1.25", not including antenna (15.6 cm x 8.9 cm x 3.2 cm)
Weight	14 ounces (0.397 kg), with batteries installed
Temperature:	
Operating	14°F to 140°F (-10°C to 60°C)
Storage	-40°F to 167°F (-40°C to 75°C)
Case	waterproof (non-submersible)
Antenna	detachable quadrifilar

Operating Characteristics

Accuracy:

Position	12 meters RMS in 3D operation without SA	
Velocity	0.5 meters/second RMS	

Speed limit	up to 951 miles per hour (1,530 kilometers per hour)
Elevation limit	57,414 feet (17,500 meters)

Time to First Fix:

Cold start*	2 minutes or less
Warm start*	40 seconds or less

* In a warm start, the receiver has obtained a position fix within the last 2 hours. In a cold start, the receiver has been idle for 2 hours or longer.

After memory loss	15 minutes or more
Update rate	every second

OUTPUT NMEA DATA

Data Transfer. Your GPS receiver can be set to output GPS data in the NMEA 0183 format to interface with marine electronic navigation devices.

> ⚠ The dataport must be turned on and the output message format selected in AUX.

NMEA Data Messages. NMEA data is output at 4800 baud, 8, N, 1, checksum off. These settings are acceptable to most equipment and software applications.

There are several NMEA output message sets, each with a slightly different application. Check the documentation for your external equipment to select the appropriate message set.

SET OUTPUT/USAGE

0183A BWC, APA, GLL, VTG
    Remote displays, version 1.5 marine autopilots

0183B RMC, RMB
    NMEA-recommended navigation data for remote map, etc.

0183C APB, GGA, BWC, GLL, VTG
    Version 2.0 marine autopilot data and satellite data

NMEA Message Definitions

APA   Cross track error, direction to steer, status of GPS, route status, destination landmark name, and bearing from origin to destination (old format).

APB   Revised autopilot message contains all of the above plus: heading to steer toward destination, bearing from the present location to the destination (magnetic or true).

BWC   Range and bearing to a landmark.

GGA   GPS location, time, fix quality, number of satellites used, HDOP (Horizontal Dilution of Precision), differential reference information, and age.

GLL   GPS-derived latitude, longitude, and time of fix.

RMB   Data status, cross track error, direction to steer, origin, destination landmark, landmark location, bearing to destination, and velocity toward the destination.

RMC   Time, latitude, longitude, speed over ground, course over ground, and date.

VTG   Track (magnetic and true) and ground speed (knots and KPH).

OUTPUT DATA FORMAT

APA   Autopilot Format A

```
   1 2 3    4 5 6 7 8    9 10
APA,A,A,X.XX,L,N,A,A,XXX.,M,CCC

        1    OR'ed Blink and SNR (A = valid, V = invalid)
        2    Cycle Lock (A = valid, V = invalid)
        3-5 Cross Track, Sense (L = steer left, R = steer
             Right), N.Mi. Units
        6-7 Arrival Circle, Arrival Perpendicular (crossing
             of the line which is perpendicular to the course
             line and which passes through the destination
             landmark.
        8-9 Bearing dest. lmk. from origin lmk., Magnetic
        10   Dest lmk. identifier
```

APB   Autopilot Sentence "B"

```
    1 2 3    4 5 6 7 8    9 10    11 12 13 14
APB,A,A,x.x,a,N,A,A,x.x,a,c—c,x.x,a,x.x,a*hh
```

```
     1       Status: V = Loran-C Blink or SNR warning
                     A = general warning flag for other
                         navigation systems when a
                         reliable fix is not available.
     2       Status: V = Loran-C cycle lock warning flag
                     A = OK or not used
     3       Magnitude of XTE
     4       Direction to steer (L, R)
     5       XTE units, nautical miles
     6       Status: A = arrival circle entered
     7       Status: A = perpendicular passed at landmark
     8-9     Bearing origin to detination, M/T
     10      Destination landmark ID
     11-12   Bearing, present location to destination,
             Magnetic or True
     13-14   Heading to steer to destination landmark,
             Magnetic or True
```

BWC   To Selected Landmark, Great Circle

```
    1      2        3 4          5 6     7 8    9 10     11 12
BWC,XXXXXX,XXXX.XX,N,XXXXX.XX,W,XXX.,T,XXX.,M,XXX.X,N,CCCC

     1       UTC of Bearing
     2-3     Lat, N or S of landmark
     4-5     Long, E or W of landmark
     6-7     Bearing, True
     8-9     Bearing, Magnetic
     10-11   Distance, naut. miles
     12      Landmark identifier
```

GGA   Global Positioning System Fix Data

```
    1          2      3 4         5 6 7 .8   9    1011
GGA, hhmmss.ss,111.11,a,yyyyy.yy,a,x,xx,x.x,x.x,M,x.x,

    1213 14
    M,x.x,xxxx*hh

     1       UTC of Position
     2-3     Latitude - N/S
     4-5     Longitude - E/W
     6       GPS Quality Indicator
```

```
                0 = fix not available or invalid
                1 = GPS Fix
                2 = Differential GPS Fix
```

    7   Number of satellites in use

    8   Horizontal dilution of precision

    9   Antenna altitude above/below mean sea level

    10   Units of antenna altitude

    11   Geoidal separation - difference between the
              WGS-84 earth ellipsoid and mean sea level
              (geoid), "-" = mean sea level below ellipsoid

    12   Units of geoidal separation, meters.

    13   Age of Differntial GPS data - Time in seconds
              since last SC104 Type 1 or 9 update, null
              field when DGPS is not used

    14   Differential reference station ID, 0000-1023

GLL   Geographic Location — Latitude/Longitude

```
    1       2 3       4 5         6
GLL,1111.11,a,yyyyy.yy,a,hhmmss.ss,A*hh
```

    1-2   Latitude, N/S

    2-3   Longitude, E/W

    4   UTC of location

    6   Status A = Data valid

RMB   Generic Navigation Information (immediately follows RMC)

```
   1 2    3 4    5    6      7 8          9 10    11    12
RMB,A,X.XX,L,CCCC,CCCC,SSS.SS,N,XXXXX.XX,W,XXX.X,XXX.,XX.X,

   13 14
   A *XX
```

    1   Status (A = valid, V = invalid)

    2-3   XTE, naut. miles and direction to steer (L or
              R) [If XTE excces 9.99 NM, display 9.99 in
              field 2.]

    4   Origin landmark ID

    5   Destination landmark ID

    6-7   Destination Landmark Latitude (N or S)

    8-9   Destination Landmark Longitude (E or W)

10	Range naut. miles, present fix to destination landmark Great Circle. [If range exceeds 999.9 nm, display 999.9.]
11	Bearign, True, Great Circle, Present fix to dest. landmark
12	Closign velocity to destination, knots
13	Arrival (OR'ed arrival circle and crossing of line which is perpendicular to the course line and which Passes through the destination landmark.)
14	CHECKSUM (Mandatory in this sentence.)

RMC   Transit Specific (to be followed by RMB)

```
    1      2 3       4 5       6 7   8   9           10
12
RMC,XXXXXX,A,XXXX.XX,N,XXXXX.XX,W,XX.X,XXX.,XXXXXX,XX.,E
*XX
```

1	Time, UTC
2	Status (A = valid, V = invalid)
3-4	Latitude at UTC time, N or S
5-6	Longitude at UTC time, E or W
7	Speed over ground, knots
8	COG (track), degrees
9	Date (DDMMYY)
10	Variation, degrees
11	Variation, sense (E or W)
12	CHECKSUM (Mandatory in this sentence)

VTG   Actual Track and Ground Speed (SOG)

```
            1    2 3    4 5    6 7    8
          VTG,XXX.,T,XXX.,M,XX.X,N,XX.X,K
```

1-2	Track degrees, True
3-4	Track degrees, Magnetic
5-6	Speed, knots
7-8	Speed, kilometers/hour

> ⚠ The formats listed are NMEA formats. Your Magellan receiver may not output all of the information listed for a particular format.

PACKING LIST

The following items should be in your package:

    GPS Trailblazer XL
    Reference guide
    Field guide
    Carrying Case

If any of these items is missing, please contact your local Magellan dealer or distributor.

OPTIONAL ACCESSORIES

In addition to the items provided with the receiver, optional accessories are also available.

Mounting Kit. Includes a mountable bracket for hands-free operation, an 11-16 VDC Power/Data Cable, the Antenna Extension Cable, and the Antenna Suction Cup Mount. The Extension Cable and Suction Cup Mount are required to operate with the quadrifilar antenna detached. Do not alter the length of the antenna extension cable or use a non-Magellan cable, as this may adversely affect receiver sensitivity.

External Antenna. An external antenna that is mounted to a range pole or vehicle roof in order to provide satellite signals to the receiver when being operated in a sheltered location. Does not require a separate power source. Comes with 30 feet of connecting cabling and mounting hardware.

Magnetic Mount for External Antenna. A magnetic mounting device used to temporarily mount the external antenna to a flat metal surface.

Global Positioning System   4

WHAT IS GPS?

GPS is a constellation of navigation satellites that orbit the earth. The precise time and position information transmitted by these satellites is used by a GPS receiver to triangulate a location fix.

The system is now officially declared "initial operational", and provides continuous, 24-hour 3D (location plus elevation) coverage anywhere on the earth.

GPS was developed by the United States Department of Defense to provide consistent, reliable navigation information that is unaffected by rough terrain and bad weather, and is highly resistant to multipath errors and interference. The DoD continues to administer and control the Global Positioning System.

Although GPS was developed as a military navigation system, its civilian and commercial uses were recognized. The satellites therefore transmit two codes, a military-only encrypted code (PPS) and a civilian-access, Standard Positioning Service (SPS) code. All commercial and consumer GPS receivers are SPS receivers.

HOW DOES GPS WORK?

Each GPS satellite transmits its precise position (location and elevation) and the start time of the transmission. A GPS receiver acquires the signal, then measures the interval between transmission and receipt of the signal to determine the distance between the receiver and the satellite: this is ranging. Once the receiver has computed range for at least three satellites, its location on the surface of the earth can be determined.
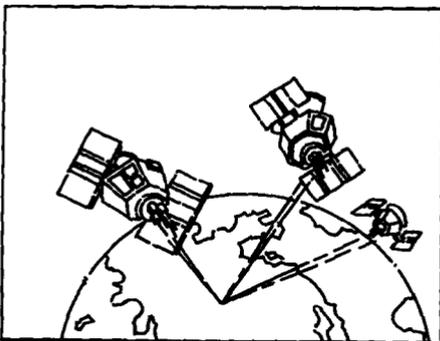
Every satellite transmits two types of data, almanac and ephemeris. Almanac data is general information on the location and health of each satellite in the constellation. Since it contains general information, an almanac can be collected from any satellite. A receiver with a current almanac in its memory knows where in the sky to look for satellites, given its last known location and the time of day. Ephemeris data is the precise satellite locating information that is used for ranging. Each satellite transmits its own ephemeris data.

Both almanac and ephemeris data are required for a GPS receiver to locate and acquire satellites quickly and compute a location fix.

ACCURACY

GPS positioning with an SPS receiver that is intended for general use will produce accuracies of 25 meters or better.

In fact, SPS receivers have proven to be far more accurate than anyone anticipated. DoD has decided that 25-meter accuracy is a potential risk, and has introduced Selective Availability (SA) to maintain a military advantage. SA is a random error that is introduced to the SPS code ephemeris data and reduces the accuracy of any SPS receiver. The size of the error changes, but rarely exceeds 100 meters.

The DoD civil GPS user policy is that GPS accuracy as affected by SA is sufficient for general navigation. In an open environment, it usually is. Even with SA, a GPS receiver will bring you within visual range of a destination or target, and GPS remains the best available source of accurate, repeatable navigation and positioning information.

If you feel that you really need 25-meter accuracy, the effects of SA can be overcome with a technique called broadcast differential to produce highly accurate location fixes.

DGPS

Differential GPS (DGPS) computes the size of the error and applies it to positioning information. There are several ways to perform DGPS, one of which is broadcast differential. Broadcast differential uses GPS receivers at control sites to measure the range errors for all visible satellites and determines a correction for each satellite. These corrections are broadcast in the RTCM SC-104 format by a radio beacon at the control site to any differential beacon receiver that is within range of the signal.

The differential beacon receiver receives and demodulates the signal, then relays it to the user's differential-ready GPS receiver. The user's GPS receiver applies the corrections to the positioning information it collects to compute differentially corrected Position and navigation data.

This technique requires that your GPS receiver be connected to a compatible differential beacon receiver (such as the Magellan DBR™, which is compatible with all differential-ready Magellan receivers). You must also be within range of a differential radio beacon.

MORE INFORMATION

For information relating to the operation of your Magellan GPS receiver, call Magellan at (909) 394-5000 and ask for Customer Service.

General information on the Global Positioning System and satellite status is available from the Civil GPS Information Center (GPSIC) in Virginia. It is operated by the United States Coast Guard for the Department of Transportation, and was established to provide information and to serve as a point of contact. There are three ways to telephone the GPSIC:

1. 24-hour recorded message at 703-313-5905

2. computer bulletin board at 703-313-5910

   (parameters: 8 data bits, 1 stop bit, no parity)

3. 24-hour live Operator at 703-313-5900

Navtech provides seminars (for a fee) and books on GPS and navigation. The Navtech bookstore can be reached at 800-NAV-0885 or 703-931-0500, or at FAX 703-931-0503.

There are other sources for GPS information, ranging from free, governmentally produced literature to purchased professional literature and seminars. The geography department of your local college or the local office of the National Geodetic Survey may be able to help you locate additional sources of general or technical information.

Glossary

Azimuth   The height above the horizon of a satellite or other object.

Bearing   Direction, as measured in degrees from north in a clockwise direction. The receiver uses either true north or magnetic north, as selected from the Setup Menu.

CDI   Course deviation indicator. A graphic representation of cross track error.

Cross Track Error   The closest (perpendicular) distance of the present location to the courseline. Measured as a distance to the right or left of the courseline.

Coordinates   A unique numeric or alphanumeric description of a location.

Course   The planned path of travel from a point of departure to a destination.

DMG   Distance made good. The total distance of a route less the distance from the current location to the destination.

ETA   Estimated time of arrival at the destination.

Heading   The direction of movement, expressed as a bearing. Also called ground course.

Landmark   Either a location fix that has been saved in the receiver's memory or the coordinates of a location that has been entered manually. Landmarks are most frequently used to create routes.

Location Fix   Your location or position coordinates as determined by some navigation technique or aid, including by a GPS receiver.

Relative Bearing   The angle between track and bearing of the destination.

Route   A planned course of travel that is defined by a series of landmarks. When a route is active, it is used to calculate all navigation data except location, speed over ground, and course over ground.

SOA   Speed of advance. The component of velocity that is parallel to the courseline. The receiver displays a negative SOA as a blank line. Also referred to as speed of approach.

Speed	The rate of motion over the surface of the earth (not through the air or water). Sometimes called ground speed.
Steering	Setting and holding to a course. A steering correction is the change in heading that must be made to get back an course.
Track	The actual path travelled, which may differ from the planned course.
Track History	The track over a selected length of time.
TTG	Time to go. The length of time until the destination is reached.
VMG	Velocity made good. The component of velocity that is in the direction of the destination.
VMG Bar	A graphic display of VMG in relation to SOG.
XTE	Cross track error.

City Reference Chart

Australia & 5W Pacific

Adelaide	34°55 S	138°35 E
Alice Springs	23°42 S	133°53 E
Apia	13°48 S	171°45 W
Auckland	36°55 S	174°47 E
Bourail	21°34 S	165°29 E
Brisbane	27°28 5	153°02 E
Canberra	35°17 S	149°08 E
Coober Pedy	28°56 5	134°45 E
Dampier	20°45 5	116°48 E
Darwin	12°28 S	130°50 E
Derby, WA	17°19 S	123°38 E
Honiara	9°28S	159°57 E
Iron Range	12°39 S	143°13 E
Mount Isa	20°50 S	139°29 E
Nadi	17°47 5	177°29E
Newman, Mt.	23°20 S	119°34E
Ooldea	30°30 S	131°45 E
Perth	31°56 S	115°50E
Port Moresby	9°30 S	147°07 E
Rawlinna	31°00 5	125°21 E
Timaru	44°23 S	171°14 E
Townsville	19°13S	146°48E

Asia

Bangalore	12°58 N	77°35 E
Bangkok	13°44 N	100°30 E
Beijing	39°55 N	116°26 E
Bombay	18°56 N	74°35 W
Calcutta	22°30 N	88°20 E
Colombo	6°55 N	79°52 E
Delhi	28°40 N	77°14 E
Hanoi	21°01 N	105°52 E
Harbin	45°45 N	126°41 E
Ho Chi Minh City	10°46 N	106°43 E
Hong Kong	22°15 N	114°10 E
Islambad	33°40 N	73°08 E
Jakarta	6°08 S	106°45 E
Kagoshima	31°37 N	130°32 E
Kandla	23°03 N	70°11E
Karachi	24°51 N	67°02 E
Kathmandu	27°42 N	85°19E
Kinabalu, Gunung	6°03 S	116°32 E
Kota, Malaysia	2°33 N	102°10 E
Kuala Lumpur	3°08 N	101°42 E
Kunming	25°04 N	102°41 E
Malang	7°59 S	112°45 E
Mandalay	21°57 N	96°04 E
Nagpur	21°10 N	79°12 E
Padang	6°12 S	120°27 E
Palu	8°19 5	121°44 E
Pinang	5°30 N	100°28 E
Pontianak	0°05 S	109°16 E
Rangoon	16°47 *N*	96°10 E
Sapporo	43°05 N	141°21 E
Seoul	37°30 N	127°00 E
Shanghai	31°06 N	121°22 E
Sorong	0°50 S	131°17 E
Surakarta	7°32 5	110°50 E
Tanahmerah	6°08 S	140°18 E
Tapei	25°05 N	121°32 E
Thimphu	27°32 N	89°43 E

Tokyo	35°40 N	139°45 E
Tonhil	46°19 N	93°54 E
Ulaanbaatar	47°54 N	106°52 E
Ürümqi	43°43 N	87°38 E
Wuhan	30°35 N	117°55 E
Xi'an	34°16 N	108°54 E
Yumen	39°54 N	97°43 E

CIS

Anadyr	64°50 N	177°50 E
Arkhangersk	64°32 N	40°40 E
Ashkhabad	37°58 N	58°24 E
Baku	40°22 N	49°53 E
Balkhash	46°50 N	74°57 E
Barnaul	53°21 N	83°45 E
Chita	52°03 N	113°35 E
Gizhiga	62°00 N	160°34 E
Igarka	67°31 N	86°33 E
Inarigda	63°15 N	107°40 E
Kargasok	59°07 N	80°58 E
Khatanga	71°59 N	102°31 E
Kiyev	50°25N	133°43 E
Krasnodar	45°02 N	39°00 E
Magdagachi	53°27 N	125°44 E
Moscow	55°45 N	37°42 E
Okhotsk	59°20 N	143°15 E
Perm	58°01 N	56°10 E
Petropavlovsk	54°53 N	69°13 E
Riga	56°40 N	106°10 E
Saratov	51°30 N	45°55 E
Tashkent	41°16 N	69°13 E
Tulun	54°32 N	100°35 E
Vanino	49°05 N	140°14 E
Vladivostok	43°09 N	131°53 E
Vorkuta	67°27 N	64°00 E
Yakutsk	62°10 N	129°50 E

Middle East

Al Kuwayt	29°20 N	48°00 E
Ar Riyad	24°39 N	46°46 E
Baghdad	33°20 N	44°26 E
Bam	36°57 N	57°56 E
Halab	36°14 N	37°10 E
Herat	34°20 N	62°12 E
Jerusalem	31°47 N	35°13 E
Kabul, Afghanistan	34°31 N	69°12 E
Mashhad, Iran	36°16 N	59°34 E
Nazwä	22°56 N	57°33 E
Salalah	17°00 N	54°04 E
San' a	15°24 N	44°14 E
Shiraz	29°38 N	52°34 E
Tabriz	38°05 N	46°18 E
Tarim	16°08 N	48°58 E
Tehran	35°40 N	51°26 E

Africa

Abidjan	5°19 *N*	0°05 W
Ad Dakhla	23°43 N	15°57 W
Adis Abeba	9°03 N	38°42 E
Alger	36°50 N	3°00 E
Antananarivo	18°52 S	47°30 E
Asmera	15°20 N	38°58 E
Aswän	24°05 N	32°56 E

Bamako	12°39 N	8°00 W		Nice	43°42 N	7°15 E
Banghazi	32°07 N	20°04 E		Nuugaatsiaq	71°30 N	53°00 W
Bangui	4°22 N	18°35 E		Oslo	59°55 N	10°45 E
Beira	19°49 5	34°52 E		Paris	48°52 N	2°20 E
Cairo	30°03 N	31°15 E		Reykjavik	64°09 N	21°51 W
Capetown	33°55 S	18°22 E		Scoresbysund	70°30 N	22°00 W
Dakar	14°40 N	17°26 W		Stensele	65°05 N	17°10 E
Fes	34°05 N	5°00 W		Stockholm	59°20 N	18°03 E
Freetown	8°30 N	13°15 W		Thule	76°35 N	68°30 W
Harare	17°5g 5	31°03 E		Torshavn	62°02 N	6°47 W
Kabwe	14°29' S	28°25 E		Trabzon	41°00 N	39°43 E
Kampala	0°19 N	32°25 E		Vardo	60°16 N	20°20 E
Kano	12°00 N	8°31 E				
Khartoum	15°36N	32°32 E		**The Americas**		
Kinshasa	4°18 5	15°18 E		Albany, NY	42°39 N	73°45 W
Kisangani	0°33 N	25°14 E		Alburquerque	35°05 N	106°39 W
Lagos	6°27 N	3°24 E		Amarillo	35°14 N	101°50 W
Las Palmas de GC	28°08 N	15°27 W		Antofagasta	23°40S	70°23 W
Lindi	10°00 S	39°41 E		Arequipa	16°25S	71°32 W
Lobito	12°20 5	13°34 E		Atlanta	33°44 N	84°23 W
Lome	6°08 N	1°13 E		Baton Rouge	30°27 N	91°09 W
Lubumbashi	11°41 S	27°29 E		Belem	1°27 5	48°29 W
Lüderitz	26°38 5	15°10 E		Billings, MT	45°47 N	108°30 W
Lusambo	4°59 S	23°26 E		Birmingham	33°31 N	86°48 W
Maputo	25°58 5	32°35 E		Bismarck	46°48 N	100°47 W
Maseru	29°19 S	27°29 E		Bogotä	4°36 N	74°05 W
Mbale	1°04 N	34°12 E		Boise	43°36 N	116°12 W
Mogadishu	2°02 N	45°21 E		Boston	42°21 N	71°03 W
Monrovia	6°18 N	10°47 W		Brasilia	15°47 S	47°55 W
Mwanza, Zaire	7°51 5	26°43 E		Buffalo, NY	42°52 N	78°55 W
N' Djamena	12°10 N	14°59 E		Caracas	10°30 N	66°56 W
Nairobi	1°17 S	36°49 E		Casper	42°50 N	106°20 W
Namibe	15°10 5	12°09 E		Cayenne	4°56 N	52°20 W
Nouakchott	18°09 N	15°58 W		Chicago	41°51 N	87°39 W
Ouagadougou	12°22N	1°31 W		Chihuahua	28°40 N	106°06 W
Pointe Noire	4°46 S	11°53E		Churchill, CAN	58°45 N	•94°00 W
Port Elizabeth	33°58 5	25°36 E		Cleveland	41°29 N	81°41 W
Sabha, Libya	27°02 N	14°26 E		Comodoro R	45°50 S	67°30 W
Serowe	22°25 5	26°44 E		Coppermine	67°49 N	115°21 W
Sidi Ifni	29°24 N	10°12 W		C6rdoba, Veracruz	18°55 N	96°55 W
Toliara	23°20 S	43°41 E		Cuiabä	7°15 5	58°25 W
Tombouctou	16°49 N	2°59 W		Dallas	32°46 N	96°47 W
Tripoli	32°54 N	13°11 E		Denver	39°44 N	104°59 W
Tsumeb	19°13 S	17°42 E		Des Moines	41°36 N	93°36 W
Tunis	36°48 N	10°11 E		Detroit	42°20 N	83°03 W
Winhoek	22°34 5	17°06E		Duluth	46°45 N	92°10 W
Yaounde	3°52 N	11°31 E		Fort McPherson	67°29 N	134°50 W
Zanzibar	6°10 5	39°20 E		Fort Providence	61°03 N	117°40 W
				Georgetown, Guy.	6°48 N	58°10 W
Europe				Grand Rapids, MI	42°57 N	86°40 W
Athens	37°58 N	23°43 E		Guadalajara	20°40 N	103°20 W
Barcelona	41°23 N	2°11 E		Guantänamo	20°09 N	75°14 W
Bern	46°57 N	7°26 E		Guatemala	14°38 N	90°31 W
Bordeaux	44°50 N	0°34 W		Guayaquil	2°10 S	79°50 W
Brno	49°13 N	16°40 E		Hazelton, BC	55°15 N	127°38.W
Bucuresti	44°26 N	26°06 E		Houston	29°45 N	95°21 W
Budapest	47°30 N	19°05 E		Ilheus	14°50 S	39°06 W
Cork	51°54 N	8°28 W		Indianapolis	39°46 N	86°09 W
Gdansk	54°23 N	18°40 E		Iquitos	3°51 5	73°13 W
Glasgow	55°53 N	4°15 W		Kansas City, MO	39°02 N	94°33 W
Godthäb	64°11 N	51°44 W		La Habana	23°08 N	82°22 W
Hamburg	53°33 N	9°59 E		Labrador City	52°56 N	66°52 W
Istanbul	41°01 N	28°58 E		Las Vegas	36°10 N	115°08 W
London	51°30 N	0°10 W		Lima	12°03 5	77°03 W
Longyearbyen	78°12 N	15°40 E		Little Rock	34°44 N	92°17 W
Madrid	40°24 N	3°41 W		Los Angeles	34°03 N	118°14 W
Napoli	40°51 N	14°17 E		Louisville	38°15 N	85°45 W

Managua	12°06 N	86°18 W		São Paulo	23°32 S	46°37 W
Manaus	3°06 S	60°00 W		Saskatoon	52°10 N	101°32 W
Merida, Venezuala	8°24 N	71°08 W		Seattle	47°36 N	122°19 W
Miami	25°46 N	80°11 W		Shreveport	32°30 N	93°46 W
Milwaukee	43°02 N	87°54 W		Sioux Falls	43°34 N	96°42 W
Minneapolis	44°58 N	93°15 W		Spokane	47°40 N	117°25 W
Montevideo, Uru.	34°53 S	56°11 W		St Louis	38°37 N	90°11 W
Nakina	59°12 N	132°48 W		Tampa, FL	27°58 N	82°38 W
Nashville, TN	36°09 N	86°47 W		Tijuana	32°32 N	117°01 W
New York	40°43 N	74°01 W		Toronto	43°39 N	79°23 W
Norfolk, VI	36°50 N	76°17 W		Valparaiso, Brazil	21°16 S	50°54 W
Oklahoma City	35°28 N	97°30 W		Vancouver	49°16 N	123°07 W
Omaha	41°15 N	95°56 W		Veracruz	19°12 N	96°08 W
Panama City	8°58 N	79°32 W		Washington	38°53 N	77°02 W
Peace River	56°15 N	117°18 W		Whitehorse	60°43 N	135°03 W
Peoria, IL	40°43 N	89°38 W		Wichita	37°43 N	97°20 W
Phoenix	33°26 N	112°04 W		Winnipeg	49°53 N	97°09 W
Pittsburgh	40°26 N	79°59 W				
Port-au-Prince	18°32 N	72°20 W		**Pacific Ocean**		
Portland, OR	45°31 N	122°40 W		American Samoa	14°20 S	170°00 W
Porto Velho	8°45 S	63°54 W		Baker I.	0°12 N	176°28 W
Quebec	46°50 N	71°15 W		Easter I.	27°05 S	109°20 W
Rapid City SD	44°06 N	103°14 W		Gambier I.	23°10 5	135°00 W
Recife	8°06 S	34°53 W		Honolulu	21°18 N	157°51 W
Reno	39°32 N	119°49 W		Howland I.	0°48 N	176°38 W
Rio de Janeiro	22°54 S	43°14 W		Jarvis I.	0°02 S	160°02 W
Salt Lake City	40°45 N	111°53 W		Kanton I.	2°50 5	171°40 W
San Antonio	29°25 N	98°29 W		Lihue	21°59 N	159°23 W
San Francisco	37°46 N	122°25 W		Palmyra I.	5°52 N	162°05 W
San Juan	18°28 N	66°07 W		Pitcairn I.	25°04 S	130°06 W
Santarem	2°26 S	54°41 W		Swains I.	59°30 S	100°00 W

Datum Abbreviations

Datums defined in the Trailblazer XL are accessed with the following abbreviations.

WGS84	WGS84	Indian (India, Nepal)	INDIA
North American 1927	NAD27	Iran, European 1950	IRAN
North American 1983	NAD83	Ireland 1965	IRELA
Adindan	ADIND	Kaui, Old Hawaiian	KAUAI
Alaska, NAD27	ALASK	Kertau 1948	KERTA
Arc 1950	ARC50	KKJ (Finland)	KKJ
Arc 1960	ARC60	Liberia 1964	LIBER
Campo Area Astro	ASTRO	Luzon (Philippines)	LUZON
Australian Geodetic 1966	AUS66	Massawa	MASSA
Australian Geodetic 1984	AUS84	Maui, Old Hawaiian	MAUZ
Bogota Observatory	BOGOT	Merchich	MERCH
Bukit Rimpah	BUKIT	Minna (Nigeria)	MINNA
Camp Inchauspe	CAMPO	Montjong Lowe	MONTJ
Canada, NAD27	CANAD	Nahrwan	NAHRW
Cape	CAPE	Oahu, Old Hawaiian	OAHU
Carthage	CARTH	Old Egyptian 1930	OEGYP
Central America, NAD27	CENAM	Hawaii, Old Hawaiian	OHAWA
Chatham 1971	CHATH	Oman	OMAN
Chau Astro	CHUAA	Pitcairn Astro 1967	PITCA
Corrego Alegre	CORRE	Qatar National	QATAR
Cyprus, European, 1950	CYPRU	Qornoq	QORNO
Djakarta (Batavia)	DJAKA	RT90 (Sweden)	RT90
Egypt, European 1950	EGYPT	Provisional So. Am. 1956	SAM56
Europe (military datum)	EUROP	South American 1969	SAM69
European 1950	EUR50	Schwarzeck (Namibia)	SCHWA
European 1979	EUR79	Sicily, European 1950	SICIL
Gandajika Base	GANDA	Sierrra Leone	SIERR
Geodetic Datum 1949	GE049	Tananarive Observatory	
Ghana	GHANA	1925	TANAN
Ordnance Survey of Great		Indian (Thailand, Vietnam)	THAI
Britain 1939	GRB36	Timbalai 1948	TIMBA
Guam	GUAM	Tokyo, mean value	TOKYO
G. Segara	GUNSG	User-entered	USER
Gunung	GUNSR	World Geodetic Sys. 1972	WGS72
Old Hawaiian, mean value	HAWAI	Yacare (Uruguay)	YACAR
Herat North	HERAT	Voirol	VOIRO
Hjorsey 1955	HJORS	Zanderij	ZANDE
Hu-Tzu-Shan	HUTZU		

Magellan Systems Corporation   Limited Warranty

All Magellan GPS receivers are navigational aids, and are not intended to replace other methods of navigation. Purchaser is advised to perform careful position charting and use good judgement. **Read the User Guide carefully before using this product.**

1.   MAGELLAN SYSTEMS CORPORATION WARRANTY

Magellan Systems Corporation warrants their GPS receiver and accessories to be free of defects in material and workmanship for a period of one year from the date of original purchase. **This warranty applies only to the original purchaser of this product.**

In the event of a defect, Magellan Systems Corporation will, at its option, repair or replace the product with no charge to the purchaser for parts or labor. The repaired or replaced product will be warranted for ninety (90) days from the date of return shipment, or for the balance of the original warranty, whichever is longer.

2.   PURCHASER'S REMEDY

Purchaser's Exclusive Remedy under this written warranty or any implied warranty shall be limited to the repair or replacement, at Magellan Systems Corporation's option, of any defective part of the receiver or accessories which are covered by this warranty. Repairs under this warranty shall only be made at an authorized Magellan Service Center.

3.   PURCHASER'S DUTIES

To obtain warranty service, the purchaser must return the receiver or accessories postpaid, with proof of the date of original purchase and purchaser's return address to **Magellan Authorized Service Centers.**

Magellan Systems Corporation will not be responsible for any losses or damage to the product incurred while the product is in transit or is being shipped for repair. Insurance is recommended.

4.   LIMITATION OF IMPLIED WARRANTIES

Except as set forth in item 1 above, all other expressed or implied warranties, including those of fitness for any particular purpose and merchantability, are hereby disclaimed.

Some states do not allow limitations an warranties, so the above limitation may not apply to you.

5.   EXCLUSIONS

This warranty does not cover the following:

- Installation
- Batteries
- Finishes
- Defects resulting from installation
- Any damage due to accident, resulting from inaccurate satellite transmissions. Inaccurate transmissions can occur due to changes in the position, health, or geometry of a satellite.
- Any damage due to shipping, misuse, negligence or tampering, or improper use.
- Servicing performed or attempted by anyone other than an authorized Magellan Service Center representative.

- Modifications to the receiver which may be required due to any change in the Global Positioning System (GPS). [Note: All Magellan GPS receivers use GPS to obtain position, velocity, and time information. GPS is operated by the U.S. Government, which is solely responsible for its accuracy and maintenance. Certain conditions can cause inaccuracies which could require modifications to the receiver. Examples of such conditions include but are not limited to changes in the GPS transmission. Such modifications are **not** covered by this warranty.]

Opening of this product by anyone other than an Authorized Magellan Service Center representative will void this warranty.

6.   EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES

Magellan Systems Corporation shall not be liable to purchaser or any other person for any incidental, special, indirect, or consequential damages whatsoever, including but not limited to lost profits, damages resulting from delay or loss of use, loss of or damages arising out of the use or inability to use this product, or breach of this warranty even though caused by negligence or other fault. In no event will Magellan Systems Corporation be responsible for such damages, even if Magellan Systems Corporation has been advised of the possibility of such damages.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

7.   MERGER

This written warranty is the complete, final, and exclusive agreement between Magellan Systems Corporation and the purchaser with respect to the quality of performance of all the goods and any and all warranties and representations. **This warranty sets forth all of Magellan Systems Corporation's responsibilities regarding this product.**

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

8.   FOR PURCHASERS OUTSIDE OF THE UNITED STATES
This warranty gives you specific rights. You may have other rights which vary from province to province and certain limitations contained in this limited warranty may not apply to you.

If you purchased this product outside of the United States, this limited warranty is governed by the laws of the State of California and shall benefit Magellan Systems Corporation, its successors, and assigns.

For further information concerning this limited warranty, please call or write:

Magellan Systems Corporation
960 Overland Court
San Dimas, California, 91773
Phone: (909) 394-5000   FAX: (909) 394-7050

Serial No.	Date Purchased
Place of Purchase	

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