Geo*Explorer* II

Operation Manual

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Preface

Welcome to the GeoExplorer II mapping system, Trimble's pocket sized GPS data collector and GPS processing software. The GeoExplorer II mapping system will allow you to collect geographic data and produce maps more efficiently than ever before.

Scope and Audience

Even if you have used other GPS receivers we recommend you spend some time looking through this manual. The following section provides you with a guide to this manual as well as to other documentation you have received with this product. If you want to get started now, refer to the *GeoExplorer II Quick Reference* for instructions. You can take your GeoExplorer II receiver outside, get a clear view of the sky, and record positions right away.

Organization

This manual is structured into two sections. The first section helps you get started with the GeoExplorer II receiver. The second section provides a menu-by-menu reference to all of the functions in the GeoExplorer II receiver. Use Section One to learn the basic operations of the GeoExplorer II receiver. Use Section Two as a reference tool once you are familiar with the GeoExplorer II receiver and need to find out more about a particular feature.

This manual includes the following chapters and appendices:

- Section One - GeoExplorer II Operations

    - Chapter 1, GPS and the GeoExplorer II - looks at the basic principles of GPS and data collection with the GeoExplorer II.

    - Chapter 2, System Components - a guide to the various parts of the GeoExplorer II mapping system, the receiver, software, and accessories.

    - Chapter 3, Basics Of Operation - an overview of the basic things you need to know to operate the GeoExplorer II receiver.

    - Chapter 4, Before Leaving the Office - covers the things you need to do when preparing to go out in the field to collect data.

    - Chapter 5, In the Field - provides a step by step guide to using the GeoExplorer II receiver in the field.

    - Chapter 6, Back in the Office - tells you what you need to do once you have collected some data and returned to the office.

- Section Two - GeoExplorer II Reference

    - Chapter 7, Data Capture - allows you to record, review, and delete base or rover files. You can record feature and attribute descriptions based on a data dictionary which you construct using the Pathfinder Office™ software. You can also review and delete the data dictionary.

    - Chapter 8, Position - lets you view your current position.

    - Chapter 9, GPS Status - provides information on the location and status of the satellites. Also gives an indication of the accuracy of the GPS positions you are viewing or recording.

- Chapter 10, Navigation - lets you navigate from one position to another. You can store single positions as waypoints and then navigate between two waypoints or you can navigate from your current position to a waypoint.

- Chapter 11, Date &Time - allows you to view the current date and time.

- Chapter 12, Configuration - lets you set all the configuration parameters for the GeoExplorer II receiver. Many of these are critical for recording accurate GPS data.

- Chapter 13, Data Transfer - allows you to transfer files to and from the GeoExplorer II receiver.

- Appendix A, ASCII Programs - provides information on the ASCII output from the GeoExplorer II receiver.

- Appendix B, Datums - Explains the datums used in the GeoExplorer II receiver.

- Appendix C, NMEA Format - describes the format of NMEA output.

- Appendix D, Real-Time Differential Correction - provides information on real-time differential correction.

- Appendix E, Troubleshooting - lists common problems you can encounter while using the GeoExplorer II receiver. Suggested solutions are provided.

- Appendix F, Part Numbers - contains the part numbers for the GeoExplorer II mapping system components.

Related Publications

This manual contains specific information on the GeoExplorer II receiver. Other sources of information are discussed in the following sections.

Release Notes

Release Notes may be provided with the product. They may describe new features of the product, the installation procedure, information not included in the manuals, and corrections to the manuals.

Update Notes

You will find a Warranty Activation Sheet with your GeoExplorer II mapping system. By sending in your Warranty Activation Sheet, you are automatically sent update notes as they become available. When you receive these packages, read them. They contain important information about software and hardware changes. Contact your local Trimble Dealer for more information about the support agreement contracts for software and firmware, and an extended warranty programs for hardware.

Bulletin Board Service

If you have a modem, check the Customer Support Bulletin Board Service (BBS) on a regular basis for application notes, new software release notices, and other information. The phone number is:

+1-408-481-7800
protocol: 8, n, 1

Technical Assistance

If you have problems and cannot find the information you need in this document, call the Trimble Technical Assistance Center (TAC). The phone numbers are:

+1-800-SOS-4TAC (in North America)
+1-408-481-6940 (International)
+1-408-737-6020 (fax)

You can call the Technical Assistance Center phones between 6 AM to 6 PM Pacific Standard Time. A support technician will take your call, help you determine the source of your problem, and provide you with any technical assistance you might need.

World Wide Web

Check the Trimble® World Wide Web site on the Internet (http://www.trimble.com) for the latest news on new products and releases.

Other Manuals

The GeoExplorer II mapping system is made up of the GeoExplorer II receiver plus software for processing your data. This manual explains how to use the GeoExplorer II receiver. You have received manuals for the Pathfinder Office software as well. In addition, the *Mapping Systems General Reference* explains general GPS and GIS concepts and how to access Trimble's Survey and Mapping bulletin board.

All of the manuals you have received work together to provide you with the information you need to collect and process GPS data with your GeoExplorer II mapping system. Where appropriate, this manual will refer you to your software manuals or the *Mapping Systems General Reference* for more information.

Reader Comment Form

A reader comment form is provided at the end of this guide. If this form is not available, comments and suggestions can be sent to Trimble Navigation Limited, 645 North Mary Avenue, Post Office Box 3642, Sunnyvale, CA 94088-3642. All comments and suggestions become the property of Trimble Navigation Limited.

Document Conventions

Italics identify software menus, menu commands, dialog boxes, and the dialog box fields.

SMALL CAPITALS identify DOS commands, directories, filenames, and filename extensions.

Courier is used to represent what you see printed on the screen by the DOS system or program.

Courier Bold represents information that you must type in a software screen or window.

Return or Ctrl + C identifies a hardware function key or key combination that you must press on a PC.

Helvetica Bold represents a software command button.

Notes, Tips, Cautions, and Warnings

Notes, tips, cautions, and warnings are used to emphasize important information.

Note – Notes give additional significant information about the subject to increase your knowledge, or guide your actions. A note can precede or follow the text it references.

Tip – Indicates a shortcut or other time or labor-saving hint that can help you make better use of the GeoExplorer II mapping system.

Caution – Cautions alert you to situations that could cause hardware damage or software error. A caution precedes the text it references.

Warning – Warnings alert you to situations that could cause personal injury or unrecoverable data loss. A warning precedes the text it references.

Section One

GeoExplorer II Operations

1   GPS and the GeoExplorer II

This chapter covers some basic GPS concepts and information about the GeoExplorer II receiver that can help you use your mapping system more efficiently. The *Mapping System General Reference* has a detailed discussion on GPS and GIS that we recommend you read.

The topics covered in this chapter include:

- GPS concepts

- The GeoExplorer II mapping system

- GeoExplorer II accuracy

- Differential correction

1.1   GPS Concepts

GPS (Global Positioning System) is a satellite-based positioning system operated by the U.S. Department of Defense (DoD). GPS involves three segments: space, control, and the user.

1.1.1   Space

The space segment consists of up to 24 NAVSTAR satellites (SVs). They are orbiting the earth every twelve hours at an altitude of about 12,600 miles (20,200 km). Each satellite contains several high-precision atomic clocks and constantly transmits radio signals using its own unique identifying code.

1.1.2   Control

The control segment is the Department of Defense which is responsible for maintaining the system. They have four ground-based monitor stations, three upload stations and a master control station. The monitor stations track the satellites continuously and provide data about the satellites to the master control station. The master control station calculates any changes in the satellites positions and timing and then forwards these to an upload station. The upload stations then transmit this data to each satellite at least once a day so that the satellites are sending accurate information about their orbit path back to the earth.

1.1.3   The User

This is where you come in. The user segment consists of civilian and military users with GPS receivers. GPS receivers use the signals sent from the satellites to determine where the satellites are and then use this information to calculate their own position on earth. The positions can be recorded for mapping and for navigation.

1.2   GeoExplorer II Mapping System

The GeoExplorer II mapping system consists of the GeoExplorer II GPS receiver, PC software, and accessories (cables, case and so on).

The GeoExplorer II receiver receives signals from the satellites and, because it knows where the satellites are, can calculate its current position. You can record the location of any geographic feature (point, line, or area) in the GeoExplorer II receiver. Using a data dictionary created with the Pathfinder Office™ software, you can also enter descriptive data about the geographic features you are recording.

The GeoExplorer II receiver can calculate a new position more often than once per second. When you are moving, the receiver can compute your velocity and heading so you can navigate from one position to another. The GeoExplorer II receiver lets you monitor the accuracy of the positions you are recording. You can set parameters to limit the satellites that are used, allowing you to maintain your desired level of data integrity.

Once you return from the field you can transfer your GPS positions and attribute data from the GeoExplorer II receiver to the Pathfinder Office software on the PC. The software lets you differentially correct your data to improve its accuracy, display the data graphically and transfer it to a GIS. For more information on differential correction, see Differential Correction, page 1-5.

1.3   GeoExplorer II Mapping System Accuracy

A variety of factors can affect the accuracy of your GPS data.
Accuracy can range from 1 centimeter to over 100 meters. Some of the
factors that affect the accuracy of your positions include: the number
of satellites in view, the position of the satellites in relation to each
other, the strengths of the satellite signals and the distance of your
base GPS receiver) from your rover (mobile GPS receiver). The most
significant factor is your equipment and data processing methods.

In standard operation, the GeoExplorer II receiver provides horizontal
accuracy typically in the order of 2 to 5 meters. To obtain this level of
accuracy the GeoExplorer II receiver must be configured correctly and
you must differentially correct your data. Without differential
correction and with Selective Availability on, accuracy may only be
within 100 meters CEP[1]. The configuration parameters that you need
to set on the GeoExplorer II receiver are discussed in Chapter 4,
Before Leaving the Office. Differential correction is discussed in
Differential Correction, page 1-5.

The GeoExplorer II receiver can also record submeter point data. This
involves setting some configuration parameters, working in High
Accuracy mode, and recording a single position for 10 minutes. Data
collected in High Accuracy mode must be differentially corrected with
base data collected in High Accuracy mode (carrier phase data). It
must then be processed using the Phase Processor software.

[1.] Circular Error Probable, meaning 50% of the collected points are within a
circle of specified radius on a horizontal plane.

⊠ | **Note –** For more information on using the GeoExplorer II receiver to collect High Accuracy data, refer to the *Phase Processor Software User Guide*.

Accuracy can be affected by the Department of Defense, which has the ability to degrade GPS accuracy at any time with Selective Availability (S/A). When S/A is activated, the position accuracy of a GPS receiver may be 100 meters. S/A error can be almost completely removed through differential correction.

⊠ | **Note –** For a comprehensive discussion on GPS accuracy, refer to Chapter 4 of the *Mapping Systems General Reference*.

1.4   Differential Correction

Differential correction is a technique that uses an extra GPS receiver and some calculations to increase the accuracy of GPS positions. It is based on the fact that any errors in a GPS signal are common to all receivers within about 300 miles (500 kilometers). Differential GPS can provide accuracies of submeter to 5 meters CEP.

Differential GPS requires that one receiver, known as the base station, be placed on a known reference position. The base station receives GPS data from all satellites in view. One or more rover receivers collect GPS data at unknown locations using a subset of the same satellites that the base is receiving data from. The GPS positions collected by the base station are compared to its known location and the offset differences are used to improve the accuracy of the rover positions.

Differential GPS corrections can be applied while the data is being collected in the field, using radios. This is called real-time differential GPS. Differential corrections can also be applied in the office once the rover and base station files are transferred to a PC. This is called postprocessed differential correction.

1.4.1   Real-time Differential Correction

In real-time differential correction, the base station calculates and, using radios, immediately broadcasts a correction message for each satellite as it receives the GPS data. This correction is broadcast to the roving GeoExplorer II receiver which applies the correction to the position it is computing. The result is that the position displayed on the GeoExplorer II receiver is differentially corrected in real-time. This method should be used if you need to know your position accurately while in the field. As they are calculated the corrected positions can be recorded in a file or stored as waypoints.

The GeoExplorer II receiver can use RTCM SC-104 radio signals. Radio systems suitable for transmitting and receiving RTCM SC-104 signals are available. For more information on performing differential correction in real-time, see Appendix D, Real-Time Differential Correction.

1.4.2   Postprocessed Differential Correction

For postprocessed differential GPS, the base station stores time-tagged data for each satellite in a computer file. The roving GeoExplorer II receiver records its positions in a file that is later transferred to a PC. The two files are processed with the Pathfinder Office software and the output is a differentially corrected rover file.

A unique feature of all Trimble GPS Pathfinder systems, including the GeoExplorer II receiver, is that they can record both uncorrected and real-time differential GPS corrected positions. If the differential GPS radio data link is lost or becomes intermittent, the GeoExplorer II receiver continues to store uncorrected positions that can be corrected back in the office.

Note – For a more detailed discussion on differential correction refer to Chapter 1 of the *Mapping Systems General Reference* manual. For instructions on performing differential correction refer to the *Differential Correction Software User Guide*.

2 System Components

The standard GeoExplorer II mapping system consists of a GeoExplorer II receiver, Pathfinder Office processing software plus accessories. You can also purchase extra components to expand the functionality of the system. This chapter explains what is included in the standard system and what additional options are available.

2.1 Inspect the System on Receipt

If the shipping carton is damaged, inspect all contents for visible damage (scratches, dents). If any instruments appear damaged, notify the carrier. Keep the shipping and packaging material for the carrier's inspection. To order or return any component, you need a part number. All components and part numbers are listed in Appendix F, Part Numbers, along with instructions for returning goods to Trimble.

The only maintenance you can perform on the GeoExplorer II receiver, other than keeping the outer surface and connectors free of dirt and dust, is recharging the camcorder battery and replacing the AA batteries. All other maintenance must be performed by Trimble Navigation Limited.

2.2 Standard GeoExplorer II Mapping System

The standard GeoExplorer II mapping system includes the following:

- GeoExplorer II receiver

- Receiver case and lanyard

- AA battery (4) pack

- Data download cable

- Pathfinder Officer software and software key

- Documentation - *Mapping Systems General Reference*, *GeoExplorer II Operation Manual*, *Pathfinder Office* (Volumes I, II, and III), *Phase Processor Software User Guide*, and *GeoExplorer II Quick Reference*.

2.2.1 GeoExplorer II Receiver

The GeoExplorer II receiver is a high performance six-channel hand-held receiver. It is a battery-powered unit designed for portable field use. With the receiver you can navigate and also store position and attribute information for point, line or area features. The following tables contain information on the GeoExplorer II receiver's physical characteristics, technical specifications, and accuracy specifications.

Table 2-1   Physical Characteristics

Property	Specification
Size	17.3 x 8 x 4 cm
Weight	0.4 kg (14 oz) with AA battery pack
Power	2.0 watts
Operating Temperature	-10 to +50°C
Storage Temperature	-20 to +70°C
Humidity	95% non-condensing
Casing	Splash proof (does not withstand immersion)
Memory	1/4 MB data storage
Communications	Dual EIA-RS-232 serial port
Display	Backlit, four lines, easy to read, alphanumeric characters

Table 2-2   Technical Specifications

Property	Specification
Update Rate	Minimal interval every 0.7 seconds
Time to First Fix	<2 minutes, 2D (typical) <3 minutes, 3D (typical)
Tracking	Six channels parallel/sequential L1 C/A code
Battery	Runs on four standard AA alkaline batteries (for approximately 2 hours) or an optional external rechargeable camcorder battery (for approximately 7 to 9 hours).

Table 2-3   Accuracy Specifications

Property	Specification
Autonomous with Selective Availability	100 meters CEP (Circular Error Probable, or median error)
Code Phase Differential	2 to 5 meters CEP 5 meter CEP accuracy is possible after postprocessing within 500 km (300 miles) of a Trimble base station supplying correction data. Better accuracy is achieved by collecting positions for about three minutes, differentially correcting them, and averaging the positions using the Pathfinder Office software. This yields a single position accurate to 2 meters.
Phase Processor	Submeter accuracy with the Phase Processor Software.
Selective Availability (S/A)	Without differential correction, all GPS receivers are subject to degradation of position and velocity accuracies under the U.S. Department of Defense imposed S/A. Accuracy can be degraded up to 100 meters (300 feet) CEP.

2.2.2   Receiver Case and Lanyard

To protect your GeoExplorer II receiver, store and transport it in the receiver case. The receiver lanyard attaches to the GeoExplorer II receiver to make it easier to carry. Instructions for attaching the lanyard to the receiver are included with the lanyard.

2.2.3   AA Battery Pack

The standard GeoExplorer II mapping system comes with four AA batteries and a battery pack to hold them. Four AA batteries provide over two hours of continuous operation with heavy-duty alkaline batteries. If this is not sufficient for your data collection needs, there is an optional external power kit. You can use high capacity rechargeable AA NiCad or nickel-hydride batteries.

2.2.4   Data Download Cable

A black data download cable is included to transfer data between the GeoExplorer II receiver and the PC software. The small circular end attaches to the data port on the GeoExplorer II receiver, and the DE-9 end attaches to a serial port on the computer. The data cable pinout is listed in Table 2-4.

Table 2-4   Data Port Cable Pinout

Signal Name	DE-9F Connector Pin
1. PPS (out)	1.
2. TXDA (out) (Port A)	2. (normal PC data connection)
3. RXDA (in) (Port A)	3. (normal PC data connection)
4. RXDB (in) (Port B)	4. Port B input
5. Ground	5. (normal PC data connection)
6. TXDB (out) (Port B)	6. Port B output
7. CTSA (in) (Port A)	7. Flow Control Port A
8. RTSA (out) (Port A)	8. Flow Control Port A
9. no connection	9.

2.2.5   Pathfinder Office Software

The Pathfinder Office software provides all the tools you need for managing a data collection project. It consists of the main Pathfinder Office program and a number of utilities that you can access from it or run as standalone programs. It also includes the Phase Processor software. You can run Pathfinder Office on an office computer under Microsoft Windows, Microsoft Windows 95, or Microsoft Windows NT.

Before going into the field, you can use the Pathfinder Office software to:

- plan the best times to collect GPS positions, using the powerful Quick Plan utility.

- create separate projects, which allows you to manage your data effectively and conveniently.

- construct and edit data dictionaries, using the Data Dictionary Editor. Data Dictionaries can be used to control the data capture operation. They help ensure that the data you capture is complete, accurate, and compatible with your GIS, CAD package, or database.

- transfer files to the GeoExplorer II receiver, using the Data Transfer utility.

Back at the office, you can:

- differentially correct GPS positional data collected simultaneously by base and roving receivers to improve its accuracy, using the Differential Correction utility for ordinary data or the Phase Processor software for high accuracy (carrier phase) data.

- display and edit captured data in the office, optionally overlaying it onto a vector or raster background map.

- export the captured, processed, and edited data to a GIS, CAD, or database format.

- produce a scaled plot as a paper record of the data.

See the *Pathfinder Office Software User Guide* for details on hardware requirements and installation procedure.

Note – You are supplied with a 25-pin software key, which plugs into the parallel port on the PC and activates the Pathfinder Office software. You can transfer the activation from the software key to the PC.

2.2.6   Documentation

The standard GeoExplorer II mapping system includes this *GeoExplorer II Operation Manual*, the *GeoExplorer II Quick Reference*, the *Pathfinder Office* manuals (Volumes I, II, and III), the *Phase Processor Software User Guide*, and the *Mapping Systems General Reference*. The *GeoExplorer II Quick Reference* is a 10 page booklet you can take into the field. It contains basic information on using the GeoExplorer II receiver, the menu structure, and some troubleshooting information. It is spiral bound and made from durable, waterproof paper. The *Mapping Systems General Reference* explains some general GPS and GIS concepts.

2.3   GeoExplorer II Mapping System Options

Options for the GeoExplorer II mapping system include the following:

•   External Power Kit

•   External Antennas - Vehicle and Range Pole Mount

2.3.1   External Power Kit

The standard GeoExplorer II mapping system comes with AA
batteries. For longer battery life you may buy the External Power Kit.
This lets you power the GeoExplorer II receiver from a rechargeable
12V camcorder battery or from a vehicle. The kit includes:

- Battery eliminator

- Shoulder carrying pouch

- 12V camcorder battery and accessories

- Battery Charger

Note – For information on assembling the External Power Kit, see
External Power Kit, page 3-3.

Battery Eliminator

The battery eliminator replaces the battery pack that holds the AA
batteries in the GeoExplorer II receiver. The battery eliminator enables
the GeoExplorer II receiver to be connected to and powered by an
external 9 to 32-volt, 3-watt DC power supply, such as a vehicle
cigarette lighter or a rechargeable camcorder battery. The battery
eliminator contains a replaceable 3V lithium 2/3A battery with a life
of one year. This battery prevents memory loss when changing power
supplies. There are two small hooks on the bottom of the battery
eliminator to prevent the external DC power cord from slipping out of
the adapter pack.

Shoulder Carrying Pouch

All of the GeoExplorer II mapping system equipment fits inside the
shoulder carrying pouch.

12V Camcorder Battery and Accessories

The rechargeable 12V camcorder battery provides 7 to 9 hours of continuous GeoExplorer II receiver operation and can be fully recharged overnight. The camcorder battery is used with the battery eliminator in the GeoExplorer II receiver and the vehicle power adapter. The vehicle power adapter and battery clip cable attaches to the camcorder battery. A power splitter cable is provided to allow the GeoExplorer II receiver to receiver power from the battery charger.

2.3.2   External Antenna

Two optional external antennas are available for use with the GeoExplorer II receiver in situations where the internal antenna is unusable (for example, in a vehicle). One antenna has a vehicle mount and can placed on the top of a vehicle. The other has a range pole mount and can be attached to the top of a range pole. External antennas enable 3D data capture by increasing the GeoExplorer II receiver's ability to track at least four satellites.

External antennas plug directly into the back of the GeoExplorer II receiver. The internal antenna is eliminated from the circuitry when an external antenna is attached. For a complete description of external antennas see Using Optional External Antennas, page 5-22.

3 Basics of Operation

This chapter describes basic details you need to know about using your GeoExplorer II receiver. The topics covered in this chapter include:

- Power supplies

- Turning the GeoExplorer II on and off

- GeoExplorer II buttons

- GeoExplorer II Main menu

- GeoExplorer II memory

- GeoExplorer II firmware

3.1 Power Supplies

There are three alternatives for powering the GeoExplorer II receiver: an AA battery pack, an external rechargeable camcorder battery, and a vehicle power adapter. The AA battery pack comes with the standard GeoExplorer II mapping system. The external, rechargeable camcorder battery and the vehicle power adapter are part of the External Battery Kit which is sold separately.

🤚 **Caution –** When the battery gets too low to power the GeoExplorer II receiver, the display contrast fades and the GeoExplorer II receiver turns off.

🤚 **Caution –** The GeoExplorer II receiver does not have an internal battery to power RAM, other than the removable battery packs. To prevent memory loss, always keep an alkaline battery pack with fresh batteries or a DC adapter pack with a fresh Lithium battery installed in the receiver. A capacitor in the receiver protects memory for a few minutes when changing battery packs.

3.1.1   AA Battery Pack

The AA battery pack is a standard component of the GeoExplorer II receiver. The AA battery pack holds four AA batteries and provides over two hours of continuous operation with heavy-duty alkaline batteries. You can use high capacity rechargeable AA NiCad or nickel-hydride batteries. A set of four AA alkaline batteries is shipped with the GeoExplorer II receiver.

Replacing the Batteries

Do the following to replace the batteries in the AA battery pack:

1.   Remove the battery pack.

     Lift the small tab at the bottom of the GeoExplorer II receiver away from the battery pack and pull the battery pack out of the GeoExplorer II receiver.

2.   Remove the batteries from the battery pack.

     Dispose of the old batteries properly.

3. Install the new batteries in the battery pack.

    Match the + and – polarity as indicated in the picture on the battery holder.

4. Reinstall the battery pack into the GeoExplorer II receiver.

    Push the battery pack into the GeoExplorer II receiver until a slight click indicates that the battery retaining clip is engaged.

5. Reset the Battery Usage Timer.

    On the GeoExplorer II receiver, select *Configuration/ Battery Usage/ Reset Timer.*

Caution – Follow the polarity labels on the battery pack insert when installing new batteries. The GeoExplorer II receiver will not function properly and could be damaged if batteries are improperly installed.

3.1.2   External Power Kit

The standard GeoExplorer II mapping system comes with AA batteries, but if you need longer battery life you can purchase the External Power Kit. The External Power Kit allows you to power the receiver from a rechargeable 12V camcorder battery (for approximately 7 to 9 hours) or from a vehicle. It includes the following:

•   Battery eliminator

•   Vehicle power adapter - with fuses

•   Power splitter cable

•   Rechargeable 12V camcorder battery

•   Battery clip cable

•   Battery charger

•   Shoulder carrying pouch

> ✉ **Note –** The GeoExplorer II cables are designed so that cables cannot be plugged into the wrong receptacle. All of the connections should fit smoothly and easily. If a connection must be forced, examine the connectors closely to determine if they belong together.

Assembling the External Power Kit

With the External Power Kit, the GeoExplorer II receiver can be powered from the camcorder battery or from your vehicle. Do the following to assemble the External Power Kit:

1. Replace the battery pack that holds the AA batteries with the battery eliminator on the GeoExplorer II receiver.

    The battery eliminator enables the GeoExplorer II receiver to be connected to and powered by the 12V camcorder battery.

2. Connect the vehicle power adapter to the battery eliminator.

    As shown in Figure 3-1, the battery eliminator has two small hooks on the bottom to prevent the external vehicle power adapter from slipping out of the adapter pack.
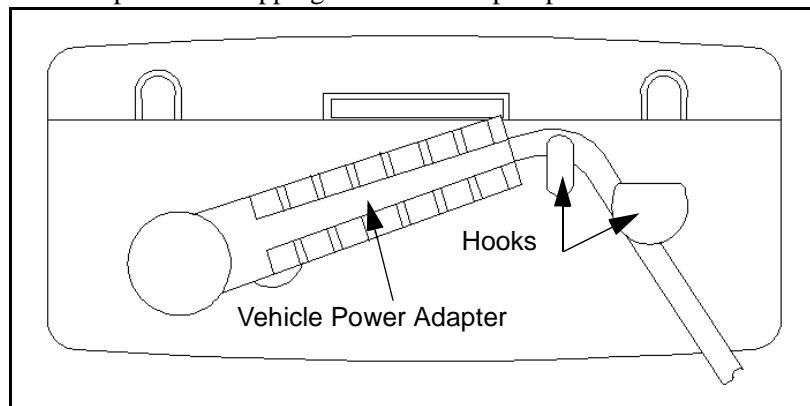
Figure 3-1   Battery Eliminator

3. Connect the vehicle power adapter to one of the following
    power sources:

    a. To power the GeoExplorer II receiver from your vehicle,
        plug the vehicle power adapter directly into the cigarette
        lighter.

    b. To power the GeoExplorer II receiver from the 12V
        camcorder battery, attach the battery clip to the top of the
        camcorder battery. Then attach the vehicle power adapter
        cord to the female end of the battery clip cable as shown in
        Figure 3-2.
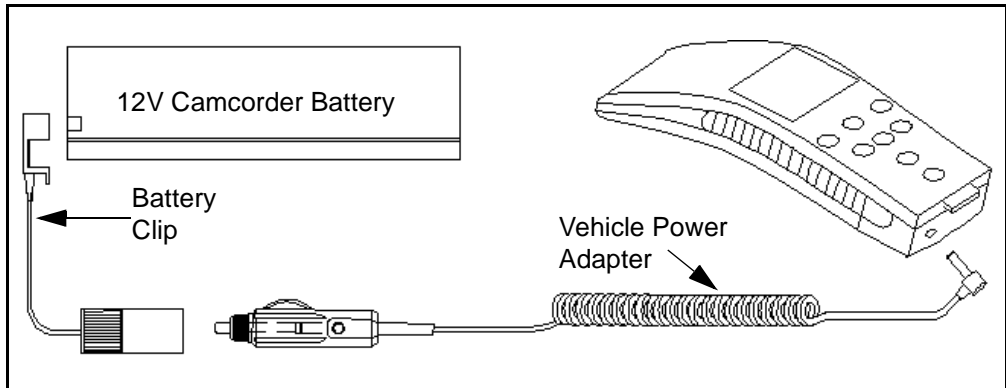
Figure 3-2   Camcorder Battery Connections

c.   To power the GeoExplorer II receiver using the battery
      charger unit, attach the vehicle power adapter cable to the
      power splitter cable. Attach the battery charger to the
      power splitter cable also and plug the battery charger into
      the wall, as shown in Figure 3-3.
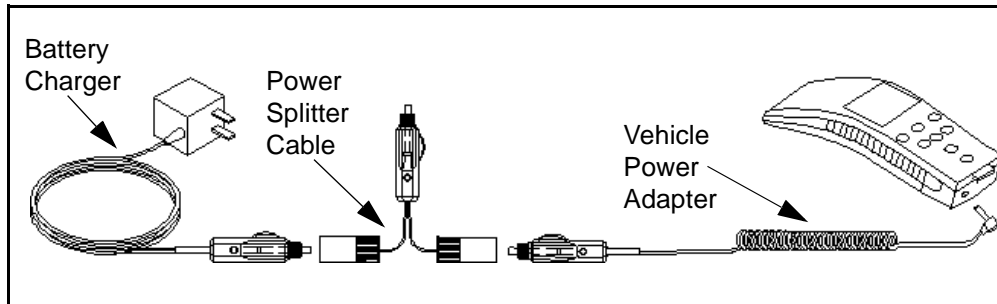
Figure 3-3   Battery Charger Connections

Recharging the 12V Camcorder Battery

The 12V camcorder battery provides 7 to 9 hours of continuous
operation and can be recharged overnight. The battery slowly
discharges when not in use and should be recharged after each use and
every two months when not in use. The battery can be left on trickle
charge with no damage.

To recharge the 12V camcorder battery do the following:

1.   Attach the battery clip cable to the battery charger.

2.   Plug the charger into the wall.

      Most outlets in the US use 120 volt AC outlets. Do not plug the
      120 volt charger into a 240 volt outlet. For 240 volt operation
      only use a battery charger rated for 240 volts.

3.   Let the battery charge until the fast charge LED is extinguished.

When the fast charge LED extinguishes, the battery is fully charged and ready for use. The battery charges to full capacity in about eight hours.

3.2   Turning the GeoExplorer II On and Off

This section explains how to turn the GeoExplorer II receiver on and off, how to reboot it, and how to adjust the backlight and screen contrast.

3.2.1   On

Turn the GeoExplorer II receiver on by pressing $\textbf{\textcircled{0}}$ (the On/Off button). A Trimble Navigation *Identification* screen appears for a few seconds while the GeoExplorer II receiver performs a short self-test. After a few seconds the *Main* menu displays.

If you are turning on the GeoExplorer for the first time, or after loading new firmware, or after clearing the memory, you will be asked to select which language you wish to use. You can change to a different language later on by using the language option in the *Configuration* menu.

3.2.2   Off

Turn the GeoExplorer II receiver off by holding down ⏻ (the On/Off button). The *Power Off* screen, Figure 3-4, appears.

```
 ─    POWER OFF    ─
     ( 5 seconds)
 ───────────────────
           A   ▦= 1.7hr
```

1. screen name
2. count down timer
3.
4. almanac indicator
   battery usage
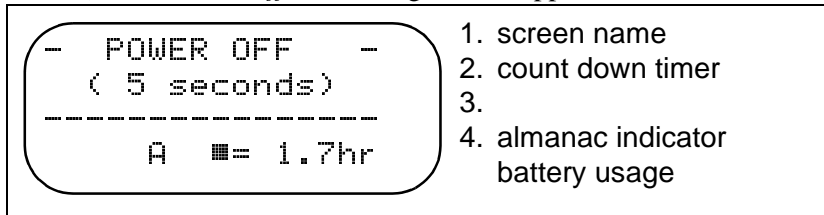
Figure 3-4   Power Off

Table 3-1 describes the *Power Off* screen items.

Table 3-1   Power Off Items

Item	Description
Countdown Timer	A 5 second countdown timer displays before power is turned off. During the countdown, you can resume operation by releasing ⏻. You can turn the GeoExplorer II receiver off while recording data to a file. The file resumes recording when the GeoExplorer II receiver is turned back on and starts tracking satellites.
Almanac Indicator	The letter indicates whether the GeoExplorer II receiver has received a complete almanac file. An uppercase *A* indicates that a complete almanac file was recorded. A lowercase *a* indicates that a complete almanac file was not recorded.
	The simplest way to get a current almanac file is to take your GeoExplorer II receiver outside and allow it to calculate positions. It automatically acquires a new almanac file in about 15 minutes. You do not need to instruct the GeoExplorer II receiver to record an almanac file.

Table 3-1   Power Off Items (Continued)

Item	Description
Battery Usage	Battery usage indicates the amount of time the battery has been used. Reset this timer each time you replace the batteries. For information on resetting the battery timer, see Battery Usage, page 12-82.

☆ **Tip –** You can turn the GeoExplorer II receiver off quickly by holding down ◉ and ①.

3.2.3   Rebooting the GeoExplorer II

If the GeoExplorer II receiver locks up and does not operate, reboot it by following the steps below:

1. Hold down ⏎.

2. While holding down ⏎, remove the battery pack or disconnect the power cord from the battery eliminator module.

3. Continue to hold ⏎ down and replace the battery pack or reconnect the power cord. After several seconds, the Trimble Navigation *Flash Loader* screen appears.

4. Release ⏎.

5. Remove the battery pack or power cord from the battery eliminator module again.

6. Replace the battery pack or reconnect the power cord to the battery eliminator module. The system automatically turns on and resets.

3.2.4   Viewing the Screen

The GeoExplorer II receiver displays information on a four-line LCD screen. The screen is easiest to read when viewed directly from the front.

Backlight

The screen on the GeoExplorer II receiver can be backlit to make viewing easier in dim lighting. The GeoExplorer II receiver backlight is normally off when the GeoExplorer II receiver is turned on. Once the GeoExplorer II receiver is turned on, the backlight can be toggled on and off by holding down ⊘ and ⏻.

Caution – Operating the backlight increases the battery drain and reduces battery life.

Screen Contrast

You can increase the screen contrast by holding down ⬆ and the ⏻ for several seconds. Decrease the screen contrast by holding down ⬇ and ⏻ for several seconds.

3.3   GeoExplorer II Buttons

Table 3-2 explains how the various buttons on the GeoExplorer II
receiver work.

Table 3-2   GeoExplorer II Buttons

Button	Description
$\blacktriangleleft$ or $\blacktriangleright$	Press $\blacktriangleleft$ or $\blacktriangleright$ to move the cursor from character to character within a field.
	Press $\blacktriangleleft$ or $\blacktriangleright$ to scroll through attribute values when entering new attributes.
$\blacktriangle$ or $\blacktriangledown$	Press $\blacktriangle$ or $\blacktriangledown$ to move the cursor through menus.
$\blacklozenge$	Press $\blacklozenge$ to select an item from a menu and to accept entered data.
$\leftarrow$	Press $\leftarrow$ to accept changes in the *Edit WPT* screen.
(Esc)	Press (Esc) to exit the current screen and return to the previous one.
	Press (Esc) multiple times to return the display to the *Main* menu.
	When entering data, press (Esc) to abandon any changes you have made.
⏻	Press the ⏻ button to turn the GeoExplorer II receiver on.
	Press the ⏻ button to turn the GeoExplorer II receiver off.

3.3.1   Selecting Options

The GeoExplorer II receiver is menu based. Menus allow you to select options from predefined lists. The *Main* menu is the first menu you access. There are a number of submenus under this. Menus also appear in configuration options, for example when you select a coordinate system and when entering feature and attribute information. To select an item from a menu, use �▲ or �▼ to highlight the item you want and press ◆ to select the menu item.

3.3.2   Entering Information

Some fields require you to enter a word or number. As the GeoExplorer II receiver does not have an alphanumeric keypad this is done by scrolling through the alphabet or through integers. The space character is just before the A. There are some fields for which the full range of characters are not available (for example, filenames). The full range of characters for English is:

```
ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefgh
ijklmnopqrstuvwxyz0123456789
!#$%&'()*+-./:;<=>?@_
```

If you are using a language other than English then the alphabet will include various accented or special characters.

When entering data into a field (for example, entering a name for a waypoint), use ⊲▲ or ⊲▼ to scroll through the available letters and numbers until you find the one that you want. Press ⊳ to move to the next character and, again, scroll through the available letters and numbers until you find the one you want. Repeat this process until you have changed all the characters.

3.4   GeoExplorer II Main Menu

The functions in the GeoExplorer II receiver are structured as a hierarchical menu. When you turn your GeoExplorer II receiver on for the first time, the *Main* menu displays. This is the highest level menu and there are seven submenus under it. The menu structure is illustrated on the following pages.

Data Capture _____ Open Rov. File _____ File Status
_____ Pause/Resume
_____ Close File
_____ Main Menu
_____ Select Feature _____ Close Feature
_____ Pause/Resume
_____ File Status
_____ Main Menu
_____ Nest Feature

_____ Open Base File _____ Main Menu
_____ Pause/Resume
_____ Close File

_____ Review File
_____ Delete File
_____ Rename File
_____ Dictionary _____ Review
_____ Delete

Position

GPS Status _____ Sat Tracking
_____ Sat Posn & SNR
_____ Sat Hlth & URA
_____ Sat Chnl Data

Navigation _____ Start Navigate
_____ To Waypoint
_____ From Waypoint
_____ Waypoint Setup _____ Add Here
_____ Edit WPT
_____ Delete WPT
_____ Clear All

_____ Display Format _____ Dist/Bearing
_____ Track & XTE
_____ East/North
Date & Time _____ Velocity/Time

Configuration_____ Rover Options_____ Feature Logging _____ Points
_____ Line/Area
_____ Min Posn

_____ Not in Feature

_____ High Accuracy _____ Recording
_____ Log Rate
_____ Min Time
_____ PtFeats

Figure 3-5   GeoExplorer II Menu Structure

```
                                    ____ Dynamics
                                    ____ Pos Mode
                                    ____ 2D Alt
                                    ____ Elev Mask
                                    ____ SNR Mask
                                    ____ PDOP Mask
                                    ____ PDOP Switch
                                    ____ Antenna Ht
                                    ____ Log DOPs
                                    ____ Velocity
                                    ____ File Prefix

        _____ Base Options_____ Logging Rates _____ Positions
                                                    |____ Raw Msmts

                                    ____ High Accuracy _____ Recording
                                                          |____ Log Rate

                                    ____ Dynamics
                                    ____ Pos Mode
                                    ____ 2D Alt
                                    ____ Elev Mask
                                    ____ SNR Mask
                                    ____ PDOP Mask
                                    ____ PDOP Switch
                                    ____ Antenna Ht
                                    ____ Log DOPs
                                    ____ Fix Prefix
                                    ____ Reference Pos
        _____ Coordinates
        _____ Datum
        _____ Units _____ Metric Units
                                    ____ English Units
                                    ____ Custom Setup _____ Distance Units
                                                          |____ Angular Units
                                                          |____ Velocity Units
                                                          |____ Altitude Units
                                                          |____ Alt Reference
                                                          |____ North Reference

        _____ Date & Time_____ Date Format
                                    ____ Set Local Time
                                    ____ Time Display

        _____ Communications_____ Port A _____ Protocol
                                                          |____ Baud
                                                          |____ Parity
                                                          |____ Data Bits
                                                          |____ Stop Bits
                                                          |____ Precision
                                                          |____ Send At
```

Figure 3-5   GeoExplorer II Menu Structure (Continued)

Figure 3-5   GeoExplorer II Menu Structure (Continued)

Table 3-3 is a list of the *Main* menu options.

Table 3-3   GeoExplorer II Main Menu Options

Option	Description
Data Capture	The items under *Data Capture* allow you to open a rover or base file and record data. You can also review files, delete files, review and delete the data dictionary.
Position	The *Position* option displays the current position; latitude, longitude and altitude. You can check whether positions are currently being computed or if the position displayed is old.
GPS Status	The items under *GPS Status* allow you to check which satellites are being tracked, where the satellites are and what their signal strengths are. You can also get an indication of the accuracy of the positions being calculated.
Navigation	The items under *Navigation* allow you to store waypoints, select which points you want to navigate to and from, choose which format of navigation screen you require and view the screen as you navigate.
Date & Time	The *Date & Time* option displays the current date and time.
Configuration	The items under *Configuration* allow you to set the parameters that control data collection, display and data transfer.
Data Transfer	The *Data Transfer* option lets you transfer files between the GeoExplorer II receiver and the PC.

3.5   GeoExplorer II Memory

There is a limited amount of memory available in the GeoExplorer II receiver. To make sure you have plenty of memory available for data collection, you should download your data to a PC and clear files from your GeoExplorer II receiver every day. This also provides a safe back up of your data even if you do not process it immediately.

Whenever a file is open, you can check the amount of free memory available on the *File Status* screen (192 KB with no recorded files). The free memory available for storing files equals total memory minus 64 KB, minus any existing files. While recording a file, the *File Status* screen shows the free memory decreasing as the file size grows.

Table 3-4 displays the approximate duration of files that can be recorded in 192 KB of free memory, with normal settings and an average number of satellites in the sky.

Table 3-4   GeoExplorer II File Duration

File Type	Settings	Approximate Duration of File
Rover	Position logging rate = 1 sec Velocity logging rate = Off	3 hours
Rover	Position logging rate 5 sec Velocity logging rate = Off	15 hours
Rover	Position logging rate = 1 sec Velocity logging rate = All	1.5 hours
High Accuracy Rover	Logging rate = 15 sec Minimum time = 10 min	4 hours
Base	Position logging rate = Off Raw Msmts logging rate = 10 sec	3 hours
Base	Position logging rate = 10 sec Raw Msmts logging rate = 10 sec	2.5 hours

Selecting a slower recording rate increases the recording time. For example, a rover file recording position and velocity at a 5-second rate allows roughly 7.5 hours of data recording time. How much memory is consumed in an hour depends also on satellite geometry, the number of satellites that rise or set in that hour, and the number of constellation switches forced by obstructions (trees, bridges, buildings, and so on).

3.6   GeoExplorer II Firmware

The GeoExplorer II version 2.11 firmware is contained on a floppy disk labeled *GeoExplorer II Firmware v2.11*. This disk also includes a program that automates the process of upgrading your GeoExplorer II firmware to version 2.11.

Note – Most of this information only applies if you are upgrading the GeoExplorer II firmware to version 2.11. For any other firmware modifications, including upgrades to future versions, set up your equipment as described in the following paragraphs, then move to the subdirectory where the firmware files are located. At the DOS prompt, type **flash** and the filename and extension of the .cfg file on the disk. Follow the instructions that appear on the screen.

To upgrade the GeoExplorer II firmware to version 2.11, the following equipment is required:

- An IBM-compatible PC with at least one serial RS-232 port and one high density (1.44 MB) 3.5 inch disk drive.

- A 9-pin to 25-pin converter if your PC has a 25 pin serial port connector on its COM1 port.

- The disk that contains the new GeoExplorer II firmware.

- The data download cable, P/N 30153.

Caution – You must have all of the equipment listed before starting to upgrade the firmware. *Do not attempt to substitute other equipment.* Using the recommended equipment and following the instructions provided in this section, allows you to quickly and reliably upgrade your GeoExplorer II receiver's firmware. If you use inappropriate equipment or fail to follow the upgrade instructions, you will probably be unable to upgrade the firmware. In addition, you may erase the current firmware in your GeoExplorer II receiver without replacing it. If this occurs, you should return your GeoExplorer II receiver to Trimble for servicing.

To perform the firmware upgrade:

1. Connect your GeoExplorer II receiver to your PC using the data download cable.

2. Place the GeoExplorer II receiver firmware disk in either the A or B drive of your PC.

3. From the hard drive DOS prompt, type `A:INSTALL` if you have placed the disk in your A drive, or `b:install` if you have placed the disk in your B drive. Press ⌷Enter⌷.

4. Invoke the Flash Loader facility on the GeoExplorer II receiver. To do this:

   a. Make sure that the GeoExplorer II receiver is turned off.

   b. Hold down ⏎.

   c. While holding down ⏎, turn the GeoExplorer II on. When the *Flash Loader* screen appears on the GeoExplorer II, release ⏎.

5. Follow the instructions that appear on the PC screen.

   This installs the firmware files onto your PC hard drive. Then the message shown in Figure 3-6 appears.

```
Installation Complete!

 ==================================================================
 | Note:                                                          |
 |   *An update requires approximately 13 minutes, please         |
 |    be sure to use power adapter or new batteries.              |
 |                                                                |
 |   *The flash loader will wipe out almanac file, data           |
 |      files (if any), and configurations in the Geo unit.       |
 ==================================================================

Do you want to update your Geo firmware? (Y/N)
```

Figure 3-6   Firmware Upgrade Message 1

6.   Press Ⓨ and Figure 3-7 appears.

```
Please check the following:
              - The power to the Geo is on.
              - The Geo is connected to the PC.
              - The Geo is in the Flash Loader mode.

 ==================================================================
 | Putting the GeoExplorer into the Flash Loader Mode:            |
 |       -On the Geo, press and hold the upper right              |
 |        button while pressing the bottom (power) button.        |
 |                                                                |
 |       -Hold these two buttons until the "Flash Loader"         |
 |        screen appears. It requires having to hold these        |
 |        two buttons down for a few seconds before the           |
 |        "Flash Loader" can come up.                             |
 ==================================================================

Press <Enter> to continue, or ESC to Quit!
```

Figure 3-7   Firmware Upgrade Message 2

7. Complete the checks listed in Figure 3-7 and then press ⌊Enter⌋.
    Figure 3-8 displays.

```
PC COM port: - - PC's Serial communication port which connected
                 to a Geo receiver

Please enter the PC COM port to use (1 or 2). <Enter> is [COM1]:
```

Figure 3-8   Firmware Upgrade Message 3

8. If your GeoExplorer II is connected to your PC's COM 1 port,
    press ⌊Enter⌋. Otherwise, press ②. Figure 3-9 appears.

```
+- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - +
| GeoExplorer FLASH Loader V2.01 Copyright (c) 1994 - 1995     |
| Trimble Navigation, Ltd.                                     |
|                                                              |
| This program updates new firmware of GeoExplorer receiver.   |
+- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - +

+- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - +
| WARNING: Do not press ESC, Control-C, Control-Break, or      |
| disconnect data or power to the computer or the receiver     |
| at any time during this update. If you perform any of        |
| these actions, you might damage the Geo and may have to      |
| send it back to Trimble for service!                         |
+- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - +

  +- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - +
  |  An update requires approximately 12 minutes, please      |
  |  be sure to use power adapter or new batteries.           |
  +- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - +

Press <Enter> to update, or ESC to quit.
```

Figure 3-9   Firmware Upgrade Message 4

9.   To upgrade your GeoExplorer II firmware from the files
     installed on your PC, press Enter.

     When the PC has established connection to the GeoExplorer II,
     it starts the firmware upgrade. The upgrade progress is
     illustrated, and regularly updated, in screens similar to Figure 3-
     10.

```
          Serial Number: 000000000000100027W9

0%                            50%                          100%
 |            |               |              |              |
 |            |               |              |              |
+- - - - - - - - - - - - - - - - - - - - - - - - - - - - - +
 |                                                         |
 |---------------------------------------------------------+
+- - - - - - - - - - - - - - - - - - - - - - - - - - - - - +
Updated Completion: 0.84%
```
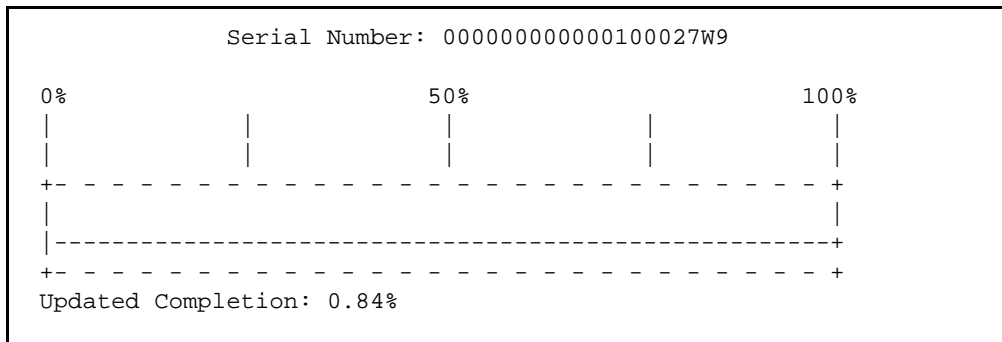
Figure 3-10   Firmware Upgrade Progress

A completion message appears when the firmware upgrade has
finished.

4 Before Leaving the Office

This chapter explains what you should do before you take the GeoExplorer II receiver out in the field. The topics covered in this chapter include:

- Planning

- Creating a data dictionary

- Checking the critical parameters

- Checking the noncritical parameters

- Setting up waypoints

- Starting the base station

- Assembling your equipment

4.1 Planning

The Quick Plan software is a component of the Pathfinder Office software package. It allows you to plan the best time to collect GPS data based on where the satellites will be. Careful planning helps make sure the GPS data you collect is accurate.

The things you need to be concerned about when planning your data collection are the number of satellites you can see, where the satellites are when you are collecting data and the PDOP (Position Dilution of Precision). The more satellites that are visible, the better. PDOP provides an indication of the expected accuracy of your GPS positions based on the relative positions of the satellites. Lower PDOP values provide more accurate data.

Now that there is 24 hour/day satellite coverage, it is not often that there are too few satellites or PDOP is too high to collect data. You should still plan your data collection carefully to avoid frustration and to achieve good accuracy.

Planning can be done in the Quick Plan software. Refer to the *Quick Plan Software User Guide* for instructions on how to use the planning option. You may find it useful to print your planning reports and graphs and take them into the field.

4.2   Creating a Data Dictionary

If you are planning to record feature and attribute information in the GeoExplorer II receiver you need to use the Data Dictionary Editor in the Pathfinder Office software to create a data dictionary. If you are collecting positions only, you do not need to create a data dictionary.

A data dictionary lets you define the features and attributes you want to collect. It is like designing a form that you take into the field. An example is a data dictionary for trees where the attributes are species, age and height. A data dictionary is created on the PC and then downloaded to the GeoExplorer II receiver. When you are in the field you are prompted to enter data for the features and attributes you described.

Data dictionaries are infinitely variable and you can design one to suit your particular data collection requirements. Refer to the *Data Dictionary Editor Software User Guide* for more information on designing and creating data dictionaries.

4.2.1   **Transferring a Data Dictionary**

Once you create a data dictionary you need to transfer it to the GeoExplorer II receiver. Do the following:

1. Plug the small circular end of the data download cable (P/N 30153) into the back of the GeoExplorer II receiver.

2. Plug the other end of the data download cable into the selected port on the PC.

3. On the GeoExplorer II receiver select *Configuration/Communication /Port A*.

4. From this screen set up the communications parameters for Port A. The following settings are recommended:

    ProtocolXMODEM
    Baud rate9600
    ParityNone
    Data bits8
    Stop bits1

5. Select *Data Transfer* on the GeoExplorer II receiver *Main* menu.

6. In Pathfinder Office, select *Data Transfer* under the *Utilities* menu.

7. If communication fails, specify the PC communication port to which you connected your GeoExplorer II receiver and press Connect.

8. When the status shows "Connected to GeoExplorer", select Data Dictionary in the *Data Type* field. If the source directory is incorrect then press the Source Directory button to change it.

9. All the data dictionaries available are displayed. Select the desired data dictionary by clicking on the name and pressing Add.

10. Click on Transfer to automatically transfer the data dictionary to the GeoExplorer II receiver.

A progress bar displays as the data dictionary is transferred.

Once you transfer the data dictionary, you can review it on the GeoExplorer II receiver. For more information on reviewing a data dictionary, see Review, page 7-28.

Note – You can only store one data dictionary on the GeoExplorer II receiver at a time. If you want to transfer a new data dictionary, you must delete the current one first. For more information on deleting a data dictionary, see Delete, page 7-28.

4.3   Setting Up Waypoints

A waypoint is a single position that can be stored by saving a GPS position on the GeoExplorer II receiver or by entering the position manually. You can store up to 99 waypoints. A waypoint has a waypoint number, name, latitude, longitude and altitude.

If you need to navigate to a number of locations, you can define them as waypoints before you leave. You can:

• manually enter the waypoints into the GeoExplorer II receiver

• create the waypoints and save them in a waypoint file using the Pathfinder Office software, then transfer the file to the GeoExplorer II receiver

4.3.1 Entering Waypoints Into the GeoExplorer II

When you are entering waypoints the coordinate system, datum, and altitude reference selected in the GeoExplorer II receiver must be the same as those used to calculate the coordinates you are entering. If you are reading the coordinates from a map, the map's datum, coordinate system, and altitude reference are usually shown in the map legend or title block. For instructions on changing the coordinate system, see Coordinates, page 12-47. For instructions on changing the datum, see Datum, page 12-49. For instructions on changing the altitude reference see Custom Setup, page 12-52.

Select *Navigation/ Waypoint Setup/ Edit WPT* to create new waypoints and edit old ones, a screen similar to Figure 4-1 appears.

```
┌─    Edit WPT    ─┐       1. screen name
│ W08 HOME          │       2. wpt number, name
│  N   37°23'35.35" │       3. coordinate
│  W 122°02'15.02"  │       4. coordinate
└───────────────────┘
```
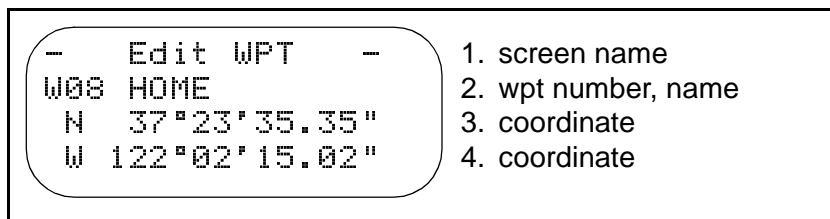
Figure 4-1   Navigation/ Waypoint Setup/ Edit WPT

You can enter the name and coordinates of a new waypoint in an empty waypoint. If you have a new GeoExplorer II receiver all the waypoints are empty.

To create a new waypoint do the following:

1. Find an empty waypoint.

    Use ⒶUse ▲ or ▼ to scroll until you find the waypoint you want to change and press ◆. A screen similar to Figure 4-2 appears.

```
W04
Lat 0°00'00.00N
Lon 0°00'00.00E
Alt   +0.0m M
```
1. wpt number, name
2. coordinate
3. coordinate
4. altitude, altitude
   reference
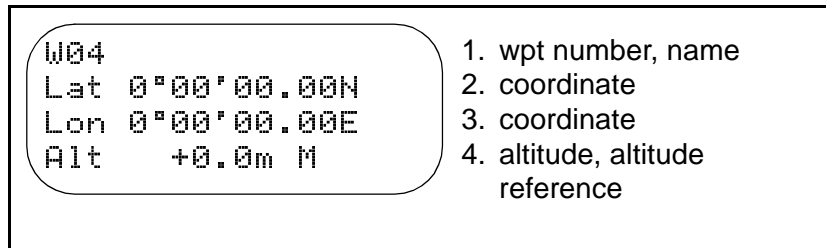
Figure 4-2   Navigation/ Waypoint Setup/ Edit WPT/ WPT

2. Enter a name for the waypoint.

    Press ↵ to move the cursor to the first character of the waypoint name. Use ▲ or ▼ to scroll through the list of characters until you reach the one you want. Press ▶ to move to the next character and repeat this process until you have the waypoint name you want. Press ↵ to accept the waypoint name.

3. Enter the waypoint coordinates.

    Press ↵ to move the cursor to the first digit of the waypoint coordinate. Use ▲ or ▼ to scroll through the list of digits until you reach the one you want. Press ▶ to move to the next digit and repeat this process until you have the coordinate you want. Make sure you set the correct hemisphere. Press ↵ to accept the waypoint coordinates.

4. Repeat this for both coordinates and the altitude.

    You can scroll the altitude units from meters to feet. The altitude reference displays in the bottom line at the right corner.

    If the position coordinates are inappropriate they are rejected.

5.   When you finish entering the waypoint data press ◈, Figure 4-3 appears.

```
 ╭────────────────────╮        1. screen name
 │ Save                │        2. wpt number
 │ W21?                │        3. option
 │ Yes                 │        4. option
 │ No                  │
 ╰────────────────────╯
```
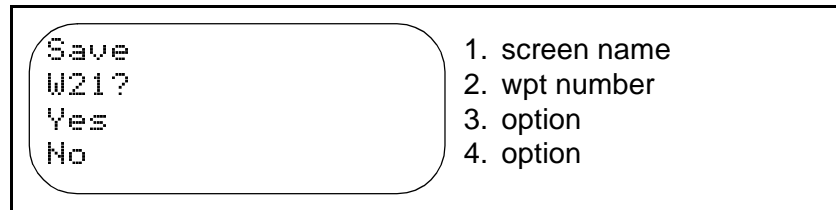
Figure 4-3   Navigation/ Waypoint Setup/ Edit WPT/ Save

Select *Yes* to save the waypoint edits and exit the screen. Select *No* to abandon the edits.

4.3.2   Creating Waypoints in the Pathfinder Office Software

If you need to key in more than a few waypoints, it is much easier and more reliable to create them in the Pathfinder Office software. You can key them in using a PC keyboard, click on a location or a feature on the Map window, or import them as ASCII coordinates.

4.3.3   Transferring Waypoints

You can transfer waypoints to the GeoExplorer II receiver from a waypoint file, using Pathfinder Office on the office PC. This overwrites existing waypoints. You can only send waypoints from one file at a time. Do the following:

1.   Connect the GeoExplorer II to the PC and prepare both for data transfer as described in Transferring a Data Dictionary, page 4-3. When the status field shows "Connected to GeoExplorer", data transfer can begin.

2.   Select Waypoint in the *Data Type* field, and Send in the *Direction* field. If the source directory is incorrect then press the Source Directory button to change it.

3. All the waypoint files available are displayed. Select the desired waypoint file by clicking on the name and pressing Add.

4. Click on the Transfer button to transfer the waypoint file to the GeoExplorer II receiver.

5. If you want to transfer all the waypoints in the selected file, select All.

6. If you want to transfer only selected waypoints, select Range and enter the start and end waypoint numbers in the Start and End fields.

7. Press OK to transfer the waypoints.

   When the transfer is complete, a message appears indicating how many waypoints were transferred.

4.4   Checking the Critical Parameters

The configuration parameters on the GeoExplorer II receiver must be set correctly before you can record accurate data. This section describes the critical parameters that affect data collection. If they are not set correctly, the GeoExplorer II receiver may not compute positions or it might record data that cannot be differentially corrected. Check these parameters each time you use the GeoExplorer II receiver.

The following ten parameters are critical for recording accurate GPS data:

- Feature Logging Rate, Points

- Feature Logging Rate, Line/Area

- Feature Logging Rate, Min Posn

- Not in Feature Rate

- Position Mode

- 2D Altitude

- Elevation Mask

- SNR Mask

- PDOP Mask

- PDOP Switch

Note – The critical parameters for collecting High Accuracy data are not discussed here. For this information refer to the *Phase Processor Software User Guide*.

When the GeoExplorer II receiver is shipped, the parameters are set to their recommended default values. While you are learning about GPS and the GeoExplorer II receiver leave the parameters at their default settings. As you get more experience you can change them to suit your location and application.

You can return the parameters to their default settings using the *Fact. Defaults* option. On the GeoExplorer II receiver, select *Configuration/ Fact. Defaults* to set all the parameters to their default values. Using the default values almost always result in good data, except in unusual circumstances.

Note – The GeoExplorer II receiver does not automatically revert to default settings when it is shut off. Check these parameters each data collection session or when you are having trouble computing positions.

All of the critical parameters are set from the *Configuration/ Rover Options* screen. Each critical parameter is explained below. If you need to change these, instructions are given in Chapter 12, Configuration.

4.4.1   Feature Logging, Points

Points lets you determine how often positions are stored when recording point features. The default setting is to record GPS positions at a one second interval. For information on changing this parameter, see Feature Logging, page 12-3.

4.4.2   Feature Logging, Line/Area

Line/Area lets you determine how often positions are stored when recording line or area features. The default setting is to record GPS positions at a five second interval. For information on changing this parameter, see Feature Logging, page 12-3.

4.4.3   Feature Logging, Min Posn

Min Posn lets you set the minimum number of positions you want to collect for a point feature. Set this option in conjunction with the point logging rate. When collecting data, you can save a feature before the minimum number of positions are collected, but a warning message displays indicating that it is not complete. The recommended value is 120. For information on changing this parameter, see Feature Logging, page 12-3.

4.4.4   Not in Feature Rate

Not in Feature Rate lets you determine how often positions are stored when you are not recording features. (For example, when you do not have a data dictionary or you are moving between features.) The default setting is to record all GPS positions that the GeoExplorer II calculates. For information on changing this parameter, see Not In Feature Rate, page 12-7.

4.4.5   Position Mode

Pos Mode lets you choose a position fix mode. You can choose to collect two dimensional positions (latitude and longitude), or three dimensional positions (latitude, longitude and altitude). The option you choose affects the number of satellites you need to calculate a position. Manual 3D is the default setting. For information on changing this parameter, see Pos Mode, page 12-36.

4.4.6   2D Altitude

2D Alt allows you to enter an altitude value to be used when the GeoExplorer II receiver is using a two-dimensional position mode (Auto 2D/3D or Manual 2D). For information on changing this parameter, see 2D Alt, page 12-38.

4.4.7   Elevation Mask

Elev Mask allows you to specify the minimum elevation above the horizon that a satellite must reach before the GeoExplorer II receiver uses it for position calculations. The default and recommended Elevation Mask for a rover file is 15°. If you change the Elevation Mask, make sure that the rover mask is always at least 1° higher than the base mask for every 100 km (60 miles) between the rover and base. For information on changing this parameter, see Elev Mask, page 12-20.

4.4.8   SNR Mask

SNR Mask allows you to specify the minimum strength that a satellite signal must have before the GeoExplorer II receiver uses it to calculate positions. When a satellite's signal strength drops below the SNR Mask, the GeoExplorer II receiver stops using it to compute positions, although the GeoExplorer II receiver continues to track it. Weaker (lower) signals are ignored because weak signals produce noisy positions. Stronger (higher) signals produce cleaner positions.

The default and recommended SNR Mask setting is 5. However, signals as low as 2 can be used for navigation purposes, especially under tree canopies. This can decrease accuracy. For information on changing this parameter, see SNR Mask, page 12-21.

4.4.9   PDOP Mask

PDOP Mask allows you to set a maximum PDOP (Position Dilution Of Precision) value. When the PDOP goes over this value the GeoExplorer II receiver stops calculating positions. PDOP is an indication of the accuracy of the GPS positions calculated by the GeoExplorer II receiver in the field. It takes into account each satellite's location relative to the other satellites (the satellite geometry).

A constellation with a PDOP of 4 or below is likely to yield highly accurate positions. A PDOP between 5 and 8 is acceptable. A PDOP of 8 or more is poor. The default and recommended PDOP Mask is 6. When the PDOP rises above the mask, the message *High PDOP* is displayed on the *GPS Status/ Sat Tracking* screen and positions are not calculated. For information on changing this parameter, see PDOP Mask, page 12-22.

4.4.10   PDOP Switch

PDOP Switch allows you set a PDOP (Position Dilution of Precision) value that causes the GeoExplorer II receiver to switch between 2D and 3D mode when the *Pos Mode* is set to Auto 2D/3D. The default and recommended setting for the PDOP Switch is 6. For information on changing this parameter, see PDOP Switch, page 12-24.

4.5   Checking the Noncritical Parameters

The configuration parameters in the GeoExplorer II receiver must be set correctly before you can record accurate data. This section describes the noncritical parameters that affect display and data collection. While these are important, they are not critical for collecting accurate GPS data. Once the parameters are set correctly they usually do not need to be changed. It is still good practice to check these before each data collection session.

The noncritical parameters are:

- Antenna Height
- Log DOPs
- Velocity
- File Prefix
- Coordinates
- Datum
- Units
- Date & Time
- Sat Health
- WPT Averaging

When the GeoExplorer II receiver is shipped, the parameters are set to their recommended default values. While you are learning about GPS and the GeoExplorer II receiver leave the parameters at their default settings. As you get more experience you can change them to suit your location and application.

You can return the parameters to their default settings using the *Fact. Defaults* option. On the GeoExplorer II receiver, select *Configuration/ Fact. Defaults* to set all the parameters to their default values. Using the default values almost always results in good data, except in unusual circumstances.

Note – The GeoExplorer II receiver does not automatically revert to default settings when it is shut off. Check these parameters before each data collection session or when you are having trouble computing positions.

All of the noncritical parameters are set from the *Configuration* or *Configuration/ Rover Option* screen. Each noncritical parameter is explained below. If you need to change these, instructions are given in Chapter 12, Configuration.

4.5.1   Antenna Ht

Antenna Ht lets you specify the height of the GPS antenna above the features you are surveying. The antenna is inside the GeoExplorer II receiver under the raised sextant. When recording non-High Accuracy data, set this value to the approximate height you hold the unit. When recording High Accuracy data, the antenna height must be set to within 10 centimeters of the height of the antenna above the feature you are surveying. The default setting is 1 meter. For information on changing this parameter, see Antenna Ht, page 12-25.

4.5.2   Log DOPs

Log DOPs lets you choose whether or not you want DOP
measurements recorded in the rover file. Recording DOP
measurements can be useful for troubleshooting data sets if you are
having problems. The default setting is off, to not record DOP data in
the rover file. For information on changing this parameter, see Log
DOPs, page 12-26.

4.5.3   Velocity

Velocity lets you select whether or not you want velocity
measurements recorded in your data file. The default setting is off, to
not store velocity measurements when recording. For information on
changing this parameter, see Velocity, page 12-27.

4.5.4   File Prefix

File Prefix allows you to specify a single letter to identify the rover
files you record. When you change the prefix character to a different
letter or number, all consequent rover files generated on the
GeoExplorer II receiver start with that character. The remainder of the
filename is generated from the date and time it was created. The
default setting is R. For information on changing this parameter, see
File Prefix, page 12-29.

4.5.5   Coordinates

Coordinates allows you to choose the coordinate system you want. Before entering coordinates (a waypoint, for example) make sure that the display coordinate system is the same one used to calculate the coordinates. When navigating with a map, change the coordinate system so the GeoExplorer II receiver displays positions in the same coordinates used to draw the map. The map's coordinate system is usually shown in the map legend or title block. For information on changing this parameter, see Coordinates, page 12-47.

4.5.6   Datum

Datum allows you to choose the datum you want. A datum is a reference earth model used for mapping. You can enter and view positions in over 70 datums. See Appendix B, Datums for a list of datums in the GeoExplorer II receiver. Regardless of the datum chosen here, the GeoExplorer II receiver always computes and stores positions in the WGS-84 datum. Positions collected using one datum can be converted to another datum on the PC using the Pathfinder Office software.

Before entering coordinates (a waypoint, for example) make sure that the display datum is the same one used to calculate the coordinates. When navigating with a map, change the datum so the GeoExplorer II receiver displays positions in the same datum used to draw the map. The map's datum is usually shown in the map legend or title block. For information on changing this parameter, see Datum, page 12-49.

Note – When the coordinate system is Ordnance Survey of Great Britain (OSGB), the Great Britain datum of 1936 is automatically used.

4.5.7   Units

Units affect the way that data is displayed or entered manually. Table 4-1 describes the *Units* screen options

Table 4-1   Units Options

Option	Description	Unit	Settings
Metric Units	Selecting this option sets up the GeoExplorer II receiver to display data in the following metric units. This is the default setting.	Distance	Kilometers
		Angular	Degrees
		Velocity	Kilometers/ Hour
		Altitude	Meters
		Alt Reference	HAE
		North Reference	Magnetic
English Units	Selecting this option sets up the GeoExplorer II receiver to display data in the following English units.	Distance	Miles
		Angular	Degrees
		Velocity	Miles/Hour
		Altitude	Feet
		Alt Reference	HAE
		North Reference	Magnetic
Custom Setup	Selecting this option allows you to view and change the selected units.		

For information on changing the units, see Units, page 12-50.

4.5.8   Date & Time

Date & Time allows you to set the current time, the current date and to change the way these display in the GeoExplorer II receiver. Table 4-2 describes the *Date & Time* options.

Table 4-2   Date & Time Options

Option	Description
Date Format	Date Format allows you to select how you want the date displayed. The default setting is MM/DD/YY.
Set Local Time	Set Local Time allows you to set your current local time by specifying your offset to UTC (Universal Time Coordinated).
Time Display	Time Display allows you to select whether you want time displayed in UTC or local time in 12 or 24 hour format. The default setting is UTC.

For information on changing this parameter, see Date & Time, page 12-58.

4.5.9   Sat Health

Sat Health lets you enable and disable satellites and override health messages. This parameter is for advanced users only. The default is to enable all satellites and to follow the intent of all health messages. Use extreme caution when changing these options. For information on changing this parameter, see Sat Health, page 12-77.

4.5.10   WPT Averaging

WPT Averaging allows you to record more accurate waypoints by
calculating the average of several GPS positions rather than recording
a single position as the waypoint. Table 4-3 describes the WPT
Averaging options.

Table 4-3   WPT Averaging Options

Option	Description
Averaging	When waypoint averaging is on, multiple GPS positions are averaged into a single waypoint when you use *Add Here* to create a waypoint. When waypoint averaging is off, a single GPS position is recorded when you use *Add Here* to create a waypoint.
# of Psns	# of Psns lets you set the number of GPS positions that should be averaged to create the waypoint when using *Add Here*. When you use *Add Here*, a message displays when enough positions are averaged.

For information on changing this parameter, see WPT Averaging,
page 12-82.

4.6   Setting Up a Base Station

If you plan to differentially correct your data, either real-time or postprocessed, you need to set up a base station. Data from a GeoExplorer II receiver can be differentially corrected with base files from a Trimble 4000 Series receiver, a GPS Pathfinder Community Base Station, a Trimble Universal Reference Station, or any GPS Pathfinder receiver (including another GeoExplorer II receiver) operating in Base mode. Other manufacturers' base stations can be used, provided the correction files are in the RINEX format. For detailed information about setting up and running a base station, refer to the documentation that came with your base station receiver and software.

We highly recommend you carefully plan for both your roving unit and base station. You must make sure your base station records positions, (and transmits them if you intend to do real-time differential correction), at the same time your roving unit(s) collects data. It is also important that they track the same satellites.

Check that the Elevation Masks are set correctly on the base and the rover. The recommended Elevation Mask for a rover file is 15°. The recommended Elevation Mask for a base file is 10°. You can use different Elevation Mask values but make sure that the rover mask is at least 1° higher than the base mask for every 100 km (60 miles) between the rover and base.

The further your rover is from your base, the greater the chance that it will track a satellite that the base station cannot see. Remember to think about any potential obstructions (for example, a hill, or building) that can block a satellite signal to the base.

4.6.1   Using the GeoExplorer II as a Base Station

A GeoExplorer II receiver can be used as a temporary base station in situations where a more permanent base station is impossible or impractical to set up. The amount of base data you can record on a GeoExplorer II receiver is limited. For example, when the Position and Raw Measurement Logging Rates are set to 10 seconds, a GeoExplorer II receiver records approximately 2.5 hours of data.

Although a GeoExplorer II receiver operating as a rover can receive real-time corrections, when operating as a base station it cannot transmit real-time corrections. Therefore, to use the GeoExplorer II receiver as a base station, you need to differentially correct your data using the Pathfinder Office software.

If you are going to use the GeoExplorer II receiver as a base station, you must check the following parameters:

- Logging Rate, Positions
- Logging Rate, Raw Msmts
- Position Mode
- 2D Altitude
- Elevation Mask
- SNR Mask
- PDOP Mask
- PDOP Switch
- Antenna height
- Log DOPs
- File Prefix
- Reference Position
- Sat Health

Note – The parameters for collecting High Accuracy base files are not discussed here. For this information refer to the *Phase Processor Software User Guide*.

When the GeoExplorer II receiver is shipped, the parameters are set to their recommended default values. While you are learning about GPS and the GeoExplorer II receiver leave the parameters at their default settings. As you get more experience you can change them to suit your location and application.

You can return the parameters to their default settings using the *Fact. Defaults* option. On the GeoExplorer II receiver, select *Configuration/ Fact. Defaults* to set all the parameters to their default values. Using the default values almost always results in good data, except in unusual circumstances.

Note – The GeoExplorer II receiver does not automatically revert to default settings when it is shut off. Always check these parameters when you turn the GeoExplorer II receiver on or when you are experiencing trouble computing positions.

All of the parameters are set from the *Configuration* or *Configuration/ Base Option* screen. Each parameter is explained below. If you need to change these, instructions are given in Chapter 12, Configuration.

Logging Rates, Positions

Positions determines how often positions are stored in a base file. The default and recommended setting is 15 seconds. For information on changing this parameter, see Logging Rates, page 12-31.

Logging Rates, Raw Msmts

Raw Msmts determines how often measurement data is recorded in a base file. Measurement data is only recorded in a base file. Rover files do not record measurement data. Measurement data contains information about the satellite's location and path that is needed for differential correction. The default and recommended setting is 15 seconds. For information on changing this parameter, see Logging Rates, page 12-31.

Position Mode

Pos Mode lets you choose a position fix mode. You can choose to collect two dimensional positions (latitude and longitude), or three dimensional positions (latitude, longitude and altitude), or both. The option you choose affects the number of satellites you need to calculate a position. Manual 3D is the default and recommended setting. For information on changing this parameter, see Dynamics, page 12-35.

2D Altitude

2D Alt allows you to enter an altitude value for when the GeoExplorer II receiver is using a two-dimensional position mode (Auto 2D/3D or Manual 2D). For information on changing this parameter, see 2D Alt, page 12-38.

Elevation Mask

Elev Mask allows you to specify the minimum elevation above the horizon that a satellite must reach before the GeoExplorer II receiver uses it for position calculations. The default and recommended Elevation Mask for a base file is 10°. If you change the Elevation Mask make sure that the rover mask is always at least 1° higher than the base mask for every 100 km (60 miles) between the rover and base. For information on changing this parameter, see Elev Mask, page 12-38.

SNR Mask

SNR Mask allows you to specify the minimum strength that a satellite signal must have before the GeoExplorer II receiver uses it to calculate positions. When a satellite's signal strength drops below the SNR Mask, the GeoExplorer II receiver stops using it to compute positions, although the GeoExplorer II receiver continues to track it. Weaker (lower) signals are ignored because weak signals produce noisy positions. Stronger (higher) signals produce cleaner positions. The default and recommended SNR Mask setting is 5. For information on changing this parameter, see SNR Mask, page 12-40.

PDOP Mask

PDOP Mask allows you to set a maximum PDOP (Position Dilution Of Precision) value. When the PDOP goes over this value the GeoExplorer II receiver stops calculating positions. PDOP is an indication of the accuracy of the GPS positions calculated by the GeoExplorer II receiver. It takes into account each satellite's location relative to the other satellites (the satellite geometry).

A constellation with a PDOP of 4 or below is likely to yield highly accurate positions. A PDOP between 5 and 8 is acceptable. A PDOP of 8 or more is poor. The default and recommended PDOP Mask is 6. When the PDOP rises above the mask the message *High PDOP* is displayed on the *GPS Status/ Sat Tracking* screen. For information on changing this parameter, see PDOP Mask, page 12-41.

PDOP Switch

PDOP Switch allows you set a PDOP (Position Dilution of Precision) value that causes the GeoExplorer II receiver to switch between 2D and 3D mode when the *Pos Mode* is set to Auto 2D/3D. The recommended and default setting for the PDOP Switch is 6. For information on changing this parameter, see PDOP Switch, page 12-42.

Antenna Ht

Antenna Ht lets you specify the height of the GPS antenna above the reference position. The antenna is inside the GeoExplorer II receiver under the raised sextant. The default setting is 1.0 meters. For information on changing this parameter, see Antenna Ht, page 12-43.

Log DOPs

Log DOPs lets you choose whether or not you want DOP measurements recorded in the base file. Recording DOP measurements can be useful for troubleshooting data sets if you are having problems. The default setting is to not record DOP data in the rover file. For information on changing this parameter, see Log DOPs, page 12-44.

File Prefix

File Prefix allows you to specify a single letter to identify the base files you record. When you change the prefix character to a different letter or number, all consequent base files generated on the GeoExplorer II receiver start with that character. The remainder of the filename is generated from the date and time it was created. The default setting is B. For information on changing this parameter, see File Prefix, page 12-45.

Reference Position

Reference Pos allows you to enter the known position of the base station. You can enter the reference position from a map or from a previously conducted control survey.

The coordinate system, datum, and altitude reference selected in the GeoExplorer II receiver must be the same as the ones used to calculate the coordinates of the reference position you are entering. If you are entering the reference position from a map, the map's coordinate system, datum, and altitude reference are usually shown in the map legend or title block. For instructions on changing the coordinate system, see Coordinates, page 12-47. For instructions on changing the datum, see Datum, page 12-49. For instructions on changing the altitude reference, see Units, page 12-50.

Note – You do not need to enter a reference position for a base station in the field, but you must specify a reference position in the Pathfinder Office software, before using the base files.

For information on changing this parameter, see Reference Pos, page 12-46.

Sat Health

Sat Health lets you enable and disable satellites and override health messages. This parameter is for advanced users only. The default is to enable all satellites and to follow the intent of all health messages. Use extreme caution when changing these options. For information on changing this parameter, see Sat Health, page 12-77.

4.6.2   Recording a base file

Once you check all the parameters listed above you can start recording a base file by selecting *Data Capture/ Open Base File*. The GeoExplorer II receiver continues collecting base data until you close the file or the memory fills up.

4.7   Assembling Your Equipment

Before you leave the office, make sure you have all the equipment you need. If you are using the standard GeoExplorer II receiver, you need to make sure that you have enough AA batteries. If you are using the 12V camcorder battery or intend to power the GeoExplorer II receiver from a vehicle, refer to External Power Kit, page 2-8 for instructions on assembling the external power kit. Assemble the following:

- GeoExplorer II receiver

- Shoulder carrying pouch, if using the external battery

- Batteries- AA batteries and /or external rechargeable plus battery cable

- Additional AA batteries as a backup

- GeoExplorer II Quick Reference

- Pen and paper

If you intend to differentially correct your data in real-time refer to Appendix D, Real-Time Differential Correction for information on using RTCM.

5   In the Field

This chapter explains the main tasks you can perform in the field using the GeoExplorer II receiver. Although you do not need to do all the tasks mentioned in this chapter at least read the first four sections. From there, refer to the remaining topics as needed. The topics covered in this chapter include:

- Getting a clear view of the sky

- Viewing your position

- Viewing GPS status

- Recording files without a data dictionary

- Recording files with a data dictionary

- Navigating

5.1   Getting a Clear View of the Sky

Move to a location where you have a clear view of the sky and switch the GeoExplorer II receiver on. Hold the receiver with the screen facing you. The GeoExplorer II receiver's internal antenna is located under the raised Trimble logo (a stylized sextant). The receiver does not need to be held perfectly level, but keep the antenna facing up, not down or sideways. Hold the GeoExplorer II receiver at shoulder height so your body does not block the signals. You can use the neck lanyard to hold the receiver, but it probably will not compute positions while hanging down.

The antenna needs a clear view of the sky to receive satellite signals. Signals can be received from any direction, but if you cover the antenna, the GeoExplorer II receiver can lose the satellites and stop computing positions. Satellite signals can be blocked by people, buildings, heavy tree cover, large vehicles, or powerful transmitters. Anything that blocks light also blocks signals. Signals can go through leaves, plastic, glass, and rain, although this weakens the signal.

Note – If you cannot obtain a clear view of the sky, attach one of the optional external antennas to the Geo Explorer II receiver. You can mount the antenna on a vehicle, or place it on a range pole so that it can be elevated when satellite visibility is poor.

Multipath is another problem that can occur when using the GeoExplorer II receiver around obstructions. This is when the signals bounce off objects like buildings or a water surface, so that the antenna not only receives the original signal but also a reflected signal. This results in less accurate positions. The less accurate positions are usually good enough for navigating. Multipath errors cannot be corrected by differential GPS. See Chapter 4 of the *Mapping Systems General Reference* for more information on multipath.

5.2   **Viewing Your Position**

When you turn on the GeoExplorer II receiver, it begins to track visible satellites and to calculate its current position, whether or not *Position* is selected. *Position* lets you view your current position. From the time the GeoExplorer II receiver is turned on, it can take up to 5 minutes to calculate the first position. If the receiver is moved a great distance since the last fix, it can take up to 15 minutes.

In the *Main* menu press ⧫ to select *Position*. A screen similar to
Figure 5-1 appears.

```
╭─────────────────────────╮
│ - GPS Position -        │    1. screen name
│  N  37°23'28.20"        │    2. current position
│  W 122°02'15.50"        │    3.
│ 3D  HAE        68m      │    4. Position mode, alt
╰─────────────────────────╯          reference, current alt
```
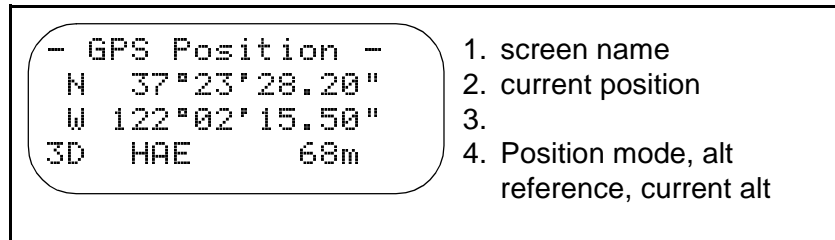
Figure 5-1   Position/ GPS Position

- When *GPS Position* displays on the first line of the
  Position screen, the GeoExplorer II receiver has started
  calculating positions. On average, the position is updated
  every 0.7 seconds.

When *Old Position* displays on the first line of the screen, the position
is not current or the GeoExplorer II receiver has stopped computing
positions. For example, if there are not enough satellites visible to
calculate a position, the *Old Position* screen displays as shown in
Figure 5-2.

```
╭─────────────────────────╮
│ - Old Position -        │    1. screen name
│  N  37°23'10.00"        │    2. old position
│  W 122°02'16.40"        │    3.
│     HAE        83m      │    4. altitude reference, and
╰─────────────────────────╯          altitude
```
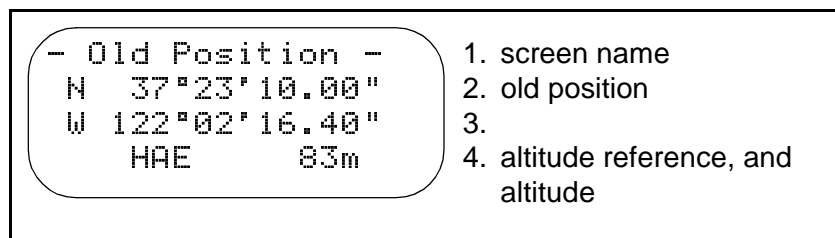
Figure 5-2   Position/ Old Position

If the GeoExplorer II receiver does not compute positions within 15 minutes of being turned on, check that the critical settings are set correctly (see Checking the Critical Parameters, page 4-8). Make sure the *RTCM Mode* is set to *Autonomous* unless you are using radios to differentially correct in real-time. For information on changing this parameter see Mode, page 12-74.

Wait a few more minutes to see if the GeoExplorer II receiver starts computing positions. Another reason for a slight delay in computing a position fix is a large change in position from the last use or the loss of an almanac resulting from a cleared memory. If you are still not computing positions, look around for any obstructions that might block satellite signals. Stand at least 5 feet away from obstructions. If the GeoExplorer II receiver is still is not computing positions refer to Appendix E, Troubleshooting on troubleshooting.

Once the GeoExplorer II receiver computs its first position, it computes subsequent positions more quickly. The positions viewed on screen are not saved. To save your positions, open a file or record a waypoint.

If you are working in Auto 2D/3D mode, when the GeoExplorer II receiver is switched to 2D, if you do not enter a new altitude within 30 minutes or if you move more than 1 mile from the last 3D position computation, the *Altitude* field of the *Position* screen flashes to remind you that the altitude is old.

5.3   Viewing GPS Status

The GeoExplorer II receiver has six channels that can track satellites.
In standard (non-overdetermined, non-High Accuracy) 3D tracking
mode, the receiver tracks eight satellites and uses the best four
satellites meeting all masks to compute a three-dimensional position.
In standard (non-High Accuracy) 2D tracking mode, the GeoExplorer
II receiver tracks eight satellites and uses the best three satellites
meeting all masks to compute a two-dimensional position. In
overdetermined mode (ODS 3D), the receiver tracks the six highest
satellites and uses these to compute a position. When you are
collecting High Accuracy data in 3D mode, the GeoExplorer II
receiver tracks the six highest satellites and uses the best four to
calculate a position.

GPS Status provides information about the satellites and the positions
you are collecting as you record data. You can also get an indication of
accuracy. If you have trouble computing positions, check the status
screens for clues.

5.3.1   Sat Tracking

Sat Tracking lets you view which satellites are currently being tracked,
which satellites are used to calculate the current position, and the
current PDOP.

In the *Main* menu press ◆ to select *GPS Status*. Then select *Sat
Tracking*. A screen similar to Figure 5-3 appears.

```
 ┌─────────────────────┐     1. screen name
 │ - Sat Tracking -    │     2. PRNs of the satellites
 │ >07 >26  19 >27     │     3. being tracked
 │ >02                 │     4. number of satellites
 │ ⌘⌘⌘⌘    PDOP:2.51   │        available, PDOP value
 └─────────────────────┘
```
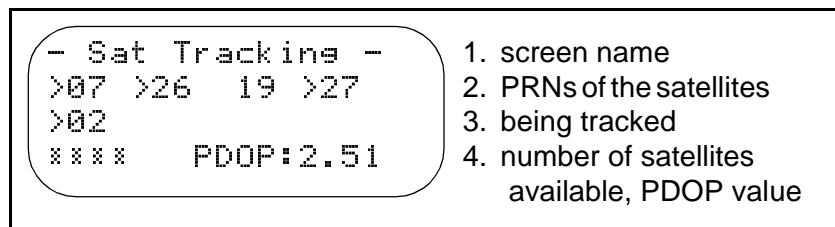
Figure 5-3   GPS Status/ Sat Tracking

Table 5-1 describes the *Sat Tracking* screen data.

Table 5-1   Sat Tracking Data

Value	Description
PRNs of the satellites being tracked	The PRN (pseudorandom number) is the individual ID number of the satellite assigned by the DoD. The PRNs range from 1 to 32. The *Sat Tracking* screen shows the PRNs of the satellites the GeoExplorer II receiver is tracking. This includes all satellites, whether they meet the PDOP and Elevation Masks or not. The receiver displays an arrow in front of the PRN, when that satellite is being used in a position fix. If more satellites are available than the maximum number the GeoExplorer II receiver can track, only the highest satellites are tracked.
Number of satellites available	The number of satellites available for a position fix. This shows only healthy satellites that meet all required masks. Before a satellite can be used for a position fix it must meet all the masks set in the *Configuration /Rover Options* menu. In non-overdetermined mode, four satellites yield 3D positions and three satellites yield 2D positions. In overdetermined (ODS 3D) mode, four, or more satellites yield overdetermined 3D positions.

Table 5-1   Sat Tracking Data (Continued)

Value	Description
PDOP	PDOP (Position Dilution Of Precision) is a mathematical calculation that takes into account each satellite's location relative to the other satellites in the constellation (the constellation geometry) to predict the accuracy of positions obtained with that constellation. PDOP is the best overall indicator of accuracy, although PDOP alone does not guarantee good positions. The GeoExplorer II receiver automatically uses the constellation with the lowest PDOP. A constellation with a PDOP of 4 or below is likely to yield highly accurate positions. A PDOP between 5 and 8 is acceptable. A PDOP of 8 or more is poor. This value must be below the PDOP Mask (or PDOP Switch) for the constellation to be used. The default PDOP Mask in the GeoExplorer II receiver is 6. The PDOP Mask and PDOP Switch are set under the *Configuration /Rover Options* menu. For more information on how satellite geometry and PDOP affect accuracy, refer to the *Mapping Systems General Reference*.

5.3.2 Sat Posn & SNR

Sat Posn & SNR displays elevation, azimuth, and signal strength information for individual satellites.

In the *Main* menu press ◆ to select *GPS Status*. Then select *Sat Posn & SNR*. A screen similar to Figure 5-4 appears.

```
PRN  Elv   Az   SNR      column 1 - PRN of the
 07   83    76   0.0        satellites being tracked
>26   38   260   4.3      column 2 - sat. elevation
>09   20   312  11.0      column 3 - satellite azimuth
                          column 4 - satellite SNR
```

Figure 5-4   GPS Status/ Sat Posn & SNR

Scroll down the screen to see the complete list of satellites and satellite information. Table 5-2 describes the *Sat Posn & SNR* screen data.

Table 5-2   Sat Posn & SNR Data

Value	Description
PRN	The PRN (pseudorandom number) is the individual ID number of the satellite assigned by the DoD. The PRNs range from 1 to 32.
Elv	The elevation above the horizon of each satellite. The elevation must be higher than the Elevation Mask for the GeoExplorer II receiver to use the satellite for positions. The Elevation Mask is set under *Configuration/ Rover Options*.
Az	The azimuth of each satellite. The azimuth is always referenced to True North.

Table 5-2   Sat Posn & SNR Data (Continued)

Value	Description
SNR	The SNR (Signal to Noise Ratio) value of each satellite currently being tracked. This is the strength of the signal. If a signal is too weak and does not meet the SNR Mask, it is not used for positions. An SNR of 5 or more is good. You can decrease the SNR Mask if you are not tracking enough satellites to record a position. The SNR Mask is set under *Configuration/ Rover Options*.

5.3.3   Sat Hlth & URA

Sat Hlth & URA displays the health status and URA value for individual satellites.

In the *Main* menu press ◉ to select *GPS Status*. Then select *Sat Hlth & URA*. A screen similar to Figure 5-5 appears.

```
PRN    Hlth URA          column 1 - PRNs of the
 02     OK   32.0m          satellites being tracked
>07     OK   32.0m       column 2 - satellite health
>26     OK   32.0m       column 3 - satellite URA
```

Figure 5-5   GPS Status/ Sat Hlth & URA

Scroll down the screen to see the list of satellites and satellite information. Table 5-3 describes the *Sat Hlth & URA* screen data.

Table 5-3   Sat Hlth & URA Data

Value	Data
PRN	The PRN (pseudorandom number) is the individual ID number of the satellite assigned by the DoD. The PRNs range from 1 to 32.

Table 5-3 Sat Hlth & URA Data (Continued)

Value	Data
Hlth	The current health of each satellite. If a satellite is OK, it is healthy and can be used to compute positions. If a satellite is U, it is unhealthy and is not used to compute positions. If a satellite is n/a, it is not being tracked or there is no almanac record for it.
URA	URA (User Range Accuracy) is an estimate of the accuracy of the satellite range measurement in meters. It is provided by the Department of Defense and transmitted from the satellite to the GeoExplorer II receiver. The value is based on a variety of factors, including age of the data, type of clock in the satellite, satellite orbit and clock behavior, and whether Selective Availability is activated. The possible values of URA are: 1,2, 2.8, 4, 5.8, 8, 16, 32, 64, 128, 256, 512, and 1024 meters.
	Below 5.8 Position accuracy is good using this satellite.
	5.8 to 8 Position accuracy may be poor if this satellite is used.
	16 SA may be activated. Accuracy may be degraded up to 100 meters (2dRMS).
	32 or 64 SA is activated. Data needs to be differentially corrected to achieve 2 to 5 meter accuracy.
	Above 64 SA is on to an abnormal extent or a problem exists with the satellite. Satellite problems usually cause the satellite to be set unhealthy.

5.3.4   Sat Chnl Data

Sat Chnl Data displays diagnostic information for the GeoExplorer II receiver. You do not need to refer to this screen unless a Trimble technical support person advises you to do so. For more information on *Sat Chnl Data*, see Sat Chnl Data, page 9-7.

5.4   Recording Files without a Data Dictionary

Most of the GPS data you collect with the GeoExplorer II receiver is recorded in files rather than as waypoints. A file lets you store GPS positions continuously. If you do not have a data dictionary loaded in the receiver, you can collect positions in a file but you cannot collect feature and attribute data. Positions are recorded at the interval set as the Not In Feature Rate. The Point and Line/Area Logging Rates are only used when you are using a data dictionary.

There are two ways to record point features in a file. You can record a single feature in each file. To do this when the Not In Feature Rate is set to All, stand by or over the feature, open a file, record positions for 30 to 60 seconds, and then close the file. Back in the office use the Pathfinder Office software to average these to produce a single position for that point feature.

Or, open a single file and use the Pause option to stop the GeoExplorer II receiver from recording positions as you move between features. Back in the office use the Pathfinder Office software to differentially correct the data. Then average the positions into the separate point features using the GROUPING UTILITY. You can only record 99 files in the GeoExplorer II receiver. If you have more than 99 features use this method to record a file.

For line or area features, go to the start of the feature, open a file, walk or drive the length of the feature and close the file. You may find it useful to take a notebook and record when you started each feature and the file name.

5.5 Recording Files with a Data Dictionary

With the Pathfinder Office software, you can create a data dictionary that allows you to store point, line, and area features as well as attribute data. To record data with a data dictionary do the following:

1. In the *Main* menu press ◉ to select *Data Capture*.

2. Use ⊙ or ⊙ to scroll to *Open Rov. File* and press ◉.

    A file is automatically opened and named (for more information on file naming, see Open Rov. File, page 7-1). The GeoExplorer II receiver is now recording positions to this file.

3. To record a feature in your file, use ⊙ or ⊙ to scroll to *Select Feature* and press ◉.

    The items on this menu are the features in your data dictionary. They vary according to the data dictionary loaded. When you select a feature from the feature list, the feature opens in the current data file. Subsequent GPS positions are recorded as part of the feature, until the feature is closed or aborted.

4. Select a feature to display the attributes for that feature, use ⊙ or ⊙ to scroll to the desired feature and press ◉.

    If the feature has attributes, enter the attribute data as the positions are recorded. There are five types of attributes: menu, numeric, character, date, and time.

5. To enter the attribute data, do one of the following:

    a. To select a menu field, move the cursor over the attribute and press ◉ to display a list of menu options. If it is a long list, scroll through the items using ⊙ or ⊙. Highlight the one you want and press ◉ to select it.

b. To enter a number for a numeric field, move the cursor over the attribute and press ⬙ to change to edit mode. The cursor is over the first digit, use ⬘ or ⬛ to scroll through this digit. When it is correct, use ⬗ to move to the second digit. Repeat this process until the number is correct and then press ⬙.

c. To enter a letter for a character field, move the cursor over the attribute and press ⬙ to change to edit mode. The cursor is over the first character field. Use ⬘ or ⬛ to scroll through the available characters. When it is correct, use ⬗ to move to the second character. Repeat this process until you complete the field and then press ⬙.

d. To enter the time in a time field, move the cursor over the attribute and press ⬙ to change to edit mode. Press ⬘ or ⬛ to display the current time. To change any of the digits, use ⬘ or ⬛ to scroll through the available characters. Repeat this process until you complete the time field and then press ⬙.

e. To enter the date in a date field, move the cursor over the attribute and press ⬙ to change to edit mode. Use ⬘ or ⬛ to scroll through the available characters. When it is correct, use ⬗ to move to the next character. Repeat this process until you complete the data and then press ⬙.

6. When you finish entering attribute data and have collected enough positions for the feature, use ⬘ or ⬛ to scroll to *Close Feature* and press ⬙.

You are returned to the *Select Feature* screen. You can continue to record features by selecting another feature and entering the attribute data.

7. When you finish collecting features, use ⬘ or ⬛ to scroll to *Close File* and press ⬙.

5.5.1   Recording High Accuracy Points

High accuracy point features can be captured in two ways:

- If you do not have a data dictionary installed in the GeoExplorer II receiver, you must collect high accuracy points individually, with each point in its own file. You cannot capture more than one point in a file unless you have a data dictionary.

- If you do have a data dictionary installed in the GeoExplorer II receiver, you can capture points as features and store many in a single file.

Collecting a High Accuracy Point without a Data Dictionary

A high accuracy point file can be recorded in two ways:

- Configure the GeoExplorer II receiver so that High Accuracy Recording is set to *On*. Each file you record is logged in high accuracy mode and represents one point.

- Configure the GeoExplorer II receiver so that High Accuracy Recording is set to *Ask*. Then, if you answer *Yes* to the question *Open HiAccuracy Rover File?*, the point file is recorded with carrier phase data.

When a file opens in high accuracy mode, the upper-right hand corner of the GeoExplorer II display shows a number indicating the amount of time remaining in the data collection period. When the number reaches zero, the carrier-phase observations have been collected for the data collection period. Data collection continues until the file is closed.

Collecting High Accuracy Point Features with a Data Dictionary

When you record high accuracy point features with a data dictionary, you do not want to record carrier-phase data between features. Therefore, configure the GeoExplorer II so that High Accuracy Recording is set to *Off*. Then, a high accuracy point feature is recorded in one of two ways:

- Configure the GeoExplorer II receiver so that *PtFeats* is set to *On*. Recorded point features are then logged in high accuracy mode.

- Configure the GeoExplorer II receiver so that *PtFeats* is set to *Ask*. Then, if you answer *Yes* to the question *Open HiAccuracy Point Feature?*, recorded point features are logged in high accuracy mode.

When a point feature opens in high accuracy mode, the upper-right hand corner of the GeoExplorer II display shows a number indicating the amount of time remaining in the data collection period. When the number reaches zero, the carrier-phase observations have been collected for the data collection period. Data collection continues after the counter reaches zero, until you close the feature.

The high accuracy recording options are shown in Table 5-4.

Table 5-4   High Accuracy Recording Options

Option	Description
Off	*Off* disables carrier-phase recording for files. Use *Off* when a data dictionary is loaded and *PtFeats* is set either to *On* or *Ask*.
On	*On* enables carrier-phase recording when a data dictionary is not loaded or you do not want to use the data dictionary. When set to *On*, the GeoExplorer II receiver is configured to capture one carrier-phase data point in each file. Each point occupied requires its own file.

Table 5-4   High Accuracy Recording Options

Option	Description
Ask	*Ask* enables carrier-phase recording if you answer *Yes* to the question *OpenHiAccuracy Rover File?* when you open a file. If you have a data dictionary, only point features are recorded in High Accuracy mode. If you do not have a data dictionary and you select *Yes* when opening a new file, all positions are recorded as High Accuracy.

Caution – Setting recording to *On* when using a data dictionary can cause the high accuracy file to fail to process. Use *On* only when you are not using a data dictionary.

Pausing and Resuming High Accuracy Data Collection

During data collection with the GeoExplorer II receiver, you can pause and resume data logging. To temporarily stop data logging, select *Pause* from the *Open Rover File* screen or *Feature* screen. The screen then shows the *Resume* command. To restart data recording, select *Resume* from the *Open Rover File* screen or *Feature* screen.

5.5.2   File Status

An option called *File Status* is on the *Open Rover File* screen. *File Status* shows the size of the current file and the amount of free memory available. This information is updated as more data is stored in the file. Scroll down to view the number of features recorded in the current file and the number of positions recorded in the current file. Features can only be recorded in the file if you have a data dictionary loaded. The number of positions recorded in the file is a count of all the GPS positions, averaged GPS positions are counted as a single point.

5.5.3   Pause/Resume

An option called *Pause* is on the *Open Rover File* screen and the *Feature* screen. *Pause* allows you to temporarily halt the logging of positions to the file. Use this option if you need to temporarily move away from the feature or if you have enough positions but want to record more attribute data. Once you select this option it changes from *Pause* to *Resume*. Selecting *Pause* does not close the file, it halts the recording of positions. Select *Resume* when you are ready to continue recording data in the file. Do the following:

1.   Use ⓐ or ⓥ to scroll to *Pause* and press ⓓ.

     The GeoExplorer II receiver stops recording positions and this option changes to *Resume*.

2.   When you are ready to continue recording positions, use ⓐ or ⓥ to scroll to *Resume* and press ⓓ.

It is a good practice to *Pause* data logging or to select *Close File* before turning the GeoExplorer II receiver off.

5.5.4   Close File

An option called *Close File* is on the *Open Rover File* screen. *Close File* allows you to end the file. This closes the data file permanently and positions are no longer stored. Select this option when you finish your data logging session. To close a rover file do the following:

1.   In the *Open Rover File* screen use ⓐ or ⓥ to scroll to *Close File* and press ⓓ.

2.   Select *Yes* to close the file.

If the GeoExplorer II receiver is turned off while you are in *Data Capture*, it resumes recording as soon as it is turned back on and satellites are tracked. You can also replace the battery pack during *Data Capture*. The GeoExplorer II receiver resumes recording positions as soon as the battery exchange is completed and satellites are being tracked.

5.5.5   Main Menu

An option called *Main* menu is on the *Open Rover File* screen, the *Open Base File* screen and the *Feature* screen. *Main* menu allows you to temporarily return to the GeoExplorer II receiver *Main* menu. This gives you access to the menu functions. You can view the GPS status and change configuration parameters if necessary. Data recording to the open files continues while other screens are selected. To access the *Main* menu do the following:

1. Use ⬆ or ⬇ to scroll to *Main* menu and press ◆.

    You are temporarily returned to the *Main* menu while positions are being recorded in the open file.

2. Use ⬆ or ⬇ to scroll to *GPS Status* to view satellite status information or *Configuration* to change the configuration parameters.

3. Use ⬆ or ⬇ to scroll to *Data Capture* and press ◆, to return to the open file.

⊠   **Note –** From the *Open Rover File* and *Open Base File* screens you can press (Esc) to temporarily return to the *Main* menu while the date file remains open.

5.5.6   Review File

Review File lets you review the files you collected. The *Review File* screen is a view-only screen so you cannot change any data. To review a file do the following:

1.   In the *Main* menu press ⧫ to select *Data Capture*.

2.   Use ▲ or ▼ to scroll to *Review File* and press ⧫.

     A list of rover and base files available on the GeoExplorer II receiver displays.

3.   Use ▲ or ▼ to scroll to the required file and press ⧫.

     The filename, type, Not In Feature log rate, number of positions, number of features, and file duration is shown.

5.5.7   Delete File

Delete File lets you erase a data file from the GeoExplorer II receiver. Use this option once you have downloaded a file to the PC and need space for more files. To delete a file do the following:

1.   In the *Main* menu press ⧫ to select *Data Capture*.

2.   Use ▲ or ▼ to scroll to *Delete File* and press ⧫.

     A list of rover and base files available on the GeoExplorer II receiver displays.

3.   Use ▲ or ▼ to scroll to the required file and press ⧫.

     Select *Yes* to delete the file.

🖐   **Caution –** Deleted files cannot be recovered.

5.5.8   Rename File

Rename File lets you rename a data file you previously collected. To rename a file do the following:

1.   In the *Main* menu press ◉ to select *Data Capture*.

2.   Use ▲ or ▼ to scroll to *Rename File* and press ◉.

     A list of rover and base files available on the GeoExplorer II receiver displays.

3.   Use ▲ or ▼ to scroll to the required file and press ◉.

4.   When the letter or number you want to change is highlighted with the cursor, use ▲ or ▼ to select the new letter or number.

5.   Press ◉ to rename the file.

5.5.9   Improving Position Accuracy

A single position collected at a location may not yield the highest GPS accuracy. The following suggestions can improve the GPS accuracy of positions. For a complete discussion of factors affecting GPS accuracy, see Chapter 3 of the *Mapping Systems General Reference*.

Collect More Positions at Each Point

GPS accuracy is increased by collecting data for three minutes at a point, differentially correcting the data, and averaging the results. If you are operating in non-overdetermined, non-High Accuracy mode, this reduces the error to 5 meters CEP. To reduce the error to 2 meters or less CEP, average positions for three minutes or more after they are differentially corrected.

Avoid multipath

If you are using the GeoExplorer II receiver around obstructions (buildings, cars) you can experience multipath. This is when the signals bounces off objects like buildings or a water surface, so that the antenna not only receives the original signal but also a reflected signal. This results in less accurate positions. The less accurate positions are usually good enough for navigating. Multipath errors cannot be corrected by differential GPS. Avoid environments where this can occur. Some multipath can be overcome by raising the Elevation Mask and SNR Mask.

Increase the Elevation Mask

When a satellite is low on the horizon, its signals reflect off nearby surfaces, yielding noisier data because of multipath. Also, the signals must travel a longer path through the atmosphere, resulting in lower signal strength and propagation delays. By using an Elevation Mask of 15°, these effects are lessened.

When the elevation angle is raised, the PDOP usually rises because there are fewer satellites from which to choose. Our recommendation is to increase the Elevation Mask, if you are concerned with minimizing noise and if the PDOP report in the planning software shows that you can still achieve good PDOPs with that Elevation Mask.

Collect ODS 3D Positions

ODS 3D positions are more accurate than 3D positions. Whenever possible work in ODS 3D mode.

5.5.10   Using Optional External Antennas

You can use GeoExplorer II external antennas in situations where the internal antenna is not effective, for example inside of a vehicle or under a heavy tree canopy. External antennas can produce a significantly higher Signal-to-Noise Ratio than the internal antenna.

Two external antennas are available. One is a range pole mount antenna with groundplane (P/N 28780-00), see Figure 5-7. The other is a magnetic mount vehicle antenna (P/N 28789-00), see Figure 5-8.

When connected to the GeoExplorer II receiver, the external antenna automatically shuts off the internal antenna. This prevents the system from receiving GPS signals from both internal and external antenna at the same time. Such a situation could produce inaccuracies.

Connecting External Antennas

External antennas are connected to the GeoExplorer II receiver through an antenna jack located in the upper corner on the back of the receiver. See Figure 5-6.
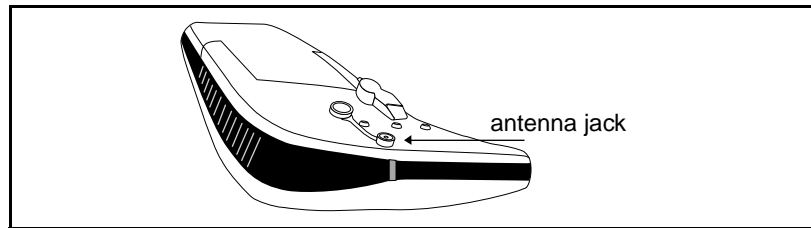
antenna jack

Figure 5-6   Antenna Jack

To connect the antenna, remove the dust cover from the antenna jack and push the antenna plug gently into the jack until it seats. When properly connected, the plug is securely attached to the receiver.

To disconnect the antenna, grasp the antenna plug as close to the receiver as possible and gently pull the plug straight out of the jack. Do not grasp or pull on the antenna cord. Replace the antenna jack dust cover after disconnecting the antenna.

✋ **Caution –** Pull only on the antenna plug. Do not under any circumstances pull on the antenna cord.

Using the Range Pole Antenna

Use the range pole mount antenna wherever field conditions make the internal antenna less effective, such as under a heavy tree canopy. With this antenna, the groundplane limits the amount of multipath you encounter. The antenna has a standard 5/8" fitting for pole mounting, see Figure 5-7.
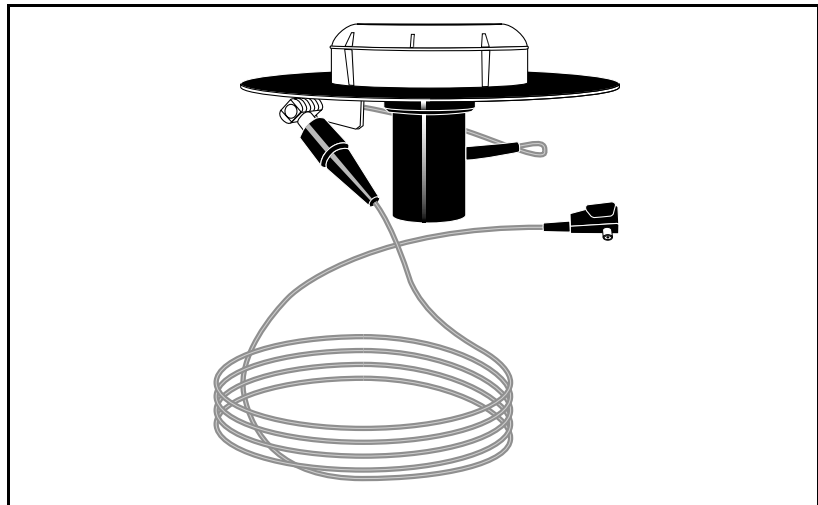
Figure 5-7   Range Pole Mount Antenna with Groundplane

You can enhance the effectiveness of the antenna by raising it above your head. This increases the visibility of the sky and can improve the reception of GPS signals. This can be particularly effective when local objects such as fences, buildings, or trees are blocking the view of the sky.

Using the Vehicle Mount Antenna

Inside a closed roof vehicle, the view of the sky of a receiver's internal antenna is blocked. The vehicle mount antenna lets you use the GeoExplorer II receiver inside a vehicle. The powerful magnet of the vehicle mount antenna lets you attach the antenna to any steel surface. Attaching the antenna to the steel roof of the vehicle not only lets you use the receiver inside the vehicle, the groundplane effect of the metal surface helps limit multipathing. See Figure 5-8.
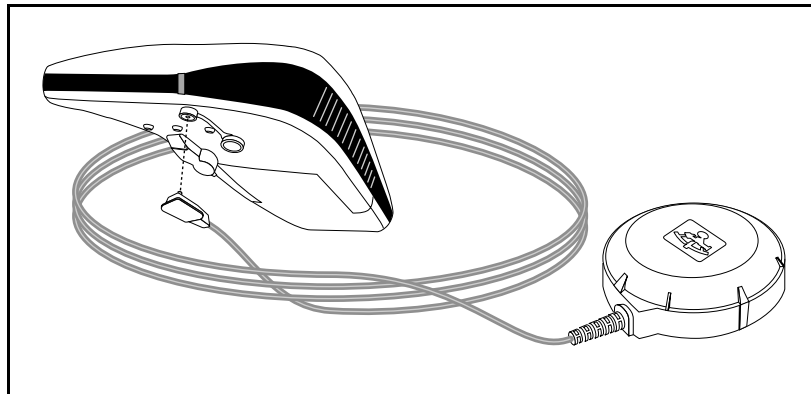
Figure 5-8   GeoExplorer II Receiver with Vehicle Mount Antenna

5.6   Navigating

The GeoExplorer II receiver is an excellent navigation tool. *Navigation* lets you navigate from one position to another. You can store single locations as waypoints and then navigate between two waypoints or you can navigate from your current position to a waypoint. Waypoints can be GPS positions saved on a previous visit to a site or they can be manually entered from a map. First you need to set up some waypoints, select a display format, and select which waypoints you are navigating from and to.

The GeoExplorer II receiver uses great circle calculations to perform navigation. This means it can guide you on a route that follows the shortest distance between the two points. Under about 100 miles, great circle and Rhumb line calculations are equivalent.

Table 5-5 lists some terms used when discussing navigation:

Table 5-5   Navigation Terminology

Term	Description
Bearing	The direction you need to go to get to a destination.
ETA	The Estimated Time of Arrival, the time of day you will reach your destination.
Heading	The current direction of travel (for example, you are heading east, 90° magnetic).
Range	The distance to a destination (for example, the range is 23.75 kilometers).
TTG	The Time To Go, the time remaining until you reach your destination.
Velocity	Your current speed across the ground.
XTE	Cross track error is the distance and direction (left or right) of your current location in regard to an imaginary line connecting the starting point and the destination. For example, XTE is 2 miles to the right, means you are 2 miles right of the line, and you must turn left to return to the line.

5.6.1   Waypoints

A waypoint is a single position coordinate (latitude, longitude, and altitude) that is given a name and assigned to a specific waypoint number. It can be any place of interest. You can use the GeoExplorer II receiver to navigate back to a waypoint from a different location, or to navigate from one waypoint to another.

The GeoExplorer II receiver can store 99 waypoints. When you first receive the receiver, it contains 99 empty waypoint numbers. You can store waypoint data to a waypoint number in several ways. Waypoint data can be created from a GPS position that the GeoExplorer II receiver calculates, waypoint data can be manually entered using the buttons, or existing waypoint data can be edited to create a new one.

When you enter waypoints the coordinate system, datum, and altitude reference selected in the GeoExplorer II receiver must be the same ones used to calculate the coordinates you enter. If you are reading the coordinates from a map, the map's datum, coordinate system, and altitude reference are usually shown in the map legend or title block. For instructions on changing the coordinate system, see Coordinates, page 12-47. For instructions on changing the datum, see Datum, page 12-49. For instructions on changing the altitude reference see Custom Setup, page 12-52.

A complete waypoint has a waypoint number, name, and coordinates. Once a waypoint name and coordinates are attached to a specific waypoint number, they are recorded permanently until you edit, delete, or clear them. *Waypoint Setup* allows you to create, edit, delete, and clear waypoints.

Add Here

Add Here allows you to save your current location as a waypoint. The GeoExplorer II receiver must be computing positions to record your current position as a waypoint. If the GeoExplorer II receiver is not computing positions when you want to create a waypoint, it stores one waypoint with the most recent position. Additional attempts to store the same position will fail.

To store the current or last recorded position as a waypoint do the following:

1. In the *Main* menu press ⬥ to select *Navigation*.

2. Use ▲ or ▼ to scroll to *Waypoint Setup* and press ⬥.

3. Use ▲ or ▼ to scroll to *Add Here* and press ⬥.

4. Use ▲ or ▼ to scroll through the waypoints available and find the waypoint number you want. Press ⬥ twice to add the waypoint.

   The waypoint name is created automatically from the time the position is computed.

Any position more than 3 seconds old is considered an old fix. If you are saving an old position (the GeoExplorer II receiver is not currently calculating positions), the default name is *OLDPOS00*. You can rename waypoints after saving the coordinates using *Edit WPT*.

If *Waypoint Averaging* is *Off*, a single GPS position is assigned to the waypoint. If *Waypoint Averaging* is *On*, the GeoExplorer II receiver calculates the specified number of GPS positions and averages these into a single waypoint position. For more information on waypoint averaging, see WPT Averaging, page 12-82.

When you save a waypoint the waypoint number automatically increments. Then, whenever you press ⬥ twice, another waypoint is saved sequentially.

If you save waypoint data continuously as described, the coordinates but not the names of any existing waypoints encountered are overwritten. Empty waypoints are named with the time of the position.

For example, if you stored 6 continuous waypoints starting with Waypoint 25 and Waypoints 27 and 29 were already assigned, the new waypoints are shown in Table 5-6.

Table 5-6   Waypoint Data

#	Name	Latitude	Longitude	Altitude
25	07:22:15	37°23'32.4"N	122°02'42.9"W	+88ft
26	07:22:26	37°23'32.8"N	122°02'43.2"W	+92ft
27	LAMP POST	37°23'32.1"N	122°02'42.6"W	+85ft
28	07:22:45	37°23'32.6"N	122°02'43.2"W	+91ft
29	LAKE	37°23'32.8"N	122°02'43.3"W	+88ft
30	07:23:04	37°23'32.0"N	122°02'43.5"W	+86ft

Edit WPT

Edit WPT allows you to manually change a waypoint number, name or coordinates. This lets you create new waypoints and edit old ones. You can enter the name and coordinates of new waypoint in an empty waypoint or over an existing waypoint. To edit a waypoint do the following:

1. In the *Main* menu press ◉ to select *Navigation*.

2. Use ▲ or ▼ to scroll to *Waypoint Setup* and press ◉.

3. Use ▲ or ▼ to scroll to *Edit WPT* and press ◉.

   The currently selected waypoint displays. If this is not the waypoint you want to edit, use ▲ or ▼ to scroll to the correct waypoint.

4. When the waypoint you want to edit displays, press ◉.

5.   Enter a name for the waypoint.

Press ▶ to move the cursor to the first character of the
waypoint name. Use ▲ or ▼ to scroll through the list of
characters until you reach the one you want. Move to the next
character and repeat this process until you have the waypoint
name you want. Press ↵ to accept the waypoint name.

6.   Enter the waypoint coordinates.

Press ▶ to move the cursor to the first digit of the waypoint
coordinate. Use ▲ or ▼ to scroll through the list of digits until
you reach the one you want. Move to the next digit and repeat
this process until you have the coordinate you want. Make sure
you set the correct hemisphere. Press ↵ to accept the waypoint
coordinates.

7.   Repeat this for both coordinates and the altitude.

You can scroll the altitude units from meters to feet. The
altitude reference displays in the bottom line at the right corner.

If the position coordinates are inappropriate they are rejected.

8.   When you are finished entering the waypoint data press ◆.
Select *Yes* to save the waypoint edits.

Delete WPT

Delete WPT allows you to delete the waypoint name and coordinates from a waypoint number. The waypoint information cannot be recovered. To delete a waypoint from the GeoExplorer II receiver do the following:

1. In the *Main* menu press ◉ to select *Navigation*.

2. Use ▲ or ▼ to scroll to *Waypoint Setup* and press ◉.

3. Use ▲ or ▼ to scroll to *Delete WPT* and press ◉.

    The currently selected waypoint displays. If this is not the waypoint you want to delete, use ▲ or ▼ to scroll to the correct waypoint.

4. When the waypoint you want to delete displays, press ◉. Select *Yes* to delete the waypoint.

Clear All

Clear All lets you clear waypoint data from all the waypoint numbers in the GeoExplorer II receiver. Use this option with extreme care as waypoint data cannot be recovered. Use this option when you are certain you no longer need the waypoint data. With the Pathfinder Office software, you can transfer the waypoints to the PC first as a backup. To clear all waypoint data from the GeoExplorer II receiver do the following:

1. In the *Main* menu press ◉ to select *Navigation*.

2. Use ▲ or ▼ to scroll to *Waypoint Setup* and press ◉.

3. Use ▲ or ▼ to scroll to *Clear All* and press ◉. Select *Yes* to clear all waypoint data.

5.6.2 Display Format

There are four different navigation screens that you can use when navigating from one position to another. *Display Format* lets you choose which measurements you want to see on screen when navigating.

Dist/Bearing

To display the *Start Navigate* screen with Distance/Bearing information do the following:

1. In the *Main* menu press ◉ to select *Navigation*.

2. Use ▲ or ▼ to scroll to *Display Format* and press ◉.

3. Use ▲ or ▼ to scroll to *Dist/Bearing* and press ◉.

   The *Start Navigate* screen looks similar to Figure 5-9.

```
>W05 HOME              1. To WPT number, name
 Dist:    0.1435km     2. distance to destination
 Turn:   left 147°     3. turn to modify track
 Bearing:  353°Mn      4. current bearing
                          (scroll)
 Heading:  140°Mn      5. current heading
```
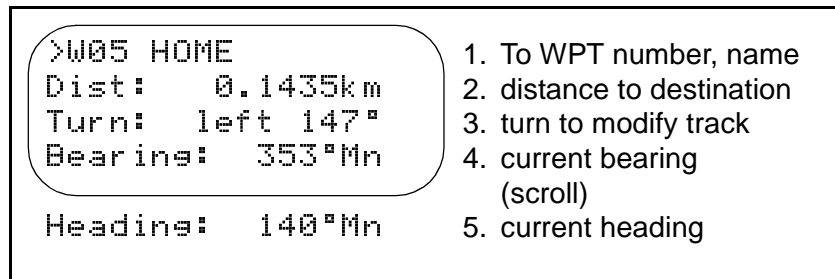
Figure 5-9   Navigation/ To Waypoint (Dist/Bearing)

Track & XTE (Cross Track Error)

To display the *Start Navigate* screen with Track & XTE information do the following:

1. In the *Main* menu press ◆ to select *Navigation*.

2. Use ▲ or ▼ to scroll to *Display Format* and press ◆.

3. Use ▲ or ▼ to scroll to *Track & XTE* and press ◆.

    The *Start Navigate* screen looks similar to Figure 5-10.

```
From 02 TO 05          1. From-To WPT numbers
Heading:   140°Mn      2. current heading
Dist:    0.1435km      3. distance to destination
XTE:     0.1256km>     4. cross track error
```
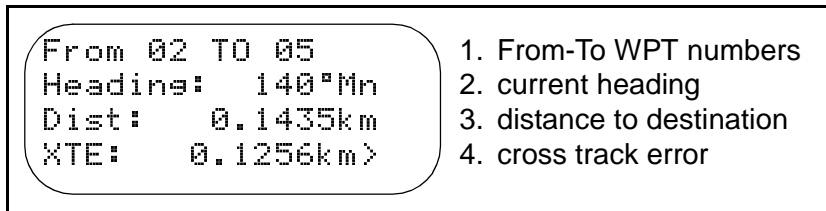
Figure 5-10   Navigation/ Start Navigate (Track & XTE)

East/North

To display the *Start Navigate* screen with East/North information do the following:

1. In the *Main* menu press ◉ to select *Navigation*.

2. Use ⬆ or ⬇ to scroll to *Display Format* and press ◉.

3. Use ⬆ or ⬇ to scroll to *East/North* and press ◉.

    The *Start Navigate* screen looks similar to Figure 5-11.

```
>W05 HOME              1. To WPT number, name
Elevation:   12°       2. vertical angle to WPT
Heading:    8°Mn       3. current heading
Go E:    0.1583km      4. modify track to east
                          (scroll)
Go N:    0.0002km      5. modify track to north
Go U:     0.199km      6. modify elevation
```
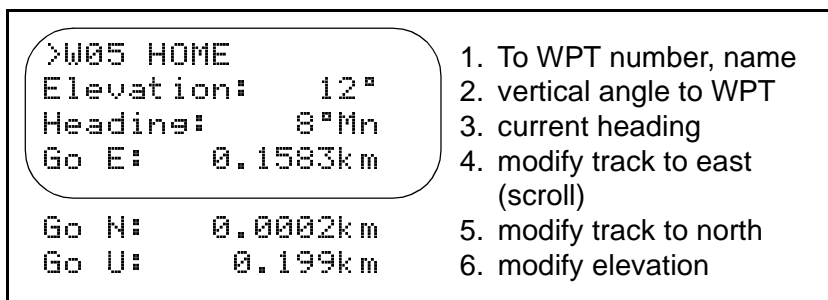
Figure 5-11   Navigation/ Start Navigate (East/North)

Velocity/Time

To display the *Start Navigate* screen with Velocity/Time information do the following:

1. In the *Main* menu press ◆ to select *Navigation*.

2. Use ▲ or ▼ to scroll to *Display Format* and press ◆.

3. Use ▲ or ▼ to scroll to *Velocity/Time* and press ◆.

   The *Start Navigate* screen looks similar to Figure 5-12.

```
From 02 TO 05          1. From-To WPT number
Vel:     12.30kph      2. current velocity
TTG:      0:45:13      3. time to go
ETA:   09:33:00am      4. estimated time of arrival
                          (scroll)
Turn right:   15°      5. turn to modify
Heading:      8°Mn     6. total distance between
TotDist:8.1047km          From-To WPTs
TotBearng:296°Mn       7. bearing between
                          From -To WPTs
```
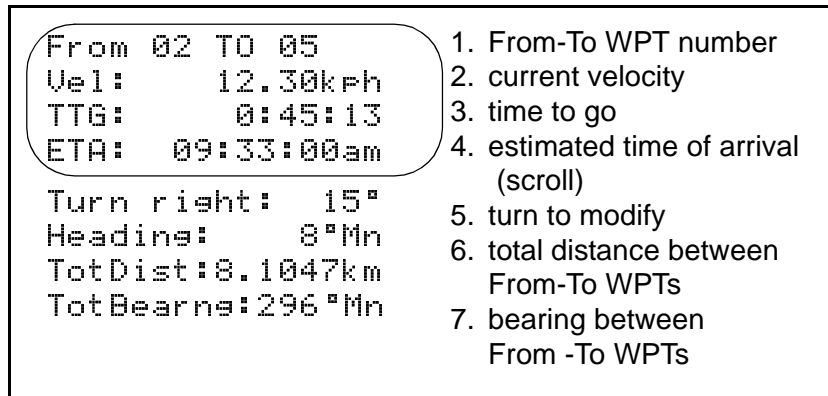
Figure 5-12   Navigation/ Start Navigate (Velocity/Time)

5.6.3   Navigation Procedure

To navigate to a specific waypoint from another specific waypoint do the following:

1. In the *Main* menu press ◆ to select *Navigation*.

2. Use ▲ or ▼ to scroll to *To Waypoint* and press ◆.

   Use ▲ or ▼ to scroll through the waypoints available. Press ◆ when the waypoint you want to navigate to displays. This selects your destination.

3.   Use ⬆ or ⬇ to scroll to *From Waypoint* and press ◆.

Use ⬆ or ⬇ to scroll through the waypoints available. Press ◆ when the waypoint you want to navigate from displays. This selects your starting point.

To start navigating from your current position (the last recorded position, if the GeoExplorer II receiver is computing positions), use Waypoint 00.

4.   Start moving.

As you move, the velocity, range, heading and bearing change. When the waypoint designator is *TO*, the range shown is the distance to the destination. When the designator is *FROM*, the range is the distance from the starting point. Keep your heading the same as the bearing. This keeps you on the shortest route to your destination. As you draw closer, the range decreases. When it reaches 0, you are at the destination.

If you started from your current position, the *XTE* and *FROM* range are always 0 because the GeoExplorer II receiver continually updates Waypoint 0 with the last recorded position.

If you started from a waypoint other than 0, the *XTE* shows how far off course you are from an imaginary line between the two waypoints that is the shortest distance between them. For example, if the *XTE* is Left, you are left of the line and must turn right to get back on the line. If the *XTE* is 0, you are on the imaginary line. *XTE* does not need to be 0 in order to arrive at the destination.

6   Returning to the Office

This chapter covers what to do with your data once you have collected it in the field. The topics covered in this chapter include:

- Transferring data files to the PC

- Transferring waypoints to the PC

- Transferring an almanac to the PC

6.1   Transferring Data Files to the PC

Use the Pathfinder Office software to transfer data files to the PC. To transfer data files from the GeoExplorer II receiver to the PC do the following:

1. Plug the small circular end of the data download cable (P/N 30153) into the back of the GeoExplorer II receiver.

2. Plug the other end of the cable into the selected port on the PC.

3. Select *Data Transfer* on the GeoExplorer II receiver *Main* menu.

4. In Pathfinder Office, select *Data Transfer* under the *Utilities* menu.

5. If communication fails, specify the PC communication port to which you connected your GeoExplorer II receiver and press Connect.

6. Select Data in the *Data Type* field.

7. Select the desired files by clicking on the filename and pressing Add.

    All the data files available on the GeoExplorer II receiver display. You can select several files to transfer at a time. The data files have the same filenames they had on the GeoExplorer II receiver with an .SSF extension.

Note – Waypoints recorded in a GeoExplorer II data file are included in the transferred file as positions.

8. Click on Transfer to automatically transfer the data files to the default drive and directory.

    A progress bar displays as the data is transferred.

6.2   Transferring Waypoints to the PC

You can transfer waypoints from the GeoExplorer II to the Pathfinder Office software on the PC, for example if you captured your data as waypoints, or if you want to keep the current waypoints but need to load other ones. Do the following:

1.   Connect the GeoExplorer II to the PC and prepare both for data transfer, as described in Transferring Data Files to the PC, page 6-1. When the status field shows "Connected to GeoExplorer", data transfer can begin.

2.   Select Waypoint in the *Data Type* field, and Receive in the *Direction* field. If the Destination Directory is incorrect then press the Destination Directory button to change it.

3.   Click on Transfer to transfer the waypoint file to the GeoExplorer II receiver.

4.   If you want to transfer all waypoints stored in the GeoExplorer II, select All.

5.   If you want to transfer only selected waypoints, select Range and enter the start and end waypoint numbers in the Start and End fields.

6.   Press OK, then enter a name for the waypoint file, or accept the default name.

7.   Press OK to transfer the waypoints.

When transfer is complete, a message appears indicating how many waypoints were transferred.

6.3   Transferring an Almanac to the PC

The GeoExplorer II receiver automatically collects a new almanac every 45 minutes. An almanac is required to use the Quick Plan software. The almanac contains clock information as well as information about the orbital path for each satellite (where it will be in the sky at any particular time). Almanacs are typically valid for about three months.

Since the GeoExplorer II receiver has several channels, almanac data collection has no impact on position computations. The GeoExplorer II receiver can compute positions as often as once per second while simultaneously collecting an almanac. The GeoExplorer II receiver collects the almanac more frequently because it is there and requires little effort. The need to transfer a new almanac to the PC is based on the age of the existing almanac and the occurrence of events such as new satellites or satellite maneuvers.

The simplest way to get an current almanac file is to take your GeoExplorer II receiver outside and allow it to calculate positions. It automatically acquires a new almanac file in about 15 minutes. You do not need to instruct the GeoExplorer II receiver to record an almanac file.

You can tell if your GeoExplorer II receiver has received a complete almanac file by switching it off. As the screen is counting down time to shut down, the letter *a* is displayed at the bottom of the screen. An uppercase *A* indicates that a complete almanac file was recorded. A lowercase *a* indicates that a complete almanac file was not recorded.

To transfer an almanac file from the GeoExplorer II receiver to the PC do the following:

1. Connect the GeoExplorer II to the PC and prepare both for data transfer, as described in Transferring Data Files to the PC, page 6-1. When the status field shows "Connected to GeoExplorer", data transfer can begin.

2. Select Almanac in the *Data Type* field.

3. Click on Transfer to automatically transfer the almanac file to the default drive and directory. The almanac is given the default filename ALMANAC.SSF and is stored in the default directory used by Quick Plan. You can change the filename if you want to.

    A progress bar displays as the almanac is transferred.

Section Two

GeoExplorer II Reference

7 Data Capture

Data Capture allows you to record, review, rename and delete base or rover files, and to review or delete the data dictionary. Figure 7-1 lists the *Data Capture* options.

```
┌──────────────────────────────────┐
│  ╭─ Data Capture ─╮    1. screen name
│  │1.Open Rov. File │    2. option
│  │2.Open Base File │    3. option
│  │3.Review File    │    4. option
│  ╰─────────────────╯       (scroll)
│                        
│    4.Delete File       5. option
│    5.Rename File       6. option
│    6.Dictionary        7. option
└──────────────────────────────────┘
```
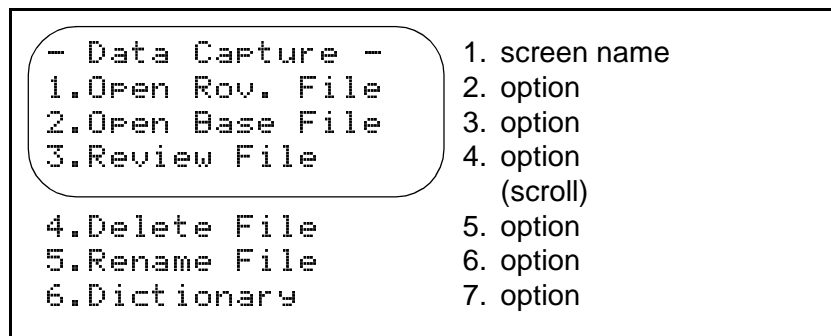
Figure 7-1   Data Capture Menu

7.1   Open Rov. File

Open Rov. File allows you to automatically create a new data file and start logging GPS data to it. A rover file is a standard data collection file used for recording position and attribute data. You can record up to 99 files in the GeoExplorer II receiver. If you have a loaded data dictionary, you can store positions, plus feature and attribute data in the file. If you have not loaded a data dictionary, you can only collect positions.

When you select *Open Rov. File*, a file opens and position recording begins. The file is automatically named using the standard naming convention. The convention uses the time and date to name the file. An example of an automatically generated file name is R071309A. It is derived as follows:

R	file prefix
07	month 07, July
13	day 13
09	hour 09, GPS time
A	the first file created in the 9th hour of July 13

R071309B would be the second file created in the same hour on the same day. Using the automatic naming system, up to 36 files can be generated per hour. For more information on changing the user defined file prefix, see File Prefix, page 12-45.

If you are not using a data dictionary you might choose to open a new file each time you map a new entity. To record more than 99 features in a session, use the *Pause/Resume* option to record more than one point feature per file. You must process this file with the Pathfinder Office GROUPING utility.

Before you record a rover file check the configuration parameters in *Rover Options* under the *Configuration Menu*. Many of these are critical for collecting accurate data. See Rover Options, page 12-2 for more information. Refer to section 4.4.2 in the *Mapping Systems General Reference* for a complete discussion of rover files.

Figure 7-2 lists the *Open Rov. File* menu options available when you are not using a data dictionary.

```
/-Open Rov. File-\        1. screen name
1.File Status             2. option
2.Pause                   3. option
3.Close File              4. option
_____/           (scroll)
   4.Main Menu             5. option
```

Figure 7-2   Data Capture/ Open Rov. File

If you are using a data dictionary you might choose to open a new file whenever you start a project or at a specific time interval (for example, every hour or half day). Figure 7-3 lists the *Open Rov. File* menu options available when you are using a data dictionary.

```
/-Open Rov. File-\        1. screen name
1.File Status             2. option
2.Pause                   3. option
3.Close File              4. option
_____/           (scroll)
   4.Main Menu             5. option
   5.Select Feature        6. option
```

**Figure 7-3   Data Capture/ Open Rov. File (Data
                   Dictionary)**

7.2   High Accuracy Data Collection

If you open a file with *High Accuracy Recording* set to *On*, the file opens in High Accuracy Recording mode. Figure 7-4 appears and you must confirm that you have the Phase Processor software required to process high accuracy data.

```
 ╭──────────────────╮     1. message
 │Phase Processor   │     2.
 │required to use   │     3.
 │high-acc data!    │     4. option
 │1.Proceed         │        (scroll)
 ╰──────────────────╯
   2.Cancel               5. option
```
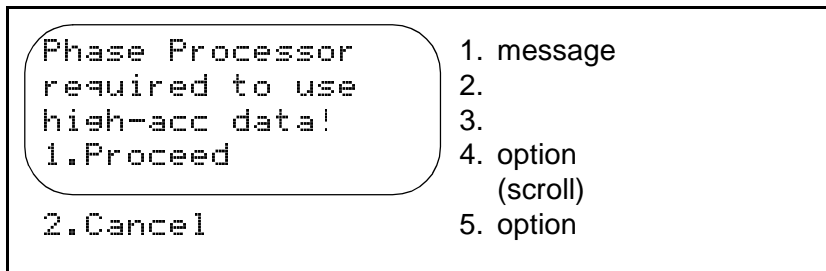
Figure 7-4   Data Capture/ Open Rov. File/ HiAccuracy File Warning

Table 7-1 describes the options on the *HiAccuracy File Warning* screen.

Table 7-1   HiAccuracy File Warning Options

Option	Description
Proceed	Select *Proceed* to record High Accuracy GPS position data.
Cancel	Select *Cancel* to abandon the operation.

When High Accuracy Recording is set to *Off* the file contains position records. If you open a file with High Accuracy Recording set to *Ask*, Figure 7-5 appears.

```
┌─────────────────────╮        1. screen name
│ Open HiAccuracy     │        2.
│   Rover File?       │        3. option
│ Yes                 │        4. option
│ No                  │
└─────────────────────╯
```
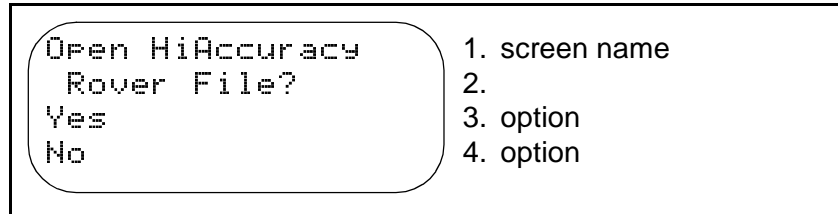
Figure 7-5   Data Capture/ Open Rov. File/ HiAccuracy File

Table 7-2 describes the *HiAccuracy File* screen options.

Table 7-2   HiAccuracy File Options

Option	Description
Yes	Select *Yes* to record High Accuracy GPS position data.
No	Select *No* to record GPS position data.

For more information on recording in High Accuracy mode see High Accuracy, page 12-33.

7.2.1   High Accuracy Recording with a Data Dictionary

If you have a data dictionary loaded and High Accuracy *PtFeats* is set to *On*, the features are recorded in High Accuracy mode. If you have High Accuracy *PtFeats* set to *Ask*, Figure 7-6 appears.

```
Open HiAccuracy       1. screen name
  Point Feature?      2.
Yes                   3. option
No                    4. option
```
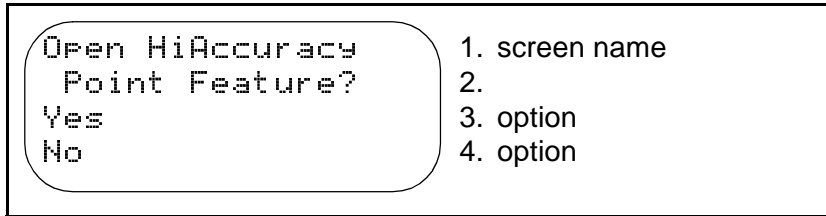
Figure 7-6   Data Capture/ Open Rov. File/ Select Feature (Data Dictionary)

Table 7-3 describes the *HiAccuracy Point Feature* screen options.

Table 7-3   HiAccuracy Point Feature Options

Option	Description
Yes	Select *Yes* to record a High Accuracy Point Feature
No	Select *No* to record a point feature with standard GPS data.

7.2.2   File Status

File Status allows you to view information about a particular data file. When you select *File Status*, a screen similar to Figure 7-7 appears.

```
┌─ File  Status  ─┐      1. screen name
│File:    A022600A│      2. filename
│Size:     1.7773K│      3. file size in KB
│Free:    177.63K │      4. free memory in KB
└─────────────────┘         (scroll)
 #Features:      0       5. # of features
 #Positions:    49       6. # of positions
```
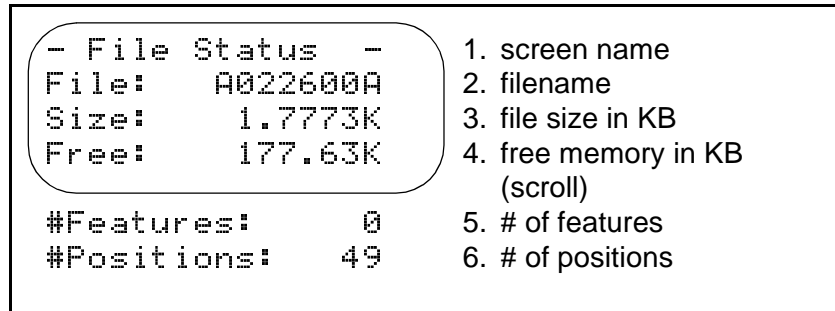
Figure 7-7   Data Capture/ Open Rov. File/ File Status

File Status shows the size of the current file and the amount of free memory available. This information is updated as more data is stored in the file. Scroll down to view the number of features recorded in the current file and the number of positions recorded in the current file. Features can only be recorded in the file if you have a data dictionary loaded. The number of positions recorded in the file is a count of all the GPS positions, as averaged GPS positions are counted as a single point.

7.2.3 Pause/Resume

Pause/Resume allows you to temporarily halt the logging of positions to the file. Use this option to temporarily move away from the feature or if you have enough positions but want to record more attribute data. Once you select this option it changes from *Pause* to *Resume*. Selecting *Pause* does not close the file, it halts the recording of positions. Select *Resume* when you are ready to continue recording data in the file. It is a good practice to *Pause* data logging or close the file before turning the GeoExplorer II receiver off.

7.2.4 Close File

Close File allows you to end the file. This closes the data file permanently and positions are no longer stored. Select this option when you finished the data logging session. When you select *Close File*, Figure 7-8 appears.

```
┌─────────────────────────────┐
│ ╱Close File       ╲     1. screen name
│ │    A022600A      │     2. file name
│ │Yes               │     3. option
│ │No                │     4. option
│ ╲─────────────────╱
└─────────────────────────────┘
```
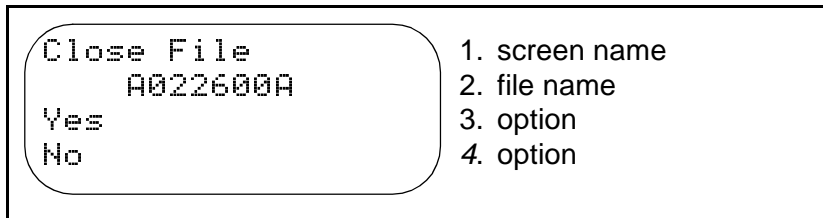
Figure 7-8   Data Capture/ Open Rov. File/ Close File

Table 7-4 describes the *Close File* screen options.

Table 7-4   Close File Options

Option	Description
Yes	Select *Yes* if you are finished recording data to the current file.
No	Select *No* to continue recording data to the current file.

7.2.5   Main Menu

Main menu allows you to temporarily return to the GeoExplorer II
receiver *Main* menu. This gives you access to the menu functions. You
can view the GPS status or change configuration parameters if
necessary. Data recording to the open file continues while other
screens are selected. To return to the current file, select *Data Capture*
from the *Main* menu, or press (Esc).

7.2.6   Select Feature

Select Feature only appears if you have a data dictionary loaded. A
data dictionary is a list of the features and attributes you want to
collect. It is like a form that you take into the field. A data dictionary is
created using the Pathfinder Office software on the PC and then
downloaded to the GeoExplorer II receiver. In the field, you are
prompted to enter data for the defined features and attributes. For
more information on data dictionaries refer to the *Data Dictionary
Editor Software User Guide*.

When you choose *Select Feature*, a screen similar to Figure 7-9
appears.

```
-Select Feature-          1. screen name
1.Tree                    2. feature
2.Trail                   3. feature
3.Plantcommunity          4. feature
```
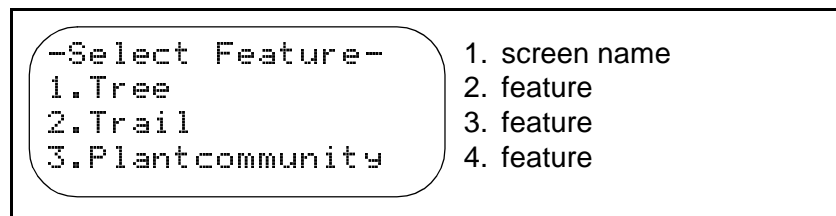
Figure 7-9   Data Capture/ Open Rov. File/ Select Feature

The items on this menu are the features in your data dictionary. They vary according to the data dictionary loaded. See Table 7-5 for an example of a feature in a data dictionary.

Table 7-5   Sample Data Dictionary

Feature	Attribute	Value
Plant Community - the feature being recorded.	Species - the type of plant community being recorded.	Serpentine Grass
		Riparian
		Chaparral
		Mixed Evergreen
		non-Serpentine Grass
		Oak Woodland
	Condition - the condition of the plant community being recorded.	Excellent
		Good
		Poor
		Dead
	Size - the area of the plant community being recorded.	Numeric value

When you select a feature from the feature list, the feature opens in the current data file. Subsequent GPS positions are recorded as part of the feature, until the feature is closed or aborted. Selecting a feature displays the feature's attribute list.

If you select *Plant Community* in the example, a screen similar to
Figure 7-10 appears.

```
┌─────────────────────────┐
│ Plantcommunity 8        │   1. feature, posns stored
│   Species               │   2. attribute
│     Serpentine Gra      │   3. value
│   Condition             │   4. attribute
└─────────────────────────┘      (scroll)
     Good                      5. value
   Size                        6. attribute
     Not entered               7. value
  1.Close Feature              8. option
  2.Pause                      9. option
  3.File Status                10.option
  4.Main Menu                  11.option
  5.Nest Feature               12.option
```
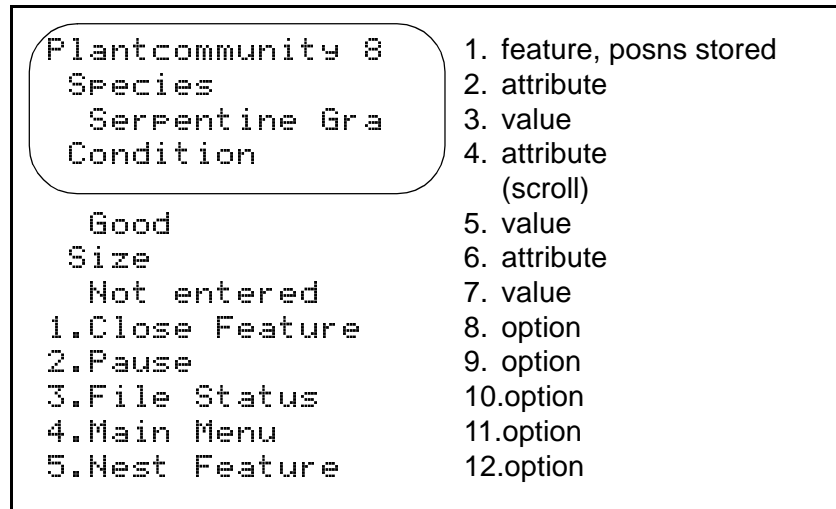
**Figure 7-10   Data Capture/ Open Rov. File/ Select Feature/
Feature**

The number in the upper right corner is the number of positions
recorded in the feature. The number is updated as positions are
recorded. In this example, *Plant* is the feature and *Species*, *Condition*,
and *Size* are its attributes. There are five types of attribute: menu,
numeric, character, date, and time.

Attributes can be defined with a default value. Default values are
automatically stored when the feature opens. They also display on the
attribute list. In the example, *Serpentine Grass* is the *Species* default
value, *Good* is the *Condition* default value, *Size* has no default value.
Attributes that do not have a default value display *Not entered*. This
indicates that the attribute was not stored as part of the selected
feature.

To select a menu option, move the cursor over the attribute value and press ◆ to display a list of menu options. Scroll through the items using ▲ or ▼. Highlight the one you want and press ◆ to select it.

Another way to select a menu option is to highlight the attribute value on the screen shown in Figure 7-10 and press ▶ or ◀ to scroll through the options until the one you want displays. Then press ▲ or ▼ to move to the next attribute.

To enter a value for a numeric field, move the cursor over the attribute and press ◆ to change to edit mode. The cursor is over the units digit. Use ▲ or ▼ to scroll through this digit. When it is correct, use ◀ to move to the tens digit. Repeat this process until the number is correct and then press ◆.

To enter a letter for a character fields, move the cursor over the attribute and press ◆ to change to edit mode. The cursor is over the first character of the field. Use ▲ or ▼ to scroll to the character you want. When it is correct, use ◀ to move to the second character. Repeat this process until you have completed the field and then press ◆.

For example, if you select *Condition* in the example, a screen similar to Figure 7-11 appears.

```
  Condition          1. attribute
   Excellent         2. value
  Good               3. value
  Poor               4. value
                        (scroll)
  Dead               5. value
```
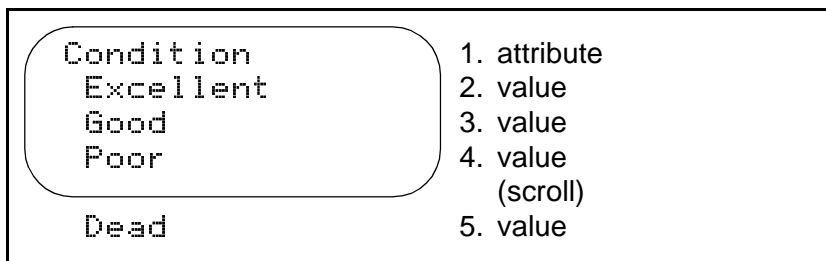
Figure 7-11   Data Capture/ Open Rov. File/ Select Feature/ Feature/ Attribute

In this example *Condition* is the attribute, *Excellent*, *Good*, *Poor*, and *Dead* are the possible attribute values.

⊠   **Note –** If you have High Accuracy mode turned on, you can record
     point features with submeter accuracy. You need the Phase Processor
     software to process this data. For more information refer to the *Phase
     Processor Software User Guide.*

If you open a point feature with *PtFeats* (under *Rover Options* in the
Configuration menu) set to *Ask*, Figure 7-12 appears.

```
╭─────────────────────╮
│ Open HiAccuracy     │   1. screen name
│   Point Feature?    │   2.
│ Yes                 │   3. option
│ No                  │   4. option
╰─────────────────────╯
```
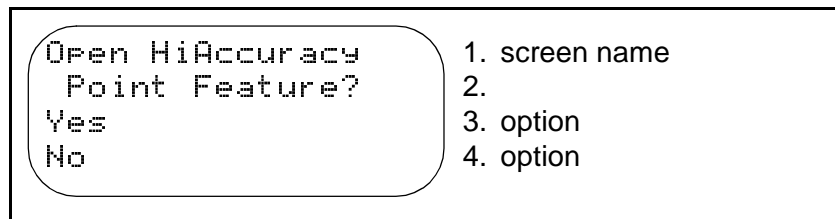
**Figure 7-12   Data Capture/ Open Rov. File/ Select Feature/
                 HiAccuracy Feature**

Table 7-6 describes the *HiAccuracy Feature* screen options.

Table 7-6   HiAccuracy Feature Options

Option	Description
Yes	Select *Yes* to record High Accuracy GPS position data in the current file.
No	Select *No* to record GPS position data in the current file.

If you open a point feature with *PtFeats* (under *Rover Options* in the *Configuration* menu) set to *On*, Figure 7-13 appears.

```
/Phase Processor       1. message
 required to use        2.
 high-acc. data!        3.
 1.Proceed              4. option
                           (scroll)
 2.Cancel               5. option
```
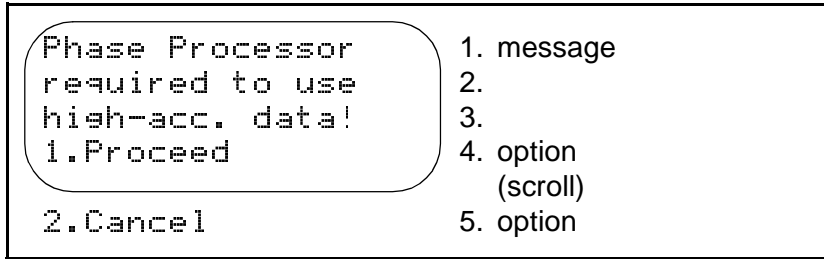
Figure 7-13   Data Capture/ Open Rov. File/ HiAccuracy Feature Warning

Table 7-7 describes the options on the *HiAccuracy File Warning* screen.

Table 7-7   HiAccuracy Feature Warning Options

Option	Description
Proceed	Select *Proceed* to record High Accuracy GPS position data.
Cancel	Select *Cancel* to abandon the operation.

For more information on recording in High Accuracy mode see High Accuracy, page 12-33.

Close Feature

Close Feature allows you to close the feature. Select this when you are finished entering attribute data and have collected enough positions for that feature. You are returned to the *Select Feature* menu.

If you select *Close Feature* before the specified minimum number of positions are recorded, Figure 7-14 appears. The minimum number of positions is specified in the *Configuration/ Rover Options* screen, see Rover Options, page 12-2.

```
 Only 5 posns.        1. message
   Close anyway?      2.
 Yes                  3. option
 No                   4. option
```
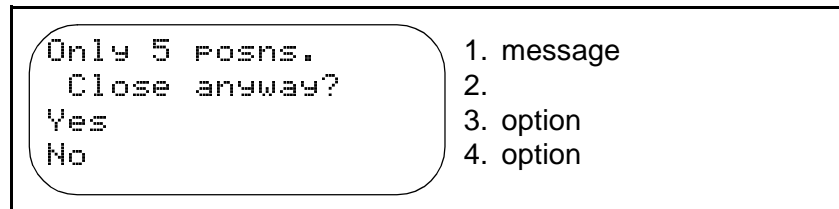
**Figure 7-14   Data Capture/ Open Rov. File/ Select Feature/
                 Close Feature/ Cannot Close**

Press any key to return to the *Select Feature* screen.

Attributes can be tagged as mandatory. Each mandatory attribute must be logged to the file. If there are mandatory attributes that are unentered when you select *Close Feature*, Figure 7-15 appears.

```
╭─────────────────╮   1. message
│ Cannot Close    │   2.
│   Feature,      │   3.
│ Mandatory fields│   4.
│   left unentered.
╰─────────────────╯
```
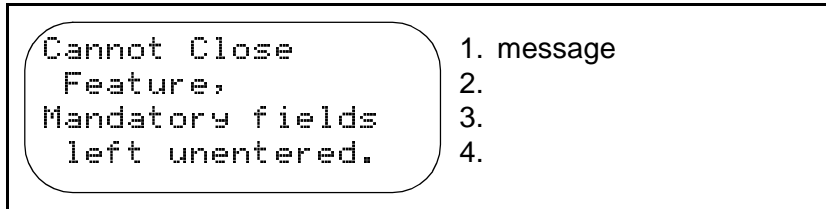
**Figure 7-15   Data Capture/ Open Rov. File/ Select Feature/
                 Close Feature/ Cannot Close**

Press any key to return to the *Select Feature* screen.

If you are recording a High Accuracy point feature, and you select *Close Feature* before the specified minimum time has elapsed, Figure 7-16 appears. The minimum time is specified in the *Configuration/ Rover Options* screen, see Rover Options, page 12-2.

```
╭─────────────────╮   1. message
│ Cannot Close    │   2.
│   Feature,      │   3.
│   Too little time│  4.
│   has elapsed.  │
╰─────────────────╯
```
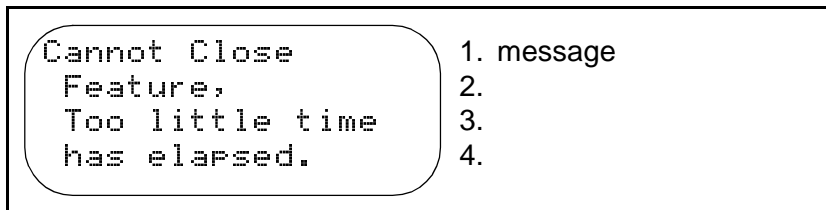
**Figure 7-16   Data Capture/ Open Rov. File/ Select Feature/
                 Close Feature/ Cannot Close**

Press any key to return to the *Select Feature* screen.

Abandon Feature

When you press $\textcircled{\scriptsize Esc}$, Figure 7-17 appears.

```
 ╭─────────────────────╮
 │ Abandon Feature     │    1. screen name
 │      Tree?          │    2. feature
 │ Yes                 │    3. option
 │ No                  │    4. option
 ╰─────────────────────╯
```
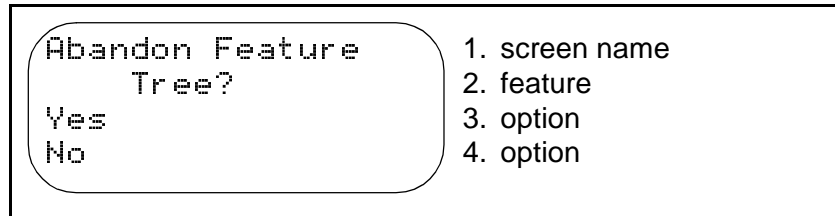
**Figure 7-17   Data Capture/ Open Rov. File/ Select Feature/
                 Abandon Feature**

Table 7-8 describes the *Abandon Feature* screen options.

Table 7-8   Abandon Feature Options

Option	Description
Yes	Select *Yes* to abandon the feature. None of the attributes stored in the feature are saved. The GPS position data is saved as Not in Feature positions.
No	Select *No* to continue recording positions and attribute data for the current feature.

Pause/Resume

Pause/Resume allows you to temporarily halt the logging of positions to the file. Use this option if you need to temporarily move away from the feature or if you have enough positions but want to record more attribute data. Once you select this option it changes from *Pause* to *Resume*. Selecting *Pause* does not end the feature or close the file, it halts the recording of positions. *Pause* also prevents the storage of waypoints in the data file. For more information, see Add Here, page 10-6. Select *Resume* when you are ready to continue the feature.

Main Menu

Main menu allows you to temporarily return to the GeoExplorer II receiver *Main* menu. This gives you access to the menu functions. You can view the GPS status or change configuration parameters if necessary. Data recording to the open file continues while other screens are selected. To return to the current file, select *Data Capture* from the *Main* menu.

Nest Feature

Nest Feature only appears when you have a data dictionary loaded and you select a line or area feature. *Nest Feature* allows you to record a point feature within a line or area feature. For example you could be recording a fence line and stop to record a tree half way along it. When you select *Nest Feature*, a screen similar to Figure 7-18 appears.

```
 ⸺ Nest Feature ⸺       1. screen name
                          2.
  1.Tree                  3. feature
  2.Pole                  4. feature
```
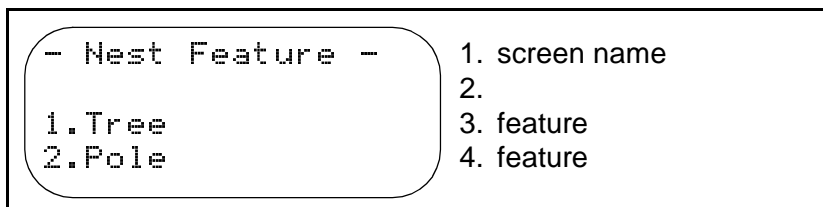
Figure 7-18   Data Capture/ Open Rov. File/ Select Feature/ Nest Feature

This is a list of the point features in your data dictionary. You can select them and record data as described above. It is possible to nest multiple point features in line or area features.

Note – You can only nest point features in line or area features. Lines cannot be nested in area features. Points cannot be nested in points.

7.3   Open Base File

The GeoExplorer II receiver can be used as a base station to collect base data for differential correction. In addition to position data a base file records raw measurement data from the satellites. For more information on base files, refer to your *Mapping Systems General Reference*. It contains a complete discussion of differential correction, base files, and rover files.

Before you record a base file check the set up parameters in *Base Options* under the *Configuration* menu. Many of these are critical for collecting accurate data. See Base Options, page 12-30 for more information.

Note – Due to the amount of memory available, the GeoExplorer II receiver is not suitable for collecting base data for long periods of time. It records 1 hour of data at a 5 second recording rate and 2 to 3 hours of data at a 10 second recording rate.

When you select *Open Base File*, a file opens and data logging begins, a screen similar to Figure 7-19 appears.

```
File:     B022600A        1. base file name
Size:       0.1152K       2. file size in KB
Free:      190.69K        3. amount of free memory
1.Main Menu               4. option
                             (scroll)
2.Pause                   5. option
3.Close File              6. option
```
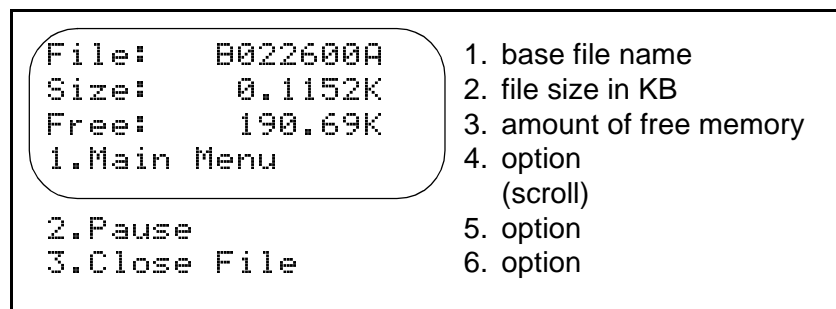
Figure 7-19   Data Capture/ Open Base File

This screen shows the base file name, the size of the current base file, and the amount of free memory available. This information is updated as more data is stored in the file.

When you select *Open Base File*, a file opens and position recording begins. The file is automatically named using the standard naming convention. The convention uses the time and date to name the file. An example of an automatically generated file name is B071309A. It is derived as follows:

B	file prefix
07	month 07, July
13	day 13
09	hour 09, GPS time
A	the first file created in the 9th hour of July 13

B071309B would be the second file created in the same hour on the same day. Using the automatic naming system, up to 36 files can be generated per hour.

Note – The base file must be recorded as a High Accuracy base file to differentially correct High Accuracy rover files. For more information on recording a High Accuracy base file, refer to the *Phase Processor Software User Guide*.

7.3.1   Main Menu

Main menu allows you to temporarily return to the GeoExplorer II receiver *Main* menu. This gives you limited access to the menu functions. You can view the GPS status or change configuration parameters if necessary. Data recording to the open file continues while other screens are selected. To return to the current file, select *Data Capture* from the *Main* menu, or press (Esc).

7.3.2   Pause/Resume

Pause/Resume allows you to temporarily halt the logging of base data to the file. Once you select this option it changes from *Pause* to *Resume*. Selecting *Pause* does not close the file, it halts the recording of data. Select *Resume* when you are ready to continue recording data in the file. It is a good practice to pause data logging or to select *Close File* before turning the GeoExplorer II off.

7.3.3   Close File

Close File allows you to end the file. This closes the data file permanently and base data is no longer recorded to this file. Use *Close File* when you finish logging your base data. You are returned to *Data Capture*. When you select *Close File*, Figure 7-20 appears.

```
╭────────────────────╮
│ Close File          │    1. screen name
│      B022600A       │    2. file name
│ Yes                 │    3. option
│ No                  │    4. option
╰────────────────────╯
```
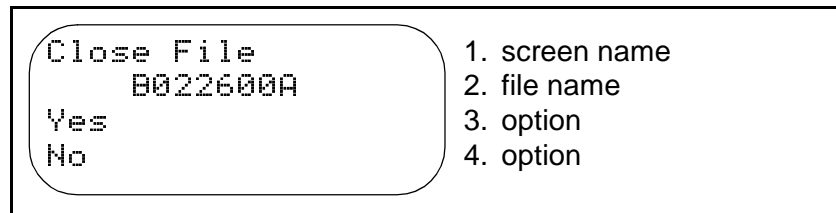
Figure 7-20   Data Capture/ Open Base File/ Close File

🖐 **Caution –** The base file must be recording the entire time that the rover file is being recorded. Use *Pause* only if you are certain your rover file is not collecting data. If the base file is not recording data at the correct time differential correction will fail.

Table 7-9 describes the *Close File* screen options.

Table 7-9   Close File Options

Option	Description
Yes	Select *Yes* to abandon the file. None of the data stored in the file is saved.
No	Select *No* to continue recording data in the current file.

7.4   Review File

Review File lets you review the base and rove files you collected. If there are no files to review, when you select *Review File*, Figure 7-21 appears.

```
/ - Review File -    \     1. screen name
|   No data files     |    2. message
|    have been        |    3.
|    captured.        |    4.
\                    /
```
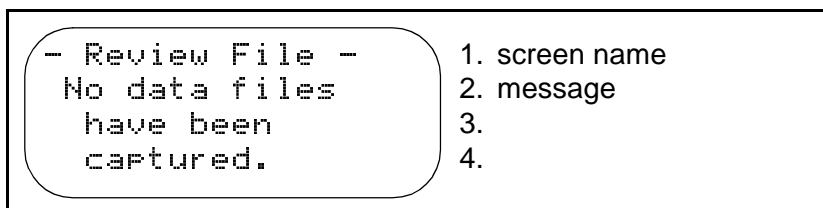
Figure 7-21   Data Capture/ Review File

Press any key to return to the *Data Capture* screen.

If files are present, when you select *Review File*, Figure 7-22 appears.

```
/ - Review File   -  \     1. screen name
| 001 R022423A        |    2. filename
| 002 R022600A        |    3. filename
| 003 B022814A        |    4. filename
\                    /
```
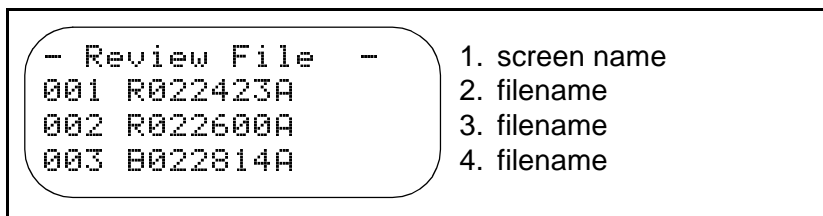
Figure 7-22   Data Capture/ Review File

When you press ◆, a screen similar to Figure 7-23 appears.

```
┌─────────────────────────────────────────────────────────────┐
│  ╭─────────────────────╮                                     │
│  │ Review: R022600A    │   1.  screen and file name          │
│  │ Rover File          │   2.  file type                     │
│  │ Log Rate:       1s  │   3.  log rate                      │
│  │ Pt Rate:        1s  │   4.  point log rate                │
│  ╰─────────────────────╯       (scroll to view the following)│
│                                                              │
│    L/A rate:     5s        5.  line/area log rate            │
│    Hi Rate:     15s        6.  High Accuracy log rate        │
│    #Positions: 1200        7.  # of points                   │
│    #Features:     2        8.  # of features                 │
│    Duration:   0:20        9.  file duration                 │
│    A Plantcommunity        10. area feature                  │
│    P Tree                  11. nested point feature          │
│      Species               12. point feature attribute       │
│        Redwood             13. point feature value           │
│      Condition             14. point feature attribute       │
│        Good                15. point feature value           │
│      Size                  16. point feature attribute       │
│        70                  17. point feature value           │
│     End Feature            18. point feature option          │
│      Species               19. area feature attribute        │
│        Serpentine G        20. area feature value            │
│      Condition             21. area feature attribute        │
│        Good                22. area feature value            │
│      Size                  23. area feature attribute        │
│        10                  24. area feature value            │
│     End Feature            25. area feature option           │
└─────────────────────────────────────────────────────────────┘
```

Figure 7-23   Data Capture/ Review File/ Review

This is a view-only screen so you cannot change any data. The point
logging rate and line/area logging rate are displayed if the file contains
these features. The High Accuracy logging rate displays if the file
contains High Accuracy data.

A *P*, *L*, or *A* before a features indicates a point, line, or area feature. A
p before a feature indicates a High Accuracy point feature. The
features' attributes and attribute values follow. The High Accuracy
point feature *Tree* is nested inside the area feature *Plant Community*.

7.5   Delete File

Delete File lets you erase a data file from the GeoExplorer II receiver.
Use this option after you download a file to the PC and need space for
more files. If there are no files to delete when you select *Delete File*,
Figure 7-24 appears.

```
┌─ Delete File ─┐      1. screen name
│  All files have │     2. message
│  been deleted.  │     3.
│                 │     4.
└─────────────────┘
```
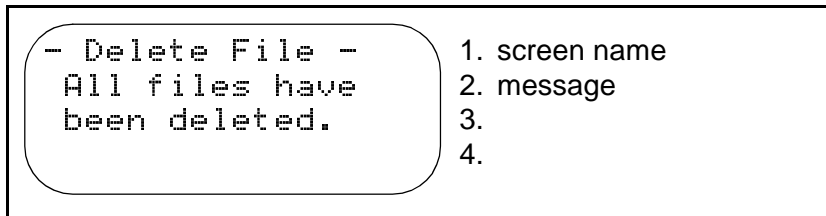
Figure 7-24   Data Capture/ Delete File

If files are present when you select *Delete File*, Figure 7-25 appears.

```
┌─ Delete File  ─┐      1. screen name
│ 001 R022423A   │      2. filename
│ 002 R022500A   │      3. filename
│ 003 R022600A   │      4. filename
└─────────────────┘
```
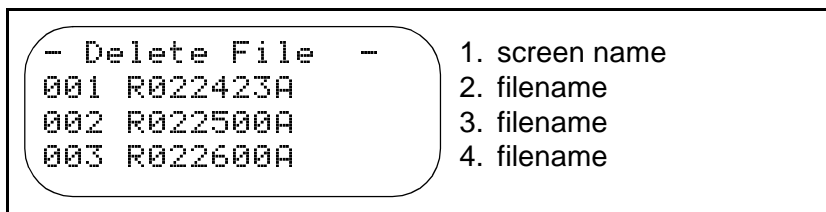
Figure 7-25   Data Capture/ Delete File

When you press ◆, Figure 7-26 appears.

```
┌────────────────────────────────┐
│  ⎛Delete                ⎞    1. screen name  │
│  ⎜    002 R022500A       ⎟    2. file name    │
│  ⎜Yes                   ⎟    3. option       │
│  ⎝No                    ⎠    4. option       │
└────────────────────────────────┘
```
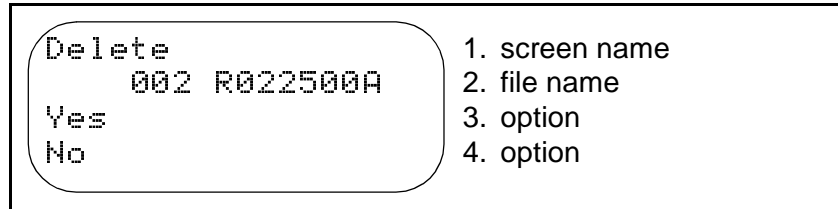
Figure 7-26   Data Capture/ Delete File/ Delete

🖐   **Caution –** Deleted files cannot be recovered.

Table 7-10 describes the *Delete* screen options.

Table 7-10   Delete Options

Option	Description
Yes	Select *Yes* to delete the file.
No	Select *No* if you do not want to delete the file.

7.6   Rename File

Rename File allows you to rename a data file from the GeoExplorer II receiver. Use this option to make files more distinguishable when reviewing or postprocessing them. If there are no data files when you select *Rename File*, the screen shown in Figure 7-27 appears.

```
┌─ Rename File ─┐      1. screen name
│  No data files │      2. message
│  to rename.    │      3.
│                │      4.
└────────────────┘
```
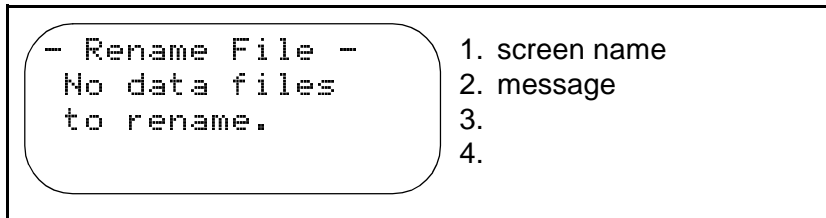
Figure 7-27   Data Capture/ Rename File

If files are present when you select *Rename File*, a screen similar to Figure 7-28 appears.

```
┌─ Rename File  ─┐      1. screen name
│ 001 R120421A   │      2. filename
│ 002 R120421B   │      3. filename
│ 003 R120421C   │      4. filename
└────────────────┘
```
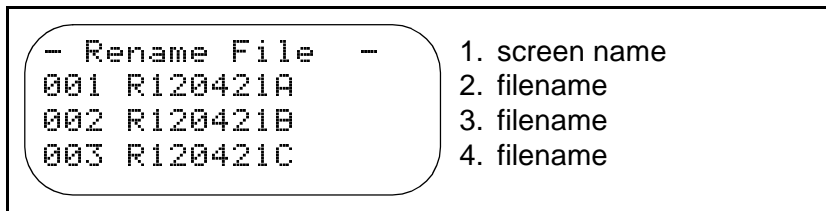
Figure 7-28   Data Capture/ Rename File

When you press ◈, a screen similar to Figure 7-29 appears.

```
 ⸻ Rename File ⸻        1. screen name
                        2.
     R120421B           3. filename
                        4.
```
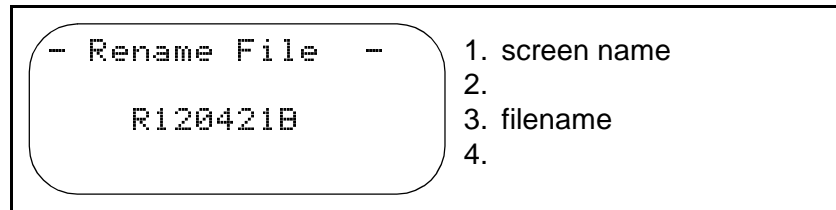
Figure 7-29   Data Capture/ Rename File

The cursor is initially positioned over the first character of the file name. Use the ▶ and ◀ keys to move through the filename. Use the ▲ and ▼ keys to change the character highlighted by the cursor. Press the ◈ key to confirm your change.

7.7   Dictionary

A data dictionary is a list of the features and attributes you want to collect. It is like a form that you take into the field. A data dictionary is created using the Pathfinder Office software on the PC and then downloaded to the GeoExplorer II receiver. In the field you are prompted to enter data for the defined features and attributes.

If you do not have a data dictionary loaded, when you select *Dictionary*, Figure 7-30 appears.

```
 ⸻ Dictionary ⸻        1. screen name
 A data                 2. message
 dictionary is          3.
 not loaded.            4.
```
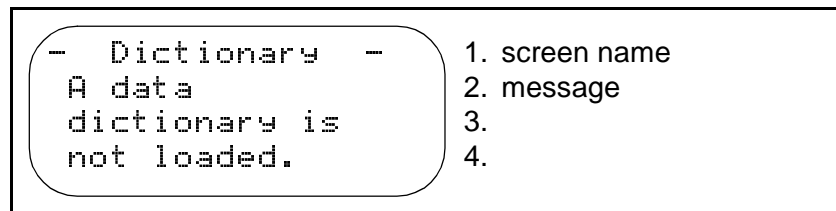
Figure 7-30   Data Capture/ Dictionary

If you do have a data dictionary loaded, when you select *Dictionary*, Figure 7-31 appears.

```
  -   Dictionary   -       1. screen name
Woods                      2. dictionary name
1.Review                   3. option
2.Delete                   4. option
```
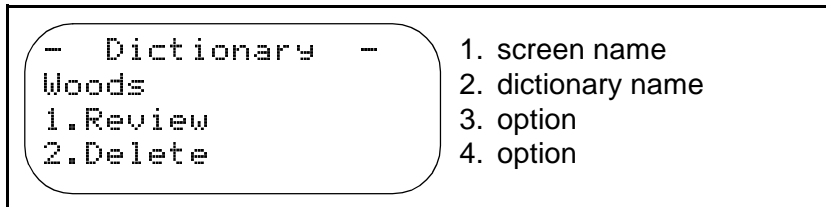
Figure 7-31   Data Capture/ Dictionary

7.7.1   Review

Review lets you view the current data dictionary. When you select *Review*, a screen similar to Figure 7-32 appears.

```
DD:Woods                   1. data dictionary name
  1.Plant community        2. feature
  2.Tree                   3. feature
  3.Trail                  4. feature
```
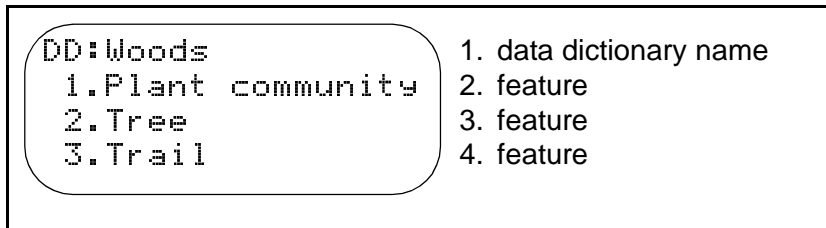
Figure 7-32   Data Capture/ Dictionary/ Review

7.7.2   Delete

Delete lets you erase the current data dictionary from the GeoExplorer II receiver. The data dictionary uses memory that could be used for data recording. If you do not plan to use the data dictionary, delete it to maximize base or rover file recording time.

A data dictionary can only be deleted when it is not in use, in other words, the data files do not have logged features. Before deleting a data dictionary, transfer all files to the PC, delete the data files on the GeoExplorer II receiver, then delete the data dictionary on the receiver.

You can only store one data dictionary on the GeoExplorer II receiver. You do not need to delete an old data dictionary when loading a new one. The new data dictionary loads over the old one, if the old data dictionary is not in use, and there is enough memory.

When you select *Delete*, Figure 7-33 appears.

```
Del Dictionary        1. screen name
  Woods               2. dictionary name
Yes                   3. option
No                    4. option
```
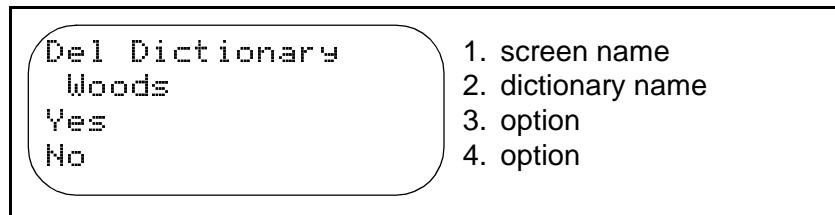
Figure 7-33   Data Capture/ Dictionary/ Delete

✋   **Caution –** A deleted data dictionary cannot be recovered. Keep a copy of the data dictionary on your PC so you can download it again.

Table 7-11 describes the *Delete* screen options.

Table 7-11   Delete Options

Option	Description
Yes	Select *Yes* to delete the data dictionary.
No	Select *No* if you do not want to delete the data dictionary.

8   Position

Position lets you view your current position. When you press ◈ to select *Position*, a screen similar to Figure 8-1 appears.

```
  ─ GPS Position ─      1. screen name
   N  37°23'28.20"      2. current position
   W 122°02'15.50"      3.
  3D  HAE      68m       4. Position mode, alt
                            reference, current alt
```
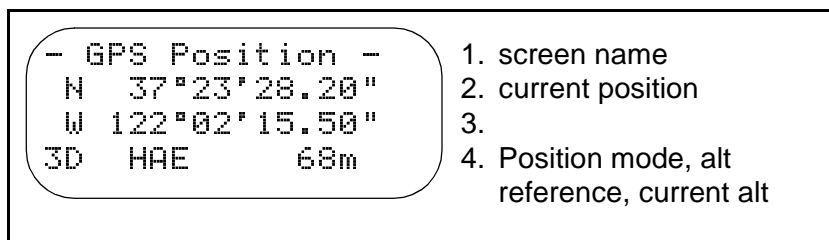
Figure 8-1   Position/ GPS Position

You can change the datum, coordinate system, and units under the *Configuration* menu. See Chapter 12, Configuration for more information. Table 8-1 describes the Position mode options on the *GPS Position* screen.

Table 8-1   Position Mode Options

Value	Description
2D	The position is two-dimensional (latitude and longitude).
3D	The position is three-dimensional (latitude, longitude, and altitude).
3OD	The position is overdetermined, three-dimensional.
2DX	The position is two-dimensional and was corrected in real-time.

Table 8-1   Position Mode Options (Continued)

Value	Description
3DX	The position is three-dimensional and was corrected in real-time.
3ODX	The position is overdetermined, three-dimensional and was corrected in real-time.
A2D	The position is two-dimensional and recorded in Auto 2D/3D mode.
A3D	The position is three-dimensional and recorded in Auto 2D/3D mode.
A2DX	The position is two-dimensional, recorded in Auto 2D/3D mode, and was corrected in real-time.
A3DX	The position is three-dimensional, recorded in Auto 2D/3D mode, and was corrected in real-time.

If there are not enough satellites visible to calculate a position, the *Old Position* screen displays as shown in Figure 8-2.

```
┌─ Old Position ─┐   1. screen name
│ N  37°23'10.00" │   2. old position
│ W 122°02'16.40" │   3.
│    HAE     83m  │   4. altitude reference, and
└─────────────────┘      altitude
```
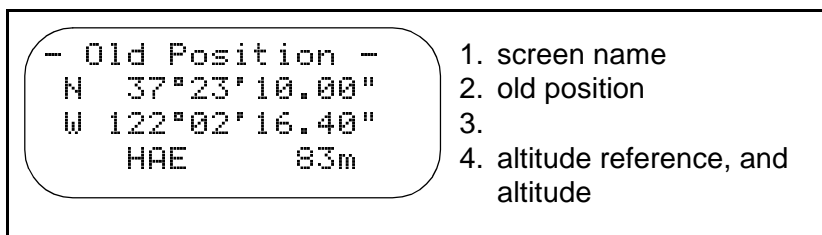
Figure 8-2   Position/ Old Position

When the GeoExplorer II receiver has switched to 2D, if you do not enter a new altitude within 30 minutes or if you move more than 1 mile from the last 3D position computation, the altitude field of the *Position* screen flashes to remind you that the altitude is old.

9 GPS Status

GPS Status provides information on the location and status of the satellites. It also indicates the accuracy of the positions you are viewing or recording. Figure 9-1 lists the *GPS Status* menu options.

```
┌─  GPS Status  ─┐   1. screen name
│1.Sat Tracking  │   2. option
│2.Sat Posn & SNR│   3. option
│3.Sat Hlth & URA│   4. option
└────────────────┘      (scroll)
 4.Sat Chnl Data     5. option
```
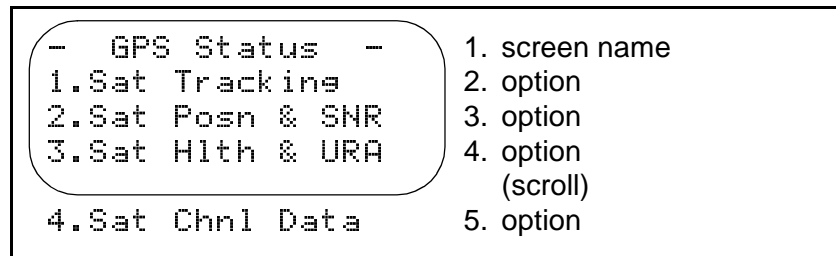
Figure 9-1   GPS Status Menu

9.1   Sat Tracking

The GeoExplorer II receiver has six channels that can track satellites. In standard (non-overdetermined, non-High Accuracy) 3D tracking mode, the receiver tracks eight satellites and uses the best four satellites to compute a three-dimensional position. In standard (non-High Accuracy) 2D tracking mode, the receiver tracks eight satellites and uses the best three satellites to compute a two-dimensional position. In overdetermined mode (ODS 3D), the receiver tracks the six highest satellites and uses these to compute a position. When you are collecting High Accuracy data in 3D mode, the receiver tracks the six highest satellites and uses the best four to calculate a position.

Sat Tracking lets you view which satellites are currently being tracked, which satellites are used to calculate the current position, and the current PDOP. When you select *Sat Tracking*, a screen similar to Figure 9-2 appears.

```
 ⟋‾ Sat Tracking ‾⟍     1. screen name
|  >07 >26  19 >27  |    2. PRNs of the satellites
|  >02             |     3. being tracked
|  ░░░░    PDOP:2.51|     4. number of satellites
 ⟍_____⟋         available, PDOP value
```
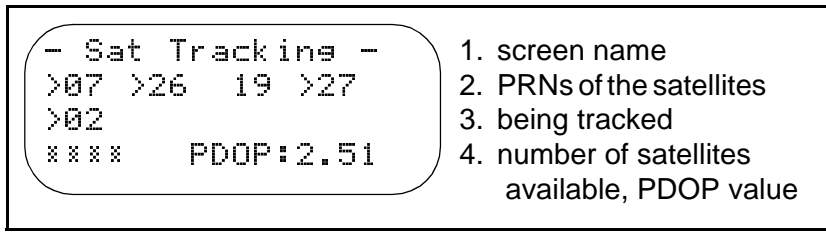
Figure 9-2   GPS Status/ Sat Tracking

describes the *Sat Tracking* screen data.

Table 9-1   Sat Tracking Data

Value	Description
PRNs of the satellites being tracked	The PRN (pseudorandom number) is the individual ID number of the satellite assigned by the DoD. The PRNs range from 1 to 32.
	The *Sat Tracking* screen shows the PRNs of the satellites the GeoExplorer II receiver is tracking. This includes all satellites, whether they meet the PDOP and Elevation Masks or not. The receiver displays an arrow in front of the PRN, when that satellite is used in a position fix. If more satellites are available than the maximum number the GeoExplorer II receiver can track, only the highest satellites are tracked.

Table 9-1   Sat Tracking Data (Continued)

Value	Description
Number of satellites available	The number of satellites available for a position fix. This shows only healthy satellites that meet all required masks. Before a satellite can be used for a position fix it must meet all the masks set in the *Configuration /Rover Options* menu. In non-overdetermined mode, four satellites yield 3D positions and three satellites yield 2D positions. In overdetermined (ODS 3D) mode, four, five, or six satellites yield overdetermined 3D positions.
PDOP	PDOP (Position Dilution Of Precision) is a mathematical calculation that takes into account each satellite's location relative to the other satellites in the constellation (the constellation geometry) to predict the accuracy of positions obtained with that constellation. PDOP is the best overall indicator of accuracy, although PDOP alone does not guarantee good positions. The GeoExplorer II receiver automatically uses the constellation with the lowest PDOP. A constellation with a PDOP of 4 or below is likely to yield highly accurate positions. A PDOP between 5 and 8 is acceptable. A PDOP of 8 or more is poor. This value must be below the PDOP Mask (or PDOP Switch) for the constellation to be used. The default PDOP Mask in the GeoExplorer II receiver is 6. The PDOP Mask and PDOP Switch are set under the *Configuration /Rover Options* menu. For more information on how satellite geometry and PDOP affect accuracy, refer to the *Mapping Systems General Reference*.

9.2   Sat Posn & SNR

Sat Posn & SNR displays elevation, azimuth, and signal strength information for individual satellites. When you select *Sat Posn & SNR*, a screen similar to Figure 9-3 appears.

```
PRN Elv  Az   SNR        column 1 - PRN of the
 07  83   76   0.0          satellites being tracked
>26  38  260   4.3       column 2 - sat. elevation
>09  20  312  11.0       column 3 - satellite azimuth
                         column 4 - satellite SNR
```

Figure 9-3   GPS Status/ Sat Posn & SNR

Scroll down the screen to see the complete list of satellites and satellite information. Table 9-2 describes the *Sat Posn & SNR* screen data.

Table 9-2   Sat Posn & SNR Data

Value	Description
PRN	The PRN (pseudorandom number) is the individual ID number of the satellite assigned by the DoD. The PRNs range from 1 to 32.
Elv	The elevation above the horizon of each satellite. The elevation must be higher than the Elevation Mask for the GeoExplorer II receiver to use the satellite for positions. The Elevation Mask is set under *Configuration/ Rover Options*.
Az	The azimuth of each satellite. The azimuth is always referenced to True North.

Table 9-2   Sat Posn & SNR Data (Continued)

Value	Description
SNR	The SNR (Signal to Noise Ratio) value of each satellite currently being tracked. This is the strength of the signal. If a signal is too weak and does not meet the SNR Mask, it is not used for positions. An SNR of 5 or more is good. You can decrease the SNR Mask if you are not tracking enough satellites to record a position. The SNR Mask is set under *Configuration/ Rover Options*.

9.3   Sat Hlth & URA

Sat Hlth & URA displays the health status and URA value for individual satellites. When you select *Sat Hlth & URA*, a screen similar to Figure 9-4 appears.

```
PRN    Hlth URA          column 1 - PRNs of the
 02    OK   32.0m           satellites being tracked
>07    OK   32.0m        column 2 - satellite health
>26    OK   32.0m        column 3 - satellite URA
```

Figure 9-4   GPS Status/ Sat Hlth & URA

Scroll down the screen to see the complete list of satellites and satellite information. Table 9-3 describes the *Sat Hlth & URA* screen data.

Table 9-3   Sat Hlth & URA Data

Value	Data
PRN	The PRN (pseudorandom number) is the individual ID number of the satellite assigned by the DoD. The PRNs range from 1 to 32.

Table 9-3   Sat Hlth & URA Data (Continued)

Value	Data
Hlth	The current health of each satellite. If a satellite is OK, it is healthy and can be used to compute positions. If a satellite is U, it is unhealthy and is not used to compute positions. If a satellite is n/a, it is not being tracked or there is no almanac record for it.
URA	URA (User Range Accuracy) is an estimate of the accuracy of the satellite range measurement in meters. It is provided by the Department of Defense and transmitted from the satellite to the GeoExplorer II receiver. The value is based on a variety of factors, including age of the data, type of clock in the satellite, satellite orbit and clock behavior, and whether Selective Availability is activated. The possible values of URA are: 1,2, 2.8, 4, 5.8, 8, 16, 32, 64, 128, 256, 512, and 1024 meters.
	Below 5.8Position accuracy is good using this satellite.
	5.8 to 8Position accuracy may be poor if this satellite is used.
	16SA may be activated. Accuracy can be degraded up to 100 meters (2dRMS).
	32 or 64SA is activated. Data needs to be differentially corrected to achieve 2 to 5 meter accuracy.
	Above 64SA is on to an abnormal extent or a problem exists with the satellite. Satellite problems usually cause the satellite to be set unhealthy.

9.4   Sat Chnl Data

Sat Chnl Data displays diagnostic information for the GeoExplorer II receiver. When you select *Sat Chnl Data*, a screen similar to Figure 9-5 appears.

```
Chnl   PRN   Code        column 1 - satellite channel
1-0    07    ---c-       column 2 - PRN of the
2-0    26    or-c-          satellites being tracked
3-0    02    ---c-       column 3 - satellite code
```

Figure 9-5   GPS Status/ Sat Chnl Data

Scroll down the screen to see the complete list of channels and information. Table 9-4 describes the *Sat Chnl Data* screen data.

Table 9-4   Sat Chnl Data

Value	Data
Chnl	The number of the channel the GeoExplorer II receiver is using to track the satellite. This is useful to check that the channels are working. The receiver has six channels that can track satellites.
PRN	The PRN (pseudorandom number) is the individual ID number of the satellite assigned by the DoD. The PRNs range from 1 to 32. This indicates which satellite is being tracked by each channel.

Table 9-4   Sat Chnl Data (Continued)

Value	Data
Code	A code that indicates the state of the satellite and the state of the receiver's signal reception: hBad health - The satellite is unhealthy and is not used in a position fix. pBad parity - The message from the satellite is bad. oOld - The satellite is not visible, it may be blocked by an object. rNever acquired - The satellite has never been acquired. mHave integer millisecond - The satellite is being tracked by the GeoExplorer II receiver, which has a rough measurement from it that can be used in a position fix. cCollecting data - The satellite is being used to receive an almanac eNo ephemeris - The satellite cannot be used to calculate a position fix.

10 Navigation

Navigation lets you navigate from one position to another. You can store single locations as waypoints and then navigate between two waypoints or you can navigate from your current position to a waypoint. Waypoints can be GPS positions saved on a previous visit to a site or they can be manually entered from a map. Figure 10-1 lists the *Navigation* menu options.

```
 ⌐   Navigation   ¬        1. screen name
 1.Start Navigate          2. option
 2.To Waypoint             3. option
 3.From Waypoint           4. option
                              (scroll)
 4.Waypoint Setup          5. option
 5.Display Format          6. option
```
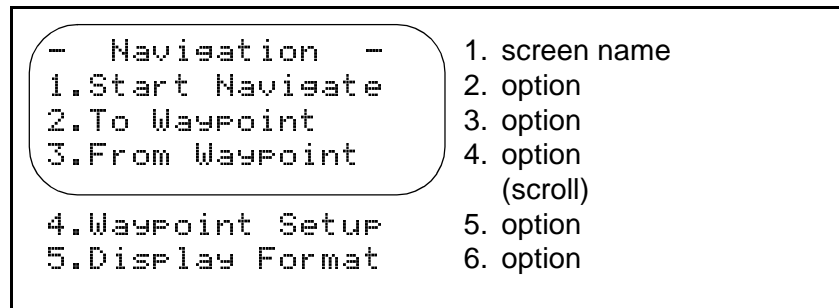
Figure 10-1   Navigation Menu

10.1 Start Navigate

Select *Start Navigate* when you are ready to navigate. However, first you need to set up some waypoints, select which waypoints you are navigating from and to, and select a display format. You can navigate from your current position by selecting Waypoint 00 as your *From Waypoint*.

The *Start Navigate* screen varies according to the display format selected, see Display Format, page 10-13. As you move, the velocity, range, heading and bearing change. When the waypoint designator is *TO*, the range shown is the distance to the destination. When the designator is *FROM*, the range is the distance from the starting point. Keep your heading the same as the bearing. This keeps you on the shortest route to your destination. As you draw closer, the range decreases. When it reaches 0, you are at the destination.

The GeoExplorer II receiver uses great circle calculations to perform navigation. This means it guides you on a route that follows the shortest distance between the two points. Under about 100 miles, great circle and Rhumb line calculations are equivalent.

Table 10-1 lists some terms used when discussing navigation:

Table 10-1   Navigation Terminology

Term	Description
Bearing	The direction you need to go to get to a destination.
ETA	The Estimated Time of Arrival, the time of day you will reach your destination.
Heading	The current direction of travel (for example, you are heading east, 90° magnetic).
Range	The distance to a destination (for example, the range is 23.75 kilometers).
TTG	The Time To Go, the time remaining until you reach your destination.
Velocity	Your current speed across the ground.
XTE	Cross track error is the distance and direction (left or right) of your current location in regard to an imaginary line connecting the starting point and the destination. For example, XTE is 2 miles to the right, means you are 2 miles right of the line, and you must turn left to return to the line.

10.2 To Waypoint

To Waypoint lets you select a waypoint to navigate to. When you select
To Waypoint, a screen similar to Figure 10-2 appears.

```
TO:04 HOME              1. wpt number, name
 N  37°23'30.00"        2. coordinate
 W 122°02'15.00"        3. coordinate
     HAE     160m       4. altitude reference, and
                           altitude
```
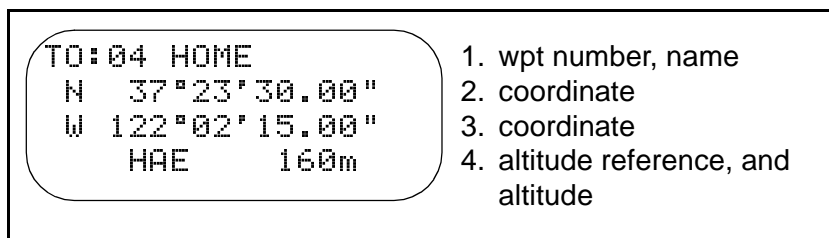
Figure 10-2   Navigation/ To Waypoint

The cursor is over the waypoint number. Use ⊙ or ⊙ to scroll
through the waypoints available. Press ⊙ when the waypoint you
want to navigate to displays.

✉   **Note –** Before navigating to a waypoint, you must set up some
     waypoints. Refer to Waypoint Setup, page 10-5 for more information.

10.3 From Waypoint

From Waypoint lets you select a waypoint to navigate from. When you select *From Waypoint*, a screen similar to Figure 10-3 appears.

```
FR:08 SITE A         1. wpt number, name
  N  37°26'10.00"    2. coordinate
  W 122°01'08.00"    3. coordinate
      HAE     160m   4. altitude reference, and
                        altitude
```
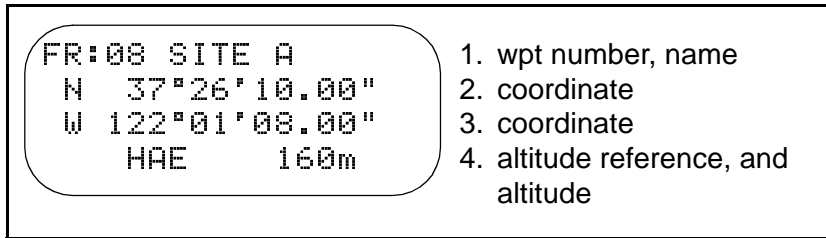
Figure 10-3   Navigation/ From Waypoint

☆ **Tip –** To start navigating from your current position, select Waypoint 00.

The cursor is over the waypoint number. Use ▲ or ▼ to scroll through the waypoints available. Press ◉ when the waypoint you want to navigate from displays.

✉ **Note –** Before navigating from a waypoint, you must set up some waypoints. Refer to Waypoint Setup, page 10-5 for more information.

10.4 Waypoint Setup

Waypoint Setup option allows you to create, edit, delete, and clear waypoints. Figure 10-4 lists the *Waypoint Setup* menu options.

```
┌─────────────────────────┐   1. screen name
│ -Waypoint Setup-        │   2. option
│ 1.Add Here              │   3. option
│ 2.Edit WPT              │   4. option
│ 3.Delete WPT            │        (scroll)
│                         │
│ 4.Clear All             │   5. option
└─────────────────────────┘
```
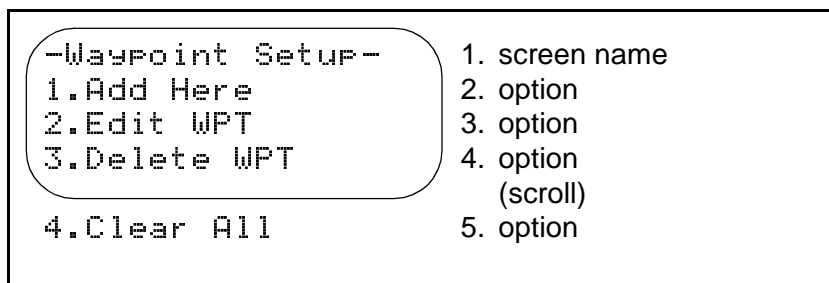
Figure 10-4   Navigation/ Waypoint Setup

You can store 99 waypoints. Waypoint coordinates can be stored by recording GPS positions from the GeoExplorer II receiver or entering them manually. A complete waypoint has a waypoint number, name, and coordinates. Once a waypoint name and coordinates are attached to a specific waypoint number, they are recorded permanently until you edit, delete, or clear them.

10.4.1 Add Here

Add Here allows you to save your current location as a waypoint. The GeoExplorer II receiver must be computing positions to record your current position as a waypoint.

If the GeoExplorer II receiver is not computing positions when you want to create a waypoint, it stores one waypoint with the most recent position. When you select *Add Here*, a screen similar to Figure 10-5 appears.

```
─    Add Here    ─        1. screen name
W01                       2. waypoint number
  N    0°00'00.00"        3. coordinate
  E    0°00'00.00"        4. coordinate
```
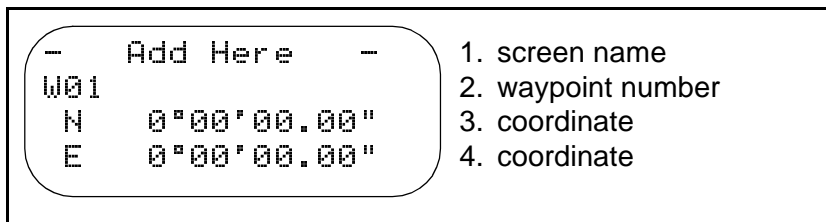
Figure 10-5   Navigation/ Waypoint Setup/ Add Here

Use ▲ or ▼ to scroll through the waypoints available and find the waypoint number you want. Press ◆ twice to add the waypoint. The waypoint name is created automatically from the time the position was computed.

Any position more than 3 seconds old is considered an old fix. If you are saving an old position (the GeoExplorer II receiver is not currently calculating positions), the default name is *OLDPOS00*. You can rename waypoints after saving the coordinates using *Edit WPT*.

If *Waypoint Averaging* is *Off*, a single GPS position is assigned to the waypoint. If *Waypoint Averaging* is *On*, the GeoExplorer II receiver calculates the specified number of GPS positions and averages these into a single waypoint position. For more information on waypoint averaging, see WPT Averaging, page 12-82.

When you save a waypoint the waypoint number automatically increments. Then, when you press $\Diamond$ twice, another waypoint is saved sequentially.

If you save waypoint data continuously as described, the coordinates but not the names of any existing waypoints encountered are overwritten. Empty waypoints are named with the time of the position. For example, if you stored 6 continuous waypoints starting with Waypoint 25 and Waypoints 27 and 29 were already assigned, the new waypoints are shown in Table 10-2.

Table 10-2   Waypoint Data

#	Name	Latitude	Longitude	Altitude
25	07:22:15	37°23'32.4"N	122°02'42.9"W	+88ft
26	07:22:26	37°23'32.8"N	122°02'43.2"W	+92ft
27	LAMP POST	37°23'32.1"N	122°02'42.6"W	+85ft
28	07:22:45	37°23'32.6"N	122°02'43.2"W	+91ft
29	LAKE	37°23'32.8"N	122°02'43.3"W	+88ft
30	07:23:04	37°23'32.0"N	122°02'43.5"W	+86ft

Note – You can also enter waypoint names and coordinates manually. Refer to Edit WPT, page 10-8 for more information.

This feature is useful if you know the names of waypoints you will be storing ahead of time. You can create the list of waypoint names in the Pathfinder Office software and load these into the GeoExplorer II receiver. When you arrive at a pre-defined waypoint, locate the waypoint number and use *Add Here* to save the location in the waypoint. Only the waypoint data changes.

Waypoint Storage and Data Capture

If you are using *Data Capture* when a waypoint is stored, the waypoint is stored in both the waypoint library and the data file as a waypoint point feature. The waypoint name and position are both stored in the file. If point averaging was selected, the averaged point is stored in the file. Waypoints are not stored in a data file while data logging is in *Pause* mode.

You can change the name of the waypoint stored in the file by editing the waypoint name in the waypoint library. The name of the corresponding waypoint in the data file also changes. Only the most recent corresponding waypoint name changes.

10.4.2 Edit WPT

Edit WPT allows you to manually change a waypoint number, name or coordinates. This lets you create new waypoints and edit old ones. When you are entering waypoints the coordinate system, datum, and altitude reference selected in the GeoExplorer II receiver must be the same ones used to calculate the coordinates you are entering. If you are reading the coordinates from a map, the map's datum, coordinate system, and altitude reference are usually shown in the map legend or title block. For instructions on changing the coordinate system, see Coordinates, page 12-47. For instructions on changing the datum, see Datum, page 12-49. For instructions on changing the altitude reference see Custom Setup, page 12-52.

When you select *Edit WPT*, a screen similar to Figure 10-6 appears.

```
┌─────────────────────────┐
│ —    Edit WPT    —      │   1. screen name
│ W08 HOME                │   2. wpt number, name
│   N   37°23'35.30"      │   3. coordinate
│   W  122°02'15.00"      │   4. coordinate
└─────────────────────────┘
```
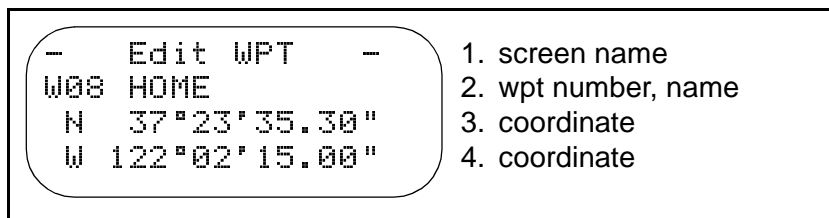
Figure 10-6   Navigation/ Waypoint Setup/ Edit WPT

You can enter the name and coordinates of new waypoint in an empty waypoint or over an existing waypoint. To edit a waypoint do the following:

1. Use ⬆ or ⬇ to scroll until you find the waypoint you want and press ◆.

    A screen similar to Figure 10-7 appears.

```
┌─────────────────────────┐
│ W04                     │   1. wpt number, name
│ Lat   0°00'00.00N       │   2. coordinate
│ Lon   0°00'00.00E       │   3. coordinate
│ Alt +     0.0m   M      │   4. altitude, altitude
│                         │      reference
└─────────────────────────┘
```
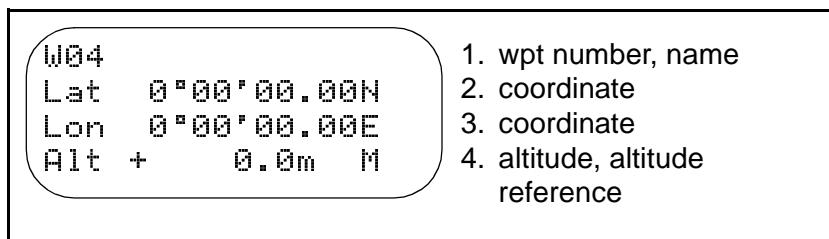
Figure 10-7   Navigation/ Waypoint Setup/ Edit WPT/ WPT

2. Enter a name for the waypoint.

    Press ▶ to move the cursor to the first character of the waypoint name. Use ⬆ or ⬇ to scroll through the list of characters until you reach the one you want. Move to the next character and repeat this process until you have the waypoint name you want. Press ↵ to accept the waypoint name.

3. Enter the waypoint coordinates.

Press ⊙ to move the cursor to the first digit of the waypoint coordinate. Use ⊙ or ⊙ to scroll through the list of digits until you reach the one you want. Move to the next digit and repeat this process until you have the coordinate you want. Make sure you set the correct hemisphere. Press ⊙ to accept the waypoint coordinates.

4. Repeat this for both coordinates and the altitude.

You can scroll the altitude units from meters to feet. The altitude reference displays in the bottom line at the right corner.

If the position coordinates are inappropriate they are rejected.

5. When you are finished entering the waypoint data press ⊙, Figure 10-8 appears.


```
Save
W04?
Yes
No
```
1. screen name
2. wpt number
3. option
4. option
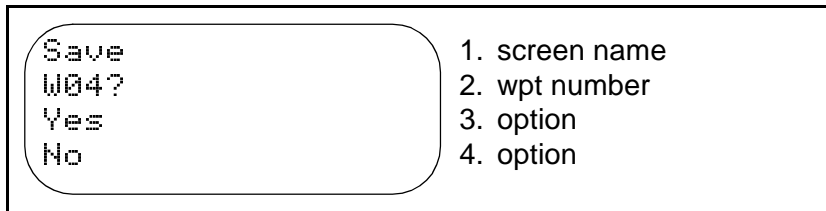
Figure 10-8   Navigation/ Waypoint Setup/ Edit WPT/ Save

6. Select *Yes* to save the waypoint edits and exit the screen. Select *No* to abandon the edits.

10.4.3   Delete WPT

Delete WPT allows you to delete the waypoint name and coordinates from a waypoint. The waypoint information cannot be recovered. When you select *Delete WPT*, a screen similar to Figure 10-9 appears.

```
 ⎛  -   Delete WPT   -  ⎞    1. screen name
 ⎜ W08 HOME             ⎟    2. wpt number, name
 ⎜  N   37°23'30.00"    ⎟    3. coordinate
 ⎝  W  122°02'15.00"    ⎠    4. coordinate
```
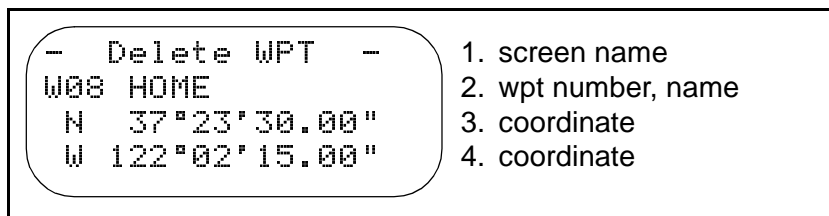
Figure 10-9   Navigation/ Waypoint Setup/ Delete WPT

Use ⬆ or ⬇ to scroll through the waypoints available. Press ◆ when the waypoint you want to delete displays, Figure 10-10 appears.

```
 ⎛ Delete              ⎞    1. screen name
 ⎜ W02 OLDPOS00        ⎟    2. wpt number, name
 ⎜ Yes                 ⎟    3. option
 ⎝ No                  ⎠    4. option
```
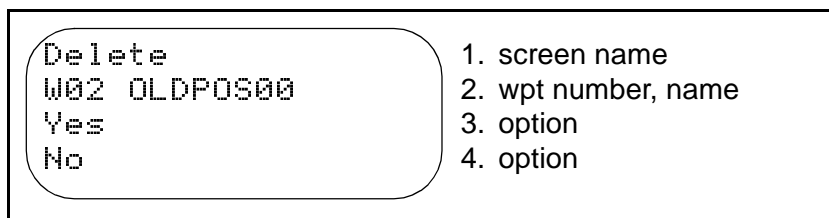
Figure 10-10 Navigation/ Waypoint Setup/ Delete WPT/
**   Delete**

Table 10-3 describes the *Delete* screen options.

Table 10-3   Delete Options

Option	Description
Yes	Select *Yes* to delete the waypoint. The waypoint name and position are deleted.
No	Select *No* to abandon the operation.

Caution – Deleted waypoint data cannot be recovered.

10.4.4   Clear All

Clear All lets you clear waypoint data from all the waypoint numbers in the GeoExplorer II receiver. Use this option with extreme care as waypoint data cannot be recovered. Use this option when you are certain you no longer need the waypoint data. With the Pathfinder Office software, you can transfer the waypoints to the PC first as a backup. When you select *Clear All*, Figure 10-11 appears.

```
Clear All            1. screen name
  waypoints?         2.
Yes                  3. option
No                   4. option
```
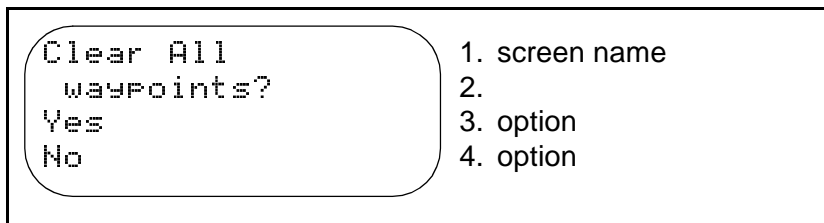
Figure 10-11   Navigation/ Waypoint Setup/ Clear All

Table 10-4 describes the *Clear All* screen options.

Table 10-4   Clear All Options

Option	Description
Yes	Select *Yes* to clear the waypoint. All waypoint data is cleared and you have 99 empty waypoints.
No	Select *No* to abandon the operation.

Caution – Cleared waypoint data cannot be recovered.

Note – You cannot add, edit, or delete waypoint 00. It is always the current position.

10.5 Display Format

Display Format lets you choose which measurements you want to see on screen when navigating. Figure 10-12 lists the *Display Format* menu options.


```
-Display Format-        1. screen name
1.Dist/Bearing          2. option
2.Track & XTE           3. option
3.East/North            4. option
                           (scroll)
4.Velocity/Time         5. option
```

Figure 10-12 Navigation/ Display Format

10.5.1 Dist/Bearing

When you select *Dist/Bearing*, the *Start Navigate* screen looks similar to Figure 10-13.

```
>W05 HOME              1. To WPT number, name
 Dist:    0.1435km     2. distance to destination
 Turn:    left 147°    3. turn to modify track
 Bearing:  353°Mn      4. current bearing
                          (scroll)
 Heading:   140°Mn     5. current heading
```
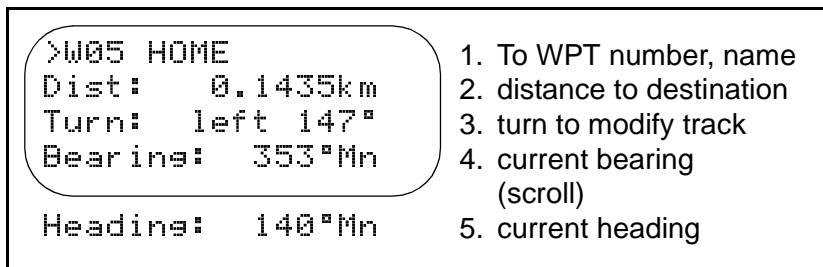
Figure 10-13 Navigation/ To Waypoint (Dist/Bearing)

The heading and bearing should be the same value when you are directly on course. The fields update as you move. The title changes to *OLD Navigation* when GPS positions are not being calculated.

10.5.2 Track & XTE (Cross Track Error)

When you select *Track & XTE*, the *Start Navigate* screen looks similar to Figure 10-14.

```
 From 02 TO 05         1. From-To WPT numbers
 Heading:   140°Mn     2. current heading
 Dist:    0.1435km     3. distance to destination
 XTE:     0.1256km>    4. cross track error
```
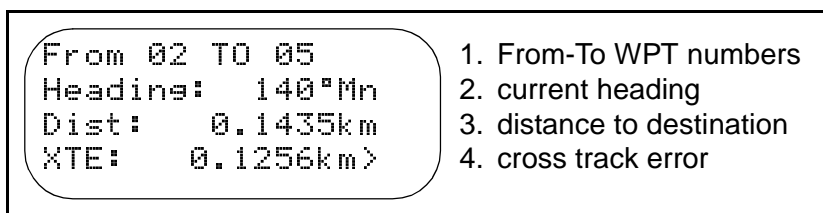
Figure 10-14 Navigation/ Start Navigate (Track & XTE)

The fields update as you move. An arrow at the end of the *XTE* line indicates the direction you should go. The title changes to *OLD Navigation* when GPS positions are not being calculated.

If you started from your current position, the *XTE* and *FROM* range is always 0 because the GeoExplorer II receiver continually updates Waypoint 0 with the last recorded position.

If you started from a waypoint other than 0, the *XTE* shows how far off course you are from an imaginary line between the two waypoints that is the shortest distance between them. For example, if the *XTE* is Left, you are left of the line and must turn right to get back on the line. If the *XTE* is 0, you are on the imaginary line. *XTE* does not need to be 0 in order to arrive at the destination.

10.5.3   East/North

When you select *East/North*, the *Start Navigate* screen looks similar to Figure 10-15.

```
>W05 HOME                    1. To WPT number, name
 Elevation:     12°          2. vertical angle to WPT
 Heading:      8°Mn          3. current heading
 Go E:    0.1583km           4. modify track to east
                                (scroll)
 Go N:    0.0002km           5. modify track to north
 Go U:     0.199km           6. modify elevation
```
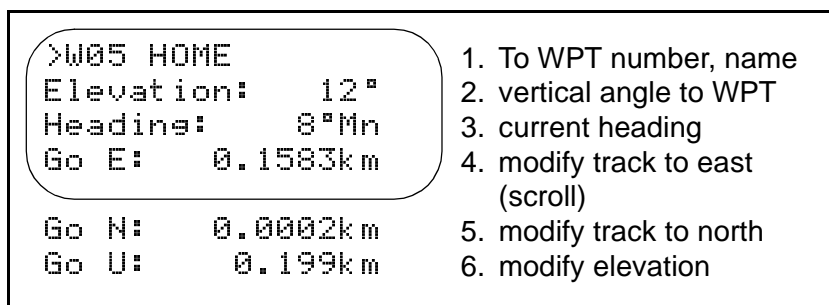
Figure 10-15 Navigation/ Start Navigate (East/North)

The fields update as you mov. The title changes to *OLD Navigation* when GPS positions are not being calculated.

10.5.4 Velocity/Time

When you select *Velocity/Time*, the *Start Navigate* screen looks similar to Figure 10-16.

```
From 02 TO 05          1. From-To WPT number
Vel:     12.30kph      2. current velocity
TTG:      0:45:13      3. time to go
ETA:   09:33:00am      4. estimated time of
                          arrival (scroll)
Turn right:   15°      5. turn to modify
Heading:     8°Mn      6. current heading
TotDist:8.1047km       7  total distance between
TotBearng:296°Mn          From-To WPTs
                       8. bearing between
                          From -To WPTs
```
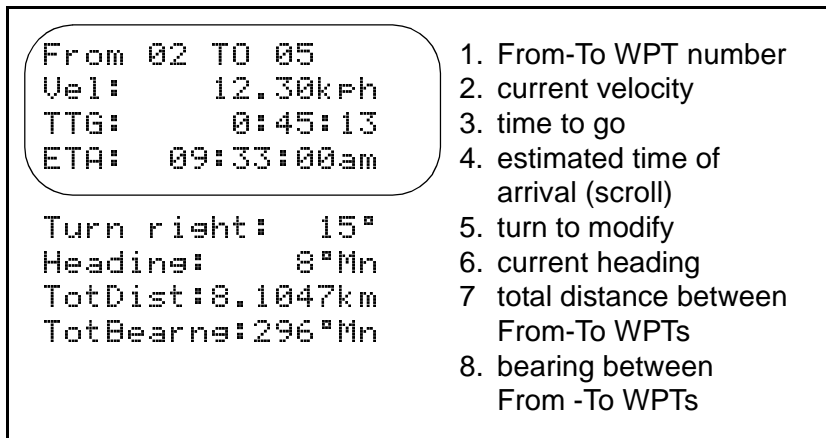
Figure 10-16 Navigation/ Start Navigate (Velocity/Time)

The fields update as you move. The title changes to *OLD Navigation* when GPS positions are not being calculated.

11 Date & Time

Date & Time lets you view the current date and time. When you press ◈ to select *Date & Time*, a screen similar to Figure 11-1 appears.

```
THU  4/14/94
  19:08:23 UTC
GPS Week:    744
Local-UTC:-07:00
```

1. current day and date
2. current time in UTC
3. GPS week
4. local time offset from UTC
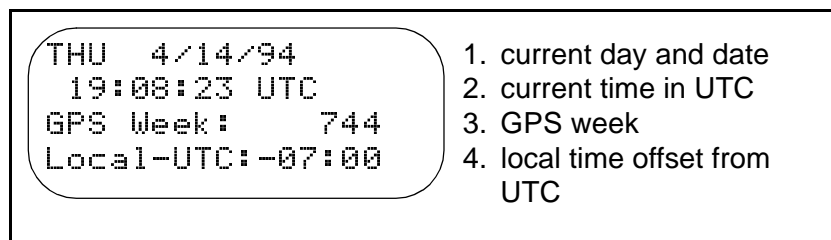
Figure 11-1   Date & Time

This is a view-only screen so you cannot change the data, but you can change the data format. See Date & Time, page 12-58 in Chapter 12, Configuration.

12 Configuration

Configuration lets you set all the configuration parameters for the GeoExplorer II receiver. Many of these are critical for achieving accurate GPS data. Figure 12-1 lists the *Configuration* menu options.

```
 ⎛ - Configuration-  ⎞      1. screen name
 ⎜   1.Rover Options  ⎟      2. option
 ⎜   2.Base Options   ⎟      3. option
 ⎝   3.Coordinates    ⎠      4. option
                            (scroll to view the following)
     4.Datum                5. option
     5.Units                6. option
     6.Date & Time          7. option
     7.Communication        8. option
     8.RTCM                 9. option
     9.Sat Health           10.option
    10.Battery Usage        11.option
    11.WPT Averaging        12.option
    12.Fact.Defaults        13.option
    13.Language             14.option
    14.About GeoExpl        15.option
```

Figure 12-1   Main Menu/ Configuration

12.1 Rover Options

Rover Options lets you set the parameters that affect the way rover data is collected. (If you are recording a base file, you need to change parameters under *Base Options*, see Base Options, page 12-30.) Many of these options are critical for rover data collection and should be checked before any data collection session. Figure 12-2 lists the *Rover Options* menu selections.

```
-Rover Options -          1. screen name
  Feature Logging         2. category
  Points         1s       3. option
  Line/Area      5s       4. option
                          (scroll to view the following)
 Min Posn       120       5. option
Not In Feature            6. category
Rate           All        7. option
High Accuracy             8. category
  Recording    Off        9. option
  Log Rate     15s        10.option
  Min Time     10m        11.option
  PtFeats      Off        12.option
Dynamics      Land        13.option
Pos Mode        3D        14.option
2D Alt        65.4        15.option
Elev Mask       15        16.option
SNR Mask         5        17.option
PDOP Mask        6        18.option
PDOP Switch      6        19.option
Antenna Ht    1.00        20.option
Log DOPs      Off         21.option
Velocity      Off         22.option
File Prefix     R         23.option
```

Figure 12-2   Configuration/ Rover Options

This screen is a list of configuration parameters you can change. When the GeoExplorer II receiver is shipped all the configuration parameters are set to the default values that Trimble recommends. You can return all the parameters to the default settings using *Fact. Defaults*, see Fact. Defaults, page 12-84. Using the default values generally result in good data, except in unusual circumstances. Some of the parameters are the same as those used when recording a base file. The parameters you set here do not change the settings for the base file.

12.1.1   Feature Logging

The *Feature Logging* category allows you to determine the rate at which different types of data are stored in your GPS file. Logging rates are critical for data accuracy and should be checked before each data collection session.

Points

Points determines how often positions are stored when recording point features. Check this option before recording GPS data to a file. When you select *Points*, Figure 12-3 appears.

```
 ╭──────────────────────╮          1.  screen name
 │ Point Feature        │          2.
 │  Logging Rate:       │          3.  value
 │      1 seconds       │          4.
 │                      │
 ╰──────────────────────╯
```
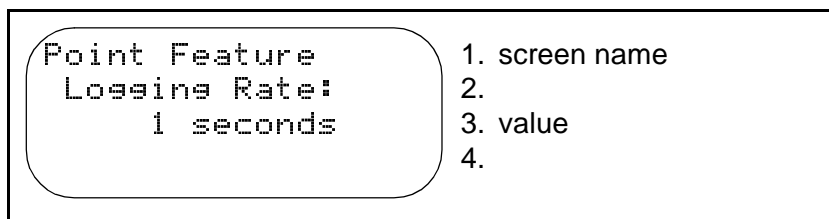
Figure 12-3   Configuration/ Rover Options/ Points

Use ⬇ or ⬆ to scroll through the options available. Press ◈ when the value you want displays.

Table 12-1 describes the *Points* screen options.

Table 12-1   Points Options

Option	Description
All	Records positions continuously.
1 to 999 seconds	Records the next available position after the selected interval of seconds or selected distance from the last fix. A 1 second interval is the default setting.
Off	Does not store positions when recording point features.

Line/Area

Line/Area determines how often positions are stored when recording line or area features. Check this option before recording GPS data to a file. When you select *Line/Area*, Figure 12-4 appears.

```
 ╭─────────────────╮    1. screen name
 │ Line/Area Feat. │    2.
 │  Logging Rate:  │    3. value
 │     5 seconds   │    4.
 ╰─────────────────╯
```
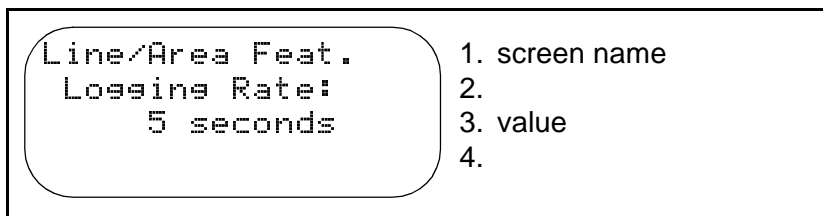
Figure 12-4   Configuration/ Rover Options/ Line/Area

Use ▼ or ▲ to scroll through the options available. Press ◀ or ▶ to move the cursor between the value field and the unit field. Use ▼ or ▲ to scroll through the digits in the value field and the options in the unit field. Press ◆ when the value and unit you want displays.

The units field allows you to determine whether positions are recorded by time or distance. For example, if the interval is set to 20 and the units are seconds, a position is recorded every 20 seconds, regardless of how far the GeoExplorer II receiver moved (or if it moved at all).

As another example, if the interval is 20 and the units are feet, a
position is recorded when the GeoExplorer II receiver moved 20 feet
from its last position, regardless of how long it took to get there.

Caution – When S/A is on and real-time corrections are not being
received, the GeoExplorer II receiver may calculate a position as
much as 100 meters or more from the last position even though it has
not moved. Distance intervals are typically used when collecting data
in real-time differential mode.

Table 12-2 describes the *Line/Area* screen options.

Table 12-2   Line/Area Options

Field	Option	Description
Value	All	Records positions continuously.
	1 to 999	Records the next available position after the selected interval of seconds or selected distance from the last fix. The default setting is 5 seconds.
	Off	Does not store positions when recording point features.
Units	seconds	Records the next available position after the selected interval of seconds from the last fix.
	meters	Records the next available position when the GeoExplorer II receiver moves the selected interval of meters from the last fix.
	feet	Records the next available position when the GeoExplorer II receiver moves the selected interval of feet from the last fix.

Min Posn

Min Posn lets you set the minimum number of positions to collect for a point feature. Set this option in conjunction with the logging rates. When collecting data, you can save a feature before the minimum number of positions are collected, but a warning message displays indicating that it is not complete. Check this option before recording GPS data to a file. When you select *Min Posn*, Figure 12-5 appears.

```
⌒‾‾‾‾‾‾‾‾‾‾⌒        1. screen name
│Point Feature      2.
│ Minimum           3.
│ Positions:        4. value
│   120
```
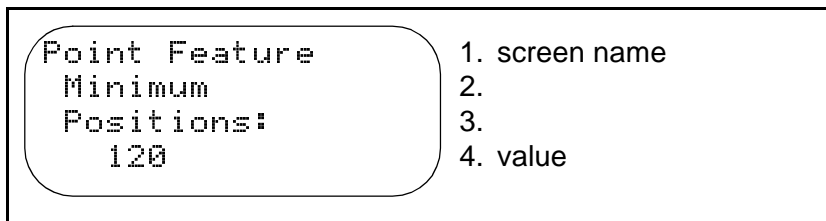
Figure 12-5   Configuration/ Rover Options/ Min Posn

Use ⊙ or ⊙ to scroll through the digits. Press ⊙ when the value you want displays. Table 12-3 describes the *Min Posn* screen options.

Table 12-3   Min Posn Options

Option	Description
0 to 999	Minimum number of positions collected for a point feature. The recommended value is 120.

12.1.2   **Not In Feature Rate**

Not In Feature Rate determines how often positions are stored when you are not recording features. (For example, when you do not have a data dictionary or you are moving between features.) Check this option before recording GPS data to a file. When you select *Not In Feature Rate*, Figure 12-6 appears.

```
 ┌─────────────────┐   1. screen name
 │ Logging Rate If │   2.
 │  Not In Feature:│   3. value
 │    All          │   4.
 └─────────────────┘
```
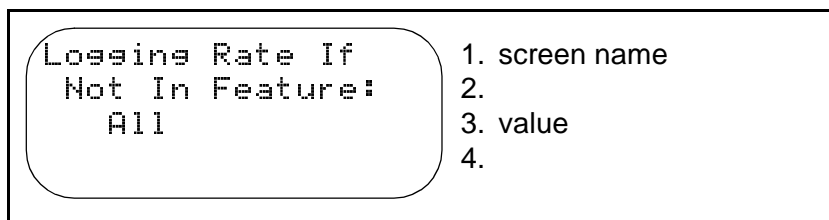
Figure 12-6   Configuration/ Rover Options/ Not In Feature Rate

Use ▼ or ▲ to scroll through the options available. Press ◀ or ▶ to move the cursor between the value field and the unit field. Use ▼ or ▲ to scroll through the digits in the value field and the options in the unit field. Press ◆ when the value and unit you want displays.

The units field allows you to determine whether positions are recorded by time or distance. For example, if the interval is set to 20 and the units are seconds, a position is recorded every 20 seconds, regardless of how far the GeoExplorer II receiver moves (or if it moves at all).

As another example, if the interval is 20 and the units are feet, a position is recorded when the GeoExplorer II receiver moves 20 feet from its last position, regardless of how long it took to get there.

Table 12-4 describes the *Not In Feature Rate* screen options.

Table 12-4   Not In Feature Rate Options

Field	Option	Description
Value	All	Records positions continuously. This is the default and recommended setting.
	1 to 999	Records the next available position after the selected interval of seconds or selected distance from the last fix.
	Off	Does not store positions when recording.
Units	seconds	Records the next available position after the selected interval of seconds from the last fix.
	meters	Records the next available position when the GeoExplorer II receiver has moved the selected interval of meters from the last fix.
	feet	Records the next available position when the GeoExplorer II receiver has moved the selected interval of feet from the last fix.

Caution – When S/A is on and real-time corrections are not being received, the GeoExplorer II receiver may calculate a position as much as 100 meters or more from the last position even though it has not moved. Distance intervals are typically used when collecting data in real-time differential mode.

12.1.3   High Accuracy

The *High Accuracy* category allows you to determine how High Accuracy (carrier phase) data is stored in your GPS file. These parameters are critical for data accuracy and should be checked before each High Accuracy data collection session.

> **Note –** Only points can be recorded in High Accuracy mode because you have to stay at a single position for 10 or more minutes and average the data you collect.

Recording

Recording allows you to change the GeoExplorer II receiver to operate in High Accuracy mode when you are not recording a point feature using a data dictionary. Check this option before recording High Accuracy GPS data to a file. When you select *Recording*, Figure 12-7 appears.

```
 Record High          1. screen name
   Accuracy Rover     2.
   Files:             3.
 1.Off                4. option
                         (scroll)
 2.On                 5. option
 3.Ask                6. option
```
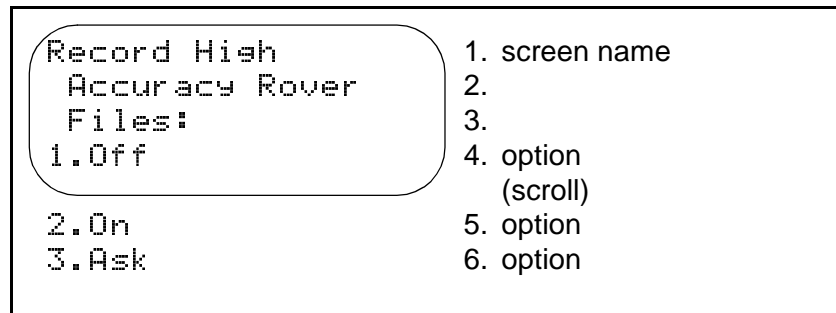
Figure 12-7   Configuration/ Rover Options/ Recording

Table 12-5 describes the *Recording* screen options.

Table 12-5 High Accuracy Recording Options

Option	Description
Off	*Off* disables carrier-phase recording for files. Use *Off* when a data dictionary is loaded and *PtFeats* is set either to *On* or *Ask*.
On	*On* enables carrier-phase recording when a data dictionary is not loaded or you do not want to use the data dictionary. When set to *On*, the GeoExplorer II receiver is configured to capture one carrier-phase data point in each file. Each point occupied requires its own file.
Ask	*Ask* enables carrier-phase recording if you answer Yes to the question *OpenHiAccuracy Rover File?* when you open a file. If you have a data dictionary, only point features are recorded in High Accuracy mode. If you do not have a data dictionary and you select *Yes* when opening a new file, all positions are recorded as High Accuracy.

Caution – Setting recording to *On* when using a data dictionary can cause the high accuracy file to fail to process. Use *On* only when you are not using a data dictionary.

Note – Data recorded in High Accuracy mode must be processed using the Phase Processor Software. For more information on High Accuracy data collection and processing, refer to the *Phase Processor Software User Guide*.

Log Rate

Log Rate determines how often High Accuracy data is recorded in a file when Recording is set to *On* or *Ask*. Check this option before recording High Accuracy GPS data to a file. When you select *Log Rate*, Figure 12-8 appears.

High Accuracy   1. screen name
   Logging Rate: 2.
     15 seconds   3. value
                             4.
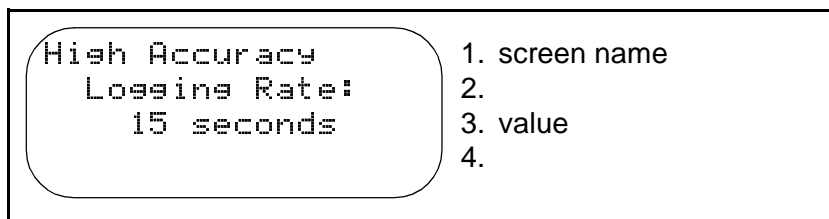
Figure 12-8   Configuration/ Rover Options/ Log Rate

Use ⊙ or ⊙ to scroll through the options available. Press ⊙ when the value you want displays. Table 12-6 describes the *Log Rate* screen options.

Table 12-6   Log Rate Options

Option	Description
Off	Does not store High Accuracy data.
5 to 120 seconds	Records High Accuracy data at the selected interval of seconds. The default logging rate is 15 seconds.

If you plan to postprocess your data the High Accuracy logging rate must be set in conjunction with the base station High Accuracy (carrier-phase or synched measurement) logging rate. The rover rate must be an integer multiple of the base rate.

Table 12-7 shows the appropriate settings.

Table 12-7   Base and Rover Logging Rates

Base Logging Rate	Rover Logging Rate
5	5, 10, 15, 20, 25, 30
10	10, 20, 30
15	15, 30
20	20
25	25
30	30

If you are using a GPS Pathfinder Community Base Station, set the base station *Log Rate* to 5 seconds. If you are using a GeoExplorer II receiver as a base and rover, set both to 10 seconds.

Min Time

Min Time determines how long High Accuracy data is recorded for each point. Check this option before recording High Accuracy GPS data to a file. When you select *Min Time*, Figure 12-9 appears.

```
High Accuracy          1. screen name
  Minimum              2.
  Recording Time       3.
      10 minutes       4. value
```
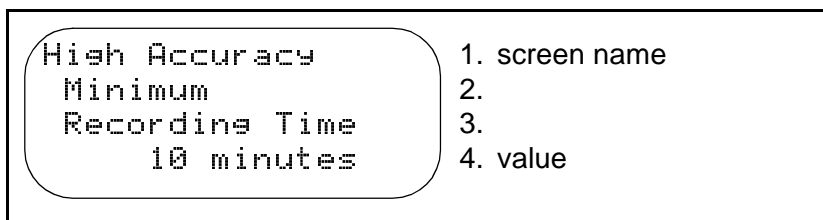
Figure 12-9   Configuration/ Rover Options/ Min Time

Use ▼ or ▲ to scroll through the options available. Press ◆ when the value you want displays.

Table 12-8 describes the *Min Time* screen options.

Table 12-8   Min Time Options

Option	Description
Off	Does not store positions.
5 to 999 minutes	Records High Accuracy positions for the selected interval of minutes. The default setting is 10 minutes.

PtFeats

PtFeats determines whether point features should be collected in High Accuracy mode or not. This parameter is only relevant if you have a data dictionary, and Recording is set to *On* or *Ask*. Check this option before recording High Accuracy GPS data to a file. When you select *PtFeats*, Figure 12-10 appears.

```
╭─────────────────────╮        1. screen name
│ Record High         │        2.
│  Accuracy Point     │        3.
│  Features?          │        4. option
│ 1.Off               │           (scroll)
╰─────────────────────╯
                                5. option
  2.On                          6. option
  3.Ask
```
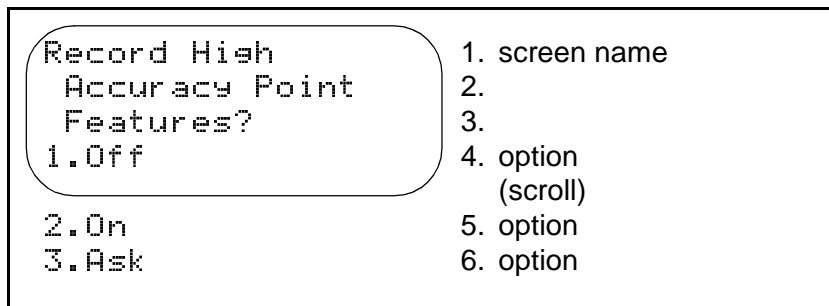
Figure 12-10 Configuration/ Rover Options/ PtFeats

Table 12-9 describes the *PtFeats* screen options.

Table 12-9 PtFeats Options

Option	Description
Off	Point features are not recorded in High Accuracy mode. This setting is the default.
On	All point features are recorded in High Accuracy mode.
Ask	When you select a point feature, you are asked if you want to record it in High Accuracy mode or not. For more information see Select Feature, page 7-9.

Dynamics

Dynamics allows you to configure the way your GeoExplorer II receiver behaves by informing it how you intend to use it. *Dynamics* mode helps to control the initial acquisition of satellites, the subsequent handling of satellite signal obstructions, and the receiver's behavior in high multipath situations. When you select *Dynamics*, Figure 12-11 appears.

```
Rover Dynamics:       1. screen name
Air                   2. option
Land                  3. option
Sea                   4. option
```
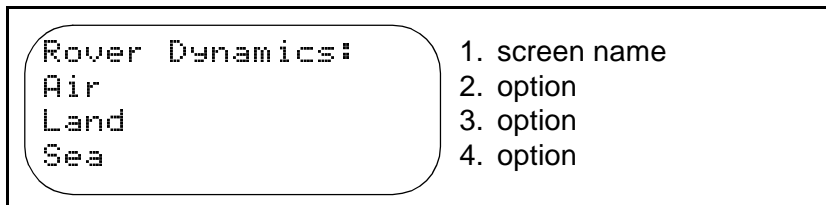
Figure 12-11 Configuration/ Rover Options/ Dynamics

Table 12-10 describes the *Dynamics* screen options.

Table 12-10 Dynamics Options

Option	Description
Land	Informs the GeoExplorer II receiver that you are operating on land. This means that you may encounter canopy or other obstacles that can obscure satellite signals, and you are moving at a relatively low velocity. This is the default dynamics code and is the best for most data capture operations.
Sea	Informs the GeoExplorer II receiver that you are on water. This means that you are at a constant altitude and can encounter obstructions but are unlikely to be moving at a high velocity. The receiver also adjusts for the to-and-fro motion of the vessel caused by waves.
Air	Informs the GeoExplorer II receiver that you are in the air. This means that you are unlikely to suffer satellite signal obstructions but are likely to be moving at a high velocity.

The *Dynamics* options are general categories into which your application may not fit. For example, if you are operating from a hot air balloon, you should choose *Land* (slow velocity, obstructions, and variations in altitude) rather than *Air*.

Note – Configuring the *Dynamics* option incorrectly does not generally cause significant error. However, you may notice a slightly longer time to initially acquire satellite signals and slightly different behavior when satellites signals are obstructed.

12.1.4 Pos Mode

Pos Mode lets you choose a position fix mode. You can choose to collect two dimensional positions (latitude and longitude), or three dimensional positions (latitude, longitude and altitude), or both. The option you choose affects the number of satellites you need to calculate a position. *Pos Mode* is critical for data accuracy and should be checked before each data collection session. When you select *Pos Mode*, Figure 12-12 appears.

```
Rover Pos Mode:          1. screen name
Manual 2D                2. option
Manual 3D                3. option
Auto 2D/3D               4. option
                            (scroll)
ODS 3D                   5. option
```
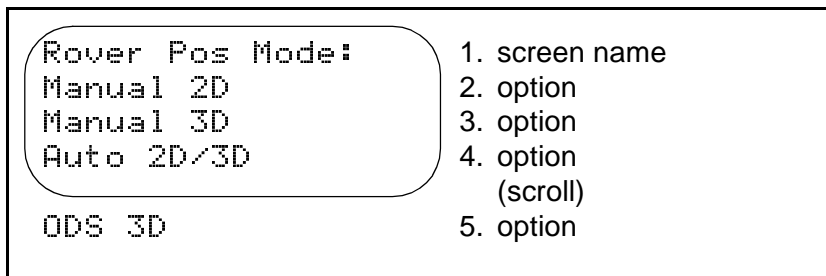
Figure 12-12 Configuration/ Rover Options/ Pos Mode

Manual 2D

In Manual 2D mode the GeoExplorer II receiver calculates latitude and longitude based on an altitude you enter. See 2D Alt, page 12-38 for information on entering an altitude. Three satellites are required for Manual 2D mode. The altitude used by the GeoExplorer II receiver is fixed regardless of your motion. If you do not supply an altitude, the receiver uses the last recorded 3D altitude.

Caution – Use Manual 2D mode only if there are not enough satellites visible to calculate a 3D position, if you can enter your correct altitude (above the WGS-84 ellipsoid) to within 2 meters, and if you are collecting static positions. If an incorrect altitude is entered, the resulting positions will be incorrect by a similar magnitude.

Collecting 2D positions is not recommended because of the problem encountered with the altitude measurement. When you set the GeoExplorer II receiver to calculate 2D positions, you are replacing one satellite measurement (altitude) with a fixed measurement. If this altitude is incorrect, the latitude and longitude will also be incorrect. For example, if the fixed altitude is incorrect by 10 meters, the calculated horizontal measurements can be incorrect by 50 meters or more. This horizontal error cannot be removed by differential correction.

You may accurately know the altitude with respect to mean sea level (MSL), but GPS determines altitude by height above the WGS-84 ellipsoid (HAE), not MSL. The difference between the two can be great. HAE to MSL conversion algorithms can have errors of greater than 5 meters. HAE on the most accurate commercially available ellipsoid maps is only $\pm$ 1 meter. For the best results, contact a surveyor to get the ellipsoid height and the exact separation between the ellipsoid and the geoid for your area of operation.

Manual 3D

In Manual 3D mode the GeoExplorer II receiver calculates latitude, longitude, and altitude. The receiver tracks the highest eight satellites and uses the best four to calculate a position. When there are not enough satellites to calculate a 3D position the GeoExplorer II receiver stops calculating and recording positions. Use Manual 3D mode when there are not enough satellites visible to operate in ODS 3D mode. Manual 3D mode is the default and recommended setting.

Auto 2D/3D

In Auto 2D/3D mode the GeoExplorer II receiver computes 3D positions whenever possible. However, when the 3D PDOP rises above a specified value, or when only three satellites are available, the receiver computes 2D positions. The PDOP value at which this switch occurs is set in the PDOP Switch parameter. The GeoExplorer II receiver considers the PDOP Switch only when in Auto 2D/3D mode. When switching from 3D positions to 2D, the receiver uses the last recorded 3D altitude or an altitude you enter. See 2D Alt, page 12-38 for information on entering an altitude. The recommended PDOP switch is 6 for most applications and receivers.

Auto 2D/3D provides a more complete record of positions even if there are only three satellites available. However, the 2D positions are significantly less accurate than the 3D positions in the file. The Pathfinder Office software allows you to filter out all of the 2D positions from the file, leaving only 3D positions in the file. It is also possible to recompute all 2D positions based on a newly defined altitude. Depending on the terrain, this may or may not increase the accuracy of your 2D positions.

ODS 3D

In ODS 3D mode the GeoExplorer II receiver uses overdetermined solutions to calculate latitude, longitude, and altitude. The receiver tracks and uses the highest four, five, or six satellites to calculate 3D positions. Using ODS 3D allows the GeoExplorer II receiver to perform additional integrity checks in the computation of positions.

If you select ODS 3D you should consider which satellites your base station will be tracking. For differential correction to work, the base station and the rover must always be tracking the same satellites. In ODS 3D mode, the rover is tracking and using six satellites and there is a chance that it will track a satellite that the base station cannot see.

There are two things you can do to prevent this problem. First make sure that the Elevation Masks are set correctly on the base and the rover. Make sure that the rover mask is at least 1° higher than the base mask for every 100 km (60 miles) between the rover and base. The further your rover is from your base, the greater the chance that it will track a satellite that the base station cannot see. Secondly, plan carefully for both your roving unit and base station. Remember to think about any potential obstructions (for example, a hill, or building) that can block a satellite signal to the base.

12.1.5   2D Alt

2D Alt allows you to enter an altitude value to be used when the GeoExplorer II receiver is using a two-dimensional position mode (Auto 2D/3D or Manual 2D). Check this option before recording GPS data to a file. When you select *2D Alt*, Figure 12-28 appears.

```
2D Altitude:              1. screen name
                          2.
+      0.0m (HAE)         3. alt value, alt units,
                             alt reference
                          4.
```
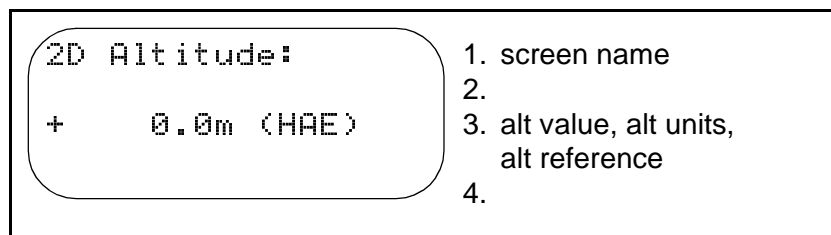
Figure 12-13 Configuration/ Rover Options/ 2D Alt

Use ▼ or ▲ to scroll through the digits. Press ◆ when the value you want displays. For more information on changing the altitude units and the altitude reference, see Units, page 12-50.

Table 12-11 describes the *2D Alt* screen options.

Table 12-11 2D Alt Options

Option	Description
-500 to 20,000	Make sure the altitude you enter is in the correct units, and was calculated using the correct altitude reference (HAE or MSL).

12.1.6   Elev Mask

Elev Mask allows you to specify the minimum elevation above the horizon that a satellite must reach before the GeoExplorer II receiver uses it for position calculations. *Elev Mask* is critical for data accuracy and should be checked before each data collection session.
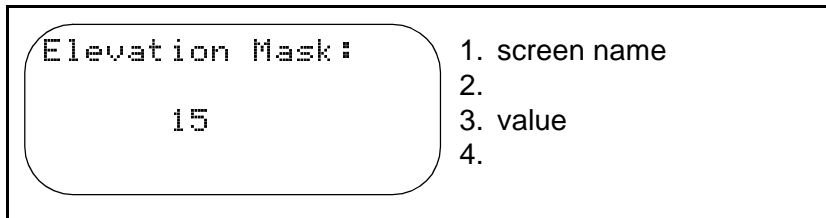
When you select *Elev Mask*, Figure 12-14 appears.


```
Elevation Mask:        1. screen name
                       2.
       15              3. value
                       4.
```

Figure 12-14 Configuration/ Rover Options/ Elev Mask

Use ▼ or ▲ to scroll through the digits. Press ◆ when the value you want displays. When the GeoExplorer II receiver is tracking satellites, the elevation of each satellite displays on the *Sat Posn & SNR* screen under the *GPS Status* menu.

Table 12-12 describes the *Elev Mask* screen options.

Table 12-12 Elev Mask Options

Option	Description
0° to 50°	A low Elevation Mask allows the GeoExplorer II receiver to track more satellites, but increases the chance of multipath and tropospheric errors. A high Elevation Mask decreases multipath, but results in higher PDOP because the receiver has fewer satellites to choose from. The default and recommended Elevation Mask for a rover file is 15°.
	If you change the Elevation Mask make sure that the rover mask is always at least 1° higher than the base mask for every 100 km (60 miles) between the rover and base. The default and recommended Elevation Mask for a base file is 10°.

12.1.7   SNR Mask

SNR Mask allows you to specify the minimum strength that a satellite signal must have before the GeoExplorer II receiver uses it to calculate positions. *SNR Mask* is critical for data accuracy and should be checked before each data collection session. When you select *SNR Mask*, Figure 12-15 appears.
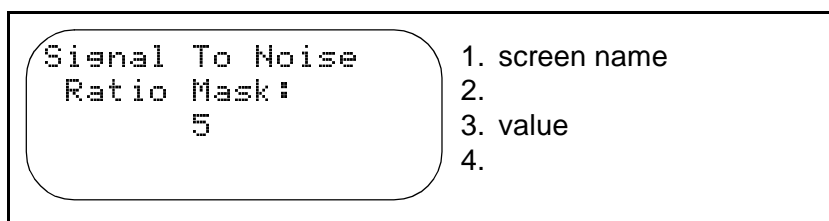
```
╭───────────────╮      1. screen name
│ Signal To Noise│     2.
│  Ratio Mask:   │     3. value
│       5        │     4.
╰───────────────╯
```

Figure 12-15 Configuration/ Rover Options/ SNR Mask

Use ⬇ or ⬆ to scroll through the digits. Press ◈ when the value you want displays. When the GeoExplorer II receiver is tracking satellites, the SNR values are displayed on the *Sat Posn & SNR* screen under the *GPS Status* menu. Table 12-13 describes the *SNR Mask* screen options.

Table 12-13 SNR Mask Options

Option	Description
0 to 99	When a satellite's signal strength drops below the SNR Mask, the GeoExplorer II receiver stops using it to compute positions, although the receiver continues to track it. Weaker (lower) signals are ignored because weak signals produce noisy positions. Stronger (higher) signals produce cleaner positions.
	The default and recommended SNR Mask setting is 5. However, signals as low as 2 can be used for navigation purposes, especially under tree canopies. This can decrease accuracy.

12.1.8 PDOP Mask

PDOP Mask allows you to set a maximum PDOP (Position Dilution Of Precision) value. When the PDOP goes over this value the GeoExplorer II receiver stops calculating positions. *PDOP Mask* is critical for data accuracy and should be checked before each data collection session. When you select *PDOP Mask*, Figure 12-16 appears.
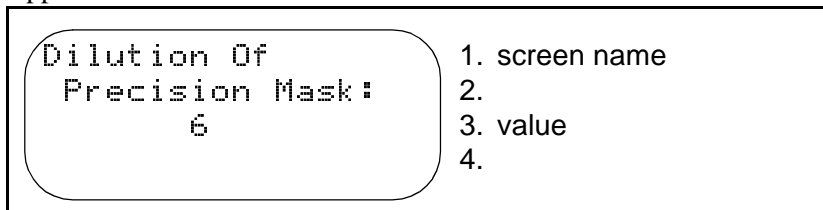
```
Dilution Of            1. screen name
  Precision Mask:      2.
        6              3. value
                       4.
```

Figure 12-16 Configuration/ Rover Options/ PDOP Mask

Use ⊙ or ⊙ to scroll through the digits. Press ⊙ when the value you want displays. Table 12-14 describes the *PDOP Mask* screen options.

Table 12-14 PDOP Mask Options

Option	Description
1 to 99	PDOP is an indication of the accuracy of the GPS positions which is calculated by the GeoExplorer II receiver in the field. It takes into account each satellite's location relative to the other satellites (the satellite geometry) to provide an indication of accuracy for the GPS positions you are recording. A constellation with a PDOP of 4 or below is likely to yield highly accurate positions. A PDOP between 5 and 8 is acceptable. A PDOP of 8 or more is poor.
	The default and recommended PDOP Mask is 6. With a PDOP Mask at this level you make sure that no positions with a high PDOP are recorded and the data in the file has a greater level of accuracy than when a high PDOP mask is set. If the PDOP increases above this level, although the GeoExplorer II receiver stops recording position, it continues tracking satellites and making PDOP calculations. When the PDOP decreases below the mask it starts recording positions again.

12.1.9 PDOP Switch

PDOP Switch allows you to set a PDOP (Position Dilution of Precision) value that causes the GeoExplorer II receiver to switch between 2D and 3D mode when the *Pos Mode* is set to Auto 2D/3D. *PDOP Switch* is critical for data accuracy and should be checked before each data collection session. When you select *PDOP Switch*, Figure 12-17 appears.
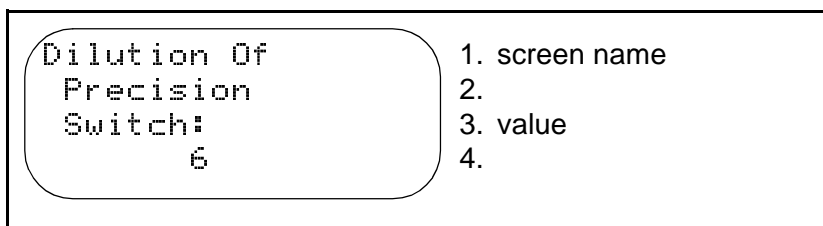
```
/Dilution Of       \      1. screen name
  Precision               2.
  Switch:                 3. value
       6                  4.
\                  /
```

Figure 12-17 Configuration/ Rover Options/ PDOP Switch

Use ▼ or ▲ to scroll through the digits. Press ◆ when the value you want displays. Table 12-15 describes the *PDOP Switch* screen options.

Table 12-15 PDOP Switch Options

Option	Description
1 to 99	The PDOP Switch is only used when the *Pos Mode* is set to Auto 2D/3D. When the PDOP goes above the PDOP Switch the GeoExplorer II receiver switches from using a four satellite constellation (to record 3D positions) to using a three satellite constellation (to record 2D positions). When the PDOP decreases below the PDOP Switch, the receiver begins calculating 3D positions again. The default and recommended setting for the PDOP Switch is 6.

12.1.10 Antenna Ht

Antenna Ht lets you specify the height of the GPS antenna above the features you are surveying. The antenna is inside the GeoExplorer II receiver under the raised sextant. When recording non-High Accuracy data, set this value to the approximate height you hold the unit. When recording High Accuracy data, the antenna height must be set to within 10 centimeters of the height of the antenna above the feature you are surveying. Check this option before recording GPS data to a file. When you select *Antenna Ht*, Figure 12-18 appears.
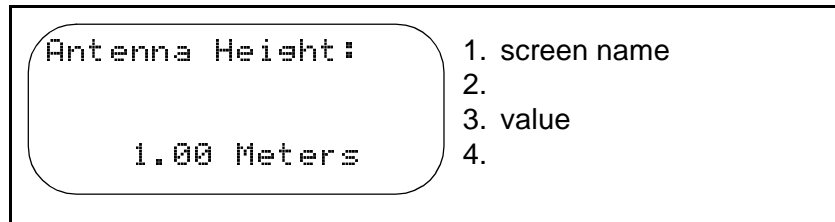
```
 ╭─────────────────────────╮       1. screen name
 │ Antenna Height:         │       2.
 │                         │       3. value
 │        1.00 Meters      │       4.
 ╰─────────────────────────╯
```

Figure 12-18 Configuration/ Rover Options/ Antenna Ht

Use ▼ or ▲ to scroll through the options available. Press ◀ or ▶ to move the cursor between the value field and the unit field. Use ▼ or ▲ to scroll through the digits in the value field and the options in the unit field. Press ◈ when the value and unit you want displays. Table 12-16 describes the *Antenna Ht* screen options.

Table 12-16 Antenna Ht Options

Field	Option	Description
Value	0 to 999.9	The antenna height is needed to record accurate altitude values. Specify the height of the antenna above the point you are surveying. The default setting is 1 meter.
Units	Meters	Records the antenna height in meters.
	feet	Records the antenna height in feet.

12.1.11 Log DOPs

Log DOPs lets you choose whether or not you want DOP measurements recorded in the rover file. Recording DOP measurements can be useful for troubleshooting data sets if you are having problems. Check this option before recording GPS data to a file. When you select *Log DOPs*, Figure 12-19 appears.
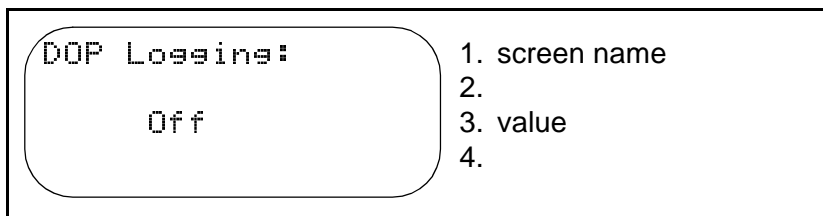
```
┌──────────────────────────┐   1. screen name
│ DOP Logging:             │   2.
│                          │   3. value
│      Off                 │   4.
└──────────────────────────┘
```

Figure 12-19 Configuration/ Rover Options/ Log DOPs

Use ⬇ or ⬆ to scroll through the options available. Press ◆ when the value you want displays. Table 12-17 describes the *Log DOPs* screen options.

Table 12-17 Log DOPs Options

Option	Description
Off	Do not record DOP data in the rover file. This is the default setting.
On	Do record DOP data in the rover file.

12.1.12 **Velocity**

Velocity lets you select whether or not you want velocity measurements recorded in your data file. Check this option before recording GPS data to a file. When you select *Velocity*, Figure 12-20 appears.
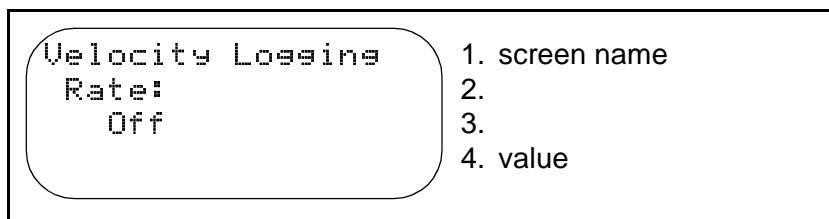
```
/Velocity Logging \      1.  screen name
  Rate:                  2.
     Off                 3.
                         4.  value
\                  /
```

Figure 12-20 Configuration/ Rover Options/ Velocity

Use ▼ or ▲ to scroll through the options available. Press ◀ or ▶ to move the cursor between the value field and the unit field. Use ▼ or ▲ to scroll through the digits in the value field and the options in the unit field. Press ◆ when the value you want displays.

The units field allows you to determine whether velocity measurements are recorded by time or distance. For example, if the interval is set to 20 and the units are seconds, a velocity measurement is recorded every 20 seconds, regardless of how far the GeoExplorer II receiver has moved (or if it has moved at all).

As another example, if the interval is 20 and the units are feet, a velocity measurement is recorded when the GeoExplorer II receiver has moved 20 feet from its last position, regardless of how long it took to get there.

Table 12-18 describes the *Velocity* screen options.

Table 12-18 Velocity Options

Field	Option	Description
Value	All	Records velocity measurements continuously.
	1 to 999	Records the next available velocity after the selected interval of seconds or selected distance from the last fix.
	Off	Does not store velocity measurements when recording. This is the default setting.
Units	seconds	Records the velocity at the selected interval of seconds after the last fix.
	meters	Records the next available velocity when the GeoExplorer II receiver has moved the selected interval of meters from the last fix.
	feet	Records the next available velocity when the GeoExplorer II receiver has moved the selected interval of feet from the last fix.

12.1.13 File Prefix

File Prefix allows you to specify a single letter to identify the rover files you record. When you change the prefix character to a different letter or number, all consequent rover files generated on the GeoExplorer II receiver start with that character. The remainder of the filename is generated from the date and time it was created. Check this option before recording GPS data to a file. When you select *File Prefix*, Figure 12-21 appears.
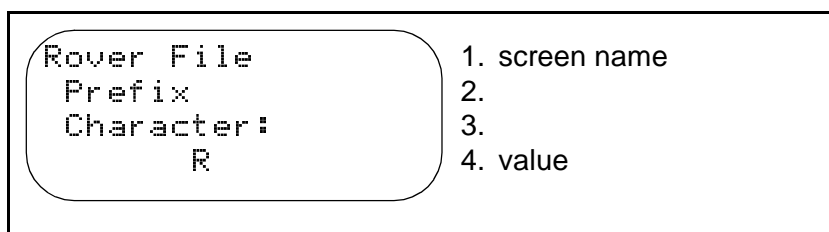
```
 ⎛Rover File          ⎞    1. screen name
 ⎜  Prefix            ⎟    2.
 ⎜  Character:        ⎟    3.
 ⎝      R             ⎠    4. value
```

Figure 12-21 Configuration/ Rover Options/ File Prefix

Use ⊗ or ⊗ to scroll through the letters. Press ⊗ when the value you want displays. Table 12-19 describes the *File Prefix* screen options.

Table 12-19 File Prefix Options

Option	Description
A to Z	Changing the prefix character decreases the chances of confusing where files came from once you download the files. The file prefix can be used to identify the datalogger unit, the office, or it can have some other meaning. The default setting is R.

12.2   Base Options

Base Options lets you set the parameters that affect the way that base data is collected. (If you are recording a rover file, you need to change parameters under *Rover Options*, see Rover Options, page 12-2.) Many of these options are critical for base data collection and should be checked before any base file is recorded. Figure 12-22 lists the *Base Options* menu selections.

```
 ┌─────────────────────┐
 │  - Base Options -    │    1. screen name
 │ Logging Rates        │    2. category
 │   Positions    15s   │    3. option
 │   Raw Msmts    15s   │    4. option
 └─────────────────────┘    (scroll to view the following)
   High Accuracy             5. category
   Recording       On        6. option
   Log Rate       15s        7. option
   Dynamics    STATIC        8. option
   Pos Mode        3D        9. option
   2D Alt       64.3        10. option
   Elev Mask       10       11. option
   SNR Mask         5       12. option
   PDOP Mask        6       13. option
   PDOP Switch      6       14. option
   Antenna Ht    1.00       15. option
   Log DOPs       Off       16. option
   File Prefix      B       17. option
   Reference Pos            18. option
```

Figure 12-22 Configuration/ Base Options

This screen is list of configuration parameters you can change. When
the GeoExplorer II receiver is shipped all the configuration parameters
are set to the default values that Trimble recommends. You can return
all the parameters to the default settings using *Fact. Defaults*, see Fact.
Defaults, page 12-84. Using the default values generally result in good
data, except in unusual circumstances. Some of the parameters are the
same as those used when recording a rover file. The parameters you
set here do not change the settings for the rover file.

12.2.1   Logging Rates

The *Logging Rates* category allows you to determine the rate at which
different types of data are stored in your base file. Logging rates are
critical for data accuracy and should be checked before each data
collection session.

Positions

Positions determines how often positions are stored in a base file.
Check this option before recording a base file. When you select
Positions, Figure 12-23 appears.

```
Base Position          1.  screen name
 Logging Rate:         2.
    15 seconds         3.  value
                       4.
```
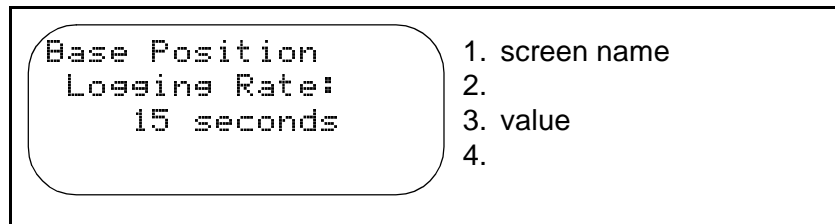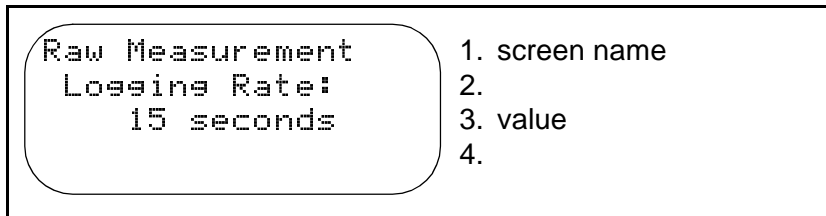
Figure 12-23 Configuration/ Base Options/ Positions

Use ▼ or ▲ to scroll through the digits. Press ◆ when the value and
unit you want displays.

Table 12-20 describes the *Positions* screen options.

Table 12-20 Positions Options

Option	Description
All	Records positions continuously.
1 to 999 seconds	Records the next available position after the selected interval of seconds. The default and recommended setting is 15 seconds.
Off	Does not store positions.

Raw Msmts

Raw Msmts determines how often measurement data is recorded in a base file. Measurement data is only recorded in a base file. Rover files do not record measurement data. Measurement data contains information about the satellites location and path that is needed for differential correction. Check this option before recording a base file. When you select *Raw Msmts*, Figure 12-24 appears.

```
┌─────────────────────┐   1. screen name
│ Raw Measurement     │   2.
│   Logging Rate:     │   3. value
│     15 seconds      │   4.
│                     │
└─────────────────────┘
```

Figure 12-24 Configuration/ Base Options/ Raw Msmts

Use ▼ or ▲ to scroll through the digits. Press ◆ when the value and unit you want displays.

Table 12-21 describes the *Raw Msmts* screen options.

Table 12-21 Raw Msmts Options

Option	Description
All	Records measurement data continuously.
1 to 999 seconds	Records the next available measurement data after the selected interval of seconds. The default and recommended setting is 15 seconds.
Off	Does not store measurement data.

12.2.2 High Accuracy

The *High Accuracy* category allows you to determine how High Accuracy (carrier phase) data is stored in your base file. These parameters are critical for data accuracy and should be checked before each High Accuracy data collection session.

Recording

Recording allows you to change the GeoExplorer II receiver to operate in High Accuracy mode. Check this option before recording a High Accuracy base file. When you select *Recording*, Figure 12-7 appears.

```
 ┌─────────────────────┐    1. screen name
 │ Record High         │    2.
 │  Accuracy Base      │    3.
 │  Files:             │    4. option
 │ 1.Off               │       (scroll)
 └─────────────────────┘
   2.On                      5. option
   3.Ask                     6. option
```
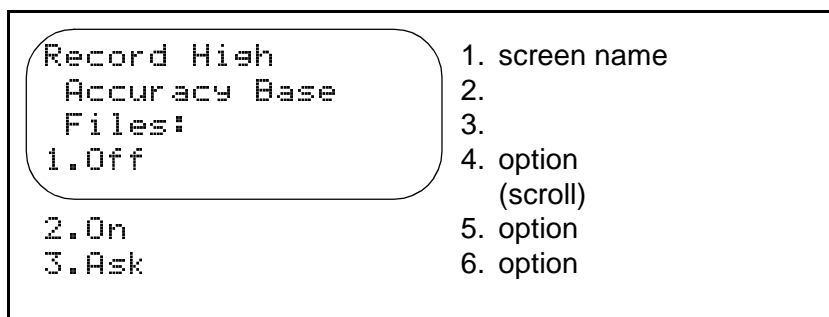
Figure 12-25 Configuration/ Base Options/ Recording

Table 12-22 describes the *Recording* screen options.

Table 12-22 Recording Options

Option	Description
Off	Disables carrier-phase recording for base files.
On	Enables carrier-phase recording for base files.
Ask	Enables carrier-phase recording, if you answer *Yes* to the question, *Open HiAccuracy Base File?* when opening a file.

Note – Data recorded in High Accuracy mode must be processed using the Phase Processor Software. For more information, see the *Phase Processor Software User Guide*.

Log Rate

Log Rate determines how often High Accuracy data is recorded in the base file when *Recording* is set to *On* or *Ask*. Check this option before recording a High Accuracy base file. When you select *Log Rate*, Figure 12-26 appears.

```
 Base High              1. screen name
   Accuracy             2.
 Logging Rate:          3.
     15 seconds         4. value
```

Figure 12-26 Configuration/ Base Options/ HiAcc Mts

Use ▼ or ▲ to scroll through the options available. Press ◆ when the value you want displays. Table 12-23 describes the *Log Rates* screen options.

Table 12-23 Log Rates Options

Option	Description
Off	Does not store High Accuracy data.
5 to 120 seconds	Records High Accuracy data at the selected interval of seconds.

The High Accuracy logging rate must be set in conjunction with the rover High Accuracy logging rate. The rover rate must be an integer multiple of the base rate. If you are using a GeoExplorer II receiver as a base and rover, set the High Accuracy logging rate in both to 10 seconds.

Table 12-24 shows the appropriate settings.

Table 12-24 Base and Rover Logging Rates

Base Logging Rate	Rover Logging Rate
5	5, 10, 15, 20, 25, 30
10	10, 20, 30
15	15, 30
20	20
25	25
30	30

12.2.3   Dynamics

Dynamics informs the GeoExplorer II receiver which operation mode the unit will be used in. When the receiver is used as a base station, it must be absolutely still. Therefore this option is a non-configurable field permanently set to Static, the most appropriate dynamics mode for a base station.

12.2.4 Pos Mode

Pos Mode lets you choose a position fix mode. The option you choose affects the number of satellites you need to calculate a position. You should site a base station such that it is always able to track at least four satellites, so there is no need to use any mode other than Manual 3D. *Pos Mode* is critical for data accuracy and should be checked before each data collection session. When you select *Pos Mode*, Figure 12-27 appears.

```
Base Pos Mode:        1. screen name
Manual 2D             2. option
Manual 3D             3. option
Auto 2D/3D            4. option
                         (scroll)
ODS 3D                5. option
```
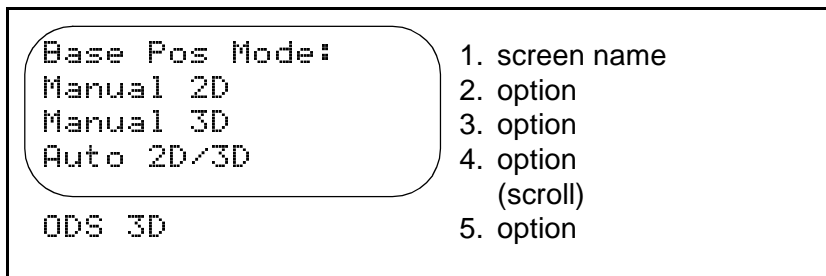
Figure 12-27 Configuration/ Base Options/ Pos Mode

Manual 2D

In Manual 2D mode the GeoExplorer II receiver records latitude and longitude based on an altitude you supply. Three satellites are required for Manual 2D mode. The altitude used by the GeoExplorer II receiver is fixed. If you do not supply an altitude, the receiver uses the last recorded 3D altitude. Manual 2D mode is not recommended for collecting base data.

Caution – Use Manual 2D mode only if there are not enough satellites visible to calculate a 3D position, if you can enter your correct altitude (above the WGS-84 ellipsoid) to within 2 meters, and if you are collecting static positions. If an incorrect altitude is entered, the resulting positions will be incorrect by a similar magnitude.

Manual 3D

In Manual 3D mode the GeoExplorer II receiver records latitude, longitude and altitude. The receiver tracks the highest eight satellites and uses the best four to calculate a position. When there are not enough satellites to calculate a 3D position the GeoExplorer II receiver stops calculating and recording positions. The receiver does not record 2D positions. Manual 3D mode is the default and recommended setting.

Auto 2D/3D

In Auto 2D/3D mode the GeoExplorer II receiver computes 3D positions whenever possible. However, when the 3D PDOP rises above a specified value, or when only three satellites are available, the receiver computes 2D positions. The PDOP value at which this switch occurs is set in the PDOP Switch parameter. The GeoExplorer II receiver considers the PDOP Switch only when in Auto 2D/3D mode. When switching from 3D positions to 2D, the receiver uses the last recorded 3D altitude or an altitude you enter. The recommended PDOP switch is 6 for most applications and receivers. Auto2D/3D mode is not recommended for collecting base data.

ODS 3D

In ODS 3D mode the GeoExplorer II receiver uses overdetermined solutions to record latitude, longitude, and altitude. The receiver tracks and uses the highest four, five, or six satellites to calculate 3D positions. Using the overdetermined position allows the GeoExplorer II receiver to perform additional integrity checks in the computation of positions. ODS 3D mode is not recommended for collecting base data.

12.2.5   2D Alt

2D Alt allows you to enter an altitude value to be used when the
GeoExplorer II receiver is using a two-dimensional position mode
(Auto 2D/3D or Manual 2D). Check this option before recording a
base file. When you select *2D Alt*, Figure 12-28 appears.

```
2D Altitude:            1. screen name
                        2.
+    0.0m  (HAE)        3. alt value, alt units,
                           alt reference
                        4.
```
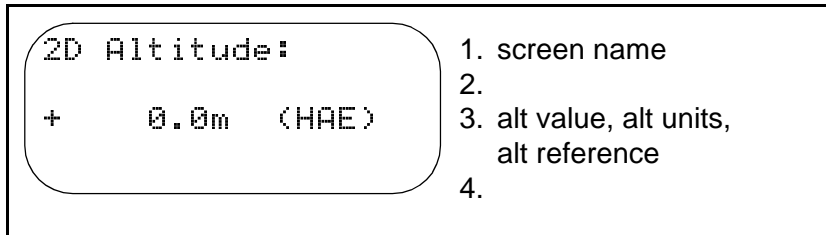
Figure 12-28 Configuration/ Base Options/ 2D Alt

Use ⊙ or ⊙ to scroll through the digits. Press ◆ when the value you
want displays. For more information on changing the altitude units
and the altitude reference, see Units, page 12-50. Table 12-25
describes the *2D Alt* screen options.

Table 12-25 2D Alt Options

Option	Description
-500 to 20,000	Make sure the altitude you enter is in the correct units, and was calculated using the correct altitude reference (HAE or MSL).

12.2.6   Elev Mask

Elev Mask allows you to specify the minimum elevation above the
horizon that a satellite must reach before the GeoExplorer II receiver
uses it for position calculations. *Elev Mask* is critical for data accuracy
and should be checked every time you want to collect a base file.

When you select *Elev Mask*, Figure 12-29 appears.

```
┌─────────────────────┐
│ Base Elevation      │     1.  screen name
│  Mask:              │     2.
│         10          │     3.  value
│                     │     4.
└─────────────────────┘
```
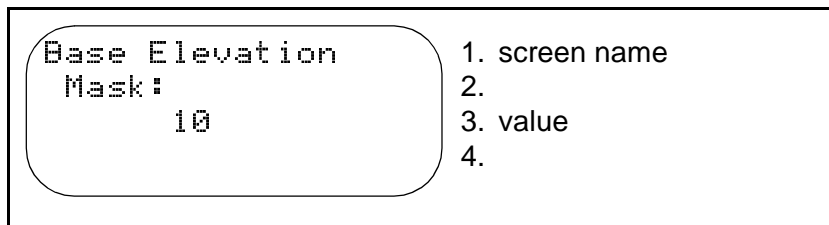
Figure 12-29 Configuration/ Base Options/ Elev Mask

Use ⊙ or ⊙ to scroll through the digits. Press ⊙ when the value you
want displays. When the GeoExplorer II receiver is tracking satellites,
the elevation of each satellite displays on the *Sat Posn & SNR* screen
under the *GPS Status* menu. Table 12-26 describes the *Elev Mask*
screen options.

Table 12-26 Elev Mask Options

Option	Description
0° to 50°	A low Elevation Mask allows the GeoExplorer II receiver to track more satellites, but increases the chance of multipath and tropospheric errors. A high Elevation Mask decreases multipath, but results in higher PDOP because the receiver has fewer satellites to choose from. The default and recommended Elevation Mask for a base file is 10°.
	If you change the Elevation Mask make sure that the rover mask is always at least 1° higher than the base mask for every 100 km (60 miles) between the rover and base. The default and recommended Elevation Mask for a rover file is 15°.

12.2.7 SNR Mask

SNR Mask allows you to specify the minimum strength that a satellite signal must have before the GeoExplorer II receiver uses it to calculate positions. Check this option before recording a base file. When you select *SNR Mask*, Figure 12-30 appears.

```
╭─────────────────────╮     1. screen name
│ Base Signal To      │     2.
│  Noise Ratio        │     3.
│ Mask:               │     4. value
│        5            │
╰─────────────────────╯
```
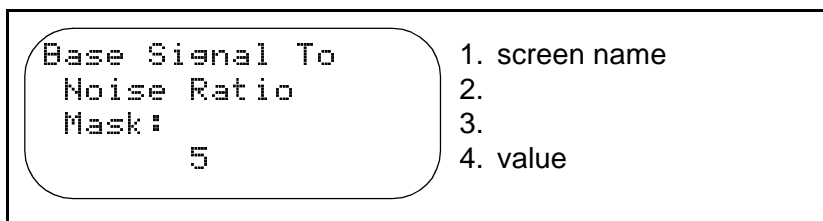
Figure 12-30 Configuration/ Base Options/ SNR Mask

Use ▼ or ▲ to scroll through the digits. Press ◆ when the value you want displays. When the GeoExplorer II receiver is tracking satellites, the SNR values are displayed on the *Sat Posn & SNR* screen under the *GPS Status* menu. Table 12-27 describes the *SNR Mask* screen options.

Table 12-27 SNR Mask Options

Option	Description
0 to 99	When a satellite's signal strength drops below the SNR Mask, the GeoExplorer II receiver stops using it to compute positions, although the receiver continues to track it. Weaker (lower) signals are ignored because weak signals produce noisy positions. Stronger (higher) signals produce cleaner positions. The default and recommended SNR Mask setting is 5.

12.2.8   PDOP Mask

PDOP Mask allows you to set a maximum PDOP (Position Dilution Of Precision) value. When the PDOP goes over this value the GeoExplorer II receiver stops calculating positions. Check this option before recording a base file. When you select *PDOP Mask*, Figure 12-31 appears.

```
Base Position          1. screen name
 Dilution Of           2.
 Precision Mask:       3.
        6              4. value
```
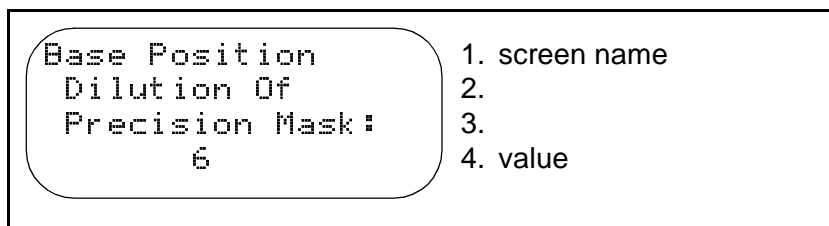
Figure 12-31 Configuration/ Base Options/ PDOP Mask

Use $\blacktriangledown$ or $\blacktriangle$ to scroll through the digits. Press $\blacklozenge$ when the value you want displays. Table 12-28 describes the *PDOP Mask* screen options.

Table 12-28 PDOP Mask Options

Option	Description
1 to 99	PDOP is an indication of the accuracy of the GPS positions which is calculated by the GeoExplorer II receiver. It takes into account each satellite's location relative to the other satellites (the satellite geometry) to provide an indication of accuracy for the GPS positions you are recording. A constellation with a PDOP of 4 or below is likely to yield highly accurate positions. A PDOP between 5 and 8 is acceptable. A PDOP of 8 or more is poor. The default and recommended PDOP Mask is 6.

12.2.9 PDOP Switch

PDOP Switch allows you set a PDOP (Position Dilution of Precision) value that causes the GeoExplorer II receiver to switch between 2D and 3D mode when the *Pos Mode* is set to Auto 2D/3D. Check this option before recording a base file. When you select *PDOP Switch*, Figure 12-32 appears.

```
┌─────────────────┐
│Base Position    │    1. screen name
│ Dilution Of     │    2.
│ Precision       │    3.
│ Switch:  6      │    4. value
└─────────────────┘
```
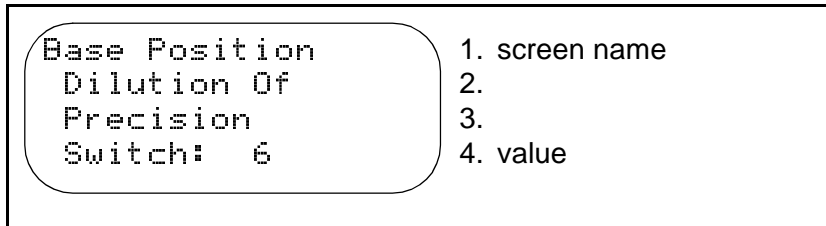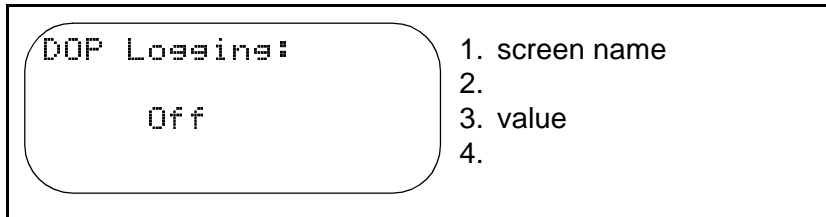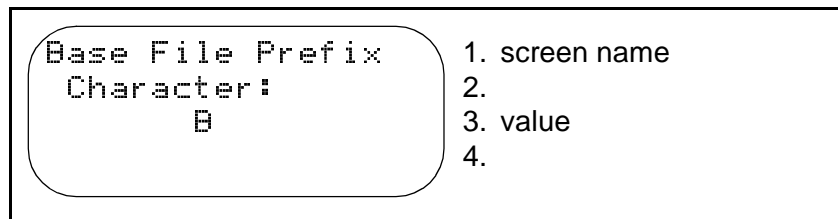
Figure 12-32 Configuration/ Base Options/ PDOP Switch

Use ▼ or ▲ to scroll through the digits. Press ◆ when the value you want displays. Table 12-29 describes the *PDOP Switch* screen options.

Table 12-29 PDOP Switch Options

Option	Description
1 to 99	The PDOP Switch is only used when the *Pos Mode* is set to Auto 2D/3D. When the PDOP goes above the PDOP Switch the GeoExplorer II receiver switches from using a four satellite constellation (to record 3D positions) to using a three satellite constellation (to record 2D positions). When the PDOP decreases below the PDOP Switch, the receiver begins calculating 3D positions again. The default and recommended setting for the PDOP Switch is 6.

12.2.10 Antenna Ht

Antenna Ht lets you specify the height of the GPS antenna above the reference position. The antenna is inside the GeoExplorer II receiver under the raised sextant. Check this option before recording a base file. When you select *Antenna Ht*, Figure 12-33 appears.

```
Base Antenna          1. screen name
 Height:              2.
      1.00 Meters     3. value
                      4.
```
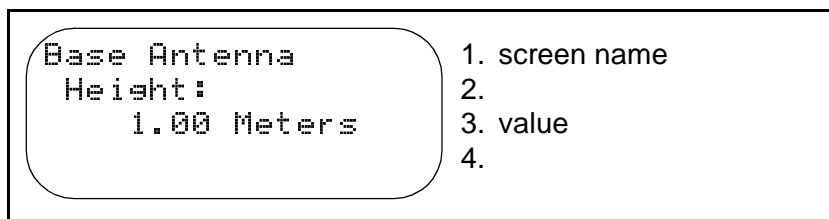
Figure 12-33 Configuration/ Base Options/ Antenna Ht

Press ◀ or ▶ to move the cursor to the first digit of the value. Use ▼ or ▲ to scroll through the digits. You can continue this process for each digit in the value until you find the one you want. Press ◆ when the value you want displays. Table 12-30 describes the *Antenna Ht* screen options.

Table 12-30 Antenna Ht Options

Field	Option	Description
Value	0 to 999.9	The antenna height is needed to record accurate altitude values. Specify the height of the antenna above the reference position. The default setting is 1.0 meters.
Units	meters	Records the antenna height in meters.
	feet	Records the antenna height in feet.

12.2.11 Log DOPs

Log DOPs lets you choose whether or not you want DOP measurements recorded in the base file. DOP measurements can be useful for troubleshooting data sets if you are having problems. Check this option before recording a base file. When you select *Log DOPs*, Figure 12-34 appears.

```
┌─────────────────────┐   1.  screen name
│ DOP Logging:        │   2.
│                     │   3.  value
│        Off          │   4.
└─────────────────────┘
```

Figure 12-34 Configuration/ Base Options/ Log DOPs

Use ▼ or ▲ to scroll through the options available. Press ◆ when the value you want displays. Table 12-31 describes the *Log DOPs* screen options.

Table 12-31 Log DOPs Options

Option	Description
Off	Do not record DOP data in the base file. This is the default setting.
On	Do record DOP data in the base file.

12.2.12 File Prefix

File Prefix allows you to specify a single letter to identify the base files you record. When you change the prefix character to a different letter or number, all consequent base files generated on the GeoExplorer II receiver start with that character. The remainder of the filename is generated from the date and time it was created. Check this option before recording a base file. When you select *File Prefix*, Figure 12-35 appears.

```
┌──────────────────────┐
│ Base File Prefix      │   1. screen name
│  Character:           │   2.
│         B             │   3. value
│                       │   4.
└──────────────────────┘
```

Figure 12-35 Configuration/ Base Options/ File Prefix

Use ▼ or ▲ to scroll through the letters. Press ◆ when the value you want displays. Table 12-32 describes the *File Prefix* screen options.

Table 12-32 File Prefix Options

Option	Description
A to Z	Changing the prefix character decreases the chances of confusing where files came from once you download the files. The file prefix can be used to identify the datalogger unit, the office, or it can have some other meaning. The default value is B.

12.2.13 Reference Pos

Reference Pos allows you to enter the known position of the base station. You can enter the reference position from a map or from a previously conducted control survey. *Reference Pos* is critical for data accuracy and should be checked every time you want to collect a base file. When you select *Reference Pos*, Figure 12-36 appears.

```
┌─ Reference Pos─┐      1.  screen name
│Lat  0°00'00.00N│      2.  coordinates
│Lon  0°00'00.00E│      3.  coordinates
│Alt +     0.0m M│      4.  altitude, alt units, alt
└────────────────┘           reference
```
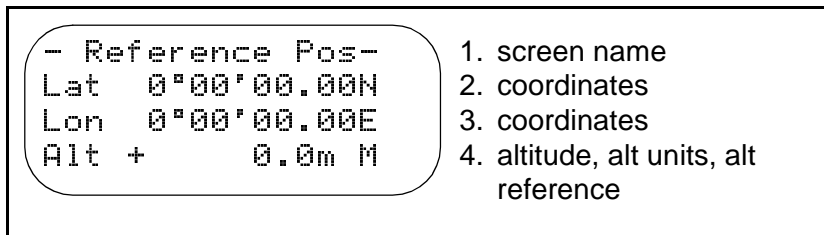
Figure 12-36 Configuration/ Base Options/ Reference Pos

Press ⓑ to move the cursor to the first digit of the latitude coordinate. Use ⓥ or ⓐ to scroll through the list of digits until you reach the one you want. Move to the next digit and repeat this process until you have the latitude coordinates you want. Press ⓙ to accept the latitude coordinates. Repeat this for the longitude and the altitude. If the reference position coordinates are inappropriate they are rejected. When you have finished entering the reference position data press ⓓ.

The coordinate system, datum, and altitude reference selected in the GeoExplorer II receiver must be that same as the ones used to calculate the coordinates of the reference position you are entering. If you are entering the reference position from a map, the map's coordinate system, datum, and altitude reference are usually shown in the map legend or title block. For instructions on changing the coordinate system, see Coordinates, page 12-47. For instructions on changing the datum, see Datum, page 12-49. For instructions on changing the altitude reference, see Units, page 12-50.

Note – You do not have to enter a reference position for a base station in the field, but you do have to specify a reference position in the Pathfinder Office software, before using the base files.

12.3   Coordinates

Coordinates allows you to choose the coordinate system you want. *Coordinates* is critical for data accuracy and should be checked every time you want to collect a file. Figure 12-37 lists the *Coordinates* menu options.

```
 ┌─ Coordinates ─╮      1. screen name
 │ Deg & Min     │      2. option
 │ Deg/Min/Sec   │      3. option
 │ OSGB          │      4. option
 ╰───────────────╯         (scroll)
   UTM                  5. option
   ECEF                 6. option
   Trimble Grid         7. option
```
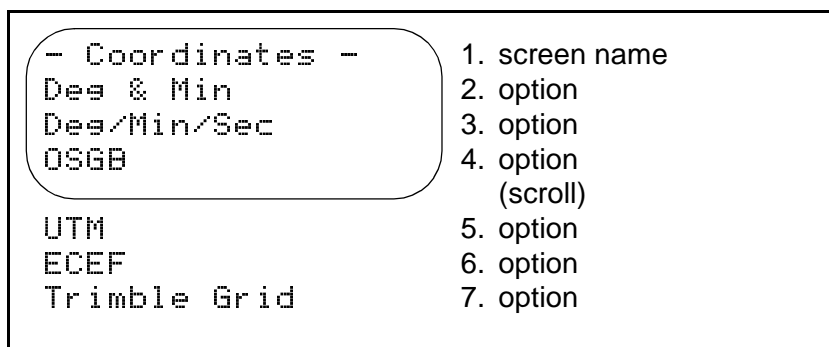
Figure 12-37 Configuration/ Coordinates

Before entering coordinates (a waypoint, for example) you should also make sure that the display coordinate system is the same one used to calculate the coordinates. When navigating with a map, change the coordinate system so the GeoExplorer II receiver displays positions in the same coordinates used to draw the map. The map's datum is usually shown in the map legend or title block.

Table 12-33 describes the *Coordinates* screen options.

Table 12-33 Coordinates Options

Option	Description
Deg & Min	Degrees, minutes, and fractional minutes shown as:
	Latitude37°23.6600'N
	Longitude122°02.3070'W
Deg/Min/ Sec	Degrees, minutes, and fractional seconds shown as:
	Latitude37°23'39.60"N
	Longitude122°2'18.40"W
	This is the default setting.
OSGB	Ordnance Survey of Great Britain shown as:
	BA 12345 67890
UTM	Universal Transverse Mercator shown in Easting and Northing in meters, regardless of the units of measure selected:
	10585113
	S4139052
ECEF	Earth Centered Earth Fixed, the 3D coordinate system used for satellite positioning. The current GPS version of this system is called WGS-84.

Table 12-33 Coordinates Options (Continued)

Option	Description
Trimble Grid	Trimble Grid Locator, shown as a combination of letters and numbers:

CM87XI42LE39

This is a more precise version of the Maidenhead Grid Locator System. In the Maidenhead system, the earth's surface is divided into fields, squares, sub-squares, and rectangles. Fields are indicated by 2 letters (AA to RR), squares by 2 digits (00 to 99), sub-squares by 2 letters (AA to XX), and rectangles by 2 number-letter-number pairs. The first character is the longitude and the second character is the latitude. Numbering is west to east and south to north. For more details, see the January 1983 issue of the amateur radio magazine QST. In the Trimble extension of the Maidenhead system, the division ratios, after the first three fields are 10, 25, and 10. |

12.4 Datum

Datum allows you to choose the datum you want. *Datum* is critical for data accuracy and should be checked every time you want to collect a file. Figure 12-38 lists the *Datum* menu options.

```
—     Datum      —        1. screen name
WGS-84 (World)            2. option
Yacare, Uruguay          3. option
Zandrij,Suriname         4. option
                         (scroll for more options)
```
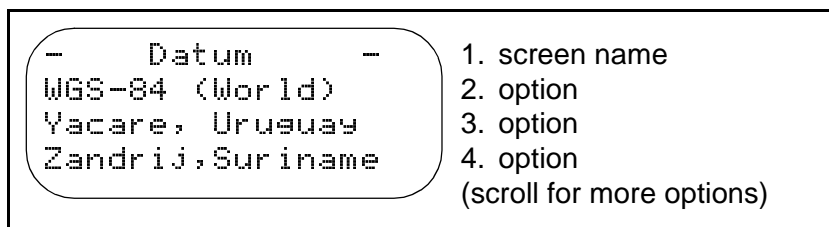
Figure 12-38 Configuration/ Datum

A datum is a reference earth model used for mapping. You can enter and view positions in over 70 datums. See Appendix B, Datums for a list of datums in the GeoExplorer II receiver. Regardless of the datum chosen here, the receiver always computes and stores positions in the WGS-84 datum. The datum you select here only affects the display. Positions collected using one datum can be converted to another datum on the PC using the Pathfinder Office software.

When changing to another coordinate system, make sure you select the correct datum. Before entering coordinates (a waypoint, for example) also make sure that the display datum is the same one used to calculate the coordinates. When navigating with a map, change the datum so the GeoExplorer II receiver displays positions in the same datum used to draw the map. The map's datum is usually shown in the map legend or title block.

Note – When the coordinate system is Ordnance Survey of Great Britain (OSGB), the Great Britain datum of 1936 is automatically used.

12.5   Units

Units affects the way that data displays on screen. Check this option before recording a file. When you select *Units*, Figure 12-39 appears.

```
─      Units      ─        1. screen name
1.Metric Units             2. option
2.English Units            3. option
3.Custom Setup             4. option
```
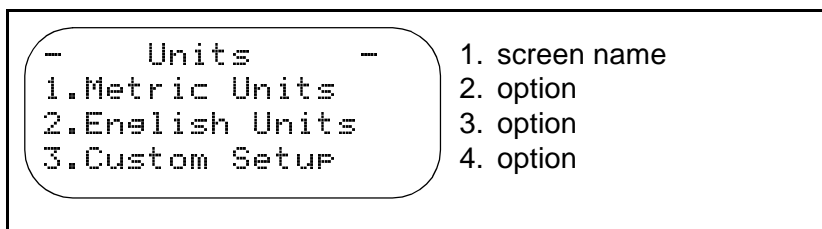
Figure 12-39 Configuration/ Units

Table 12-34 describes the *Units* screen options.

Table 12-34 Units Options

Option	Description	Unit	Settings
Metric Units	Selecting this option sets up the GeoExplorer II receiver to display data in the following metric units. This is the default setting.	Distance	Kilometer
		Angular	Degrees
		Velocity	Kilometers/Hour
		Altitude	Meters
		Alt Reference	HAE
		North Reference	Magnetic
English Units	Selecting this option sets up the GeoExplorer II receiver to display data in the following English units.	Distance	Miles
		Angular	Degrees
		Velocity	Miles/Hour
		Altitude	Feet
		Alt Reference	HAE
		North Reference	Magnetic
Custom Setup	Selecting this option allows you to view and change the selected units as described in Custom Setup, page 12-52.		

12.5.1 Custom Setup

Custom Setup allows you to view and change the selected units. When you select *Custom Setup*, Figure 12-40 appears.

```
 ⎛ - Custom Setup -  ⎞     1. screen name
 ⎜ 1.Distance Units  ⎟     2. option
 ⎜ 2.Angular Units   ⎟     3. option
 ⎝ 3.Velocity Units  ⎠     4. option
                             (scroll)
   4.Altitude Units        5. option
   5.Alt Reference         6. option
   6.NorthReference        7. option
```
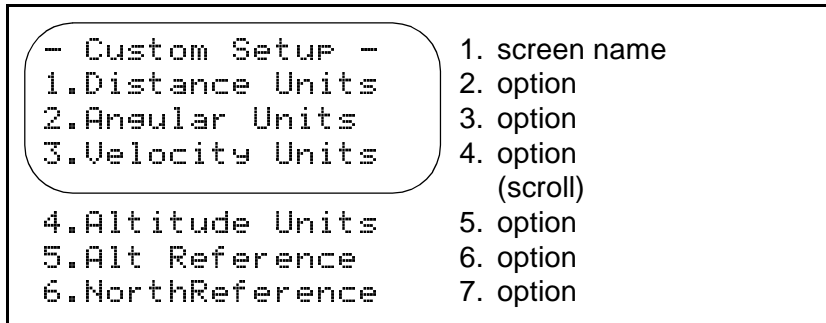
Figure 12-40 Configuration/ Units/ Custom Setup

Distance Units

Distance Units lets you select the units that distance displays in when you are navigating. When you select *Distance Units*, Figure 12-41 appears.

```
 ⎛ -Distance Units-  ⎞     1. screen name
 ⎜ Kilometers        ⎟     2. unit
 ⎜ Nautical Miles    ⎟     3. unit
 ⎝ Miles             ⎠     4. unit
                             (scroll)
   Internatl Feet          5. unit
   US Survey Feet          6. unit
   Yards                   7. unit
   Meters                  8. unit
```
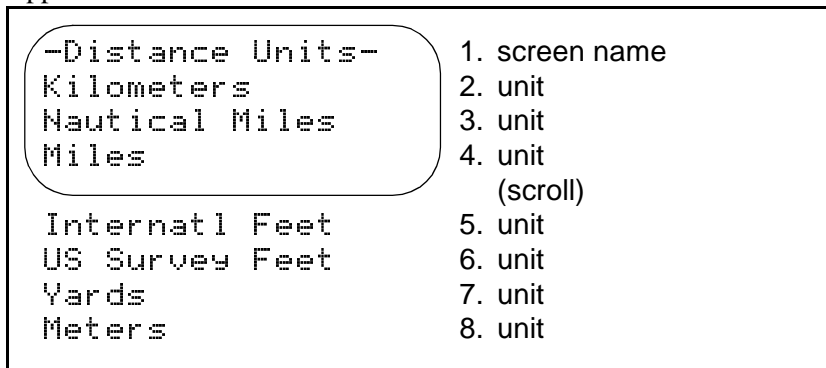
Figure 12-41 Configuration/ Units/ Custom Setup/ Distance Units

Angular Units

Angular Units allows you to select which units you want to display
bearing when navigating. When you select *Angular Units*, Figure 12-
42 appears.

```
╭─ Angular Units─╮      1. screen name
│ Degrees        │      2. unit
│ Mils           │      3. unit
│ Grads          │      4. unit
╰────────────────╯
```
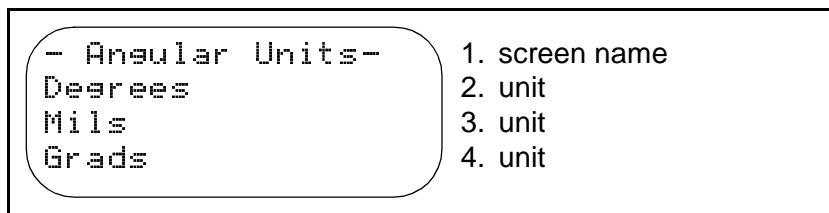
**Figure 12-42 Configuration/ Units/ Custom Setup/ Angular
                Units**

Velocity Units

Velocity Units allows you to select the units you want to display
velocity. Velocity is a vector quantity consisting of a speed and a
heading. When you select *Velocity Units*, Figure 12-43 appears.

```
╭─Velocity Units─╮      1. screen name
│ Feet/sec       │      2. unit
│ Meters/sec     │      3. unit
│ Miles/hour     │      4. unit
╰────────────────╯         (scroll)
  Kilometers/hour       5. unit
  Nautical MPH          6. unit
```
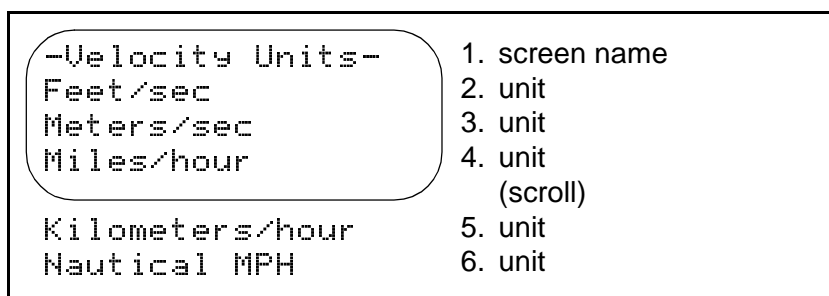
**Figure 12-43 Configuration/ Units/ Custom Setup/ Velocity
                Units**

Altitude Units

Altitude Units allows you to select the units you want to display and enter altitude. When you select *Altitude Units*, Figure 12-44 appears.

```
 ╭─Altitude Units─╮        1. screen name
 │ Meters         │        2. unit
 │ Kilometers     │        3. unit
 │ Miles          │        4. unit
 ╰────────────────╯           (scroll)
   Feet                    5. unit
```
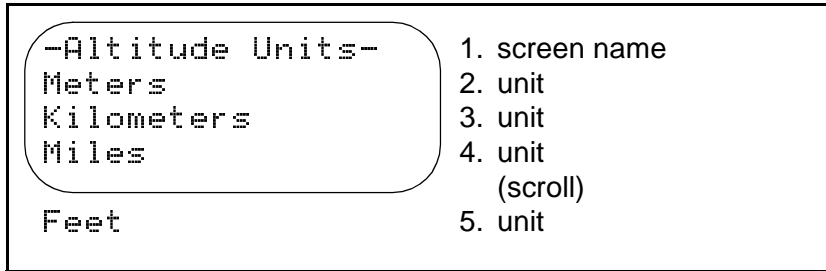
Figure 12-44 Configuration/ Units/ Custom Setup/ Altitude Units

Alt Reference

Alt Reference allows you to select the reference for altitudes when they are displayed or entered manually. When you select *Alt Reference*, Figure 12-45 appears.

```
 ╭─ Alt Reference─╮        1. screen name
 │                │        2.
 │ Ellipsoid (HAE)│        3. option
 │ Geoid (MSL)    │        4. option
 ╰────────────────╯
```
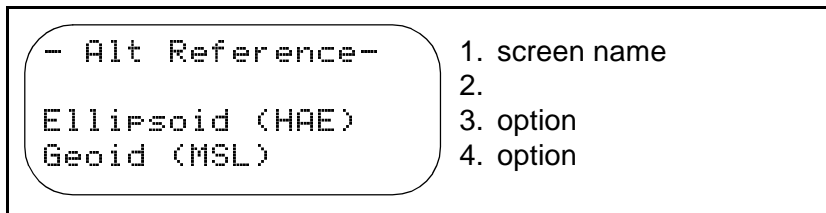
Figure 12-45 Configuration/ Units/ Custom Setup/ Alt Reference

The GeoExplorer II receiver stores GPS altitudes as HAE. If you chose to display altitude as MSL, an HAE-MSL conversion is used to determine the MSL altitude. This conversion is accurate to approximately 2 to 5 meters.

Table 12-35 describes the *Alt Reference* screen options.

Table 12-35 Alt Reference Options

Option	Description
Ellipsoid (HAE)	The altitude displays and is entered as Height Above Ellipsoid.
Geoid (MSL)	The altitude displays and is entered as height above Mean Sea Level.

North Reference

North Reference allows you to select the reference direction for headings and bearings. When you select *North Reference*, Figure 12-46 appears.

```
-NorthReference-        1. screen name
North, Magnetic         2. option
North, True             3. option
North, Manual           4. option
                           (scroll)
South, Magnetic         5. option
South, True             6. option
South, Manual           7. option
```

Figure 12-46 Configuration/ Units/ Custom Setup/ North Reference

Table 12-36 describes the *North Reference* screen options.

Table 12-36 North Reference Options

Option	Description
North, Magnetic	The GeoExplorer II receiver estimates the appropriate magnetic declination based upon the current location and a lookup table based on a 10° by 10° grid.
North, True	The GeoExplorer II receiver measures the bearing in degrees clockwise from True North.
North, Manual	This option lets you set the North declination manually. See Figure 12-47.
South, Magnetic	The GeoExplorer II receiver estimates the appropriate magnetic declination based upon the current location and a lookup table based on a 10° by 10° grid.
South, True	The GeoExplorer II receiver measures the bearing in degrees clockwise from True South.
South, Manual	This option lets you set the South declination manually. See Figure 12-47.

When you select *North Manual*, Figure 12-47 appears. A similar screen is shown if you select *South Manual*.

```
Enter North
 Declination:
    +  0.00°
```
1. screen name
2.
3. value
4.
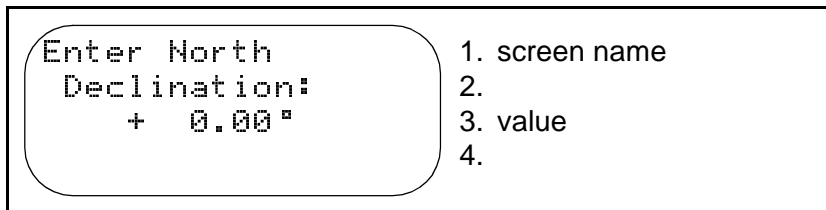
Figure 12-47 Configuration/ Units/ Custom Setup/ North Reference/ North Manual

Press ◀ or ▶ to move the cursor to the first digit of the value. Use ▼ or ▲ to scroll through the digits. You can continue this process for each digit in the value until you find the one you want. You can change from + to -. Press ◉ when the value you want displays.

Recommended Settings

Any combination of units can be used, although we recommend you use one of the systems shown in Table 12-37.

Table 12-37 Recommended Units Settings

System	Distance	Velocity	Altitude
Metric	Kilometer	KPH (Kilometers per Hour)	Meters
English	Mile	MPH (Miles per Hour)	Feet
Nautical	Nautical Mile	Knots (Nautical Miles per Hour)	Feet
Feet	Feet	FPS (Feet per Second)	Feet
Yards	Yards	MPH (Miles per Hour)	Feet

Note – Changing any of the units of measure does not affect position computations or datalogging. It only affects the data display on screen.

12.6   Date & Time

Date & Time allows you to set the current time, the current date and to change the way these display in the GeoExplorer II receiver. Check this option before recording a file. When you select *Date & Time*, Figure 12-48 appears.

```
 ⌐ Date & Time ─        1. screen name
 1.Date Format          2. option
 2.Set Local Time       3. option
 3.Time Display         4. option
```
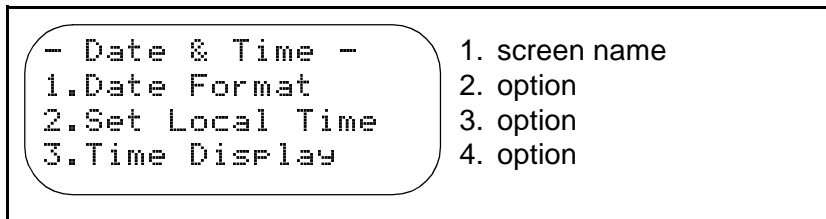
Figure 12-48 Configuration/ Date & Time

12.6.1   Date Format

Date Format allows you to select how you want the date displayed. When you select *Date Format*, Figure 12-49 appears.

```
 ⌐ Date Format  ─       1. screen name
 MM/DD/YY               2. option
 DD/MM/YY               3. option
 DD-MM-YY               4. option
                          (scroll)
 DD.MM.YY               5. option
 YY-MM-DD               6. option
 YY.MM.DD               7. option
```
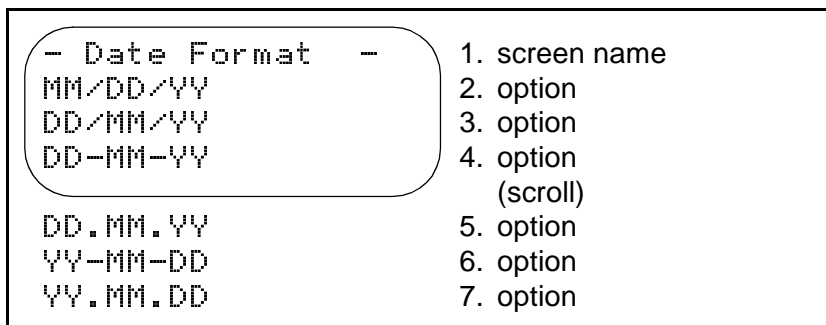
Figure 12-49 Configuration/ Date & Time/ Date Format

Table 12-38 describes the *Date Format* screen options.

Table 12-38 Date Format Options

Option	Description
MM/DD/YY	Separate the month, day, and year (in this order) with a slash. This is the default setting.
DD/MM/YY	Separate the day, month, and year (in this order) with a slash.
DD-MM-YY	Separate the day, month, and year (in this order) with a dash.
DD.MM.YY	Separate the day, month, and year (in this order) with a period.
YY-MM-DD	Separate the year, month, and day (in this order) with a dash.
YY.MM.DD	Separate the year, month, and day (in this order) with a period.

12.6.2   Set Local Time

Set Local Time allows you to set your current local time offset to UTC (Universal Time Coordinated). When you select *Set Local Time*, Figure 12-50 appears.

```
/ Set Local Time:  \      1. screen name
|    TUE 10:41 pm   |      2. local time
| Time Offset:      |      3.
\ Local-UTC:+00:00  /      4. offset time to UTC
```
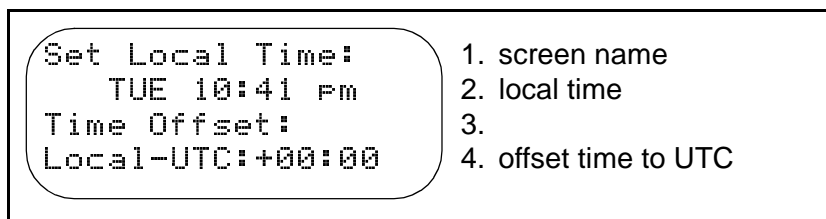
Figure 12-50 Configuration/ Date & Time/ Set Local Time

Press ⬆ or ⬇ to scroll through the time offset. Press ◆ when the correct local time displays.

12.6.3   Time Display

Time Display allows you to select whether you want time displayed in UTC or local time in 12 or 24 hour format. When you select *Time Display*, Figure 12-49 appears.

```
  ┌─ Time Display ─┐      1. screen name
  │ UTC            │      2. option
  │ Local-24 Hrs.  │      3. option
  │ Local-12 Hrs.  │      4. option
  └────────────────┘
```
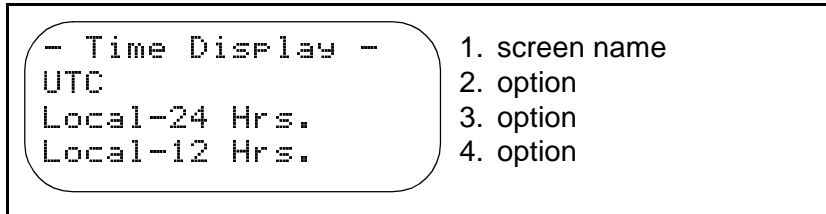
Figure 12-51 Configuration/ Date & Time/ Time Display

Table 12-39 describes the *Time Display* screen options.

Table 12-39 Time Display Options

Option	Description
UTC	Displays time in UTC format. This is the default setting.
local - 24 Hrs.	Displays local time in 24 hour (military) format.
local - 12 hrs.	Displays local time in 12 hour format.

12.7   Communication

Communication lets you set up the parameters for communication with external devices through either Port A or Port B of the GeoExplorer II receiver. You need to set these parameters when you want to transfer data to and from a PC or communicate with radios to receive differential corrections in real time (RTCM).

The receiver has two ports. Port A is the data port used with the standard cable and is the default. You can receive and transmit data in a variety of formats from Port A using the standard download cable supplied with your GeoExplorer II Mapping System. Port B is only used when you need to communicate with three external devices or when you need to communicate with two devices that have different baud, parity, stop and data bit settings. You need a Y cable to use Port B. For more information refer to the Y cable diagram, Table D-2 in Appendix D, Real-Time Differential Correction.

When you select *Communications*, Figure 12-52 appears.

```
┌─────────────────────────┐   1. screen name
│  -Communications-       │   2.
│                         │   3. option
│  1.Port A               │   4. option
│  2.Port B               │
└─────────────────────────┘
```
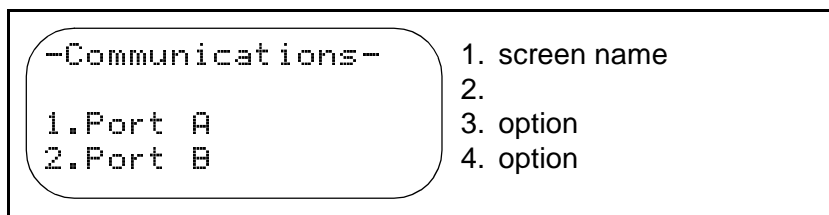
Figure 12-52 Configuration/ Communication

12.7.1 Port A and B

Port A and B are electronically similar. Port A communicates with a device using the standard data cable. For example, Port A is used when transferring data to and from the Pathfinder Office software. Port B communicates with an external device using a Y cable. For more information on the Y cable refer to Appendix D, Real-Time Differential Correction. The configuration parameters must be set correctly for the port you are using. When you select *Port A*, Figure 12-53 appears. A similar screen appears for *Port B*.

```
 ⎛ - Comm Port A -       1. screen name
 | 1.Protocol   NMEA      2. option
 | 2.Baud       4800      3. option
 ⎝ 3.Parity     None      4. option
                              (scroll)
   4.Data Bits    8       5. option
   5.Stop Bits    1       6. option
   6.Precision    3       7. option
   7.Send At      3s      8. option
```
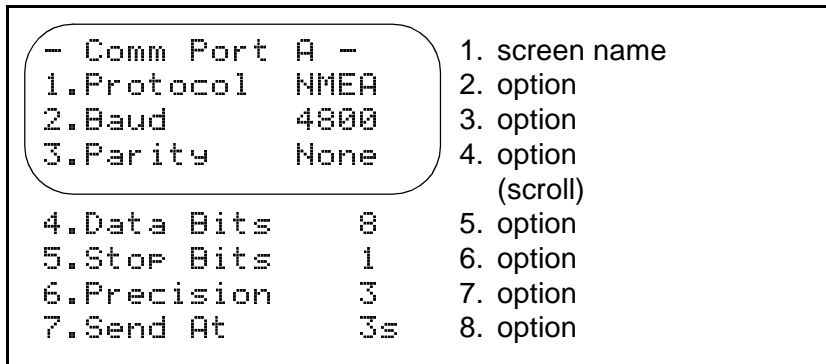
Figure 12-53 Configuration/ Communication/ Port A

Protocol

The communications protocol is like a language that the GeoExplorer II receiver uses to communicate to other devices. It must be set appropriately when transferring files to the PC or when using real-time differential GPS. *Protocol* determines what the other data communications options should be set to. When you select *Protocol*, Figure 12-54 appears.

```
 ╭─────────────────╮    1. screen name
 │ -PortA Protocol- │    2. option
 │ None             │    3. option
 │ XMODEM           │       (scroll)
 ╰─────────────────╯
  RTCM                  4. option
  NMEA                  5. option
  RTCM/NMEA             6. option
  ASCII                 7. option
  RTCM/ASCII            8. option
  TSIP                  9. option
  RTCM/TSIP             10.option
```
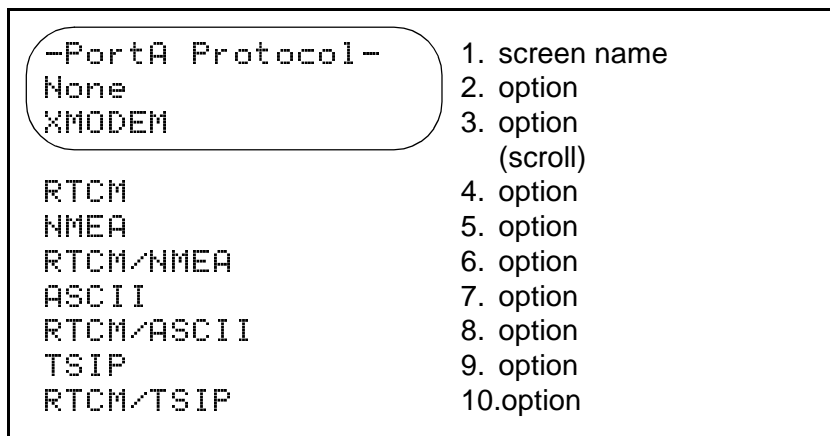
**Figure 12-54 Configuration/ Communication/ Port A/
            Protocol**

Table 12-40 describes the *Protocol* screen options.

Table 12-40 Protocol Options

Option	Description
None	In this mode, the GeoExplorer II receiver port is turned off and cannot transfer files to the PC or receive real-time differential correction signals through this port.
XMODEM	Select *XMODEM* when transferring waypoints and files between the GeoExplorer II receiver and the Pathfinder Office software on the PC. The receiver can be set in this mode during normal operation. This is the default setting.
RTCM	Select *RTCM* when you are using a radio link to receive radio correction signals for RTCM. Other RTCM settings are explained in RTCM, page 12-73.
NMEA	Select *NMEA* to output data in $GPGGA and $GPVTG NMEA formats. For more information on NMEA, see Appendix C, NMEA Format.
RTCM/NMEA	Select this when you want RTCM messages coming in on Port A and have NMEA data going out from Port A. This can be done using the standard data download cable, however the baud, parity, stop and data bits have to be the same for both the RTCM and NMEA device. If these parameters are not the same you need to use a Y cable to connect the second device to Port B.
ASCII	Select *ASCII* to transfer data in ASCII format from the GeoExplorer II receiver directly to an external device, such as a computer or printer. For more information on ASCII, see Appendix A, ASCII Programs and Messages.

Table 12-40 Protocol Options (Continued)

Option	Description
RTCM/AS CII	Select this when you want RTCM messages coming in on Port A and ASCII data going out from Port A. You would use this option if you are already using Port B to communicate with another external device. This can be done using the standard data download cable, however the baud, parity, stop and data bits have to be the same for both the RTCM and ASCII device. If these parameters are not the same you need to use a Y cable to connect the second device to Port B.
TSIP	Select *TSIP* protocol to record data directly to another GPS Pathfinder hand-held datalogger.
RTCM/TSI P	Select this when you want RTCM messages coming in on Port A and TSIP data going out from Port A. This can be done using the standard data download cable, however the baud, parity, stop and data bits have to be the same for both the RTCM and TSIP device. If these parameters are not the same you need to use a Y cable to connect the second device to Port B.

Baud

Baud determines the rate at which data is transferred from one device to another. It is expressed in bits per second. The higher the baud rate, the faster the transfer of data. Higher baud rates are preferable but many devices are not capable of transferring data at high speeds. When you select *Baud*, Figure 12-55 appears.

```
 - Port A Baud -      1. screen name
 9,600                2. option
 4,800                3. option
 2,400                4. option
                         (scroll)
 1,200                5. option
   600                6. option
   300                7. option
   150                8. option
    75                9. option
```
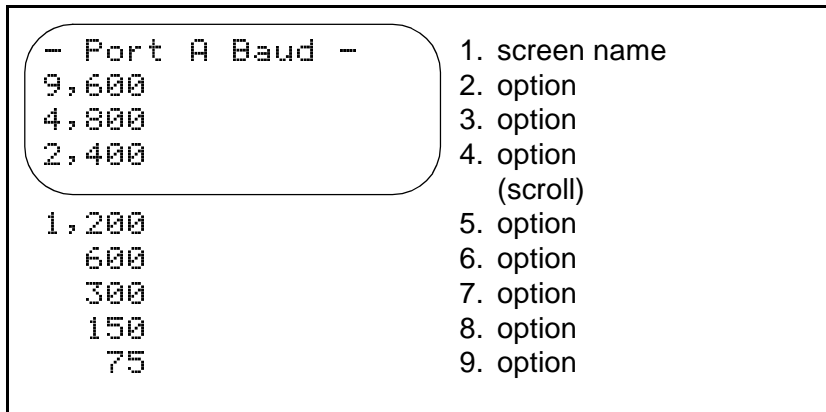
Figure 12-55 Configuration/ Communication/ Port A/ Baud

For XMODEM or TSIP protocols, select 9600. For RTCM, the setting is typically 1200.   For all other protocols, select the same baud rate as set in the external communications device. If the GeoExplorer II receiver has trouble communicating with the external device the default baud rate may be the problem. Check your external device's manual for the correct baud rate.

Parity

Parity is a form of error checking used when binary digital data is transferred. When data is transferred, each character is sent in a stream of single bits. There are a maximum of eight such bits in a byte when transferring a single character. The data can include a parity bit to detect whether or not errors have occurred during the current byte transmission. *Parity* can be set so that the binary sum of the preceding bits and itself are odd, even, or none. When you select *Parity*, Figure 12-56 appears.

```
 - Port A Parity-      1. screen name
Odd                    2. option
Even                   3. option
None                   4. option
```
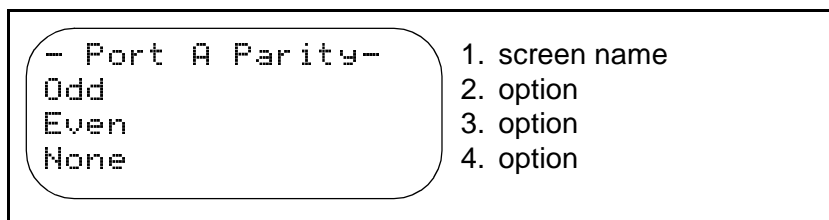
Figure 12-56 Configuration/ Communication/ Port A/ Parity

Table 12-41 describes the *Parity* screen options.

Table 12-41 Parity Options

Option	Description
Odd	Select *Odd* when using RTCM protocol. For most protocols, select the same parity as set in the external communication device.
Even	For most protocols, select the same parity as set in the external communication device.
None	Select *None* when using XMODEM protocol. For most protocols, select the same parity as set in the external communication device.

Data Bits

When data is transferred, each character is sent in a stream of single bits, but many devices transmit or receive fewer than eight bits when transferring a single character. When you select *Data Bits*, Figure 12-57 appears.

```
 ⎛ - Port A          ⎞   1. screen name
 ⎜       Data Bits - ⎟   2.
 ⎜ 7 data bits       ⎟   3. option
 ⎝ 8 data bits       ⎠   4. option
```
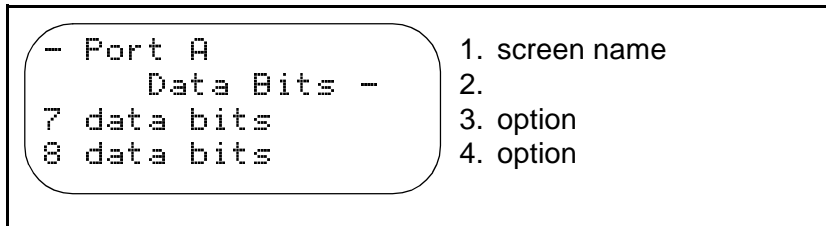
Figure 12-57 Configuration/ Communication/ Port A/ Data Bits

Table 12-42 describes the *Data Bits* screen options.

Table 12-42 Data Bits Options

Option	Description
7 data bits	This setting is seldom used.
8 data bits	Use 8 data bits for TSIP, XMODEM, and RTCM protocols. This is the default setting.

Stop Bits

Stop bits are part of the data that is transferred and signify the end of a byte. When data is transferred, each character is sent in a stream of single bits. There are eight such bits in a byte and a stop bit is used to indicate the end of a byte. When you select *Stop Bits*, Figure 12-58 appears.

```
─ Port A
        Stop Bits ─
1 stop bit
2 stop bits
```
1. screen name
2.
3. option
4. option
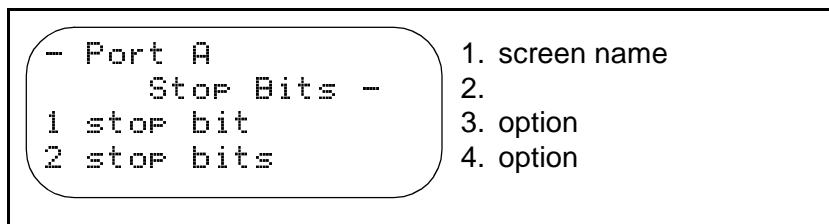
Figure 12-58 Configuration/ Communication/ Port A/ Stop Bits

Table 12-43 describes the *Stop Bits* screen options.

Table 12-43 Stop Bits Options

Option	Description
1 stop bit	The data uses a single stop bit to indicate the end of a byte. By setting this parameter you are telling the GeoExplorer II receiver to look for one stop bit. This is the default and most commonly used setting. Use 1 stop bit for TSIP, XMODEM, and RTCM protocols.
2 stop bits	The data uses two stop bits to indicate the end of a byte. By setting this parameter you are telling the GeoExplorer II receiver to look for two stop bits.

Precision

Precision only appears when you select NMEA or RTCM/NMEA as your protocol. *Precision* allows you to determine the number of decimal places used when outputting latitudes and longitudes. When you select *Precision*, Figure 12-59 appears.

```
Precision Of       1. screen name
  Output           2.
  Positions:       3.
       3           4. value
```
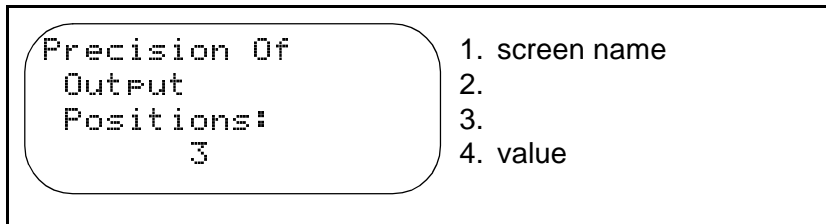
**Figure 12-59 Configuration/ Communication/ Port A/
Precision**

Use ⊙ or ⊙ to scroll through the digits. Press ⊙ when the value and unit you want displays. Table 12-44 describes the *Precision* screen options.

Table 12-44 Precision Options

Option	Description
1 to 5	The default and recommended setting is 3 decimal places.

Send At

Send At only appears when you select NMEA, RTCM/NMEA, ASCII, or RTCM/ASCII as your protocol. *Send At* determines the frequency at which ASCII or NMEA sentences are sent. When you select *Send At*, Figure 12-60 appears.

```
┌─────────────────────┐      1. screen name
│ Issue Position      │      2.
│  And Velocity       │      3.
│ Every:              │      4. value
│              3s     │
└─────────────────────┘
```
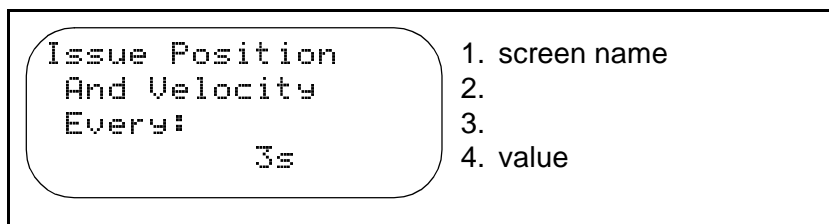
Figure 12-60 Configuration/ Communication/ Port A/ Send At

Press ⏶ or ⏷ to scroll through the options available. Press ⏴ or ⏵ to move the cursor between the value field and the unit field. Use ⏷ or ⏶ to scroll through the digits in the value field and the options in the unit field. Press ◆ when the value you want displays. Table 12-45 describes the *Send At* screen options.

Table 12-45 Send At Options

Field	Option	Description
Value	1 to 999	The default and recommended setting is 3 seconds.
	Off	ASCII or NMEA sentences are not sent unless requested by an external device.
Units	m	The units are displayed as minutes.
	s	The units are displayed as seconds.

Recommended Settings

The communications settings vary depending on the communications protocol you select. Table 12-46 shows some recommended settings. If you have problems, check the recommended settings in the manual that came with the external device.

Table 12-46   Recommended Communications Settings

Comm Protocol	Baud Rate (75 - 9,600)	Parity (None, Odd, Even)	Data Bit (7, 8)	Stop Bit (1, 2)	Precision	Send At
None	n/a	n/a	n/a	n/a	n/a	n/a
XMODEM	9600	None	8	1	n/a	n/a
RTCM[1.]	1200	Odd	8	1	n/a	n/a
NMEA[3]	9600	Odd	8	1	3	1 sec
RTCM/NMEA					3	1 sec
ASCII	9600	Odd	8	1	n/a	1 sec
RTCM/ASCII[2.]					n/a	1 sec
TSIP	9600	Odd	8	1	n/a	n/a
RTCM/TSIP[2.]					n/a	n/a
1. Verify with your RTCM device that this is correct. 2. The RTCM and other device must use the same baud, parity, data bits, and stop bits. Refer to your RTCM device documentation for these settings. 3. Verify with you NMEA device that this is correct. 4. These should be set to the same parameters as the NavBeacon XL.						

12.8   RTCM

RTCM lets you set parameters that specify which port the radios are connected to and control how RTCM is recorded. Check all of these parameters before doing real-time differential correction. When you select *RTCM*, Figure 12-61 appears.

```
 ⎛─      RTCM      ─ ⎞   1. screen name
 │1.Mode   GPS/GPD │   2. option
 │2.Port         B │   3. option
 │3.Stale time  10 │   4. option
 ⎝─────────────────⎠       (scroll)
                          5. option
    Msg Count     0    6. option
    Msg Gaps      1    7. option
```
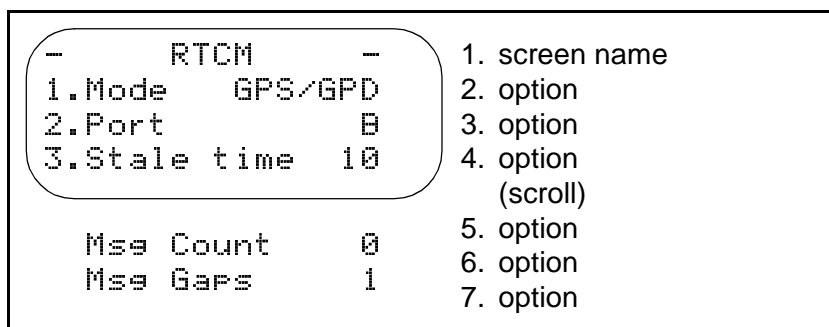
Figure 12-61 Configuration/ RTCM

⊠   **Note –** For more information on using the GeoExplorer II receiver in real time, refer to Appendix D, Real-Time Differential Correction.

12.8.1 Mode

Mode lets you set how GPS differential messages are received. When you select *Mode*, Figure 12-62 appears.

```
─      Mode        ─      1. screen name
Autonomous                2. option
Differential              3. option
Auto GPS-GPD              4. option
```
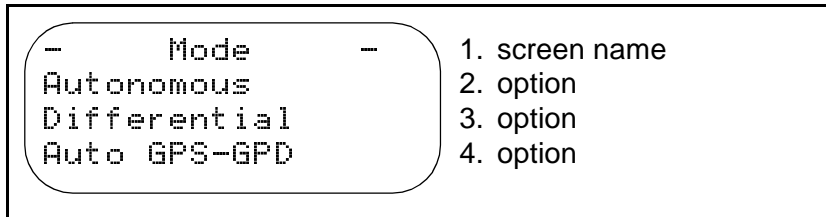
Figure 12-62 Configuration/ RTCM/ Mode

Table 12-47 describes the *Mode* screen options.

Table 12-47 Mode Options

Option	Description
Autonomous	Select *Autonomous* when you are not differentially correcting data in real time. Positions collected in Autonomous mode can be differentially corrected later using the Pathfinder Office software.
Differential	When *Differential* is selected, the GeoExplorer II receiver only calculates its position if it is receiving real-time differential corrections, usually through a radio connected to the input port. When the receiver is not receiving the corrections, it does not calculate or store positions. The stale time determines how long the GeoExplorer II receiver uses a particular RTCM correction. If the RTCM radio link is broken, then after the stale time, the receiver does not compute a real-time differential GPS position fix. See Stale Time, page 12-76 for more information on stale time.

Table 12-47 Mode Options (Continued)

Option	Description
Auto GPS-GPD	When *Auto GPS-GPD* is selected, the GeoExplorer II receiver calculates and stores a corrected position when it is receiving real-time differential corrections. The receiver calculates and stores uncorrected positions if the radio link is broken. This is the default setting.
	The stale time determines how long the GeoExplorer II receiver waits after its last real-time correction is received to revert to autonomous GPS positioning. In this mode, the receiver calculates uncorrected positions even if the RTCM link is broken. See Stale Time, page 12-76 for more information on stale time.
	The uncorrected positions can be corrected later using the Pathfinder Office software. The real-time corrected positions in the file are not affected by running differential correction in Pathfinder Office.

12.8.2   Port

Port allows you to access the port configuration parameters. When you select *Port*, Figure 12-63 appears.

```
 ⎛-Communications-⎞      1. screen name
 ⎜                 ⎟      2.
 ⎜1.Port A         ⎟      3. option
 ⎝2.Port B         ⎠      4. option
```
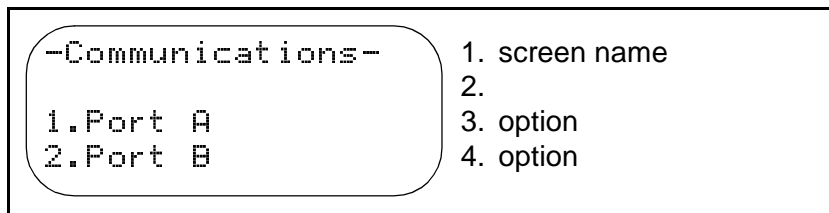
Figure 12-63 Configuration/ RTCM/ Port

You can set the protocol, baud, parity, data bits, and stop bits for both Port A and Port B. This is described in Communication, page 12-61.

12.8.3   Stale Time

Stale Time lets you set a time that determines how long the GeoExplorer II receiver uses a RTCM value after it is transmitted. If no new signal is received for this length of time, the receiver determines that the radio link has broken. When you select *Stale Time*, Figure 12-64 appears.

```
┌─────────────────────┐    1. screen name
│ Stale Time:         │    2.
│                     │    3. value
│     10 seconds      │    4.
└─────────────────────┘
```
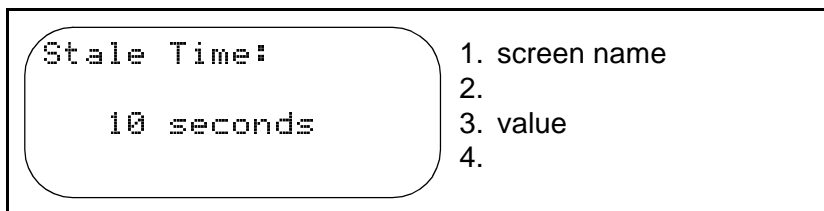
Figure 12-64   Configuration/ RTCM/ Stale Time

Use ▼ or ▲ to scroll through the digits. Press ◆ when the value you want displays. Table 12-48 describes the *Stale Time* screen options.

Table 12-48 Stale Time Options

Option	Description
1 to 999 seconds	The stale time should be at least six times the time of the transmission interval. For example, if real-time differential GPS signals are being sent every 10 seconds, set the value here to at least 60 seconds. This allows the GeoExplorer receiver to continue making corrections even if every other message is lost.

12.8.4   Msg Count

Msg Count is a status message and cannot be changed. *Msg Count* counts the real-time differential GPS signals received by the rover from the transmitting base station. Every time a correction is received, the counter increments by one. This is a good way of checking that corrections are being received correctly.

12.8.5   Msg Gaps

Msg Gaps is a status message and cannot be changed. *Msg Gaps* is the time (in seconds) between correction transmissions. The S*tale Time* should be twice the *Msg Gaps*.

12.9   Sat Health

Sat Health lets you enable and disable satellites and override health messages. When a satellite is disabled, the GeoExplorer II receiver does not use it to calculate a position. You might disable a satellite to force the receiver to use a particular constellation for testing. When you select *Sat Health*, Figure 12-65 appears.

```
 -   Sat Health   -       1. screen name
1.Ignore Health           2. option
2.Enable Sats             3. option
3.Disable Sats            4. option
                             (scroll)
4.Enable All              5. option
```
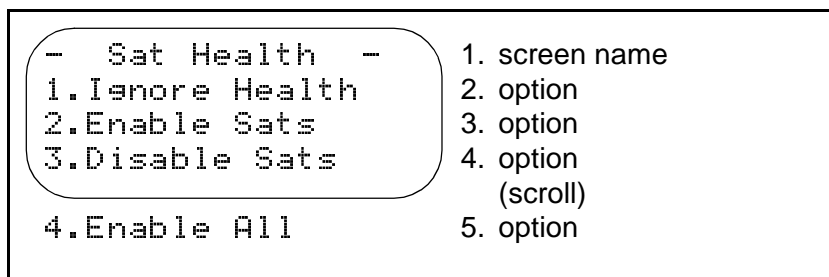
Figure 12-65 Configuration/ Sat Health

> **Caution –** This option is for advanced users only. Enabling an unhealthy satellite can result in unusable GPS data.

12.9.1 Ignore Health

If a satellite is experiencing mechanical problems or some other difficulties, it can be set unhealthy by the Department of Defense. The satellite broadcasts an unhealthy message and the GeoExplorer II receiver does not use that satellite in position calculations. You can view the satellite health on the *GPS Status/Sat Hlth & URA* screen, see Sat Hlth & URA, page 9-5.

Ignore Health allows you to override an unhealthy message from a satellite so that satellite are used in position fixes. This option should only be used when you know that the unhealthy message is incorrect, and the satellite is healthy. When you select *Ignore Health*, Figure 12-66 appears.

```
Ignored:            1. screen name
     None           2. ignored satellites
                    3.
                    4.
```
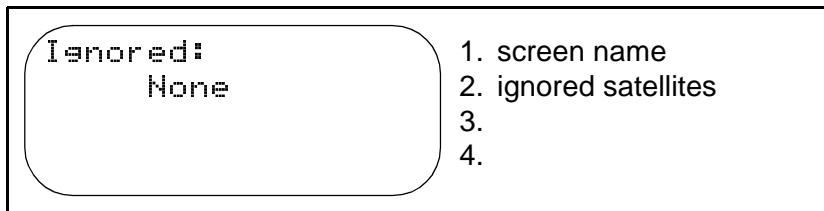
Figure 12-66 Configuration/ Sat Health/ Ignore Health

This screen shows which satellites' health are currently being ignored, and is usually set to none.

Press ◆ to display a screen similar to Figure 12-67.

```
Change mode:sv01        1. screen name, satellite#
  Current mode:         2.
      Ignored           3. option
                        4.
```
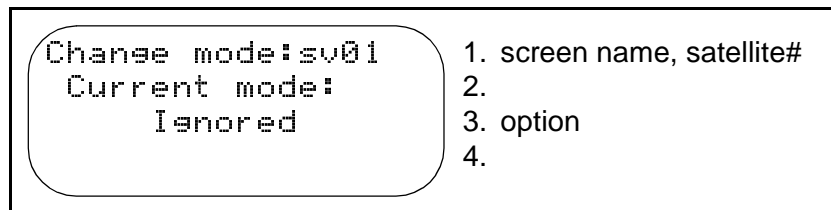
**Figure 12-67 Configuration/ Sat Health/ Ignore Hlth/
Change Mode**

Use ▲ or ▼ to scroll through the 25 satellites. Press ◀ or ▶ to
change the mode to *Ignored*. Press ◆ when the mode you want
displays.

12.9.2   Enable Sats

Enable Sats allows you to enable specific satellites that were
previously disabled. Disabling a satellite means it is not used in
position calculations. Enabling a satellite means it is used in position
calculations. When you select *Enable Sats*, Figure 12-68 appears.

```
Enabled:                1. screen name
01,02,04,05,06,         2. satellite numbers
07,09,12,14,15,         3. satellite numbers
16,17,18,19,20,         4. satellite numbers
                           (scroll)
21,22,23,24,25          5. satellite numbers
26,27,28,29,31          6. satellite numbers
```
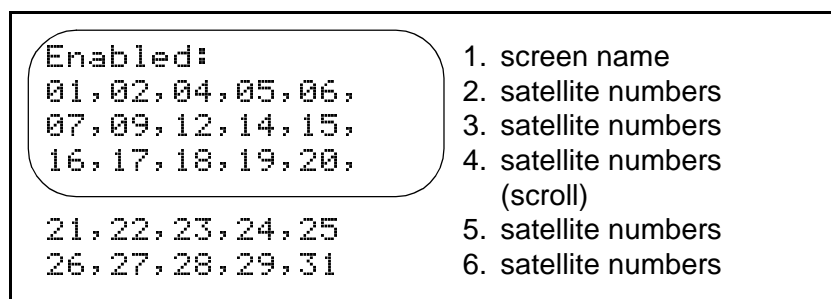
Figure 12-68 Configuration/ Sat Health/ Enable Sats

This screen shows which satellites are currently enabled. Press ◆ to display a screen similar to Figure 12-69.

```
Change mode:sv01        1. screen name, satellite#
  Current mode:         2.
      Enabled           3. option
                        4.
```
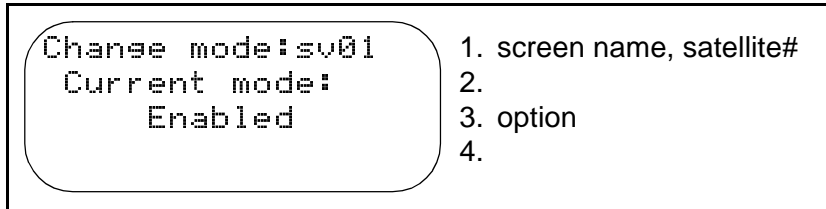
**Figure 12-69 Configuration/ Sat Health/ Enable Sats/
Change Mode**

Use ▲ or ▼ to scroll through the satellites. Press ◀ or ▶ to change the mode to *Enabled*. Press ◆ when the mode you want displays.

12.9.3 Disable Sats

Disable Sats allows you to disable specific satellites. Disabling a satellite means it is not used in position calculations. When you select *Disable Sats*, Figure 12-68 appears.

```
Disabled:               1. screen name
      None              2. option
                        3.
                        4.
```
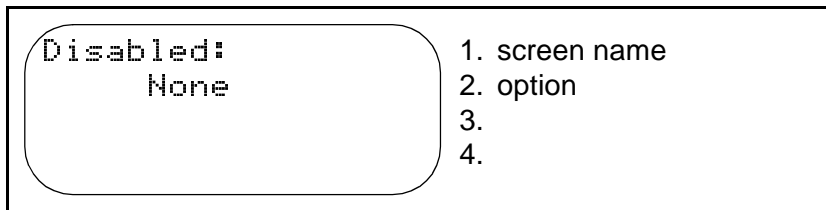
Figure 12-70 Configuration/ Sat Health/ Disable Sats

This screen shows which satellites are currently disabled and is usually set to none.

Press ◈ to display a screen similar to Figure 12-71.

```
 ┌─────────────────────┐
╱ Change mode:sv01      ╲   1. screen name, satellite#
   Current mode:            2.
       Enabled             3. option
                           4.
╲                        ╱
 └─────────────────────┘
```
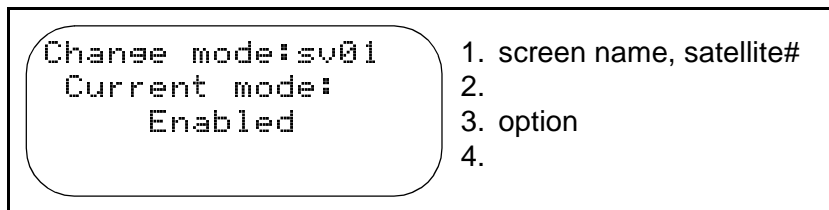
Figure 12-71 Configuration/ Sat Health/ Disable Sats/
Change Mode

Use ▲ or ▼ to scroll through the satellites. Press ◀ or ▶ to change the mode to Disable. Press ◈ when the mode you want displays. The satellite can be re-enabled in the *Enable Sats* screen or by selecting the *Enable All* option.

12.9.4 Enable All

Enable All allows you to enable all satellites. Enabling a satellite means it is used in position calculations. By default, all satellites are enabled. Use this option only if you disabled satellites using *Disable Sats*. Select *Enable All* and press ◈ to enable all satellites.

12.10 Battery Usage

Battery Usage allows you to reset the battery timer when you insert new batteries. When you turn the GeoExplorer II receiver off, the amount of time the battery was used displays in the bottom right corner. When you select *Battery Usage*, Figure 12-72 appears.

```
 ┌──────────────────────┐    1. screen name
 │ -Battery Usage -     │    2.
 │                      │    3. option
 │ 1.Reset Timer        │    4. information
 │ Hours used:   4.6    │
 └──────────────────────┘
```
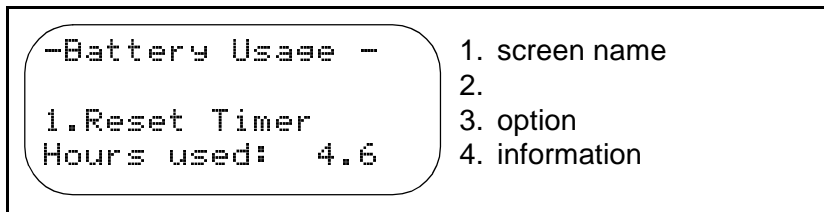
Figure 12-72 Configuration/ Battery Usage

Press ⬥ to reset the battery timer and the hours used to 0.0.

12.11 WPT Averaging

WPT Averaging allows you to record more accurate waypoints by calculating the average of several GPS positions rather than recording a single position as the waypoint. When you select *WPT Averaging*, Figure 12-73 appears.

```
 ┌──────────────────────┐    1. screen name
 │ -WPT Averaging -     │    2.
 │                      │    3. option
 │ 1.Averaging: Off     │    4. option
 │ 2.# of psns:    0    │
 └──────────────────────┘
```
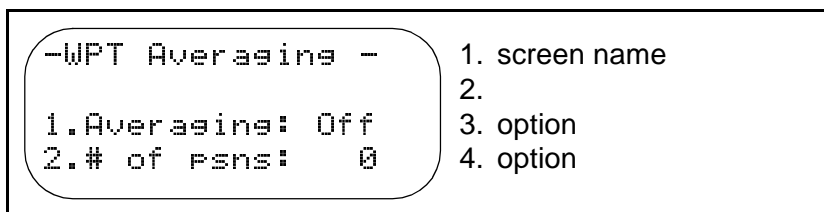
Figure 12-73 Configuration/ WPT Averaging

12.11.1 Averaging

When you select *Averaging*, Figure 12-74 appears.

```
Enable WPT          1. screen name
  Averaging?        2.
Off                 3. option
On                  4. option
```
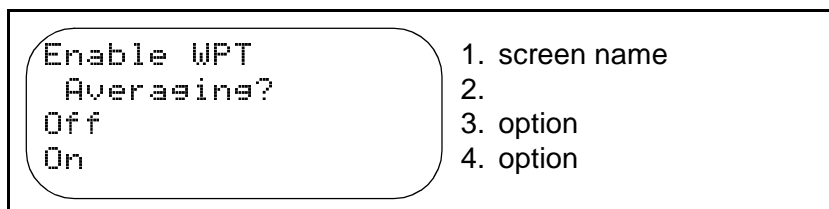
Figure 12-74 Configuration/ WPT Averaging/ Averaging

Table 12-49 describes the *Averaging* screen options.

Table 12-49 Averaging Options

Option	Description
Off	When waypoint averaging is *Off*, a single GPS position is recorded when you use *Add Here* to create a waypoint. (See Add Here, page 10-6 for more information on *Add Here*).
On	When waypoint averaging is *On*, multiple GPS positions are averaged into a single waypoint when you use *Add Here* to create a waypoint.

12.11.2 # of Psns

# of psns lets you set the number of GPS positions that should be averaged to create the waypoint when using *Add Here*. When you use *Add Here*, a message displays when enough positions are averaged. When you select *# of psns*, Figure 12-75 appears.

```
╭─────────────────────╮    1. screen name
│ Number Of psns      │    2.
│   To Average:       │    3. value
│          0 psn      │    4.
╰─────────────────────╯
```
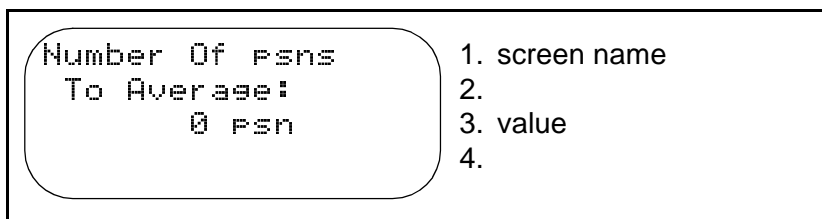
Figure 12-75 Configuration/ WPT Averaging/ # of Psns

Use ▼ or ▲ to scroll through the digits. Press ◆ when the value you want displays. Table 12-50 describes the *# of psns* screen options.

Table 12-50 # of Psns Options

Option	Description
0 to 999	The number of GPS positions that are averaged to create a single waypoint.

12.12 Fact. Defaults

Fact. Defaults returns all the parameters to the default settings. When the GeoExplorer II receiver is shipped, all the configuration parameters are set to the default values that Trimble recommends. Using the default values generally result in good data, except in unusual circumstances.

When you select *Fact. Defaults*, Figure 12-76 appears.

```
 ╱ Factory Defaults ╲      1. screen name
│                    │     2.
│ Set Defaults       │     3. option
│ Clear Memory       │     4. option
 ╲_____╱
```
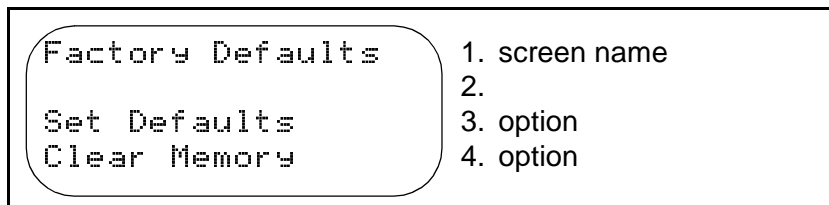
Figure 12-76 Configuration/ Fact. Defaults

Table 12-51 describes the *Fact. Defaults* screen options.

Table 12-51 Fact. Defaults Options

Option	Description
Set Defaults	Select *Set Defaults* to set the configuration parameters to the factory default values.
Clear Memory	Select *Clear Memory* to reset the GeoExplorer II receiver, clear the memory, and set the configuration parameters to the factory default values.

12.13 Language

Language allows you to change the GeoExplorer firmware to display in a different language. The supported languages are English, Spanish, French, German, Portuguese, and Russian.

Figure 12-77 lists the *Language* menu selection.

```
Select Language     1. screen name
1.English           2. option
2.Espanol           3. option
3.Francais          4. option
                       (scroll)
4.Deutsch           5. option
5.Portugues         6. option
6.Russian           7. option
```
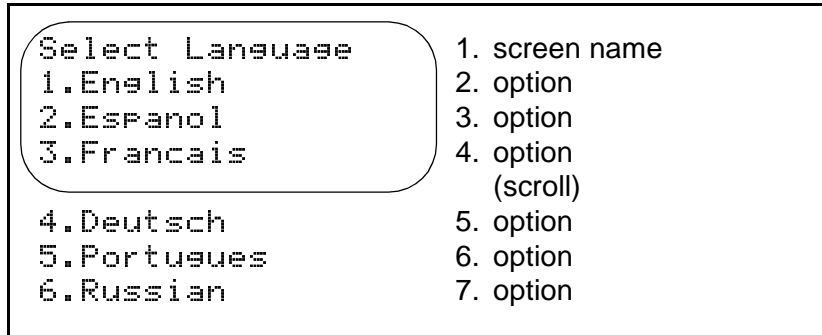
Figure 12-77 Configuration/ Language

12.14 About GeoExplorer II

About GeoExplorer II displays the unit serial number and UIF
information. When you select *About GeoExplorer II*, Figure 12-78
appears.

```
Serial Number       1.
000000000024E7      2. serial number
UIF Version         3.
 2.11  9/27/96      4. UIF number and date
                       (scroll)
Core Version        5.
 1.16  4/13/93      6. core version and date
```
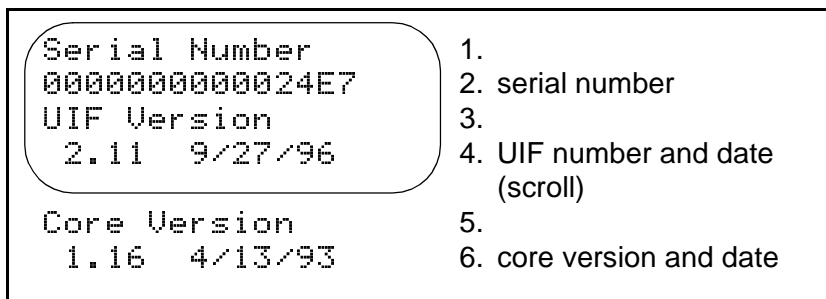
Figure 12-78 Configuration/ About GeoExplorer II

13 Data Transfer

Data Transfer allows you to check the communications port activity when you are transferring data to and from the GeoExplorer II receiver. Select *Data Transfer* when you need to transfer a data dictionary from the Pathfinder Office software, when you are transferring waypoints to Pathfinder Office, or when you are transferring rover, base, or almanac files to Pathfinder Office. All transfer processes are controlled from the PC.

When you press ◆ and then select *Data Transfer* but there is no communications port activity, Figure 13-1 appears.
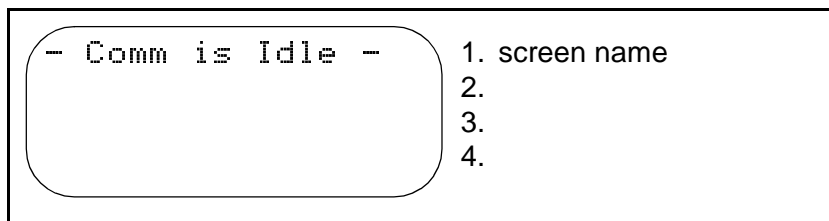
Figure 13-1   Data Transfer/ Idle

When you are transferring data, Figure 13-2 appears.

```
Loading DataDict        1. screen name
                        2.
    ▬▬▬▬▬▬              3. status bar
                        4.
```
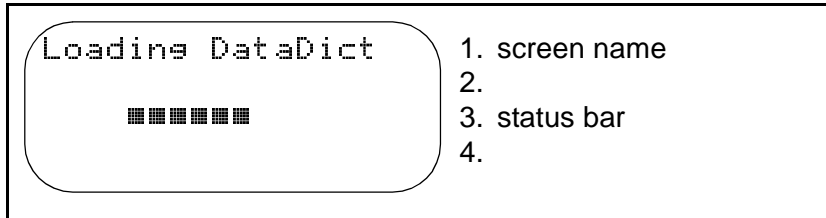
Figure 13-2   Data Transfer/ Loading

The status bar indicates the progress of the data transfer. The status bar is briefly replaced by the message *COMPLETED* when the data has transferred.

A ASCII Programs and Messages

This appendix describes how to transfer data between the GeoExplorer II receiver and a PC in ASCII format. The specific message packets that are sent and their contents are also described. With this information, you can write programs of your own that can use the ASCII files.

ASCII stands for American Standards Committee for Interchange of Information. The GeoExplorer II receiver can transfer position, velocity, and waypoint information in ASCII format to a PC. ASCII files can be viewed on a PC using any text editor or transferred to another device for various purposes, including controller applications.

When ASCII is selected as the protocol for Port A or B, the *Send At* field is displayed. This is the ASCII transmission rate. The rate determines whether the GeoExplorer II receiver operates in synchronous or asynchronous mode:

- Asynchronous Operation (rate set to Off) - The GeoExplorer II receiver responds to queries for latitude, longitude, altitude, velocity, and time from a host PC.

- Synchronous Operation (rate set from 1 second to 99 minutes or All) - The GeoExplorer II receiver sends ASCII messages to a printer, PC, datalogger, or other external device at this rate. Two messages are sent from the GeoExplorer II receiver, a time-stamped position and altitude message, and a time-stamped velocity and heading message.

A.1   Pathfinder Office ASCII I/O Programs

The following four programs, included with the Pathfinder Office software, are executed from the DOS prompt. When a program is invoked, message packets are sent between the PC and the GeoExplorer II receiver. Descriptions of the packets are given on the following pages. Set the *Comm Port* screen to ASCII, 9600, N, 8, 1.

Caution – These programs are for specialized use only. These programs should not be used for routine file and waypoint transfer between the GeoExplorer II receiver and a PC. When transferring files to a PC for differential correction or to load into a GIS, always use the Pathfinder Office software and set the GeoExplorer II communication protocol on Port A to XMODEM.

Note – Files and waypoints sent using these programs cannot be differentially corrected or used by the Pathfinder Office software. However, if the information is collected with the GeoExplorer II receiver in RTCM mode, the positions are already corrected when they are transferred to a PC using these programs.

A.1.1   UPLOAD

UPLOAD transfers waypoints from the GeoExplorer II receiver to an
ASCII file on a PC. The resulting ASCII file can be edited with any
text editor. If the file exists, the waypoints are appended to the end of
the file. Waypoints are transferred from the GeoExplorer II receiver
starting with the first waypoint and continuing until the waypoint
transfer count is exhausted. Empty waypoints are not transferred. If no
parameters are given, UPLOAD prompts for the file name, first
waypoint, count, and communication port.

UPLOAD Command Line Syntax

To use UPLOAD, enter the following at the DOS prompt:

```
UPLOAD [file] [first] [count] [port]
```

[file]	the name of the file to which the waypoints are written.
[first]	the number of the first waypoint to transfer from the GeoExplorer II receiver.
[count]	the number of waypoints to transfer from the GeoExplorer II receiver.
[port]	the port used to communicate with the GeoExplorer II receiver (com1 or com2).
Example	UPLOAD WAYPNT1.PTS 10 40 COM1

Message Packets Used

Waypoint Upload

A.1.2 DOWNLOAD

DOWNLOAD transfers waypoints from a PC to the GeoExplorer II receiver. Waypoints are stored in fixed format ASCII and are added to the end of the file. If no parameters are given, DOWNLOAD prompts for the file name, waypoint label, count, first waypoint to load, and communications port.

DOWNLOAD Command Line Syntax

To use DOWNLOAD, enter the following at the DOS prompt:

```
DOWNLOAD [file] ['waypoint'] [count] [first]
[port]
```

[file]	the name of the file from which waypoints are read.
['waypoint']	the waypoint label of the first waypoint to transfer to the GeoExplorer II receiver.
[count]	the number of waypoints to send to the GeoExplorer II receiver.
[first]	the number of the first waypoint to load in the GeoExplorer II receiver. Waypoints are loaded sequentially beginning at this waypoint.
[port]	the port used to communicate with the GeoExplorer II receiver.
Example	DOWNLOAD WAYPNT1.PTS 'POLE1' 40 10 COM1

Message Packets Used

Waypoint Download

A.1.3   DATALOG

DATALOG records position and velocity information to an ASCII file on the PC as the positions are calculated by the GeoExplorer II receiver. If no parameters are given, DATALOG prompts for the switches, download file name, datalogging interval, and communications port.

DATALOG Command Line Syntax

To use DATALOG, enter the following at the DOS prompt:

```
DATALOG [switches][file][interval][port]
```

[switches]   selects the mode of operation of the datalogger:

/p	records position packets
/v	records velocity packets
/pv and /vp	record both
/m	monitors records, no recording

[file]   the file in which to store the data packets.

[interval]   the rate at which to record data. This can be different than the GeoExplorer II receiver I/O rate.

[port]   the port used to communicate with the GeoExplorer II receiver.

Example   DATALOG /PV GPSPOS5.ASC 5 COM1

Message Packets Used

Position

Velocity

A.1.4   **SEE9600**

SEE9600 does not create a file, but displays position and velocity information in ASCII format on the PC as it is computed by the GeoExplorer II receiver. There are no arguments. After typing SEE9600, you are prompted to enter the PC communications port.

Syntax

```
SEE9600
```

Message Packets Used

Position Logging

Velocity Logging

A.2   Message Packet Descriptions

The following message packets are sent between the GeoExplorer II receiver and the PC when the four ASCII I/O programs are invoked. If desired, you can write your own programs to use the message packets.

A.2.1 Position

The GeoExplorer II receiver sends its current time, position, and altitude to the PC:

```
#GXGXP,hhmmss,XXXX.XXX,N,YYYYY.YYY,W,AAAAA,T,
CRLF
```

#	the start of message character.
GX	identifies the GeoExplorer II receiver as the sender.
GXP	the time and position message packet.
,	the message header delimiter.
hhmmss	UTC or local time in hours, minutes, and seconds.
XXXX.XXX	latitude as XX degrees XX.XXX minutes, using the selected datum.
N/S	North or South latitude.
YYYYY.YYY	longitude as YYY degrees YY.YYY minutes, using the selected datum. For example, 10° 23.456' is sent as 01023.456.
E/W	East or West latitude.
AAAAA	five digit altitude field.
T	units of altitude, F is feet, m is miles (English or Nautical), M is meters, K is kilometers (Metric).
CR	an ASCII carriage return.
LF	an ASCII line feed.

A.2.2   Velocity

The GeoExplorer II receiver sends its current time and velocity (speed and heading) to the PC:

```
#GXSOG,hhmmss,XXX.XX,N,YYY,UU,CRLF
```

#	the start of message character.
GX	identifies the GeoExplorer II receiver as the sender.
SOG	the speed over ground message packet.
,	the message header delimiter.
hhmmss	time in hours, minutes, seconds.
XXX.XX	the speed.
N	the units of speed, K is knots, M is miles per hour, k is kilometers per hour.
YYY	the heading in degrees.
UU	the heading indicator:
	TN is true north MN is magnetic north UN is user defined north reference TS is true south MS is magnetic south US is user defined south reference
CR	an ASCII carriage return.
LF	an ASCII line feed.

A.2.3   **Waypoint Upload**

The PC queries the GeoExplorer II receiver for a waypoint:

`#CCGXQ,WnnnCRLF`

#	the start of message character.
CC	identifies the PC as the sender.
GX	identifies the GeoExplorer II receiver.
Q	specifies a query message.
,	the header delimiter.
Wnnn	the waypoint number, 00 through 99.
CR	an ASCII carriage return character.
LF	an ASCII line feed character.

The response follows on the next page.

In response to the waypoint upload message, the GeoExplorer II receiver sends the waypoint to the PC:

```
#GXWPL,XXXX.XXX,N,YYYYY.YYY,W,LLLLLLLLLLLL,ZZZ
CRLF
```

#	the start of message character.
GX	identifies the GeoExplorer II receiver as the sender.
WPL	the message type of waypoint location.
,	the message header delimiter.
XXXX.XXX	latitude as XX degrees XX.XXX minutes.
N/S	North or South latitude.
YYYYY.YYY	longitude as YYY degrees YY.YYY minutes.
E/W	East or West longitude.
LLLLLLLLLLLL	the waypoint name.
ZZZ	the waypoint number.
CR	an ASCII carriage return.
LF	an ASCII line feed character.

A.2.4   **Waypoint Download**

The PC sends a waypoint to the GeoExplorer II receiver:

```
#CCWPL,XXXX.XXX,N,YYYYY.YYY,W,LLLLLLLLLLLL,ZZZ
CRLF
```

#	the start of message character.
CC	identifies the PC as the sender.
WPL	the message type of waypoint location.
,	the message header delimiter.
XXXX.XXX	latitude as XX degrees XX.XXX minutes.
N/S	North or South latitude.
YYYYY.YYY	longitude as YYY degrees YY.YYY minutes.
E/W	East or West longitude.
L-L	a 12 character label field.
ZZZ	the number of the waypoint uploaded.
CR	an ASCII carriage return character.
LF	an ASCII line feed character.

After sending a waypoint to the GeoExplorer II receiver, check the GeoExplorer II receiver to make sure the waypoint was received properly.

A.2.5   Position Logging

The PC queries the GeoExplorer II receiver for the current time, position, and altitude:

`#CCGXQ,GXPCRLF`

#	the start of message character.
CC	identifies the PC as the sender.
GX	identifies the GeoExplorer II receiver.
Q	specifies a query message.
,	the message header delimiter.
GXP	present GPS position fix with time of fix.
CR	an ASCII carriage return.
LF	an ASCII line feed.

The response follows on the next page.

The GeoExplorer II receiver sends the current time, position and altitude to the PC:

```
#GXGXP,hhmmss,XXXX.XXX,N,YYYYY.YYY,W,AAAAA,TCR
LF
```

#	the start of message character.
GX	identifies the GeoExplorer II receiver as the sender.
GXP	the time and position message packet.
,	the message header delimiter.
hhmmss	UTC or local time in hours, minutes, and seconds.
XXXX.XXX	latitude as XX degrees XX.XXX minutes.
N/S	North or South latitude.
YYYYY.YYY	longitude as YYY degrees YY.YYY minutes.
E/W	East or West latitude.
AAAAA	five digit altitude field.
T	units of altitude, F is feet (English or Nautical), M is meters (Metric)
CR	an ASCII carriage return.
LF	an ASCII line feed.

A.2.6   Velocity Logging

The PC queries the GeoExplorer II receiver for the current time and velocity:

`#CCGXQ,SOGCRLF`

#	the start of message character.
CC	identifies the PC as the sender.
GX	identifies the GeoExplorer II receiver.
Q	specifies a query message.
,	the message header delimiter.
SOG	the velocity with time stamp.
CR	an ASCII carriage return.
LF	an ASCII line feed.

The response follows on the next page.

In response to the velocity logging message, the GeoExplorer II
receiver sends the current time and velocity to the PC:

`#GXSOG,hhmmss,XXX.XX,N,YYY,UCRLF`

#	the start of message character.
GX	identifies the GeoExplorer II receiver as the sender.
SOG	the velocity message packet.
,	the message header delimiter.
hhmmss	UTC or local time in hours, minutes, and seconds.
XXX.XX	the speed.
N	Units of speed: K knots, M miles/hour k kilometers/hour
YYY	heading in degrees
U	heading indicator: True or Magnetic
CR	an ASCII carriage return
LF	an ASCII line feed

A.3   GeoExplorer II Message Summary

Position	#GXGXP,HHMMSS,XXXX.XXX,N, YYYYY.YYY,W,AAAAA,TCRLF
Velocity	#GXSOG,HHMMSS,XXX.XX,N,YYY,U,CRLF
Waypoint Upload	#GXWPL,XXXX.XXX,N,YYYYY.YYY,W, LLLLLLLLLLLL,ZZZCRLF

A.4   PC Message Summary

Waypoint Upload	#CCGXQ,WNNNCRLF
Position Logging	#CCGXQ,GXPCRLF
Velocity Logging	#CCGXQ,SOGCRLF
Waypoint Download	#CCWPL,XXXX.XXX,N,YYYYY.YYY,W, LLLLLLLLLLLL,ZZZCRLF

B   Datums

This appendix lists the values used by the GeoExplorer II receiver to convert GPS positions from WGS-84 into other datums. The GeoExplorer II receiver always stores positions in WGS-84. When you select a different display datum under the *Configuration* menu, the GeoExplorer II receiver uses these values to convert the positions. For a detailed explanation of datums refer to Chapter 5 in the *Mapping Systems General Reference*.

B.1   Datum Definitions

A datum is a mathematical model of the earth's shape. For the displayed position to agree with corresponding positions on a map, the datum selected in the GeoExplorer II receiver must be the same datum used to draw the map. The map's datum is usually indicated in the map legend or title block.

Table B-1 lists the GeoExplorer II receiver datums. The values are:

X	The difference between the X value for the local datum and the X value for WGS-84.
Y	The difference between the Y value for the local datum and the Y value for WGS-84.
Z	The difference between the Z value for the local datum and the Z value for WGS-84.
Axis	The semi-major axis for the datum (the measure of the major axis of the earth model for the datum).
EC_SQ	Computed from flattening using the formula e2 = F (2-F) (e is eccentricity, F is flattening).
Flattening	Flattening value for the local datum.

Table B-1   Datum Definition

Datum	X	Y	Z	Axis	EC_SQ	Flattening
Adindan N. Africa	-162	-12	206	6378249.145	.006803511283	0.003407561308114
AFG	-43	-163	45	6378245.0	.0066934216	0.0033523298577375
Ain El Abd 1970	-150	-251	-2	6378388.0	.006722670022	0.00336700336683
Alaska NAD83	-5	135	172	6378137.0	.00669438022290	0.00339007530392
Alaska NAD27	-5	135	172	6378206.4	.006768657997	0.00339007530392
Alaska/Canada NAD27	-9	151	185	6378206.4	.006768657997	0.00339007530392
Anna I Astro 1965	-491	-22	435	6378160.0	.0066945416031	0.00335289174307
ARC 1950	-143	-90	-294	6378249.145	.006803511283	0.003407561308114
ARC 1960	-160	-8	-300	6378249.145	.006803511283	0.00340756137878
Ascension Island 1958	-207	107	52	6378388.0	.006722670022	0.00336700336683
Astro Beacon E	145	75	-272	6378388.0	.006722670022	0.00336700336683
Astro B4 Sor. Atoll	114	-116	-333	6378388.0	.006722670022	0.00336700336683

Table B-1   Datum Definition (Continued)

Datum	X	Y	Z	Axis	EC_SQ	Flattening
Astro Pos 71/4	-320	550	-494	6378388.0	.006722670022	0.00336700336683
Astronomic Station 1952	124	-234	-25	6378388.0	.006722670022	0.00336700336683
Australian '66	-133	-48	148	6378160.0	.0066945416031	0.00335289174307
Australian '84	-134	-48	149	6378160.0	.0066945416031	0.00335289174307
Bahamas NAD27	-4	154	178	6378206.4	.006768657997	0.00339007530392
Bangladesh Nepal	289	734	257	6377276.345	.00663784663037	0.00335289174307
Bellevue (IGN)	-127	-769	472	6378388.0	.006722670022	0.00336700336683
Bermuda 1957	-73	213	296	6378206.4	.006768657997	0.00339007530392
Bogota Columbia	307	304	-318	6378388.0	.006722670022	0.00336700336683
Bukit Rimpah	-384	664	-48	6377397.115	.00667437223	0.00334277362407
Camp Area Astro	-104	-129	239	6378388.0	.006722670022	0.00336700336683
Campo Inchauspe	-148	136	90	6378388.0	.006722670022	0.00336700336683
Canada Mean Value NA27	-10	158	187	6378206.4	.006768657997	0.00339007530392
Canal Zone NAD27	0	125	201	6378206.4	.006768657997	0.00339007530392
Canton Island 1966	298	-304	-375	6378388.0	.006722670022	0.00336700336683
Cape S. Africa	-136	-108	292	6378249.145	.006803511283	0.00340756137878
Cape Canaveral mean value	-2	150	181	6378206.4	.006768657997	0.00339007530392
Caribbean NAD27	-7	152	178	6378206.4	.006768657997	0.00339007530392
Carthage	-263	6	431	6378249.145	.006803511283	0.00340756137878
Central America NAD27	-6	127	192	6378206.4	.006768657997	0.00339007530392
Chatham New Zealand	175	-38	113	6378388.0	.006722670022	0.00336700336683
Carthage Tunisia	263	-6	-431	6378249.145	.006803511283	0.00340756137878

Table B-1   Datum Definition (Continued)

Datum	X	Y	Z	Axis	EC_SQ	Flattening
Chua Astro	-134	229	-29	6378388.0	.006722670022	0.00336700336683
Corrego Alegre	-206	169	-4	6378388.0	.006722670022	0.00336700336683
Corrego Alegre (provisional)	-206	172	-6	6378388.0	.006722670022	0.00336700336683
Cuba NAD 27	-9	152	178	6378206.4	.006768657997	0.00339007530392
Cyprus Euro 1950	-104	-101	-140	6378388.0	.006722670022	0.00336700336683
Djakarta	-377	681	-50	6377397.115	.00667437223	0.00334277362407
DOS 1968	230	-199	-752	6378388.0	.006722670022	0.00336700336683
Easter Island 1967	211	147	111	6378388.0	.006722670022	0.00336700336683
Egypt Euro 1950	-130	-117	-151	6378388.0	.006722670022	0.00336700336683
European 1950 mean value	-87	-98	-121	6378388.0	.006722670022	0.00336700336683
European 1950	-87	-96	-120	6378388.0	.006722670022	0.00336700336683
European 1979	-86	-98	-119	6378388.0	.006722670022	0.00336700336683
Finnish Nautical	78	231	97	6378388.0	.006722670022	0.00336700336683
Gandajika Base	-133	-321	50	6378388.0	.006722670022	0.00336700336683
NZ Geodetic Datum 1949	84	-22	209	6378388.0	.006722670022	0.00336700336683
Ghana	0	0	0	6378137.0	.00669437999013	0.00339007830392
Great Britain '36	375	-111	431	6377563.396	.0066705397616	0.003344085052190
Greenland NAD27	11	114	195	6378206.4	.006768657997	0.00339007530392
Guam 1963	-100	-248	259	6378206.4	.006768657997	0.00339007530392
Gunug Segara	-403	684	41	6377397.115	.00667437223	0.00334277362407
Gunug Serindung	0	0	0	6377397.115	.00667437223	0.00334277362407
GUX I Astro	252	-209	-751	6378388.0	.006722670022	0.00336700336683
Herat North	-333	-222	114	6378388.0	.006722670022	0.00336700336683
Hjorsey 1955	-73	46	-86	6378388.0	.006722670022	0.00336700336683
Hong Kong 1963	-156	-271	-189	6378388.0	.006722670022	0.00336700336683

Table B-1   Datum Definition (Continued)

Datum	X	Y	Z	Axis	EC_SQ	Flattening
Hu-Tzu-Shan	-634	-549	-201	6378388.0	.006722670022	0.00336700336683
Indian	289	734	257	6377276.345	.00663784663037	0.00332444981480
Iran Euro 1950	-117	-132	-164	6378388.0	.006722670022	0.00336700336683
Ireland 1965	506	-122	611	6377340.189	.00667053935565	0.00334085031824
ISTS 073 Astro 1969	208	-435	-229	6378388.0	.006722670022	0.00336700336683
Johnston Island 1961	191	-77	-204	6378388.0	.006722670022	0.00336700336683
Kandwala	-97	787	86	6377276.345	.00663784663037	0.00332444981480
Kerguelen Island	145	-187	103	6378388.0	.006722670022	0.00336700336683
Kertau Malay	-11	851	5	6377304.063	.00663784663037	0.00332444981480
La Reunion	94	-948	-1262	6378388.0	.006722670022	0.00336700336683
L.C. 5 Astro	42	124	147	6378206.4	.006768657997	0.00339007530392
Liberia 1964	-90	40	88	6378249.145	.006803511283	0.003407561308114
Luzon Philippines	-133	-77	-51	6378206.4	.006768657997	0.00339007530392
Mahe 1971	41	-220	-134	6378249.145	.006803511283	0.003407561308114
Marco Astro	-289	-124	60	6378388.0	.006722670022	0.00336700336683
Masirah Island (Nahrwan)	-247	-148	369	6378249.145	.006803511283	0.003407561308114
Masswa	639	405	60	6377397.115	.00667437223	0.00335243583451
Merchich (Morocco)	31	146	47	6378249.145	.006803511283	0.003407561308114
Mexico NAD27	-12	130	190	6378206.4	.006768657997	0.00339007530392
Midway Astro 1961	912	-58	1227	6378388.0	.006722670022	0.00336700336683
Mindanao (Luzon)	-133	-79	-72	6378206.4	.006768657997	0.00339007530392
Minna	-92	-93	122	6378249.145	.006803511283	0.003407561308114
Montjong Lowe	0	0	0	6377397.115	.00667437223	0.00334277362407

Table B-1   Datum Definition (Continued)

Datum	X	Y	Z	Axis	EC_SQ	Flattening
NAD27 CONUS	-8	160	176	6378249.145	.006803511283	0.00339007530392
NAD83	0	0	0	6378137.0	.00669438022290	0.003407561308114
Nahrwan	-231	-196	482	6378249.145	.006803511283	0.003407561308114
Namibia	616	97	-251	6377483.865	.0066743722	0.0033427731662204
Naparima BWI	-2	374	172	6378388.0	.006722670022	0.00336700336683
Observatorio 1966	-425	-169	81	6378388.0	.006722670022	0.00336700336683
Old Egyptian	-130	110	-13	6378200.0	.0066934216	0.0033523298577375
Old Hawaiian (mean value)	61	-285	-181	6378206.4	.006768657997	0.00339007530392
Old Hawaiian, Maui	210	-230	-357	6378388.0	.006722670022	0.00336700336683
Old Hawaiian, Oahau	201	-224	-349	6378388.0	.006722670022	0.00336700336683
Old Hawaiian, Kauai	190	-230	-341	6378388.0	.006722670022	0.00336700336683
Oman	-346	-1	224	6378249.145	.006803511283	0.003407561308114
Pico De Las Nieves	-307	-92	127	6378388.0	.006722670022	0.00336700336683
Pictcarin Astro	185	165	42	6378388.0	.006722670022	0.00336700336683
Puerto Rico	11	72	-101	6378206.4	.006768657997	0.00339007530392
Quatar	-128	-283	22	6378388.0	.006722670022	0.00336700336683
Qoronq	164	138	-189	6378388.0	.006722670022	0.00336700336683
Rome 1940	-225	-65	9	6378388.0	.006722670022	0.00336700336683
RT90 Sweden	-423	80.5	-613	6377397.115	.00667437223	0.00334277362407
SAD-69/Brazil	-67	4	-39	6378160.0	.0066945419	0.0033528918920198
Santa Braz	-203	141	53	6378388.0	.006722670022	0.00336700336683
Santo (DOS)	170	42	84	6378388.0	.006722670022	0.00336700336683
Sapper Hill 1943	-355	16	74	6378388.0	.006722670022	0.00336700336683

Table B-1   Datum Definition (Continued)

Datum	X	Y	Z	Axis	EC_SQ	Flattening
Schwarzeck	616	97	-251	6377397.115	.00667437223	0.00334277362407
Sicily	-97	-88	-135	6378388.0	.006722670022	0.00336700336683
Sierra Leone 1960	0	0	0	6378249.145	.006803511283	0.003407561308114
S. America '56	-288	175	-376	6378388.0	.006722670022	0.00336700336683
S. America '69	-57	1	-41	6378160.0	.0066945419	0.00335297306875
South Asia	7	-10	-26	6378155.0	.0066934216	0.0033523298577375
S. Chilean 1963 (Provisional)	16	196	93	6378388.0	.006722670022	0.00336700336683
SE Asia (Indian)	173	750	264	6377276.345	.00663784663037	0.00332444981480
Southeast Base	-499	-249	314	6378388.0	.006722670022	0.00336700336683
Southwest Base	-104	167	-38	6378388.0	.006722670022	0.00336700336683
Tananariive '25	-189	-242	-91	6378388.0	.006722670022	0.00336700336683
Thai Viet Nam	214	836	303	6377276.345	.00663784663037	0.00332444981480
Timbalai	-689	691	-46	6377276.345	.00663784663037	0.00332444981480
Tokyo	-128	481	664	6377397.115	.00667437223	0.00334277362407
Tristan Astro 1968	-632	438	-609	6378388.0	.006722670022	0.00336700336683
United Arab Emirates	-249	-156	381	6378249.145	.006803511283	0.003407561308114
Viti Levu 1916	51	391	-36	6378249.145	.006803511283	0.003407561308114
Voirol	0	0	0	6378249.145	.006803511283	0.003407561308114
Wake-Eniwetok 1960	101	52	-39	6378270.0	.0067226700	0.0033670033557990
WGS-72	0	0	-5	6378135.0	.0066943177833	0.00335277945669
WGS-84	0	0	0	6378137.0	.00669437999013	0.00335281066474
Yacare	-155	171	37	6378388.0	.006722670022	0.00336700336683
Zanderij	-265	120	-358	6378388.0	.006722670022	0.00336700336683

C NMEA Format

This appendix describes the format of the NMEA 0183 output from the GeoExplorer II. The specific message packets that are sent and their contents are described. With this information you can write or use your own programs that accept the NMEA format.

NMEA is the standard for interfacing marine electronic devices. It permits accurate communication between electronic marine instruments, navigation equipment, and communications equipment.

The GeoExplorer II outputs the NMEA 0183 messages $GPGGA (positions) and $GPVTG (velocity). The format of these messages follows.

C.1 $GPGGA Format

The $GPGGA message contains time, position, and fix related data for a GPS receiver. The format for a $GPGGA message is:

```
$GPGGA,hhmmss.ss,xxxx.xx,a,yyyyy.yy,a,x,xx,x.x
,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>
```

hhmmss.ss	The UTC of the position, in hours, minutes, and seconds.
xxxx.xx, a	The latitude, N/S[1]
yyyyy.yy, a	The longitude, E/W[1]
x	A GPS quality indicator: 0 = fix not available or invalid 1 = GPS fix 2 = differential GPS fix
xx	The number of satellites in use, from 00 to 12. This number may be different from the number in view.
x.x	The Horizontal Dilution of Precision, HDOP.
x.x	The antenna altitude above or below MSL.
M	The units of antenna altitude in meters.
x.x	The geoidal separation, the difference between the WGS-84 earth ellipsoid and MSL.
M	The units of geoidal separation in meters.
x.x	The age of the differential GPS data. The time in seconds since the last SC-104 Type 1 or 9 update. The field is null when DGPS is not used.
xxxx	The differential reference station ID, from 0000 to 1023.

[1]. The number of decimal places is controlled by the Precision parameter as described in Port A and B, page 12-62.

C.2 $GPVTG Format

The $GPVTG message contains information on the actual track and
speed relative to the ground. The format for a $GPVTG message is:

`$GPVTG,x.x,T,x.x,M,x.x,N,x.x,K*hh<CR><LF>`

x.x	The value of the track in degrees True.
T	The units of the track in True.
x.x	The value of the track in degrees Magnetic.
M	The units of the track in Magnetic.
x.x	The value of the speed in knots.
N	The units of the speed in knots.
x.x	The value of the speed in kilometers per hour.
K	The units of the speed in kilometers per hour.

D   Real-Time Differential Correction

In real-time differential correction, the base station calculates and, using radios, immediately broadcasts a correction message for each satellite as it receives the GPS data. This correction is broadcast to the roving GeoExplorer II receiver, which applies the correction to the position it is computing. The result is that the position displayed on the GeoExplorer II receiver is differentially corrected in real-time. This method is used if you need to know your position to 2 to 5 meters of accuracy while in the field. The corrected positions can be recorded in a file or stored as waypoints as they are calculated.

For an overview of GPS and differential correction, refer to the booklet *Differential GPS Explained*, available from Trimble Navigation.

D.1   RTCM Sources

The GeoExplorer II receiver can accept real-time differential corrections in RTCM SC-104 format. Real-time differential GPS messages in RTCM SC-104 format are available from a number of sources: U.S. Coast Guard differential GPS beacons, your own GPS Pathfinder Community Base Station with an appropriate radio and modem, or a commercial source using FM radio pagers.

D.2 Connecting an RTCM Source

You can receive RTCM messages on either Port A or Port B. The standard GeoExplorer II data cable (P/N 30153) connects RTCM to Port A. If you can connect the standard data cable to your radio, use Port A.

Wiring information for the standard data cable is shown in Table D-1.

Table D-1 Data Cable Pinout

Signal Name	DE-9F Connector Pin
1. PPS (out)	1.
2. TXDA (out) (Port A)	2. (normal PC data connection)
3. RXDA (in) (Port A)	3. (normal PC data connection)
4. RXDB (in) (Port B)	4. Port B input
5. Ground	5. (normal PC data connection)
6. TXDB (out) (Port B)	6. Port B output
7. CTSA (in) (Port A)	7. Flow Control Port A
8. RTSA (out) (Port A)	8. Flow Control Port A
9. no connection	9.

If you are going to use Port B, you need a special Y cable. Refer to Table D-2 for wiring information.

Table D-2   Y Cable Pinout

To GeoExplorer II data cable DE-9M	Port A DE-9F	Port B DE-9F
1. PPS (out)	1. PPS	/
2. TXDA (out) (Port A)	2. RXDA	/
3. RXDA (in) (Port A)	3. TXDA	/
4. RXDB (in) (Port B)	4. /	2. TXDB
5. Ground	5. GND	5. GND
6. TXDB (out) (Port B)	6. /	3. RXDB
7. CTSA (in) (Port A)	7. RTSA	
8. RTSA (out) (Port A)	8. CTSA	

Two different connector/pinout combinations can be used. DGPS receivers have connectors that are wired as a PC or as a modem. If the connectors are wired as a PC, the DGPS receiver has a DE-9 male connector. Plug the GeoExplorer II cable DE-9 female connector into the DGPS receiver connector. If the DGPS receiver has a DE-9 female connector it is usually connected as a modem. Connecting the GeoExplorer II receiver to a modem requires a null modem (to swap the data on pins 2 and 3) and a DE-9 male-male gender mender. In the United States of America, Radio Shack stores are a good source of DE-9 null modems (Radio Shack part number 26-264) and DE-9 male-male gender menders (Radio Shack part number 26-280.)

D.3   Configuration for Real-Time DGPS

For the GeoExplorer II receiver to receive real-time corrections, the configuration parameters must be set correctly. The following parameters need to be set in the *Configuration/ RTCM* screen.

- Mode - must be set to Differential GPS or Auto GPS-GPD to activate real time differential correction.

- Port - select which port to use and set the configuration parameters. The following options need to be set in the *Configuration/ RTCM/ Port* screen:
  - Protocol
  - Baud
  - Parity
  - Data bits
  - Stop bits

  The protocol must be set to RTCM, RTCM/NMEA, RTCM/ASCII or RTCM/TSIP. The baud, parity, data bit and stop bits are explained in detail in Communication, page 12-61. They must be set to the same parameters as your modem. Some DGPS receivers supply the RTCM formatted corrections at 9600, N, 8, 1 while others supply the data at 1200, N, 8, 1. Refer to the documentation that came with your radio modem.

- Stale Time - should be twice the Message Gaps

For more information on setting these parameters, see RTCM, page 12-73.

D.4   Collecting Data in Real-Time

The GeoExplorer II receiver is RTCM SC-104 ready. Connect an appropriate real-time radio link and select the correct configuration parameters.

D.4.1   Rover Files

Rover files are collected in the normal manner as described in Chapter 5, In the Field. If you have problems calculating positions, refer to the troubleshooting guide in Appendix E, Troubleshooting.

If the receiver is in Auto GPS-GPD mode, some computed positions may not be corrected in real-time. You can postprocess the file in the Pathfinder Office software to make sure all positions are differentially corrected if you have access to a base station that logs data files for postprocessing.

RTCM Message Count and Message Gaps

The RTCM Message Count and Message Gaps are displayed on the *Configuration/ RTCM* screen, see RTCM, page 12-73.

Message Count counts the real-time differential GPS signals received by the rover from the transmitting base station. Every time a correction is received, the counter increments by one. This is a good way of checking that corrections are being received correctly.

Message Gaps is the time (in seconds) between correction transmissions. The Stale Time should be twice the Message Gaps.

D.4.2   Waypoints

When the receiver is in Differential GPS mode, all computed positions are differentially corrected. Coordinates stored as waypoints are corrected, so there is no need for further processing.

D.4.3   Base Files

Base files are usually not recorded when using real-time differential corrections, since there is already a base station calculating and transmitting the corrections. However, it is always good practice to have access to a back up base file.

D.4.4   Other Important Information

The base station must track every satellite that the rover might use for positions. Use the default Elevation Mask values of 10° for the base and 15° for the rover. See the rover and base Elevation Mask descriptions in Elev Mask, page 12-20 and Elev Mask, page 12-38 for guidelines on changing the values.

For real-time corrections:

- the base station must be broadcasting the corrections at the same time the rover is calculating positions.

- any number of rovers can use the same broadcast signal.

E   Troubleshooting

This appendix contains important information about troubleshooting your GeoExplorer II receiver. It is divided into the following sections:

- general problems

- error codes

- resetting GeoExplorer II memory

If you cannot locate your problem here or the fix does not work, call the Trimble Technical Assistance Center (TAC). The phone numbers are:

1-800-SOS-4TAC (in North America)
+408-481-6940 (International)
+408-737-9142 (fax)

The Technical Assistance Center phones are answered from 6 AM to 6 PM Pacific Standard Time. A support technician can take your call, isolate your difficulty, and provide technical assistance.

E.1   General Problems

If you run into trouble using the GeoExplorer II receiver, check Table E-1 to see if the problem is described. Try the suggested fix(es).

Table E-1   GeoExplorer II Troubleshooting

Symptom	Possible Cause	Fix
The GeoExplorer II receiver does not turn on.	A bad power connection.	Make sure battery pack is connected.
	The batteries are dead.	Replace or recharge batteries.
	The batteries are inserted incorrectly.	Check polarity. The GeoExplorer II receiver only operates with all the batteries inserted correctly.
The screen contrast is lower than normal.	The batteries are too low to continue operating.	Recharge or replace the batteries. Continued use of the unit when the batteries are low may lead to loss of data.
	The temperature is too cold	The GeoExplorer II does not operate in temperatures below -10°C.
The GeoExplorer II receiver displays the message *Boot RAM failed* or *RAM failed*.	An internal receiver error has occurred.	Return your GeoExplorer II receiver to Trimble Navigation Limited for service.
The GeoExplorer II receiver displays the message *Trimble Navigation Flash Loader V4*b.	An internal receiver error has occurred.	Return your GeoExplorer II receiver to Trimble Navigation Limited for service.

Table E-1   GeoExplorer II Troubleshooting (Continued)

Symptom	Possible Cause	Fix
The GeoExplorer II receiver does not transfer files to the PC.	The wrong communications protocol is selected.	Select *Configuration/ Communication/ Port A/ Protocol* and set XMODEM as the protocol.
	The data cable is not connected to the correct port on the PC.	Set the correct communications port in the Pathfinder Office software.
The GeoExplorer II receiver does not calculate positions.	The antenna is blocked.	Make sure that there are no obstructions between the antenna and the horizon.
	Too few satellites are available to obtain a position.	Lower the Elevation Mask, but this may decrease the accuracy of the positions.
		Check satellite availability using the the Pathfinder Office planning module.
		Check the *Sat Tracking* screen to determine if enough satellites are visible to make a fix.
	The GeoExplorer II receiver has an old almanac that does not reflect the current satellite status.	Collect a new almanac by tracking a satellite for 12 to 15 minutes.
	The GeoExplorer II receiver does not have an almanac.	Collect a new almanac by tracking a satellite for 12 to 15 minutes.
	The PDOP is too high	Sufficient satellites are visible and being tracked but the geometry is poor. Check the PDOP on the *Sat Tracking* screen. Lower the PDOP Mask, but this may degrade the accuracy of the positions.
	The RTCM mode is set incorrectly.	If you are not operating in real-time, the RTCM mode should be set to Autonomous.

Table E-1   GeoExplorer II Troubleshooting (Continued)

Symptom	Possible Cause	Fix
The GeoExplorer II receiver does not calculate positions in real-time differential mode.	The wrong communications protocol is selected.	Select *Configuration/ Communication/ Port A* (or *Port B*)/ *Protocol* to check that the protocol is set to RTCM.
	The wrong differential mode is selected.	Select *Configuration/ Communication/ RTCM/ Mode GPS* to check that the mode is set to Differential GPS or Auto GPS-GPD.
	The RTCM mode is Differential and there are not enough satellites available for a position.	Select *Configuration/ Communication/ RTCM/ Mode GPS* to change the mode to Auto GPS-GPD, or wait until enough satellites become available.
	The baud rate or other setting is wrong.	Select *Configuration/ Communication/ Port A* (or *Port B*)/ *Baud* to check the baud rate. It must match the baud rate set on the RTCM device.
	Corrections are not being received.	Check the Message Count on the *Configuration/ RTCM* screen. If it is not incrementing, corrections are not being received.
		Check that radio signals are being transmitted.
The GeoExplorer II receiver does not calculate positions in High Accuracy mode.	The GeoExplorer II receiver has not collected a complete almanac.	Collect a new almanac by tracking a satellite for 12 to 15 minutes.

E.2   Error Codes

If the GeoExplorer II receiver detects internal errors, it displays an error code on line 4 of the *Sat Tracking* screen under the *GPS Status* menu. Some of these errors are mere nuisances; others indicate a serious problem that requires service. See Table E-2.

Table E-2   GeoExplorer II Error Codes

Code	Reason
01	The contents of the battery-backed memory have been lost, clearing the almanac and data in memory. The GeoExplorer II receiver does not have an internal battery. If the battery pack is disconnected for more than 15 minutes, internal memory is erased. The DC adapter has a replaceable Lithium battery, with a normal life of 1 year. When the Lithium battery is exhausted, replace with a 3V Lithium 2/3A battery.
04, 06, 07, 08	Channel alignment error, an internal processing error. Turn the GeoExplorer II receiver off and then back on to clear the error. If the error recurs, return the GeoExplorer II receiver for service.
32	The internal oscillator has drifted. The GeoExplorer II receiver continues to operate, but should be returned for service if acquisition times become excessive.

E.3   Resetting the GeoExplorer II Memory

In unusual circumstances, the GeoExplorer II receiver memory may become corrupted. Symptoms of corrupted memory include the GeoExplorer II receiver failing to respond to commands and failing to track at least one satellite after an hour. Resetting the memory can solve the problem, however all internal waypoints and data files are lost.

These symptoms may also indicate hardware or software problems. If resetting the memory does not clear the problem, or if the problem recurs, contact Trimble Navigation Limited.

🖐 | **Caution –** Resetting the memory deletes the data files, waypoints, and almanac file in memory. Perform this procedure only as a last resort.

To reset the GeoExplorer II receiver memory do the following:

1. In the *Main* menu press ◈ to select *Configuration*.

2. Use ▲ or ▼ to scroll to *Fact. Defaults* and press ◈.

3. In the *Fact. Defaults* screen press ◈ and select *Clear Memory*.

F   Part Numbers

The following tables list the name and Trimble part number for each item included with the GeoExplorer II mapping system.

This information is useful for ordering spare or replacement parts.

Table F-1   GeoExplorer II System Part Numbers

Equipment Description	P/N
GeoExplorer II system	28778-00
GeoExplorer II receiver	17319-42
Mapping Systems General Reference	24177-00
GeoExplorer II Operation Manual	28801-00
GeoExplorer II Quick Reference	29554-00
Pathfinder Office version 1 activation disk	30949-00
Pathfinder Office version 1.10 CD ROM	30950-00
Pathfinder Office version 1.10 program disk	30948-00
Pathfinder Office manual Volume I	31310-00
Pathfinder Office manual Volume II	31311-00
Pathfinder Office manual Volume III	31312-00
Pathfinder Office version 1.10 Release Notes	31298-00
Phase Processor version 2 program disk	24631-10
Phase Processor version 2 activation disk	31885-00
Phase Processor Software User Guide	24344-10
Mapping Systems General Reference	24177-00
Leather receiver case	17702
Receiver lanyard	19477
AA batteries (4)	19451
Data download cable	30153

Table F-2   120V External Power Kit

Equipment Description	P/N
120V External Power Kit	23225-00
Shoulder carrying pouch	21754
Camcorder battery	17466
Battery eliminator	19074-01
Battery clip cable	21757
Vehicle power adaptor	19072
Fuses for car adaptor	10530
Power splitter cable	21756
Battery charger (120V)	13012-10

Table F-3   230V External Power Kit

Equipment Description	P/N
230V External Power Kit	23225-10
Shoulder carrying pouch	21754
Camcorder battery	17466
Battery eliminator	19074-01
Battery clip cable	21757
Vehicle power adaptor	19072
Fuses for car adaptor	10530
Power splitter cable	21756
Battery charger (230V)	24624

Table F-4   External Antenna Kits

Equipment Description	P/N
External Antenna - Vehicle	28779-00
External Antenna - Range Pole	28780-00

> **Caution –** The only maintenance you can perform on the GeoExplorer
> II receiver, other than keeping the outer surface and connectors free of
> dirt and dust, is recharging the lead acid battery and replacing the AA
> batteries. All other maintenance must be performed by Trimble
> Navigation Limited.

F.1   Returning Parts to Trimble

You may need to return parts to Trimble Navigation Limited for
service, repair, or replacement. In all correspondence with Trimble
Navigation Limited concerning equipment, please refer to your
instrument(s) by the TNL model number and full serial number that
appears on the instrument. Also include the Return Material
Authorization (RMA) Number.

Before returning the part(s) do the following:

1. Contact Trimble Customer Service for a Return Material
    Authorization (RMA) Number.

    The phone numbers are:

    1-800-SOS-4TAC (in North America)
    +408-481-6940 (International)
    +408-737-9142 (fax)

2. Securely attach a tag to the part(s) indicating the problem.

    On the tag, describe what type of service is desired. If the part
    has problems, describe the symptoms. Write the TNL part
    number, the RMA number, and the full serial number of the part
    on the tag.

3. Keep a copy of the tag for your records.

To pack the part(s) for shipping do the following:

1. Place the part in its appropriate cutout in the box. Only send back the part(s) that need repair or replacement.

2. Securely close the box.

—or—

1. Wrap the part in heavy paper or plastic. If you are sending more than one part, wrap each one individually.

2. Use a layer of shock-absorbing material 70 to 100 mm (3 to 4 inches) thick around all sides of the instrument to provide firm cushioning and prevent movement inside the container.

3. Place the part(s) in a strong shipping container.

   A double wall carton made of 350-pound test material is adequate.

4. Seal the shipping container securely.

To send the part to Trimble do the following:

1. Place a shipping label on the container.

   The label must contain both Trimble's full address and your full address, including the name of a contact.

   Trimble's full address is:

   Trimble Navigation Limited
   Surveying & Mapping Division
   645 North Mary Avenue
   Post Office Box 3642
   Sunnyvale, CA 94088-3642
   U.S.A.

2. Mark the container FRAGILE for careful handling.

3. Use the shipping company specified by Trimble Customer Service.

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for _____

Please circle a response for each of the statements below:

1 = Strongly Agree   2 = Agree   3 = Neutral   4 = Disagree   5 = Strongly Disagree

The manual is well organized.	1	2	3	4	5
I can find the information I want.	1	2	3	4	5
The information in the manual is accurate.	1	2	3	4	5
I can easily understand the instructions.	1	2	3	4	5
The manual contains enough examples.	1	2	3	4	5
The examples are appropriate and helpful.	1	2	3	4	5
The layout and format are attractive and useful.	1	2	3	4	5
The illustrations are clear and helpful.	1	2	3	4	5

The manual is: too long   just right   too short

Please answer the following questions:

Which sections do you use the most?_____

What do you like best about the manual?_____

_____

What do you like least about the manual? _____

_____

Optional

Name_____

Company_____

Address_____

_____

Telephone _____Fax _____

Please mail to the local office listed on the back cover or to Trimble Navigation Limited, Surveying and Mapping Division, 645 North Mary Avenue, Post Office Box 3642, Sunnyvale, CA 94088-3642. All comments and suggestions become the property of Trimble Navigation Limited.