GPS FieldMate™

Operations & Reference Manual

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Preface

Scope and Audience

This manual provides operating instructions and reference material for the Ashtech GPS FieldMate™ system. The manual assumes intimate knowledge of land survey operations, and some familiarity with GPS principles and procedures.

Setup and configuration instructions are covered in the operations manuals for the GPS equipment included in your system.

This manual uses the single acronym GPS to describe usage of GPS receiver systems as well as GPS+GLONASS receiver systems.

Organization

The manual is organized into five chapters and four appendices.

Chapter 1 - Introduction: An overview and functional description of the system and components.

Chapter 2 - Operation: A discussion of the basic land survey operations of offset, cut/fill, pickup/layout, and anchor point, with reference information on file formats and file transfer.

Chapter 3 - Tutorial: This tutorial takes you through the basic functionality of GPS FieldMate.

Chapter 4 - Screen References: A detailed discussion of the data and command parameters displayed on the various screens of the handheld controller.

Chapter 5 - Troubleshooting: A brief summary of commonly encountered problems, with suggested solutions.

Appendix A - Handheld Transfer: An overview of the software program used for transferring data between the handheld and the PC.

Appendix B - FSRADIO: An overview of the software program used for programming common parameters in the field radio system.

Appendix C - Datums and Ellipsoids: A listing of reference parameters for datums and ellipsoids used within GPS FieldMate software.

Appendix D - Global Product Support: Instructions for contacting Ashtech in case you need additional help.

1

Introduction

System Overview

GPS FieldMate is a real-time GPS positioning system designed for land survey environments. The system performs layout or pickup surveys in geodetic or local coordinate systems. Data can be stored in the handheld controller and the receiver depending on the operational mode.

The system can operate in autonomous, RTCM, or CPD differential modes. In the real-time modes, the system displays a constant accuracy value which provides real-time quality control.

The Husky handheld software provides several point logging and offset options and offers several different modes of navigation.

The system consists of a **base** and a **rover** or **remote** (Figure 1.1).

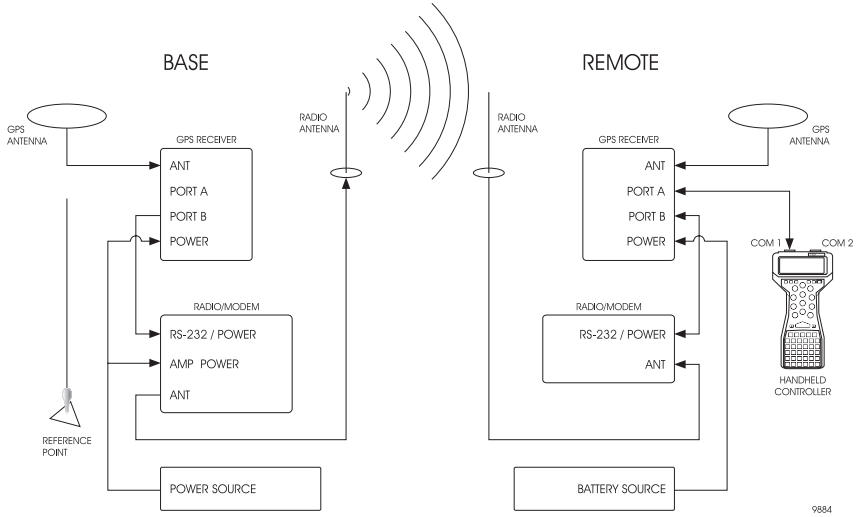

Table 1.1. Base and Rover Configuration

System Operation

The base GPS antenna is located over a reference point. The coordinates of the point are entered into the base receiver. The base receives satellite measurements from the GPS constellation and uses these measurements to calculate correction data, based on reference point coordinates.

Correction data are sent from the base GPS to the base radio via a serial cable, and the base radio broadcasts the correction information through the base radio antenna.

The remote radio receives the correction information through the remote radio antenna and sends the data to the remote GPS receiver via a serial cable.

The remote GPS receiver takes measurements from the GPS satellites and applies the correction information from the base to derive a corrected position for the remote GPS antenna.

Position information is transferred to the Husky controller through a serial cable. GPS FieldMate converts the position data into local coordinates using transformation parameters manually entered or uploaded with the mission file.

Local coordinates are displayed along with the current positional accuracy. You can then log points to handheld memory or use the uploaded points in the mission file to navigate to a specific location.

Upon completion of the survey, data stored in the Husky controller can be downloaded to a PC using the provided HTRANS communications software.

Use MConvert or GPSeismic to create Mission data files used for layout, and uploaded to the Husky using HTRANS.

Use the function keys to access the handheld controller screens.

This manual contains illustrations and descriptive information explaining each screen. The tables reference the extended function keys with the symbol (⇑) adjacent to the abbreviated name of the function. Extended function keys are accessed by pressing the Shift key.

Husky FS Series Keyboard Layout

Figure 1.1 shows the standard keyboard layout.

Figure 1.1. Standard Keyboard

Figure 1.2 shows the TDS keyboard layout.

Figure 1.2. TDS Keyboard

Keyboard Conventions

- GPS FieldMate utilizes the top left key on the keyboard for ESC key functions.
- GPS FieldMate utilizes the two keys adjacent to the YES key as shift keys.
- The standard layout has four function keys at the top of the keyboard. The ESC key is the top left key on the keyboard labeled as ESC. The shift keys are adjacent to the YES key and labeled with up arrows.
- The TDS layout contains five function keys at the top of the keyboard. The ESC key is the top left key on the keyboard labeled F1. The shift keys are adjacent to the YES key. The left shift key is labeled ESC and the right key is labeled with an up arrow.
- The space key (SP) is used to change values in toggle fields.

GPS FieldMate references the ESC and SHIFT keys during program operation. Refer to the standard keyboard layout for the location of these keys.

Software Installation

MCONVERT for Windows 95/98/NT

1. Insert disk 1 into the floppy disk drive of your computer.
2. From the **START** bar, select **RUN**.
3. Enter a:\setup.exe (or the appropriate drive) in the Open field and click the OK button.
4. Follow the on-screen instructions.

GPS FieldMate Software

To install GPS FieldMate on you Husky:

1. Copy the contents of the GPS FieldMate disk to your computer hard drive.
2. Verify that the F subdirectory exists on the data collector.Verify that the MSDATA subdirectory exists in the Fdirectory.
3. Run HCOM on the Husky.
4. Start HTRANS in Windows to communicate with the Husky.
5. Transfer the program files to the data collector.
6. Transfer the sample mission file (sample.dat) to the MSDATA subdirectory.

2

Operation

Pickup/Layout

Pickup Operations

Differential GPS offers exceptional productivity and ease of operation for a single-person survey. This section covers a typical pickup operation. Pickup operations consist of the following steps:

1. GPS Mission Planning
2. Field Surveying
3. Downloading Logged Data

GPS Mission Planning

A good knowledge of GPS coverage and geometry for the given survey area and time are crucial to a successful survey. Conduct a full review of the satellite situation before each survey.

Field Surveying

Field surveying operations consist of logging position information to the handheld computer. All points are saved in the handheld and tagged with site information.

Points can be logged as single positions or as a series of points separated by break codes. The following procedure covers both types of logging. With the remote unit operational, conduct a typical pickup operation using the following steps:

Points are logged in a binary file in the handheld. The file has the same name as the mission file but with the extension .OUT. The file is specifically formatted to work with the utility Mconvert and the seismic survey package GPSeismic.

1. Start GPS FieldMate by pressing F and the RETURN key. The logo screen appears.
2. Press YES to continue, and press B to bypass receiver initialization.
3. Select the SOLU screen to check on system operation. Verify that HRMS and VRMS are within the accuracy range required for the survey.
4. Select the ALST screen and set any appropriate alarms.

   The HRMS and VRMS alarms are useful to make sure that you are always within the required accuracy.
5. At a desired pickup point, select the FEAT screen. Type in the appropriate POINT CODE and press ENTER. The corresponding descriptor appears next to the point code area.
6. Enter the point ID, four characters of your choosing. This value can automatically be incremented or decremented using the CHANGE ID field.
7. Enter the current antenna height in the ANH field.
8. If an offset is required, choose an offset mode by toggling the OFFSET field. Enter the OFST screen and enter the appropriate OFFSET values.
9. Verify that the HRMS and VRMS values are acceptable. If they are, press SAVE to log the point. An audible alarm sounds and a message box pops up to indicate that the point has been logged.
10. To pick up a topographic feature—the toe of a bench, for example—points can be logged dynamically.
    - Enter the desired point code and point ID.
    - Enter the antenna height, select the logging mode (INTERVAL/ DISTANCE), and enter a value to set the logging rate.
    - Press TOPO and proceed to pick up the feature. An alarm sounds each time a point is logged.
    - When the feature has been picked up, press ESC to exit topo logging.

Downloading Logged Data

To download the output file using the Windows HTRANS program, complete the following steps:

1. Connect the handheld unit to the PC using the Husky-to-PC cable.
2. Start HCOM in the handheld by typing HCOM at the DOS prompt, and press the YES (Enter) key.
3. Start the HTRANS program in the PC.

HTRANS has two window panes. The left pane is the handheld directory and the right pane is the PC directory.

4. In the handheld pane, highlight the file you want to download. Drag and drop the file from the left pane to the right pane.

   You can also use Copy to and Move to in the FILE menu or the Copy to and Move to buttons on the tool bar.

5. Exit the HTRANS program on the PC, and press ESC on the handheld to exit HCOM.

Layout Operations

Differential GPS offers exceptional layout productivity due to its high accuracy navigation capabilities. This section covers a typical layout operation. Layout operations consist of the following steps:

1. GPS Mission Planning
2. Layout Point Planning
3. Layout Point File Uploading
4. Field Surveying
5. Analysis of Field Results (if required)

GPS Mission Planning

A good knowledge of GPS coverage and geometry for the given survey area and time are crucial to a successful survey. A full review of the satellite situation should be undertaken before each survey.

Layout Point Planning

GPS FieldMate works on a series of points uploaded to the handheld and laid out based on the order in which the points were entered into the file. Efficient field operation requires careful planning of the layout logistics and entering the points in the best order for ease of navigation and pickup.

Layout Point File Uploading

GPS FieldMate uses the ASCII input files which are converted to the binary files for use in the handheld and renamed with a .DAT extension by the MCONVERT program.

Once the files are uploaded to the handheld, they are available for use in layout operations. See “Creating Input Files Using MConvert” on page 13 for a full explanation of the MCONVERT program.

Complete the following steps to upload the log file using the HTRANS:

1. Connect the handheld to the PC using the Husky-to-PC cable.
2. Start HCOM in the handheld by typing HCOM and pressing the YES key.
3. Start HTRANS on the PC.

   HTRANS has two panes: the left pane is the handheld pane and the right pane is the PC pane.
4. In the handheld pane, highlight the file to be uploaded. Drag and drop the files from the right pane to the left pane.

   You can also use Copy to and Move to in the FILE menu or the Copy to and Move to buttons on the tool bar.
5. Exit the HTRANS program on the PC and press ESC on the handheld to exit HCOM.

Field Surveying

With the remote unit operational, begin layout operations:

1. Start GPS FieldMate by pressing F and RETURN. The logo screen appears.
2. Press Yes to continue, and press B to bypass receiver initialization.
3. Select the SOLU screen to check on system operation. HRMS and VRMS should be within the accuracy range wanted for the survey.
4. Select the DATA screen and load the appropriate layout file.
5. Select the DSST screen and set the most convenient range display. The choices are **DTT/CTT** (distance & course) and **ETT/NTT** (easting & northing).
6. Select the ALST screen and set any appropriate alarms.

   The HRMS and VRMS alarms ensure that you are always within the required accuracy range. The Reaching Target alarm provides an audio alarm when you are close to the target.
7. Select the SURV screen and decide which direction you will use to select points from the file.

   You can start at the first point and move down, or start at the last point and move up.
8. Select the PT screen and choose the first point to be laid out.
9. Select one of the navigation screens to provide a graphic representation of your position relative to the first point. Use this display to approach the point.
10. When the point has been laid out, use the NEXT function to switch to the next point in the file, or go to the PT screen to select a different point.
11. If a position log is needed at each layout point, choose the FEAT screen and use the SAVE function to log the point.

To save time, you can press Shift + L from any of the navigation screens to log a position.

Analysis of Field Results

If data is saved at each point, you can analyze:

- each point for accuracy
- changes to the layout
- overall layout operations

The log file saved in the handheld can be downloaded as described in “Pickup Operations” on page 9. Each of the points can be analyzed to ensure that the required accuracy was attained. Any changes to the layout can also be seen using the log file. Finally, the overall layout operation can be analyzed.

Surveying with GPS is largely a question of field procedures. Good procedures equate to more efficient operations. A study of each survey can quickly lead to smoother operations and greater productivity.

Creating Input Files Using MConvert

Use Mconvert to convert text files into mission files (*.DAT) for use with the field software. The layout files contain all the data necessary to perform survey operations in the chosen coordinate system, including all the points for the survey.

MConvert has four main functions:

- Convert - To convert an input text file (*.in) into a binary mission file (*.dat). You can choose or define a coordinate system for your mission file and you can also enter additional information and setup parameters for your mission file.
- Export - To convert (export) binary data files (*.out) created by the handheld to user-defined ASCII format files in a coordinate system of your choice.
- Log File - To combine logged (on handheld) header information with points data and create a new ASCII file.
- OBEN - To convert an OBEN file (*.obh) to an O-file (o*.*) which can be used in the Solutions software program.

Convert

This function allows you to convert an input text file (*.in) into a binary mission file (*.dat). Before converting files, in the MConvert Main Window (Figure 2.1):

1. Enter Area, Name and Note information for your mission file,

2. Select one of three Units (meter, international survey foot, U.S. survey foot) for your project,
3. Select one of three available GEOID models (NGS 96, EGM 96 GSD95, or GEOID99), or set it to none if you don't want to use one
4. Choose or define a coordinate system for your mission file. See "Coordinate System Selection" on page 18 for more information.

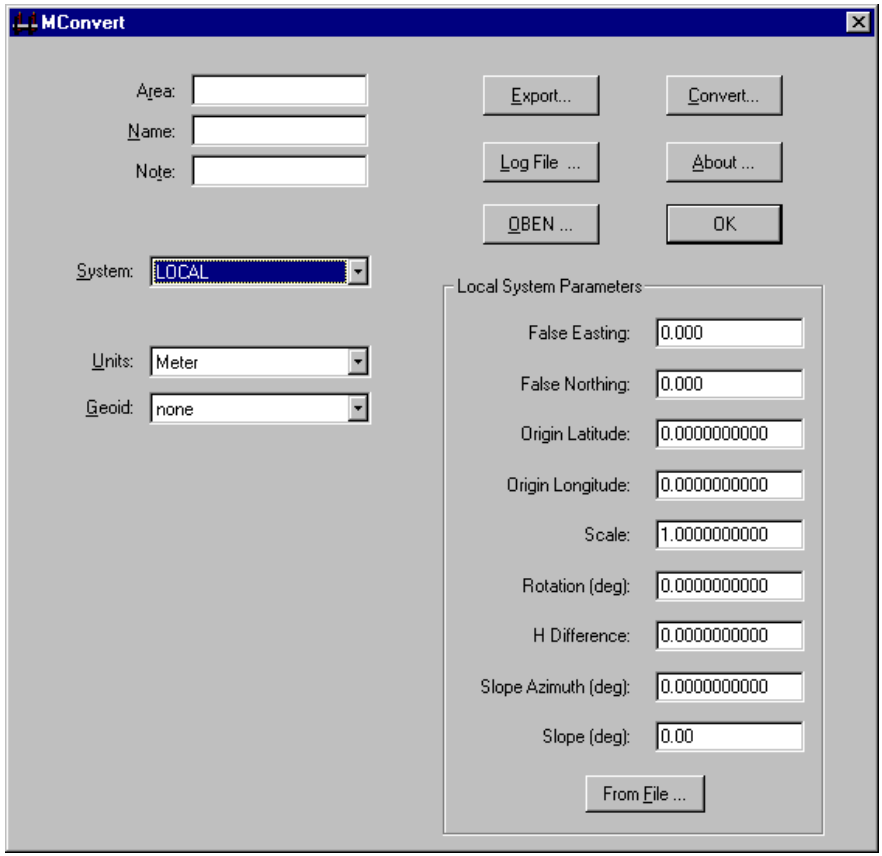

Figure 2.1. MConvert Main Window

5. Click the Convert... button to open the Convert dialog box (Figure 2.2)

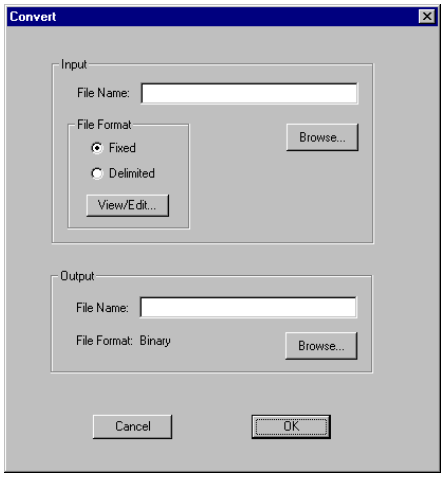

Figure 2.2. CONVERT Dialog Box

6. Select the Input file:
   - Enter the full path and file name.
   - Click the Browse button. In the Open dialog box (Figure 2.3), navigate to and select the file you want to use as an input file, then click the Open button.

     The file name is listed in the Convert dialog box.

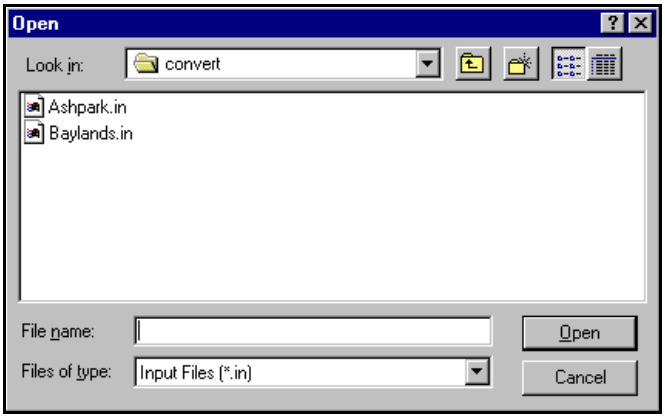

Figure 2.3. Open Dialog Box

7. If the input file is a fixed file format, select the Fixed radio button, and click the View/Edit button.

   The Fixed Format dialog box opens (Figure 2.4).

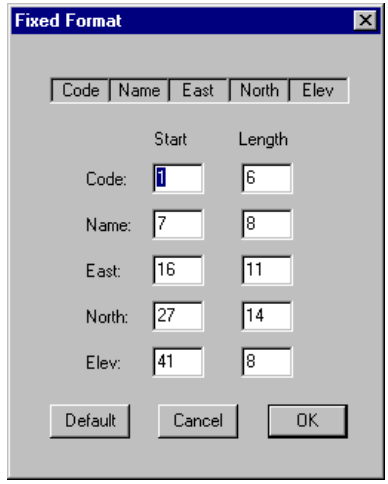

Figure 2.4. Fixed Format Dialog Box

   - Define a starting column for each of five fields (Code, Name, Lon, Lat, Elev) and their lengths, or change them to default values by using a Default function.
   - Click the OK button to save the parameters and return to the Convert dialog box.

8. If the input file is a delimited format, select the Delimited radio button, and click the View/Edit button.

The Delimited Format dialog box opens (Figure 2.5).

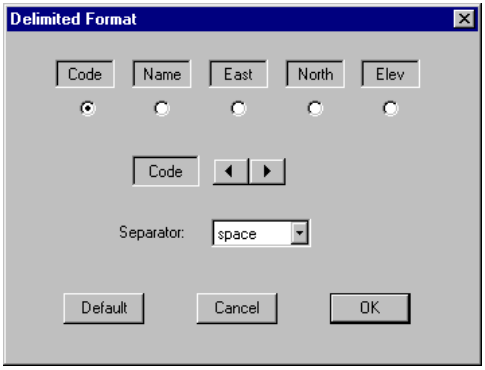

Figure 2.5. Delimited Format Dialog Box

- Define the delimited input file format as either space or comma delimited.
- Select all five fields (Code, Name, Lon, Lat, Elev) in any order. Use the left or right arrow to move currently selected field to the left or to the right in the list of fields.
- Click OK to save the parameters and return to the Convert dialog box.

9. Select the output file name:
    - Enter the full path and file name.
    - Click the Browse button. In the Save As dialog box (Figure 2.6), navigate to the folder where you want to save the converted file, enter the file name in the File Name field, and click the Save button.
    - The file name is listed in the Convert dialog box.

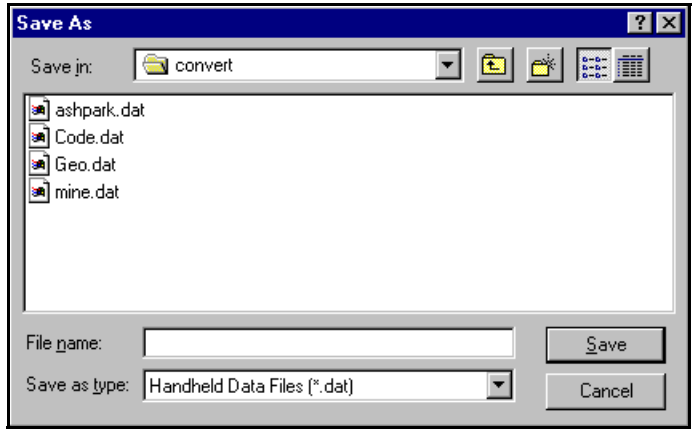

Figure 2.6. Output File Select Dialog

10. Click the Convert... button in the Convert dialog box to start the conversion.
11. A message box opens indicating the conversion was successful (Figure 2.7).

Figure 2.7. Conversion Successful Message Box

12. Click the OK button to close the message box and return to the main window.

Coordinate System Selection

MConvert has three coordinate system categories:

- Defined coordinate system,
- Local coordinate system,
- Geographic coordinate system (coordinates displayed in decimal degrees).

Defined Coordinate System

If you select a defined coordinate system, the MConvert main window changes to reflect data necessary for a defined coordinate system (Figure 2.8).

If the coordinate system has zones, select the zone for the area using the Zone drop down list box.

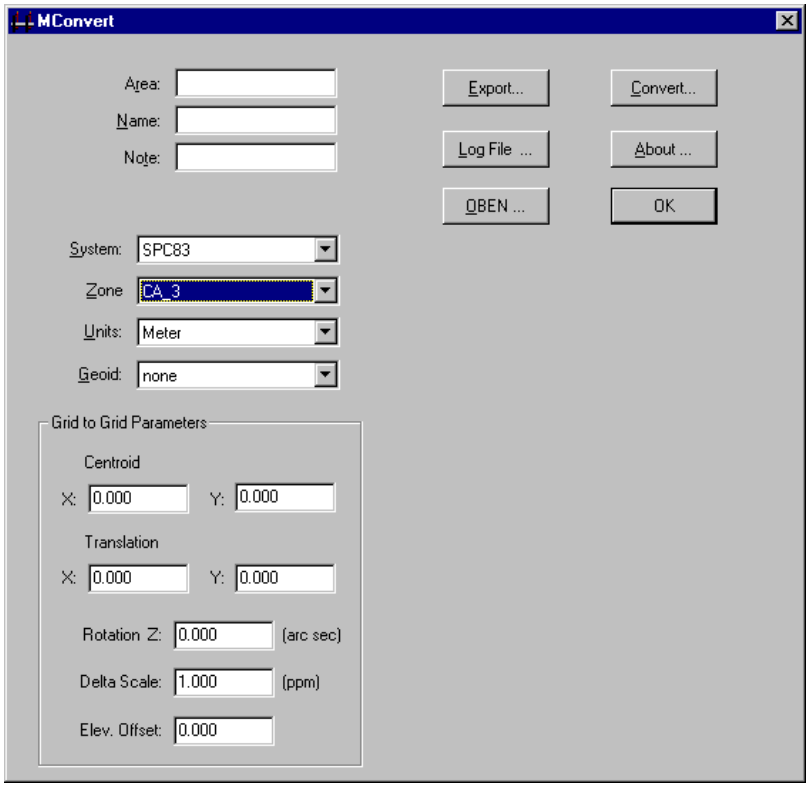

Figure 2.8. MConvert Main Window - Defined Coordinate System

Table 2.1 describes the components for a defined coordinate system in Figure 2.8.

Table 2.1. MCONVERT Main Window - Defined Coordinate System Components

Item	Description
Area	An editable field displaying the project area up to 20 characters long.
Name	An editable field displaying the operator's name up to 20 characters long.
Note	An editable field displaying a project note up to 20 characters long.

Table 2.1. MCONVERT Main Window - Defined Coordinate System Components

Item	Description
NADCON method (NADGRD files)	If the system selected is SPC27, check this box to use the NGS NADCON method rather than the Molodensky method. The NGS shift files NADGRD.LAS and NADGRD.LOS must exist in the program directory.
System	A list of coordinate systems to be selected. Certain systems contain zones.
Zone	A list of coordinate system zones to be selected. If a system that does not contain zones is selected, this field is not displayed.
Units	A list of units which include meters, US feet, and international feet.
Geoid	A list of geoids to be selected: None, NGS96, EGM96, GSD95, or GEIOD99.
Grid to Grid Parameters	Parameters to perform a grid to grid transformation from the selected system.
X centroid	The shift in the x axis from the selected centroid to the new centroid.
Y centroid	The shift in the y axis from the selected centroid to the new centroid.
X translation	The shift in the x axis from the selected system to the new grid.
Y translation	The shift in the y axis from the selected system to the new grid.
Delta Scale	The delta scale value from the selected system to the new grid (ppm).
Rotation Z	The rotation value from the selected system to the new grid(arcsec).
Elevation Offset	The elevation offset from the selected system to the new grid.

The installation disk contains the NGS DOS program NADGRD and the NGS shift files (CONUS, ALASKA, STGEORGE, STLRNC, STPAUL, HAWAII, and PRVI). NADGRD can be used to subdivide the larger shift files into smaller shift files named NADGRD.LAS and NADGRD.LOS. If the NADCON method is preferred, the NADGRD shift files must be transferred to the program file directory of the data collector. If your data collector can support storage of the larger shift files, simply rename the desired files to NADGRD.LAS and NADGRD.LOS.

The NADGRD program and the shift files used by MCONVERT are published and provided by the National Geodetic Survey (NGS). For more information regarding the NGS NADCON method, you can contact the NGS at:

National Geodetic Survey

11400 Rockville Pike

Rockville, MD 02852

Phone: (301) 443-8684

ftp://ftp.ngs.noaa.gov/pub/pcsoft/nadcon/

Local Coordinate System

If you select Local as the coordinate system, the MConvert main window changes to reflect data necessary to define the local coordinate system (Figure 2.9).

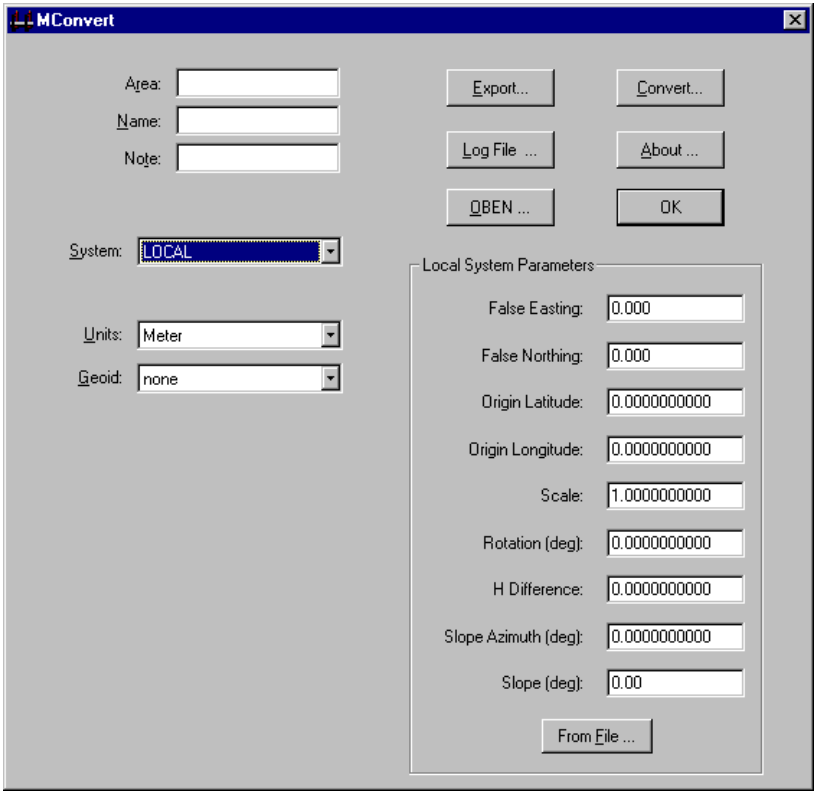

Figure 2.9. MConvert Main Window - Local Coordinate System

Table 2.2 describes the components to define a local coordinate system.

Table 2.2. MConvert Local Main Window - Local Coordinate System Components

Item	Description
Area	An editable field displaying the project area up to 20 characters long.
Name	An editable field displaying the operator's name up to 20 characters long.
Note	An editable field displaying a project note up to 20 characters long.
System	A list of coordinate systems to be selected.

Table 2.2. MConvert Local Main Window - Local Coordinate System Components

Item	Description
Units	A list of units which include meters, US feet, and international feet.
Geoid	A list of geoids to be selected: None, NGS96, EGM96, GSD95, or GEIOD99.
Local System Parameters	Parameters to perform a local system transformation.
False Easting	The local coordinate easting origin. The origin is defined as the centroid of the list of local coordinates used in the transformation.
False Northing	The local coordinate northing origin. The origin is defined as the centroid of the list of local coordinates used in the transformation.
Origin Latitude	The WGS84 latitude origin. The origin is defined as the centroid of the list of local coordinates used in the transformation.
Origin Longitude	The WGS84 longitude origin. The origin is defined as the centroid of the list of local coordinates used in the transformation.
Scale	The scale value from the UTM grid to the local grid.
Rotation	The rotation value in degrees from the UTM grid to the local grid (deg).
H Difference	The height difference from the WGS84 ellipsoid height to the local system height.
Slope Azimuth	The direction of slope in degrees from the UTM plane to the local plane (deg).
Slope	The slope value in degrees from the UTM plane to the local plane (deg).

You can either enter the parameters to define the local coordinate system, or import the parameters from a *.lsy file created in a handheld during field operations.

To import the local coordinates from a file:

1. Click the From File button to open the open dialog box.
2. Navigate to and select the .lsy file with the parameters, and click the Open button.

Geographic Coordinate System

If you selected GEOG as the coordinate system, the MConvert main window changes to reflect data necessary for a geographic coordinate system (Figure 2.10).

Select a datum from the Datum drop down list box.

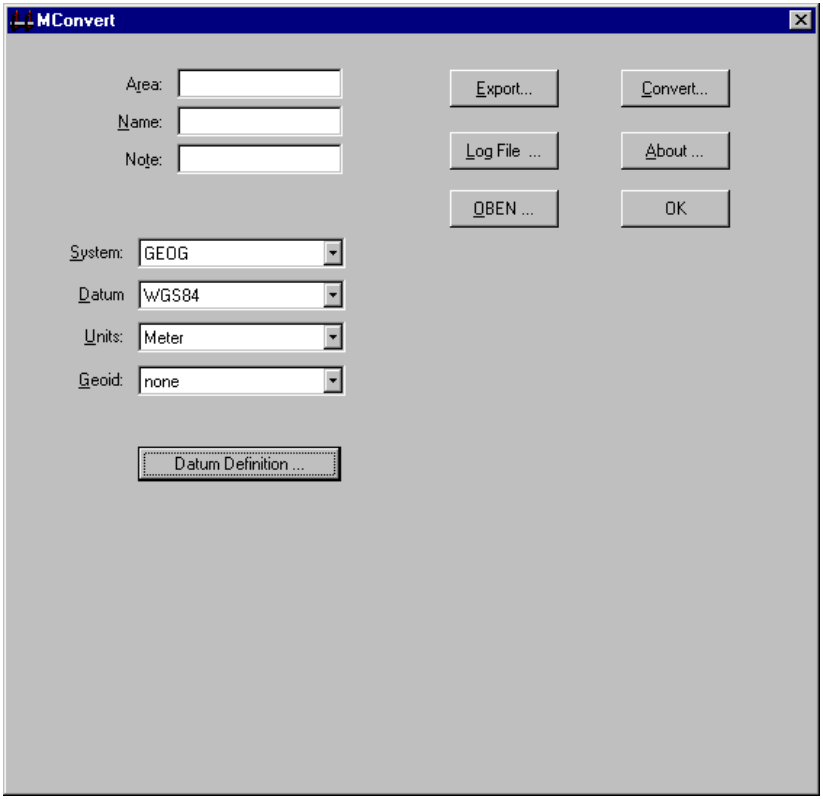

Figure 2.10. MConvert Main Window - GEOG Coordinate System

Table 2.3 describes the components for a geographic coordinate system.

Table 2.3. MConvert Main Window - GEOG Coordinate System Components

Item	Description
Area	An editable field displaying the project area up to 20 characters long.
Name	An editable field displaying the operator's name up to 20 characters long.
Note	An editable field displaying a project note up to 20 characters long.
System	A list of coordinate systems to be selected.
Datum	A list of datums to be selected. Selection of USER allows you to define new datum.

Table 2.3. MConvert Main Window - GEOG Coordinate System Components

Item	Description
Units	A list of units which include meters, US feet, and international feet.
Geoid	A list of geoids to be selected: None, NGS96, EGM96, GSD95, or GEOID99.

The input file geographic coordinate format must be in WGS84 decimal degrees.

If you wish to view the datum parameter for a defined datum, click the Datum Definition... button.

If you wish to create your own datum:

1. Select USER in the Datum drop down list box.
2. Click the Datum Definition... to open the Datum Definition dialog box (Figure 2.11)

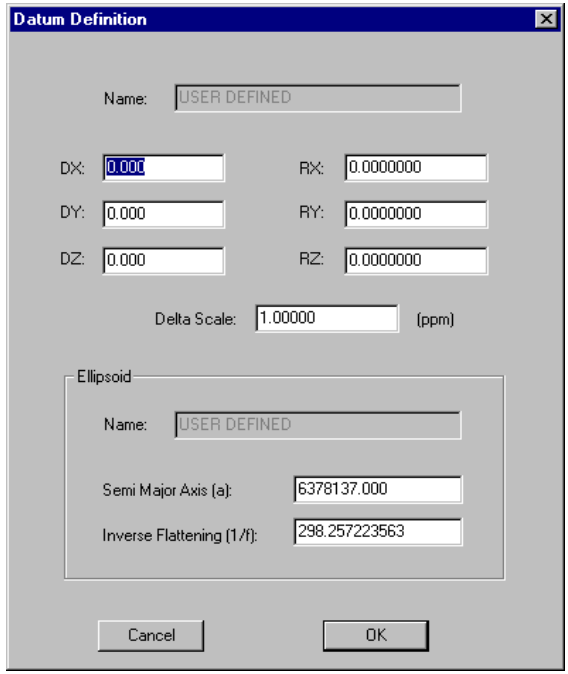

Figure 2.11. Datum Definition Dialog Box

3. Enter the datum parameters.

4. Click the OK button to save the parameters and return to the MConvert main window.

Export

Use the Export function to export binary data files created by the handheld in any coordinate system to user-defined ASCII format files. There are two ways to export data: from original grid coordinates or from radians.

Two sets of coordinates are stored in the binary output file:

- Grid coordinate displayed and logged during data collection
- An equivalent WGS84 radian coordinate.

The original grid coordinate is typically exported when RTK or other real-time data collection methods are used. No transformation is performed and the coordinates are simply transferred. The WGS84 radian coordinate is typically exported when the output file has been updated by a post processing package. The processing package updates only the WGS84 radian coordinate. A secondary use of the WGS84 radian coordinate is to export the coordinates to a different grid system than what was used in the field.

To export data:

1. Click the Export... button in the MConvert main window to open the Export dialog box (Figure 2.12).

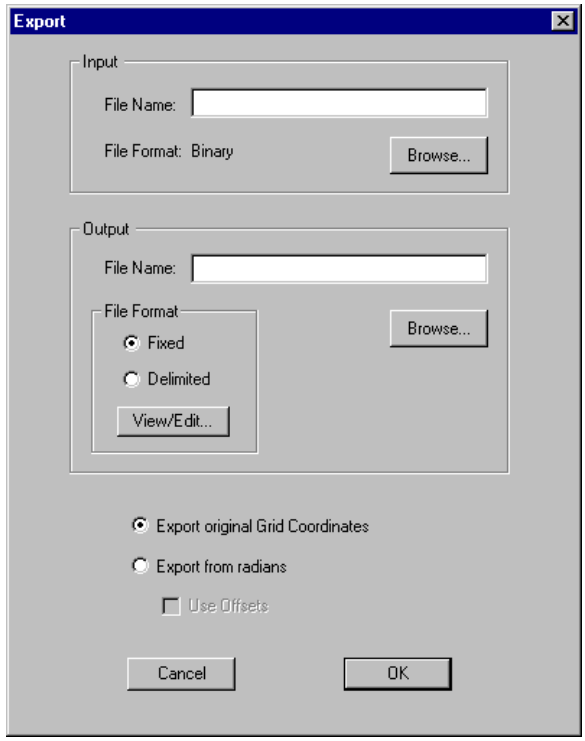

Figure 2.12. Export Dialog Box

Table 2.4 describes the components of the Export dialog box..

Table 2.4. Export Dialog Box Components

Item	Description
Input- File name	The name of the *.out file you want to export.
Output- File name	The name of the *.dat file you want to create.
File Format: Fixed	Export data in a fixed format. Refer to Table 2.5.
File Format: Delimited	Export data in a comma or space delimited file format. Refer to Table 2.6.
Export original Grid Coordinates	Export original, grid coordinates logged to the binary output file on the Husky.
Export from Radians	Export coordinates logged to the binary output file or coordinates updated from post processing.

2. Enter the full path and file name or select the file using the Browse button for the data file you wish to export.
3. Enter the full path and file name or select the directory and enter the file name using the Browse button for the exported file.
4. Select either the Fixed or Delimited radio button.
5. If you wish to view or edit the fields, click the View/Edit button.
6. If you selected the Fixed radio button, the Fixed Fields dialog box opens (Figure 2.13).

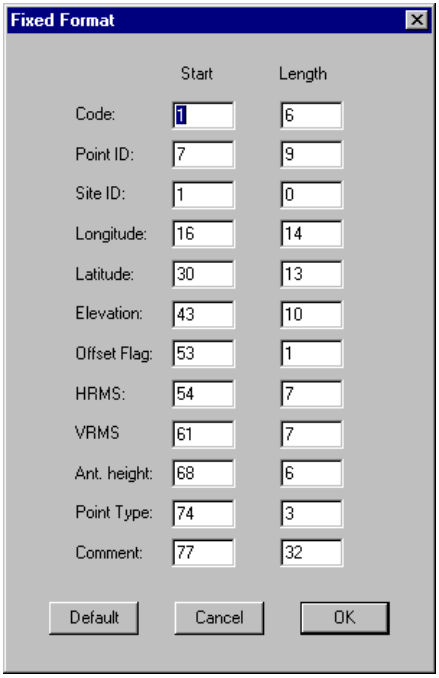

Figure 2.13. Export—Fixed File Format Dialog Box

Table 2.5 describes the components of this dialog box.

Table 2.5. Export - Fixed File Format Dialog Box Components

Item	Description
Code	The descriptor associated with the Point Code entered.
Point ID	The Point ID entered.
Site ID	The Site ID stored in LGPT for post processing.
Easting	The Easting value of the logged point.
Northing	The Northing value of the logged point.
Elevation	The elevation value (ground point).
HRMS	The HRMS value for the point logged.
VRMS	The VRMS value for the point logged.
Ant. Height	The antenna height entered for the point.
Offset	An asterisk (*) means that the point was logged with offset. A space indicates it was logged without offset.
Origin	An indicator of the point origin. ORG means that this is an original logged point (GRID coordinates). PP means that a point was post processed and will be exported in the user selected map system. NP means that a point will be exported in the user selected map system without post processing.
Comment	A comment entered when the point was logged.

- Enter the Start column number and the field length in each field. Use length 0 to omit the field in the exported data.
- Click OK to save the information and return to the Export dialog box.

7. If you selected the Delimited radio button, the Delimited Format dialog box opens (Figure 2.14).

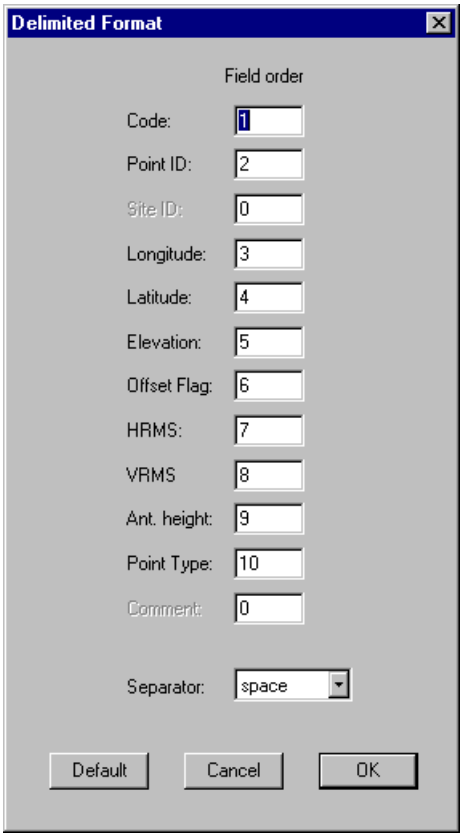

Figure 2.14. Export - Delimited Format Dialog Box

Table 2.6 describes the components of this dialog box.

Table 2.6. Export - Delimited File Format Dialog Box Components

Item	Description
Code	The descriptor associated with the Point Code entered.
Point ID	The Point ID entered.
Site ID	The Site ID stored in LGPT for post processing.
Easting	The Easting value of the logged point.

Table 2.6. Export - Delimited File Format Dialog Box Components (continued)

Item	Description
Northing	The Northing value of the logged point.
Elevation	The elevation value (ground point).
HRMS	The HRMS value for the point logged.
VRMS	The VRMS value for the point logged.
Ant. Height	The antenna height entered for the point.
Offset	An asterisk (*) means that the point was logged with offset. Space means without offset.
Origin	An indicator of the point origin. ORG means that this is an original logged point (GRID Coordinates). PP means that a point was post processed and will be exported in a user-selected map system. NP means that a point will be exported in a user selected map system without post processing.
Comment	A comment entered when the point was logged.
Separator	You can use a space or comma to delimit your file.

- Enter the order for the fields in the output file. Use Order 0 to omit the field from the exported data.
- Click OK to save the parameters and return to the Export dialog box.

8. Select either the Export Original Grid Coordinates or Export from radians radio button.

   If you check the Export from radians radio button, check the Use Offsets box if you want the exported data to include the offset information. MConvert calculates Northing and Easting, or Latitude and Longitude for all records marked with the POSTPROCESSED flag. All other data will be exported as is in the input binary file (*.out).

9. Click the OK button on the EXPORT dialog box to export the data.
10. A message box opens indicating the file exported successfully (Figure 2.15).

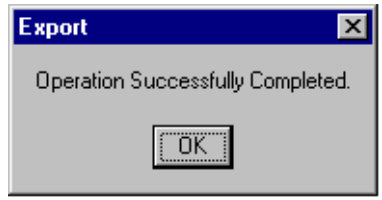

Figure 2.15. Export Successfully Completed Message Box

11. Click the OK button to close the message box and return to the main window.

Output File

Points logged with the handheld are stored in a binary file with the name of the mission file and the file extension (*.out). An additional output file is available through the Log File function in MConvert.

Log File

Use the Log File function to modify an ASCII log file created on the handheld to a new ASCII with headers data and point data.

Data stored in the log.ini file and information entered on the data header screen on the handheld are logged to a file called log.txt and assigned to the specific point you logged after you input the information.

After the log.txt file is converted by the Log File function, you will see the header records and positional data.

1. Verify that the *.out file is in the same directory as log.txt file so that Log File can find all data necessary for the conversion.
2. Click the Log File... button on the MConvert main window to open the Log File Converter dialog box (Figure 2.16).

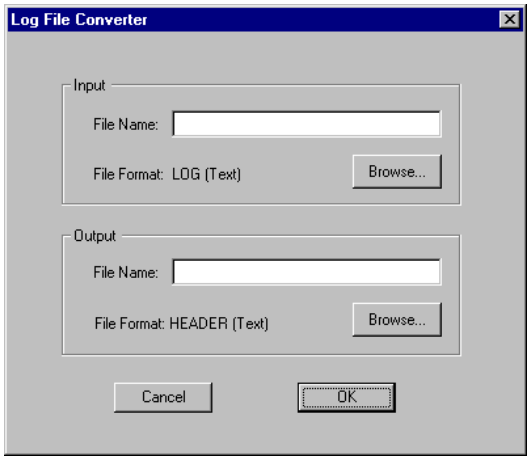

Figure 2.16. Log File Converter Dialog Box

3. Enter the full path and file name or select a file using the Browse button for the file you want to convert.
4. Enter the full path and file name or select a file using the Browse button for the converted file.
5. Click OK to start the conversion.
6. A message box opens indicating the conversion completed (Figure 2.17).

Figure 2.17. Log File Conversion Successful Message Box

7. Click the OK button to close the message box and return to the MConvert main window.

Use the OBEN function to convert OBEN files (*.obh) to an O-file (o*.*) which can be used in Ashtech Solutions.

1. Click the OBEN... button on the MConvert main window to open the OBEN to O-File Converter dialog box (Figure 2.18).

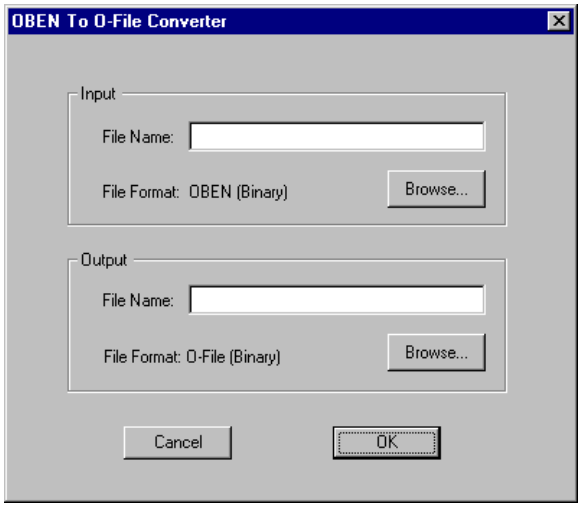

Figure 2.18. OBEN to O-File Converter Dialog Box

2. Enter the full path and file name or select a file using the Browse button for the file you want to convert.
3. Enter the full path and file name or select a file using the Browse button for the converted file.
4. Click OK to start the conversion.
5. A message box opens indicating the conversion completed (Figure 2.17).

Figure 2.19. OBEN Conversion Successful Message Box

6. Click the OK button to close the message box and return to the MConvert main window.

Code File

The code file is a text file listing code numbers in conjunction with point descriptors and is used by MConvert when exporting. The code file must be named CODE.DAT in order to be recognized by the handheld program.

The purpose of this file is to streamline the entry of point descriptors through the use of short codes. The point code and point descriptor can have up to four characters each and are space delimited. Only the descriptor is saved in the output files (*.OUT). A sample code file is shown below:

```
1 FENC
14A PIPE
37 TREE
207 TOE
```

The first column is the point code entered in the GPS FieldMate Point Code field, up to four characters in length. The second column is the point descriptor text string associated with the point code, up to four characters in length. The two strings are seperated by a space. The point code is not saved in the output files (*.OUT).

Offsetting

Points can be offset in order to log points that are physically inaccessible or to survey around locations which would adversely affect GPS (high walls, large equipment, trees, etc.). When a point is logged with an offset, the logged position is adjusted by the offset value.

GPS FieldMate offers several functions for point offsets:

- Grid
- Bearing
- Side
- Laser range finder
- From current line

These features are found in the Feature Logging (FEAT) screen (see Chapter 4, **Reference** for additional information) and enable you to offset any point or series of points.

Offset by Grid

In this method, point offset is in terms of easting and northing (Figure 2.20).

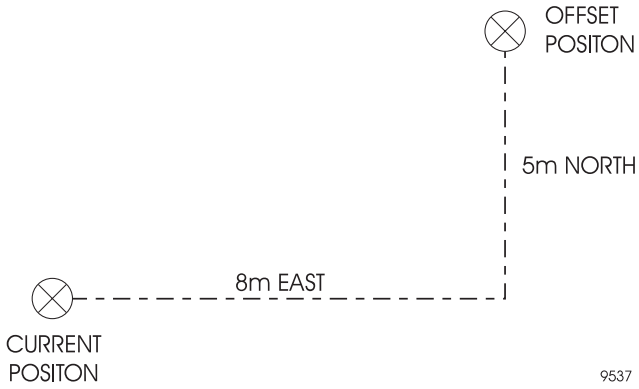

Figure 2.20. Offset by Grid

Enter any value for easting and northing offset. Use negative numbers if the offset is to the west or south. Refer to “Point Offset By Grid Screen (OFST)” on page 151 for more information.

When the point is saved, the position for the antenna is read and the offsets applied. The point is stored as an offset position with an indicator that the point was logged with an offset.

Offset by Bearing

In this method, point offset is in terms of Distance and Azimuth (Figure 2.21).

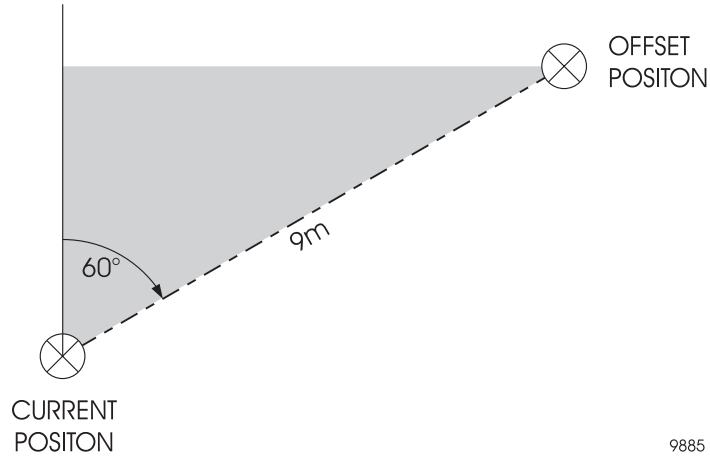

Figure 2.21. Offset by Bearing

Enter any value for distance and azimuth offset. Refer to “Point Offset By Bearing Screen (OFST)” on page 152 for more information.

When the point is saved, the position for the antenna is read and the offsets applied. The point is stored as an offset position with an indicator that the point was logged with an offset.

Offset by Side

In this method, point offset is in terms of Distance and a Side (Figure 2.22).

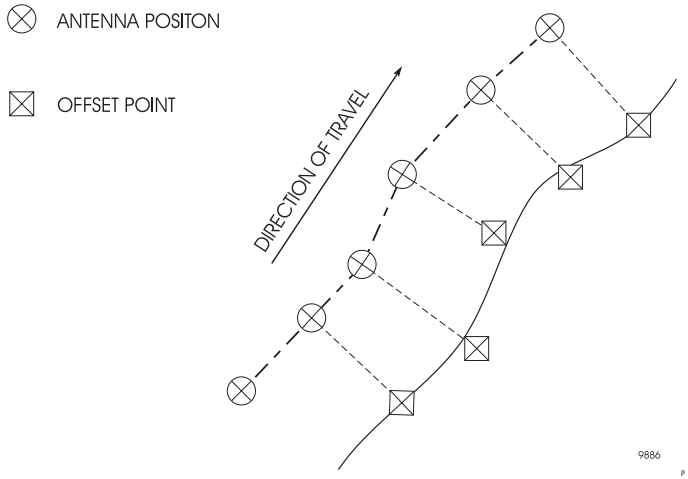

Figure 2.22. Offset by Side

The Offset by Side function calculates the position for the offset point by referencing the previous position. A line is calculated from the previous position (start point) to the current position and the point is offset, perpendicular to this line, in the direction indicated at the distance entered. The side is determined by the direction of travel or by the azimuth of the start point.

The Offset by Side function can be used with the TOPO function or as a single point offset. During TOPO logging, the initial logged position is used as the start point and is not offset. The next point logged, at the TOPO interval or distance, is offset and is then referenced as the start point.

For single-point logging, you must enter the start point as Last Logged, the current position, or any point defined in the mission file. All logged points are offset perpendicular to the line calculated between the entered start point and the current position.

Refer to “Point Offset By Side Screen (OFST)” on page 153 for more information.

When the point is saved, the position for the antenna is read and the offsets are applied. The point is stored as an offset position with an indicator that the point was logged with an offset.

Offset by Laser Range Finder (LRF)

In this method, point offset is in terms of Distance and Azimuth as read from the LRF (Figure 2.23).

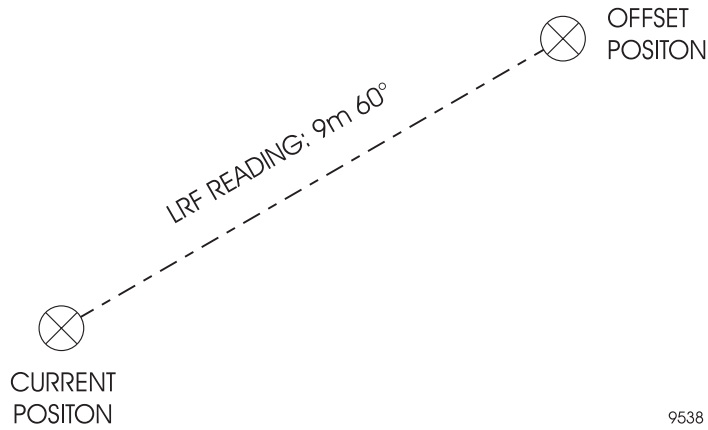

Figure 2.23. Offset by Laser Range Finder (LRF)

GPS FieldMate reads a value for distance and azimuth offset from the LRF unit and you can accept these values or enter corrected values. Refer to “Point Offset By LRF Screen (OFST)” on page 154 for more information.

When the point is saved, the position for the antenna is read and the offsets are applied.

Offset from Current Line

In this method, point offset is in terms of the currently defined line (Figure 2.24).

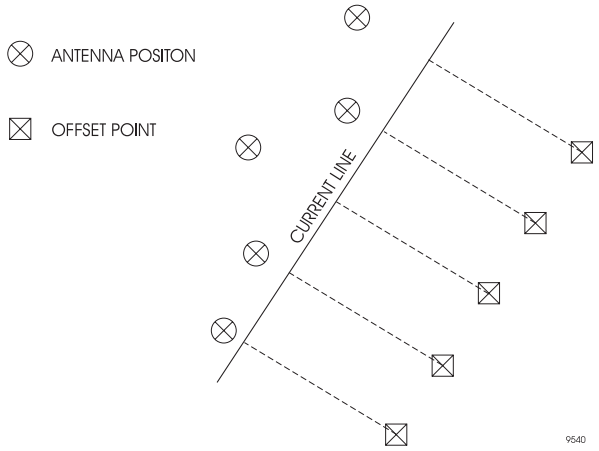

Figure 2.24. Offset from Current Line

GPS FieldMate offsets all points by a distance and direction entered, referenced to the line currently defined in the LINE function. GPS FieldMate only considers the location of the antenna position in terms of a perpendicular crossing of the line. See the “Point Offset From Current Line Screen (OFST)” on page 155 for more information.

When saving the point, the offset is applied to the antenna position. The point is stored as an offset position with an indicator that the point was logged with an offset.

The current line, defined in the navigation screens, may contain several solutions. The first time a navigation screen accessed, the start point is your current position and the end point is the selected point being navigated. Changes to points navigated adjust the order of the points defining the current line. The start point can be changed to your current position by selecting the FRHR button in the LINE navigation screen.

For example, a mission file with points 0001, 0002, and 0003 exists and the selected point being navigated is 0001. The first current line is defined as the current position to point 0001. The NEXT button is pressed to select point 0002 as the point being navigated. The current line is defined as point 0001 to point 0002. To define the current line as your current position to point 0002, press the FRHR button in the LINE navigation screen.

GPS FieldMate can perform real-time cut/fill calculations based on a single user-defined grade vector.

The system provides a real-time grade calculation based on points logged, or can be configured to provide cut/fill values based on a desired grade.

You must provide the initial grade vector definition which provides the reference for all cut/fill calculations (Figure 2.25).

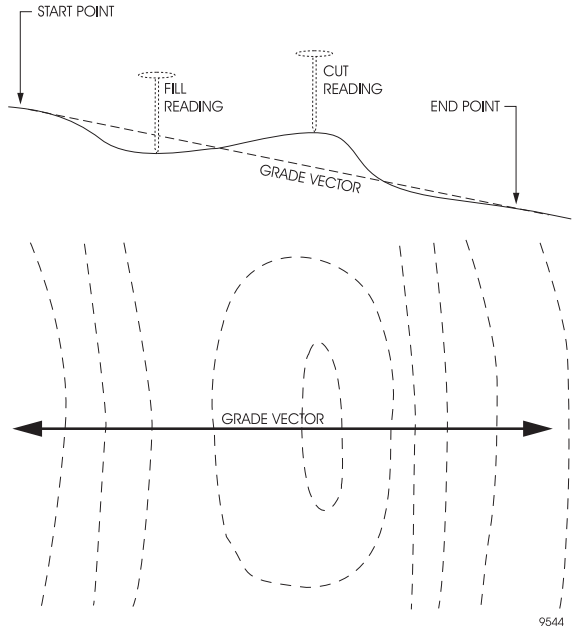

Figure 2.25. Grade Vector Definition

The grade vector can be defined in two ways. You can reference the start and end of the vector from points selected from the current mission file.

-OR-

You can log the start and end points of the vector. Log the start and end of the vector over a short distance, and extend that distance to any length (Figure 2.26).

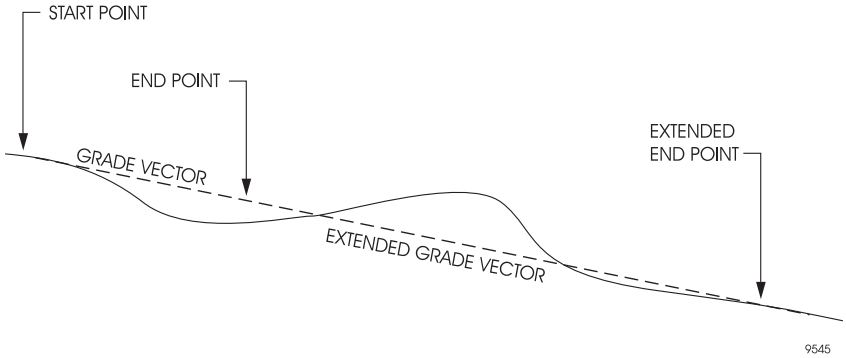

Figure 2.26. Log Start and End Points of Vector

Any grade value calculated from logging the start and end points can be adjusted using the desired grade function. If you change the grade value using this function, the system repositions the end point in the calculation to reflect the new grade.

Once the grade vector has been defined, you can obtain real-time cut/fill readings at any point near the grade vector. If readings are required behind the start point, past the end point, or far from the grade vector location, define a new grade vector. Refer to “Cut/Fill Screen (CUFL)” on page 156 for more information.

3D Cut/Fill

GPS FieldMate can perform real-time 3D cut/fill calculations based on two planes with a common center line. Each plane can have independent percent grade values to support multiple grade functions.

Real-time displays include distance travelled along the center line; distance travelled away from the center line; and cut/fill. Grid spacing within the two planes is supported. Spacing is defined as parallel to the center line (on line) and perpendicular to the center line (off line). Real-time displays include distances to the nearest grid spacing intersection.

Six parameters are required to define the two planes (one left of the center line and one right of the center line) which share a center line as well as grid spacing inside the two planes. The center line has two points: origin and center. A change in elevation between the origin point to the center point defines the center line grade.

Enter the grade for the left and right planes as percent grade or calculated from the COGO routines and retrieved from the LGRA and RGRA buttons (Figure 2.27).

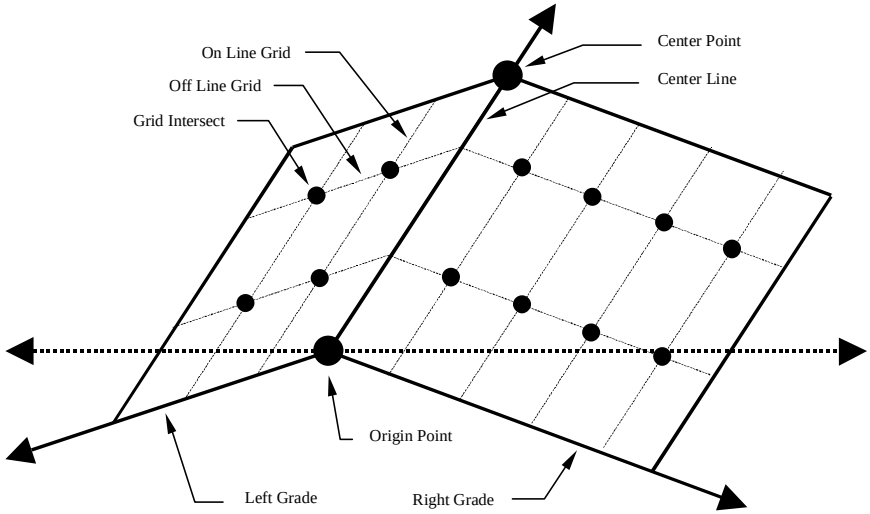

Figure 2.27. 3D Cut/Fill

The real-time display include distances away from the center line and distances away from a grid intersection.

Figure 2.28 shows the distances away from the center line. D-On is the distance along the center line from the origin point. D-Off is the distance away from the center line.

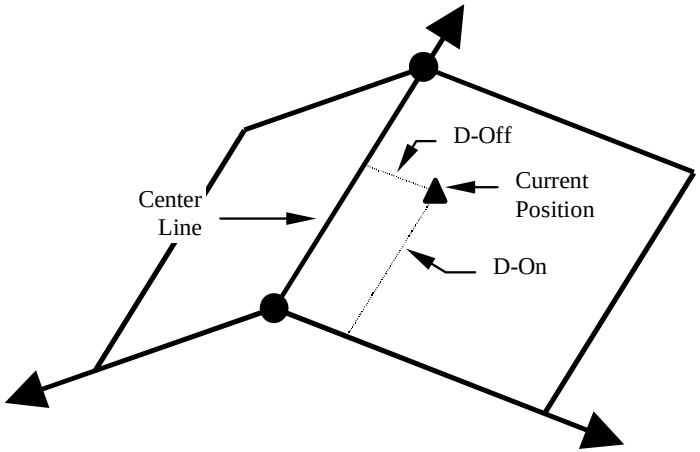

Figure 2.28. D-On/D-Off

Figure 2.29 shows the distances away from a grid intersection. G-On is the distance along the On Line Grid line from the nearest grid intersect point. G-Off is the distance along the Off Line Grid line from the nearest grid intersect point.

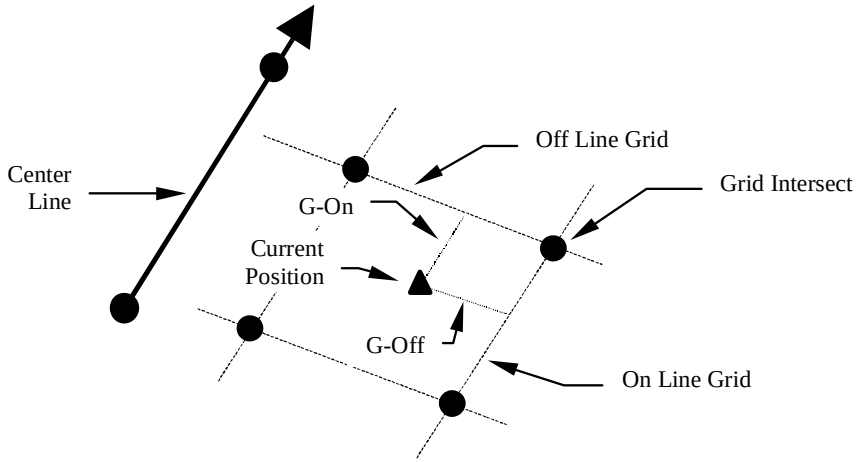

Figure 2.29. G-On/G-Off

Coordinate Geometry

You can use coordinate geometry to create points for storage in the mission file. GPS FieldMate has several coordinate geometry functions:

- Location by Azimuth and Distance
- Coordinate Inverse
- Intersection by Point to Line (Point/Azimuth)
- Intersection by Point to Line (Point/Point)
- Intersection by Azimuths
- Intersection by Distances
- Intersection by Distance and Azimuth
- Subdivision Line by Segments
- Subdivision Line by Distance

Location by Azimuth and Distance

In this method, a point is created using a From point with a distance and azimuth (Figure 2.30).

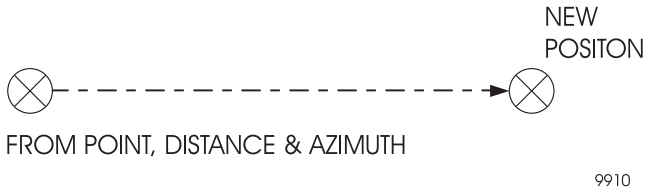

Figure 2.30. Location by Azimuth and Distance

To solve for a point, follow these steps:

1. Enter the easting and northing for an existing point, select an existing point in the mission file, or use the current calculated GPS position.
2. Measure the distance and azimuth from the existing point to the new position.

The azimuth values in the coordinate geometry functions are grid based.

3. Enter the distance and azimuth.

   The solution displays where you can assign a point id for reference to the mission file. See “Coordinate Geometry - Location by Azimuth and Distance” on page 170 for more information.

Coordinate Inverse

In this method, GPS FieldMate computes the distance and azimuth between two points (Figure 2.31).

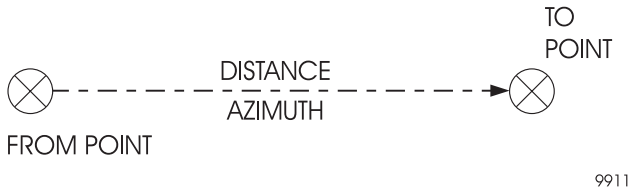

Figure 2.31. Coordinate Inverse

To solve for the distance and azimuth, follow these steps:

1. Enter the easting and northing for an existing point or select an existing point in the mission file for the From point.
2. Enter the easting and northing for an existing point or select an existing point in the mission file for the To point.

   GPS FieldMate displaysthe solution. The solution can be saved for use in other coordinate geometry functions such as Location by Azimuth and Distance.

   See“Coordinate Geometry - Coordinate Inverse” on page 173 for more information.

Intersection by Point to Line (Point/Azimuth)

In this method, GPS FieldMate computes a new position from the intersection of the defined baseline (point/azimuth) and the right angle extension to the From point (Figure 2.32).

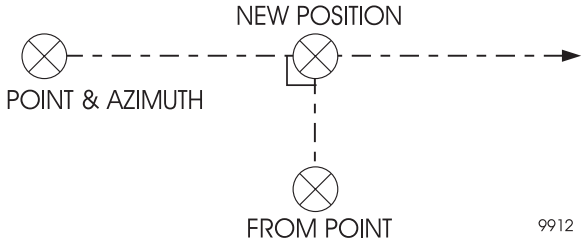

Figure 2.32. Intersection by Point to Line

To solve for the point, follow these steps:

1. Define the baseline using a point and azimuth.
    - You can enter the easting and northing for an existing point or select an existing point in the mission file.
    - Enter an azimuth.
2. Enter the From point to intersect the baseline at a 90 degree angle. You can enter the easting and northing for an existing point or select an existing point in the mission file.

    GPS FieldMate displaysthe new position. You can assign a point id for reference to the mission file.

    See “Coordinate Geometry - Location by Point to Line (Point, Azimuth)” on page 176 for more information.

Intersection by Point to Line (Point/Point)

In this method, GPS FieldMate creates a new position by the intersection of a defined baseline (point/point) and the right angle extension to the From point (Figure 2.33).

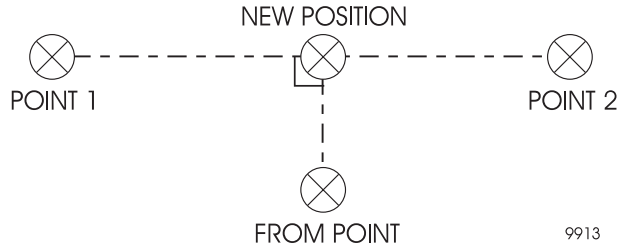

Figure 2.33. Intersection by Point to Line

To solve for the new position, follow these steps:

1. Define and enter the first point of the baseline. You can enter the easting and northing for an existing point or select an existing point in the mission file.
2. Define and enter the second point of the baseline. You can enter the easting and northing for an existing point or select an existing point in the mission file.
3. Enter the From point to intersect the baseline at a 90 degree angle. You can enter the easting and northing for an existing point or select an existing point in the mission file.

    GPS FieldMate displaysthe coordinates for the new position which you can assign a point id for reference to the mission file.

See “Coordinate Geometry - Location by Point to Line (Point, Point)” on page 179 for more information.

Intersection by Azimuths

In this method, GPS FieldMate computes the new position by the intersection of two defined baselines (point 1/azimuth and point 2/azimuth) (Figure 2.34)

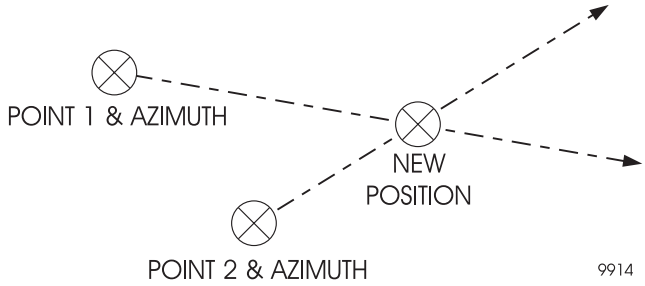

Figure 2.34. Intersection by Azimuths

To solve for the new position, follow these steps:

1. Define and enter the first line by point and azimuth. You can enter the easting and northing for an existing point or select an existing point in the mission file.
2. Define and enter the second line by point and azimuth. You can enter the easting and northing for an existing point or select an existing point in the mission file.

   GPS FieldMate displaysthe coordinates for the new position which you can assign a point id for reference to the mission file.

   See “Coordinate Geometry - Location via Intersection by Azimuths” on page 183 for more information.

If an intersection between the two point/azimuth lines does not exist, GPS FieldMate beeps. Change the coordinate and azimuth values in step 1 or step 2.

Intersection by Distances

In this method, GPS FieldMate computes two new positions by the intersection of two defined circles (point 1/distance and point 2/distance) (Figure 2.35).

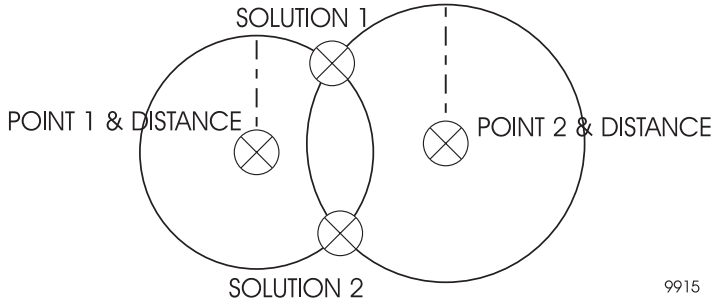

Figure 2.35. Intersection by Distances

To solve for the new positions, follow these steps:

1. Define and enter the first circle with the point and distance. You can enter the easting and northing for an existing point or select an existing point in the mission file.
2. Define and enter the second circle with the point and distance. You can enter the easting and northing for an existing point or select an existing point in the mission file.

   GPS FieldMate displays the first solution which you can assign a point id for reference to the mission file.

   The first solution is the first intersection which occurs clockwise from 0° on the circle defined by Point 1.

   GPS FieldMate displays the second solution which you can assign a point id for reference to the mission file.

   See “Coordinate Geometry - Location via Intersection by Distances” on page 186 for more information

If an intersection between the two point/distance circles does not exist, GPS FieldMate beeps. Change the coordinate and distance values in step 1 or step 2.

Intersection by Distance and Azimuth

In this method, GPS FieldMate computes the new position by the intersection of a defined line (point 1/distance) and a defined circle (point 2/azimuth) (Figure 2.36).

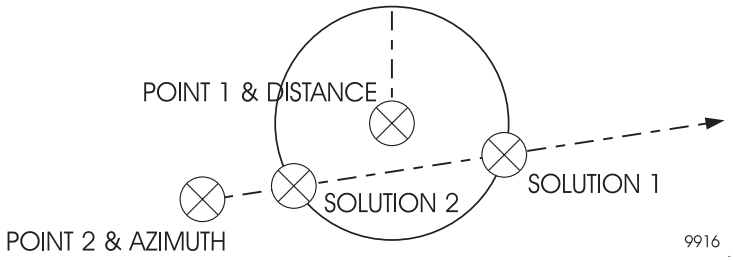

Figure 2.36. Intersection by Distance and Azimuth

To solve for the new positions, follow these steps:

1. Define and enter the circle with the point and distance. You can enter the easting and northing for an existing point or select an existing point in the mission file.
2. Define and enter the line by point and azimuth. You can enter the easting and northing for an existing point or select an existing point in the mission file.

   GPS FieldMate displays the first solution which you can assign a point id for reference to the mission file.

   The first solution is the first intersection which occurs clockwise from 0° on the circle.

   GPS FieldMate displays the second solution which you can assign a point id for reference to the mission file.

   See “Coordinate Geometry - Location via Intersection by Distance and Azimuth” on page 190 for more information

If an intersection between the point/distance circle and the point/azimuth line does not exist, GPS FieldMate beeps. Change the coordinate and distance values in step 1 or the coordinate and azimuth values in step 2.

Subdivide Line by Segments

In this method, GPS FieldMate computes points by subdividing a line using a predefined number of segments of equal length (Figure 2.37). The resulting points are equally spaced between the From and To points.

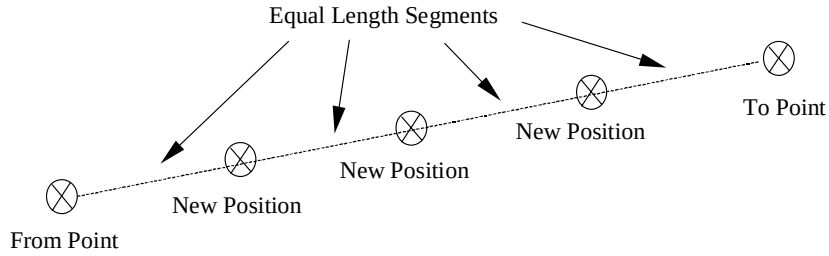

Figure 2.37. Subdividing a Line by Segments

To subdivide a line in equal segments, follow these steps:

1. Enter the easting and northing for an existing point or select an existing point in the mission file for the From point.
2. Enter the easting and northing for an existing point or select an existing point in the mission file for the To point.

   GPS FieldMate displays the distance between the two points.
3. Enter the number of segments for the line (this yields one less point).
4. Enter a four digit point ID prefix, and GPS FieldMate increments the remaining for digits of the point beginning with 0001.

   GPS FieldMate displays the range of new point ids with the distance of the new segments.

   See “Coordinate Geometry - Subdivide Line By Segments” on page 194 for more information

Subdivide Line by Distance

In this method, GPS FieldMate computes points by subdividing a line using a predefined distance between segments (Figure 2.38). The resulting points are equally spaced between the From point. The last new position may or may not be equidistant to the To point.

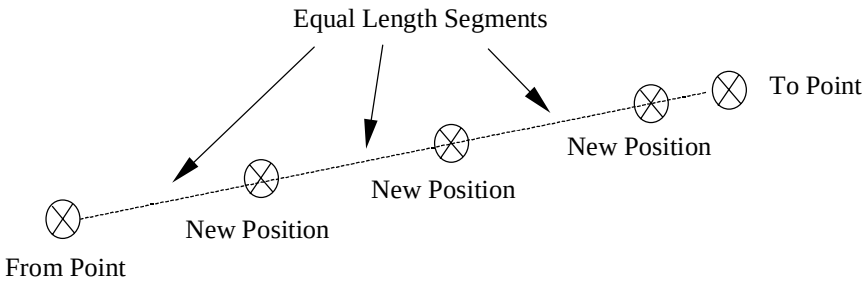

Figure 2.38. Example of Non-Equally Spaced Points

To subdivide line by distance, follow these steps:

1. Enter the easting and northing for an existing point or select an existing point in the mission file for the From point.
2. Enter the easting and northing for an existing point or select an existing point in the mission file for the To point.

   GPS FieldMate displays the distance between the two points.
3. Enter the segment length for the line.
4. Enter a four digit point ID prefix, and GPS FieldMate increments the remaining for digits of the point beginning with 0001.

   GPS FieldMate displays the range of new point ids with the distance of the new segments.

   See “Coordinate Geometry - Subdivide Line By Distance” on page 198 for more information

The Anchor Point System

GPS FieldMate can compute transformation parameters between WGS-84 GPS positions and a local coordinate system. No mention of this module is made in the Reference Chapter regarding screen function capability other than how to access the Anchor Point system through the System Selection screen (SYST).

Enter the actual geodetic position and the local coordinates for each point. GPS FieldMate calculates the transformation between systems.

A system can be defined using two methods: **local occupations** or **coordinate list** entry. Additional points can be added at any time to strengthen the calculation.

To compute transformation coordinates, follow these steps:

1. Start Anchor Point using the control points for the transformation.

   You can enter all point information manually for both the GPS coordinate and the local coordinate, using the EDIT or NEW functions.

   Anchor Point creates a TOPO.LSY file.

Local coordinates can only be entered manually. Anchor Point does not read points from the .DAT input file. Therefore, a .DAT file does not need to exist in the data directory prior to doing the Anchor Point procedure.

2. Transfer this file to the directory where the MCONVERT.EXE program resides.
3. If GPS FieldMate is operating in real-time mode, local area points can be occupied and entered into the system calculation using the HERE function. The geodetic coordinates for the point are taken from the current GPS position. You can then enter the local coordinates for the point.

4. To start Anchor Point, set FORMAT to GRID in the DSST screen, press SYST and then highlight LOCAL (Figure 2.39).

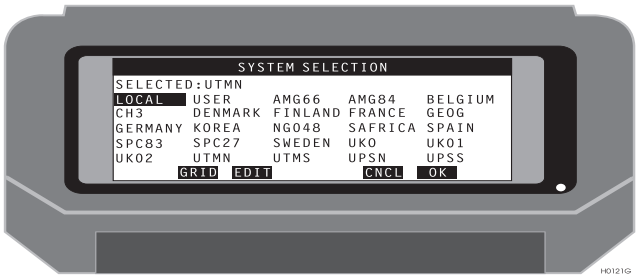

Figure 2.39. System Selection (SYST) Screen

5. Press EDIT to access the Local System Parameters (Figure 2.40).

If no TOPO.lsy file is found, you will hear a beep and the message "Cannot Open Local System" file will be displayed. Press enter to continue and a new TOPO.lsy will be created.

The Local System Parameters screen displays parameters which define the local system.

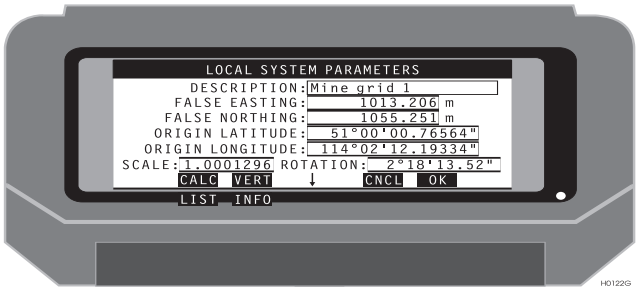

Figure 2.40. Local System Parameters Screen

Table 2.7 describes the items shown on the Local System parameters screen.

Table 2.7. Local System Screen Parameters

Item	Description
FALSE EASTING	Editable Field. The False Easting of the local system.
FALSE NORTHING	Editable Field. The False Northing of the local system.

Table 2.7. Local System Screen Parameters (continued)

Item	Description
ORIGIN LATITUDE	Editable Field. The Origin Latitude of the local system.
ORIGIN LONGITUDE	Editable Field. The Origin Longitude of the local system.
SCALE	Editable Field. The Scale Factor of the local system.
ROTATION	Editable Field. The Rotation of the local system.
CALC	Calculates new parameters for the local system based on anchor points in the list.
VERT	Calculates new local vertical parameters using the points in the list.
CNCL	Cancels any changes and returns you to the previous screen
OK	Accepts any changes and returns you to the previous screen.
LIST ⇑	Selects the Anchor Point List screen.
INFO ⇑	Selects the Local System Information screen

6. To view the points used in the local system definition, access the Anchor Point List screen (Figure 2.41).

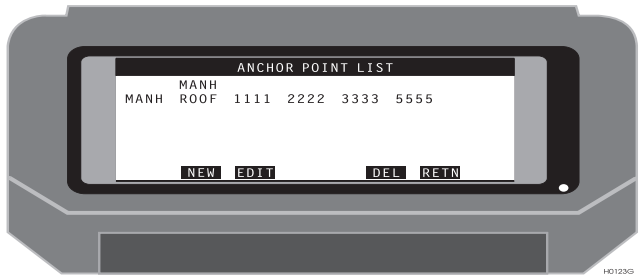

Figure 2.41. Anchor Point List Screen

Table 2.8 describes the items on the Anchor Point List screen.

Table 2.8. Anchor Points List Screen Parameters

Item	Description
MANH, ROOF, 1111	The names of the points currently used in the definition.
NEW	Selects the EDIT NEW ANCHOR POINT screen
EDIT	Selects the EDIT ANCHOR POINT screen

Table 2.8. Anchor Points List Screen Parameters (continued)

Item	Description
DEL	Deletes the highlighted point from the current definition.
RETN	Returns you to the previous screen

7. To edit a point in the current list of local coordinates, use the Anchor Point screen (local) (Figure 2.42).

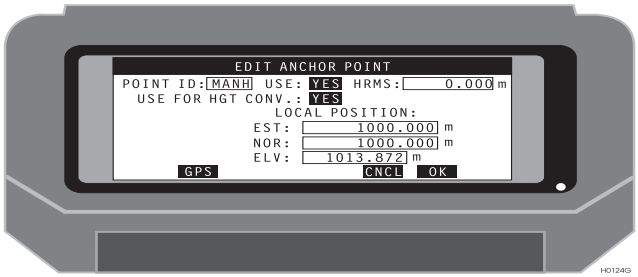

Figure 2.42. Edit Anchor Point (Local) Screen

Table 2.9 describes the items on the Anchor Point (local) screen.

Table 2.9. Anchor Point List Screen Parameters

Item	Description
POINT ID	The name of the current point selected.
USE	Toggle Field. Allows you to select this point for the local system definition.
HRMS	Editable Field. The Horizontal RMS value for this coordinate.
USE FOR HGT CONV	Toggle Field. Lets you to select this point for the local system vertical definition.
EST	Editable Field. The easting value for this point.
NOR	Editable Field. The northing value for this point.
ELV	Editable Field. The elevation value for this point.
GPS	Selects the EDIT ANCHOR POINT screen for GPS coordinates.
CNCL	Cancels any changes and return you to the previous screen
OK	Accepts any changes and return you to the previous screen

8. To edit the GPS coordinates of a point in the current list of points, use the Edit Anchor Point (GPS) screen (Figure 2.43).

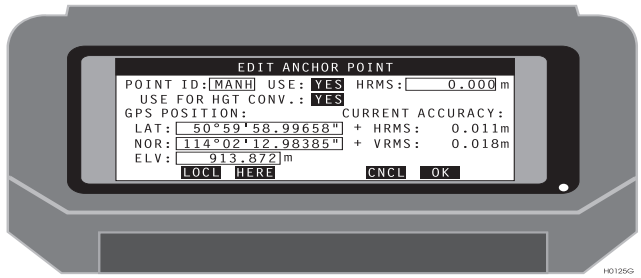

Figure 2.43. Edit Anchor Point (GPS) Screen

Table 2.10 describes the items on the Edit Anchor Point (GPS) screen.

Table 2.10. Edit Anchor Point (GPS) Screen Parameters

Item	Description
POINT ID	The name of the current point selected.
USE	Toggle Field. Lets you to select this point for the local system definition.
HRMS	Editable Field. The horizontal RMS value for this coordinate.
USE FOR HGT CONV	Toggle Field. Lets you to select this point for the local system vertical definition.
LAT	Editable Field. The latitude value for this point.
LNG	Editable Field. The longitude value for this point.
ELV	Editable Field. The elevation value for this point.
CURRENTACCURACY (HRMS/VRMS)	The current horizontal and vertical accuracy for the real-time GPS position.
LOCL	Selects the EDIT ANCHOR POINT screen for Local coordinates.
HERE	Sets a GPS position and enters it into the LAT, LNG, and ELV fields.
CNCL	Cancels any changes and returns you to the previous screen
OK	Accepts any changes and returns you to the previous screen

9. To enter a new point to the definition list, use the Edit New Anchor Point (local) screen (Figure 2.44.

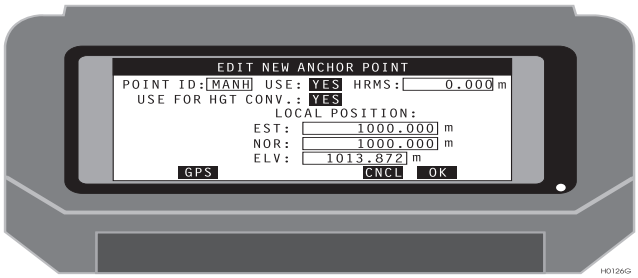

Figure 2.44. Edit New Anchor Point (Local) Screen

Table 2.11 describes the items on the Edit New Anchor Point (local) screen.

Table 2.11. Edit New Anchor Point (Local) Screen Parameters

Item	Description
POINT ID	The name of the current point selected.
USE	Toggle Field. Lets you to select this point for the local system definition.
HRMS	Editable Field. The horizontal RMS value for this coordinate.
USE FOR HGT CONV	Toggle Field. Lets you to select this point for the local system vertical definition.
EST	Editable Field. The easting value for this point.
NOR	Editable Field. The northing value for this point.
ELV	Editable Field. The elevation value for this point.
GPS	Selects the EDIT ANCHOR POINT screen for GPS coordinates.
CNCL	Cancels any changes and returns you to the previous screen
OK	Accepts any changes and returns you to the previous screen

10. To enter a new GPS point to the definition list, use the Edit New Anchor Point (GPS) screen (Figure 2.45).

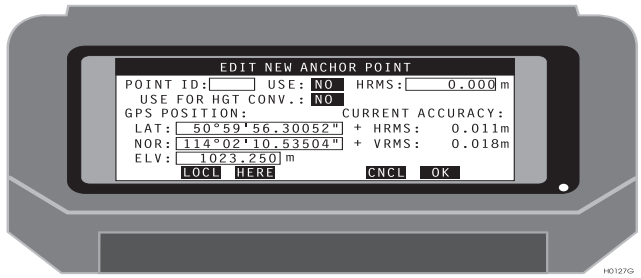

Figure 2.45. Edit New Anchor Point (GPS) Screen

Table 2.12 describes the items on the Edit New Anchor Point (GPS) screen

Table 2.12. Edit New Anchor Point (GPS) Screen Parameters

Item	Description
POINT ID	The name of the current point selected.
USE	Toggle Field. Lets you to select this point for the local system definition.
HRMS	Editable Field. The horizontal RMS value for this coordinate.
USE FOR HGT CONV	Toggle Field. Lets you select this point for the local system vertical definition.
LAT	Editable Field. The latitude value for this point.
LNG	Editable Field. The longitude value for this point.
ELV	Editable Field. The elevation value for this point.
CURRENT ACCURACY (HRMS/VRMS)	The current horizontal and vertical accuracy for the real-time GPS position.
LOCL	Selects the EDIT ANCHOR POINT screen for Local coordinates.
HERE	Sets a GPS position and enters it into the LAT, LNG, and ELV fields.
CNCL	Cancels any changes and returns you to the previous screen
OK	Accepts any changes and returns you to the previous screen

11. To display the calculation parameters for the current definition list, use the Local System Information screen (Figure 2.46).

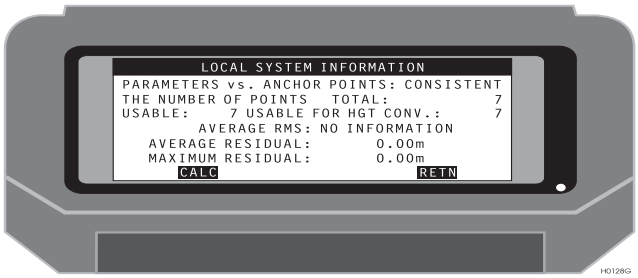

Figure 2.46. Local System Information Sceen

Table 2.13 describes the items on the Local System Information screen.

Table 2.13. Local System Information Screen Parameters

Item	Description
PARAMETERS vs.ANCHOR POINTS	Indicates whether the latest anchor points have been used in the local parameter calculation (consistent). If additional anchor points have been logged, but not added to the local parameter solution, inconsistent will appear.
THE NUMBER OF POINTS TOTAL	The total number points used in the calculation
USABLE	The number of points which can be used in the calculation
USABLE FOR HGT CONV	The number of points which can be used in the height calculation
AVERAGE RMS	The average RMS value for the system calculation
AVERAGE RESIDUAL	The average of the residual for the points used in the calculation
MAXIMUM RESIDUAL	The maximum residual for the points used in the calculations
CALC	Calculates the coordinate conversion using the current points in the definition.
RETN	Returns you to the previous screen.

12. To display the current definition list for the local vertical calculation, use the Local System Vertical Parameters screen (Figure 2.47).

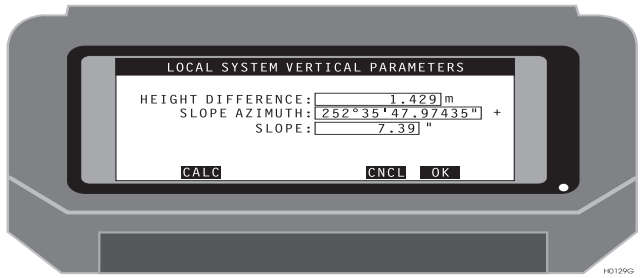

Figure 2.47. Local System Vertical Parameters Screen

Table 2.14 describes the items on the Local System Vertical Parameters screen.

Table 2.14. Local System Vertical Parameters

Item	Description
HEIGHT DIFFERENCE	The height difference for the current local system definition
SLOPE AZIMUTH	The azimuth of the slope for the current local system definition
SLOPE	The slope for the current local system definition
CALC	Calculates a value for the vertical parameters
CNCL	Ignores all changes and returns you to the previous screen
OK	Accepts all changes and returns you to the previous screen

3

Tutorial

This tutorial steps through the basic functionality of GPS FieldMate. The following topics are detailed.

- Data Collection for Post Processing
- RTK Setup
- RTK Data Logging
- Offsetting
- Stakeout
- Coordinate Geometry
- Data Output Files

Data Collection for Post Processing

There are three modes of data collection and two modes of processing. Each processing mode requires a specific method of field data collection. GPS FieldMate supports data collection for Ashtech Solutions, WinPrism and Ashtech Office Suite for Survey (AOSS). Table 3.1 details the processing modes of the software packages for different data collection methods

Table 3.1. Processing Modes in Software Packages

Data Collection Method	Ashtech Solutions Processing Modes	WinPrism ProcessingModes	AOSS Processing Modes
Single site static	Process New	Static	Static
Multi-site static	Process New	Pseudo	Rapid Static

Table 3.1. Processing Modes in Software Packages

Data Collection Method	Ashtech Solutions Processing Modes	WinPrism ProcessingModes	AOSS Processing Modes
Dynamic	Process New	Kinematic	Kinematic
Simultaneous RTK/ Dynamic	Process New	Kinematic	Kinematic

Single Site Static

The single site static method creates a file in the GPS receiver which contains epochs of data with the same site id. This method is typically used for conventional static surveys using most types of GPS receivers. This method is also used when storing data in a RTK base receiver.

Press the **Process New** button to begin data processing in Ashtech Solutions. Use the Static Processing Mode in both WinPrism and AOSS with this file type.

Check Receiver Memory

Verify that there is receiver memory available for your survey:

1. Download and erase unnecessary files from the receiver.
2. Connect the Husky to the receiver and start GPS FieldMate.
3. Access the FILE MANAGEMENT (FILE) screen.
4. Use SEL to select a file.

   GPS FieldMate displays the filename in the right pane.
5. Press DEL to delete the file.
6. Continue this process to delete all unnecessary files.
7. Return to the main menu (RETN).

System Setup

1. Access the MISSION SETUP (GO) screen.
2. Access the LOG POINT DATA (LGPT) screen.
3. Access the DATALOGGING SETUP (LGST) screen.
4. Set the following parameters;

   RECORD INT, ELEV MASK, ANTENNA HT, OCCUP TIME, DATA TO LOG, and TRAJECTORY.

   - **RECORD INT**—receiver recording interval. This parameter must be the same for all receivers in the survey. A recording interval of 5 seconds is

adequate for most static surveys. Experience over time dictates what value meets your project needs.

- **ELEV MASK**—receiver elevation mask. The default is 10 degrees. This parameter should be the same for all receivers. An elevation mask of 10 degrees is adequate for most surveys.
- **ANTENNA HT**—antenna height. Measure the vertical height of the antenna phase center. You will input this value in post processing software to reduce the GPS measurements from the antenna height to ground height.
- **OCCUP TIME**—receiver occupation time. Occupation times vary widely due to equiptment type, measured baseline length, desired accuracy level, and environmental conditions.

  A good rule of thumb for Z and GG series receivers is 10 minutes for the first 10 km and an additional minute for each km thereafter.

  Single frequency receivers require substantially more time. A good rule of thumb is 45 minutes for the first 10 km and an additional 5 minutes for each km thereafter.

  Experience over time will dictate what value meets your project needs. For long occupation times or for unattended operation, enter a value of 0.00. An occupation time of 0.00 sets the receiver to log data continuously. This is ideal for setting a RTK base station to log data for post processing.
- **DATA TO LOG**—type of data stored in the GPS receiver. There are three available types: carrier phase, pseudo range, and position. Select carrier phase for all post processing data collection tasks.
- **TRAJECTORY**—controls the storage of data between sites. Select NO for static surveys.

5. Press OK to save the parameters and return to the LOG POINT DATA screen.

Log Data

1. The LOG POINT DATA screen has fields which may not pertain to your survey. The POINT ID, POINT CODE, and MEMO fields are used by packages developed for specific markets and are not supported by the standard data processing packages. Enter this data if necessary.
2. Enter a site id in the SITE ID field.

   Valid characters include 0-9, A-Z, (,), ?, &, #, _, -. When numerals are used, the site id automatically increments by 1.
3. Start logging data by pressing LOG.

If the occupation time is greater than 0.00, an epoch counter box displays the remaining epochs and system status. If the occupation time is 0.00, a rotating dial displays the system is logging data to the receiver.

Stop Data Logging and Close the File

Will you power down the receiver between sites or stay powered up between sites? Depending on the length of time between sessions, consider turning off the GPS receiver to preserve your battery.

There are two options depending on the occupation time:

1. If the occupation time is greater than 0.00, GPS FieldMate stops logging data when the occupation time expires.

   You can stop data logging at any point by pressing the ESC key on the standard keyboard or the F1 key on TDS keyboard. Move to the next site or if you're the 'hinge' point in a network survey, you'd stay put. Either way, close the receiver file before you begin the next session.

   To close the current file, turn off the receiver (the receiver closes the current file and automatically opens a new one when turned back on) or use the data collector to close the file if you plan to leave the receiver powered between sessions.

   To close the file with the data collector, return to the main screen and access the FILE MANAGEMENT (FILE) screen. Highlight the last file and press CLOS. The data collector asks you if you want to close the file; answer yes (Y). GPS FieldMate creates a new file with the same site id as the file name, and the receiver stops collecting data.

2. If 0.00 was used as the entered occupation time, the receiver continues to log data until you physically stop it with either the data collector or by turning off the receiver.

   If you plan to leave the receiver powered on during the move or the wait between sessions, use the data collector to close the file: from the LOG POINT DATA screen, access the DATALOGGING SETUP screen (LGST). Verify that the TRAJECTORY parameter is set to NO and press OK to stop logging data and leaves the current file open. Return to the main screen and access the FILE MANAGEMENT (FILE) screen. Highlight the last file and press CLOS. The data collector will ask you if you want to close the file; answer yes (Y). GPS FieldMate creates a new file with the same site id as the file name, and the receiver stops collecting data.

Multi-Site Static

The multi-site static method creates a file in the GPS receiver which contains epochs of data with different site ids. An array of data contains the same site id followed by subsequent arrays of data containing the same site id within the array, but with different site ids than the previous array. This method is typically used for rapid static surveys using Z and GG series GPS receivers.

Press the **Process New** button to begin data processing in Ashtech Solutions. Use the **Pseudo Processing Mode** in WinPrism or the Rapid Static Mode in AOSS with this file type.

Check Receiver Memory

Verify that there is receiver memory available for your survey:

1. Download and erase unnecessary files from the receiver.
2. Connect the Husky to the receiver and start GPS FieldMate.
3. Access the FILE MANAGEMENT (FILE) screen.
4. Use SEL to select a file.

   GPS FieldMate displays the filename in the right pane.
5. Press SEL to delete the file.
6. Continue this process to delete all unnecessary files.
7. Return to the main menu (RETN).

System Setup

1. Access the MISSION SETUP (GO) screen.
2. Access the LOG POINT DATA (LGPT) screen.
3. Access the DATALOGGING SETUP (LGST) screen.
4. Set the following parameters;

   RECORD INT, ELEV MASK, ANTENNA HT, OCCUP TIME, DATA TO LOG, and TRAJECTORY.

   - **RECORD INT**—receiver recording interval. This parameter must be the same for all receivers in the survey. A recording interval of 5 seconds is adequate for most static surveys. Experience over time dictates what value meets your project needs.
   - **ELEV MASK**—receiver elevation mask. The default is 10 degrees. This parameter should be the same for all receivers. An elevation mask of 10 degrees is adequate for most surveys.
   - **ANTENNA HT**—antenna height. Measure the vertical height of the antenna phase center. You will input this value in post processing

software to reduce the GPS measurements from the antenna height to ground height.

- **OCCUP TIME**—receiver occupation time. Occupation times vary widely due to equiptment type, measured baseline length, desired accuracy level, and environmental conditions.

  A good rule of thumb for Z and GG series receivers is 10 minutes for the first 10 km and an additional minute for each km thereafter.

  Single frequency receivers require substantially more time. A good rule of thumb is 45 minutes for the first 10 km and an additional 5 minutes for each km thereafter.

  Experience over time will dictate what value meets your project needs. For long occupation times or for unattended operation, enter a value of 0.00. An occupation time of 0.00 sets the receiver to log data continuously. This is ideal for setting a RTK base station to log data for post processing.
- **DATA TO LOG**—type of data stored in the GPS receiver. There are three available types: carrier phase, pseudo range, and position. Select carrier phase for all post processing data collection tasks.
- **TRAJECTORY**—controls the storage of data between sites. Select NO for static surveys.

5. Press OK to save the parameters and return to the LOG POINT DATA screen.

Log Data

1. The LOG POINT DATA screen has fields which may not pertain to your survey. The POINT ID, POINT CODE, and MEMO fields are used by packages developed for specific markets and are not supported by the standard data processing packages. Enter this data if necessary.
2. Enter a site id in the SITE ID field.

   Valid characters include 0-9, A-Z, (,), ?, &, #, _, -. When numerals are used, the site id automatically increments by 1.
3. Start logging data by pressing LOG.

   GPS FieldMate stops data logging after the occupation time has expired.

   You can stop logging data at any point by pressing the ESC key on the standard keyboard or the F1 key on the TDS keyboard.
4. Proceed to the next survey point.
5. Repeat the site id entry and press LOG.

Close the File

When you've completed the survey, power the receiver off to close the file.

Dynamic

The dynamic method creates a file in the GPS receiver which contains epochs of data with different site ids and roving data. You are logging data at all times during the survey; while stationary on a point and while moving between points. The data contain the same site id followed by data with the site id '????', then subsequent arrays of data containing the same site id within the array, but with different site ids than the previous array. This method is typically used for dynamic or roving surveys using most all GPS receiver types.

Press the **Process New** button to begin data processing in Ashtech Solutions. Use the **Kinematic Processing Mode** in both WinPrism and AOSS with this file type.

Check Receiver Memory

Verify that there is receiver memory available for your survey:

1. Download and erase unnecessary files from the receiver.
2. Connect the Husky to the receiver and start GPS FieldMate.
3. Access the FILE MANAGEMENT (FILE) screen.
4. Use SEL to select a file.

   GPS FieldMate displays the filename in the right pane.
5. Press SEL to delete the file.
6. Continue this process to delete all unnecessary files.
7. Return to the main menu (RETN).

System Setup

1. Access the MISSION SETUP (GO) screen.
2. Access the LOG POINT DATA (LGPT) screen.
3. Access the DATALOGGING SETUP (LGST) screen.
4. Set the following parameters;

   RECORD INT, ELEV MASK, ANTENNA HT, OCCUP TIME, DATA TO LOG, and TRAJECTORY.

   - **RECORD INT**—receiver recording interval. This parameter must be the same for all receivers in the survey. A recording interval of 5 seconds is

adequate for most static surveys. Experience over time dictates what value meets your project needs.

- **ELEV MASK**—receiver elevation mask. The default is 10 degrees. This parameter should be the same for all receivers. An elevation mask of 10 degrees is adequate for most surveys.
- **ANTENNA HT**—antenna height. Measure the vertical height of the antenna phase center. You will input this value in post processing software to reduce the GPS measurements from the antenna height to ground height.
- **OCCUP TIME**—receiver occupation time. Occupation times vary widely due to equiptment type, measured baseline length, desired accuracy level, and environmental conditions.

  A good rule of thumb for Z and GG series receivers is 10 minutes for the first 10 km and an additional minute for each km thereafter.

  Single frequency receivers require substantially more time. A good rule of thumb is 45 minutes for the first 10 km and an additional 5 minutes for each km thereafter.

  Experience over time will dictate what value meets your project needs. For long occupation times or for unattended operation, enter a value of 0.00. An occupation time of 0.00 sets the receiver to log data continuously. This is ideal for setting a RTK base station to log data for post processing.
- **DATA TO LOG**—type of data stored in the GPS receiver. There are three available types: carrier phase, pseudo range, and position. Select carrier phase for all post processing data collection tasks.
- **TRAJECTORY**—controls the storage of data between sites. Select NO for static surveys.

5. Press OK to save the parameters and return to the LOG POINT DATA screen.

Log Data

1. The LOG POINT DATA screen has fields which may not pertain to your survey. The POINT ID, POINT CODE, and MEMO fields are used by packages developed for specific markets and are not supported by the standard data processing packages. Enter this data if necessary.
2. Enter a site id in the SITE ID field.

   Valid characters include 0-9, A-Z, (,), ?, &, #, _, -. When numerals are used, the site id automatically increments by 1.
3. Start logging data by pressing LOG.

An epoch counter box displays the remaining epochs and system status. GPS FieldMate continues to log data with a site id '????' after the occupation time has expired.

You can stop logging data as a site at any point by pressing the ESC key on the standard keyboard or the F1 key on the TDS keyboard.

If data logging stopped prematurely, the site id is changed to ????.

4. Proceed to the next survey point. Data continues to be logged with the site id ????, keep the antenna upright during the move.
5. Enter the site id entry and press LOG.
6. When you've completed the survey, return to the initialization point and enter INIT as the site id.
7. Press LOG to log the ending initialization point.

Close the File

When you've completed the survey, power the receiver off to close the file.

Simultaneous Dynamic/RTK

The simultaneous dynamic/RTK method creates a file in the GPS receiver which contains epochs of data with different site ids and roving data and a binary output file on the handheld controller. You log data in the GPS receiver at all times during the survey; while stationary on a point and while moving between points. An array of data contains the same site id followed by data with the site id ????, then subsequent arrays of data containing the same site id within the array, but with different site ids than the previous array. The binary output file on the handheld also has the last epoch of data.

This method is used to support post process data results if or when RTK data collection is not possible.

Press the **Process New** button to begin data processing in Ashtech Solutions. Use the **Kinematic Processing Mode** in both WinPrism and AOSS with this file type. These packages import the Husky binary output file to populate the database with site and preliminary position and preliminary quality information. After post processing, the post processing results are used to update the preliminary position and quality information in the GPSeismic database.

Check Receiver Memory

Verify that there is receiver memory available for your survey:

1. Download and erase unnecessary files from the receiver.
2. Connect the Husky to the receiver and start GPS FieldMate.

3. Access the FILE MANAGEMENT (FILE) screen.
4. Use SEL to select a file.

   GPS FieldMate displays the filename in the right pane.
5. Press SEL to delete the file.
6. Continue this process to delete all unnecessary files.
7. Return to the main menu (RETN).

System Setup

1. Access the MISSION SETUP (GO) screen.
2. Access the LOG POINT DATA (LGPT) screen.
3. Access the DATALOGGING SETUP (LGST) screen.
4. Set the following parameters;

   RECORD INT, ELEV MASK, ANTENNA HT, OCCUP TIME, DATA TO LOG, and TRAJECTORY.

   - **RECORD INT**—receiver recording interval. This parameter must be the same for all receivers in the survey. A recording interval of 5 seconds is adequate for most static surveys. Experience over time dictates what value meets your project needs.
   - **ELEV MASK**—receiver elevation mask. The default is 10 degrees. This parameter should be the same for all receivers. An elevation mask of 10 degrees is adequate for most surveys.
   - **ANTENNA HT**—antenna height. Measure the vertical height of the antenna phase center. You will input this value in post processing software to reduce the GPS measurements from the antenna height to ground height.
   - **OCCUP TIME**—receiver occupation time. Occupation times vary widely due to equiptment type, measured baseline length, desired accuracy level, and environmental conditions.

     A good rule of thumb for Z and GG series receivers is 10 minutes for the first 10 km and an additional minute for each km thereafter.

     Single frequency receivers require substantially more time. A good rule of thumb is 45 minutes for the first 10 km and an additional 5 minutes for each km thereafter.

     Experience over time will dictate what value meets your project needs. For long occupation times or for unattended operation, enter a value of 0.00. An occupation time of 0.00 sets the receiver to log data

continuously. This is ideal for setting a RTK base station to log data for post processing.

- **DATA TO LOG**—type of data stored in the GPS receiver. There are three available types: carrier phase, pseudo range, and position. Select carrier phase for all post processing data collection tasks.
- **TRAJECTORY**—controls the storage of data between sites. Select NO for static surveys.

5. Press OK to save the parameters and return to the LOG POINT DATA screen.

Log Data

1. The LOG POINT DATA screen has fields which may not pertain to your survey. The POINT ID, POINT CODE, and MEMO fields are used by packages developed for specific markets and are not supported by the standard data processing packages. Enter this data if necessary.
2. Enter a site id in the SITE ID field.

   Valid characters include 0-9, A-Z, (,), ?, &, #, _, -. When numerals are used, the site id automatically increments by 1.
3. Start logging data by pressing LOG.

   An epoch counter box displays the remaining epochs and system status. GPS FieldMate continues to log data with a site id '????' after the occupation time has expired. The last epoch is stored in the binary output file on the handheld.

   You can stop logging data as a site at any point by pressing the ESC key on the standard keyboard or the F1 key on the TDS keyboard.

   If data logging stopped prematurely, the site id is changed to ????.
4. Proceed to the next survey point. Data continues to be logged with the site id ????, keep the antenna upright during the move.
5. Enter the site id entry and press LOG.
6. When you've completed the survey, return to the initialization point and enter INIT as the site id.
7. Press LOG to log the ending initialization point.

   The point code and memo fields are optional.

Close the File

When you've completed the survey, power the receiver off to close the file.

RTK Setup

RTK data collection is available with the Z and GG series receivers. Two modes of RTK operation are available—Ashtech RTK and RTCM RTK. The Z series receivers are capable of supporting both methods depending on options available in the receiver. The GG series receivers only support RTCM RTK.

Coordinate Display Setup

1. The data collector stores the last configuration. At the beginning of a new project, set the coordinate system display/output if it is different that the previous project.
2. In the main screen, press GO.
3. In the MISSION SETUP screen, press DSST.
4. In the DISPLAY SETUP screen, highlight the FORMAT field.
5. Press the SP key to toggle between selections.
6. Select GRID. For most applications, grid coordinate display works best.
7. Highlight the QUADRANT field.
8. Press the SP key to toggle between selections.
9. Select the quadrant you are located. NW is north of the equator and west of the prime meridian.
10. Highlight the LINEAR field.
11. Press the SP key to toggle between the selections.
12. Select the units of measure desired.
13. In the DISPLAY SETUP screen, press SYST.
14. In the SYSTEM SELECTION screen, highlight the desired coordinate system.
15. Press OK to accept the selection and to return to the DISPLAY SETUP screen.

You can either use the arrow keys to highlight the desired system or press the first characters of the desired system for the data collector to perform a search.

16. If you selected a coordinate system which does not contains zones, press RETN to accept the settings and to return to the MISSION SETUP screen.
17. If you selected a coordinate system which contains zones, press Zone in the DISPLAY SETUP screen.
18. In the ZONE SELECTION screen, highlight the desired coordinate system zone.
19. Press OK to accept the selection and to return to the DISPLAY SETUP screen.

You can either use the arrow keys to highlight the desired system or press the first characters of the desired system for the data collector to perform a search.

The coordinate display and output setup is complete.

Ashtech RTK Base Setup

The base setup operation configures the RTK base receiver to broadcast data corrections. You set the base in the DIFFERENTIAL SETUP and BASE STATION COORDINATES screen:

1. In the main screen, press GO.
2. In the MISSION SETUP screen, press DFST.
3. In the DIFFERENTIAL SETUP screen, highlight the RECEIVER MODE field.
4. Press the SP key to toggle between selections.
5. Select RZ BASE.
6. Highlight the RADIO PORT field.
7. Press the SP key to toggle between selections.
8. Select PORT B. Set an external radio modems to port B.
9. Highlight the BAUD RATE field.
10. Press the SP key to toggle between selections. Most radio modems should be set to 9600.
11. Select 9600.
12. In the DIFFERENTIAL SETUP screen, press COOR.
13. In the BASE STATION COORDINATE screen, enter the base station latitude, longitude, and elevation.
14. Press OK to accept the entry and to return to the DIFFERENTIAL SETUP screen.

The base station coordinates can entered three ways; the current autonomous position computed by the GPS receiver can be entered by pressing HERE; a point stored in the mission file can be selected from a list by pressing PT; or the WGS84 coordinates can be manually entered in the coordinate fields. If selecting a point from the mission file, the coordinate display/output settings should have been set prior to entering the DIFFERENTIAL SETUP screen.

15. In the DIFFERENTIAL SETUP screen, press OK to accept the settings and to return to the MISSION SETUP screen.

    The base station setup is complete.
16. Unplug the data collector from the base and connect to the rover.

Ashtech RTK Rover Setup

The rover setup operation configures the RTK rover receiver to receive data corrections from the base station. Set the rover in the DIFFERENTIAL SETUP screen:

1. In the MISSION SETUP screen, press DFST.
2. In the DIFFERENTIAL SETUP screen, highlight the RECEIVER MODE field.
3. Press the SP key to toggle between selections.
4. Select RZ REMOTE.
5. Highlight the POSITION TO USE field.
6. Press the SP key to toggle between selections.
7. Select TRANSMITTED.

The rover can use either the base station position being transmitted or the base station position entered in the BASE STATION COORDINATE screen.

8. Highlight the RADIO PORT field.
9. Press the SP key to toggle between selections. External radio modems should be set to port B.
10. Select PORT B.
11. Highlight the BAUD RATE field.
12. Press the SP key to toggle between selections. Most radio modems should be set to 9600.
13. Select 9600.
14. Highlight the MULTIPATH field.
15. Press the SP key to toggle between selections. For most environmental conditions, the MEDIUM setting is acceptable. If the system takes long periods of time to initialize, try setting this field to HIGH or SEVERE.
16. Select MEDIUM.
17. Highlight the DYNAMICS field.
18. Press the SP key to toggle between selections. For most survey applications, the WALKING setting is acceptable.
19. Highlight the FAST CPD field.
20. Highlight the AMB FIX field. Press the SP key to toggle between selections.
21. Press the SP key to toggle between selections. For constant stakeout operations, set this field to ON. For a mix of field operations including pickup and stakeout, set this field to OFF.
22. Press OK to accept the settings and to return to the MISSION SETUP screen.

The rover setup is complete.

Check the system status before beginning work.

1. In the MISSION SETUP screen, press RETN to return to the main screen.
2. In the main screen, press SOLU.

   GPS FieldMate should be computing a RTK position. The status at the bottom left of the screen displays two characters for Z receivers or three characters for GG receivers. Press shift+H to display more information. Press DIFF for more detailed information regarding system status.
3. In the DIFFERENTIAL MODE STATUS screen,
4. Check the QA field. This field displays the percent of successful radio messages received.
5. Check the DL field. This field displays the status of the data link. A + represents data is being received and a - represents data not being received.
6. Check the SV tracking columns for base/rover usage. A BR displayed under the SV number represents the base and rover is tracking that satellite. A B represents the base is tracking that satellite. A R represents the rover is tracking that satellite.
7. If the base and rover receivers don't appear to be communicating, check the cable connections and verify that the base and rover setup operations were properly set.
8. Once the system is operational, press RETN until you reach the main screen.

RTCM RTK Base Setup

The base setup operation configures the RTK base receiver to broadcast data corrections. Set the base in the DIFFERENTIAL SETUP and BASE STATION COORDINATES screens:

1. In the main screen, press GO.
2. In the MISSION SETUP screen, press DFST.
3. In the DIFFERENTIAL SETUP screen, highlight the RECEIVER MODE field.
4. Press the SP key to toggle between selections.
5. Select RTCM/CPD BASE.
6. Highlight the RADIO PORT field.
7. Press the SP key to toggle between selections.
8. Select PORT B. Set external radio modems to port B.
9. Highlight the BAUD RATE field.
10. Press the SP key to toggle between selections.
11. Select 9600. Most radio modems should be set to 9600.

12. From the DIFFERENTIAL SETUP screen, press COOR.
13. In the BASE STATION COORDINATE screen, enter the base station latitude, longitude, and elevation.
14. Press OK to accept the entry and to return to the DIFFERENTIAL SETUP screen.
15. The base station coordinates can entered one of three ways:
    - The current autonomous position computed by the GPS receiver can be entered by pressing HERE
    - A point stored in the mission file can be selected from a list by pressing PT
    - The WGS84 coordinates can be manually entered in the coordinate fields.

    If you select a point from the mission file, enter the coordinate display/ output settings before accessing the DIFFERENTIAL SETUP screen.
16. In the DIFFERENTIAL SETUP screen,
    - Press OK to accept the settings and to return to the MISSION SETUP screen.

The base station setup is complete.

17. Unplug the data collector from the base and connect to the rover.

RTCM RTK Rover Setup

The rover setup operation configures the RTK rover receiver to receive data corrections from the base station. Set the rover in the DIFFERENTIAL SETUP screen:

1. In the MISSION SETUP screen, press DFST.
2. In the DIFFERENTIAL SETUP screen, highlight the RECEIVER MODE field.
3. Press the SP key to toggle between selections.
4. Select RTCM/CPD REMOTE.
5. Highlight the BASE STATION ID field.
6. Set the ID value to 0.
7. Highlight the RADIO PORT field.
8. Press the SP key to toggle between selections.
9. Select PORT B. Set external radio modems to port B.
10. Highlight the BAUD RATE field.
11. Press the SP key to toggle between selections.
12. Select 9600. Most radio modems should be set to 9600.
13. Highlight the FAST CPD field.

14. Press the SP key to toggle between selections. For constant stakeout operations, set this field to ON. For a mix of field operations including pickup and stakeout, set this field to OFF.
15. Highlight the AMB FIX field.
16. Press the SP key to toggle between selections.
17. Press OK to accept the settings and to return to the MISSION SETUP screen.

    The rover setup is complete.

Check the system status before beginning work:

1. From the MISSION SETUP screen, press RETN to return to the main screen.
2. From the main screen, press SOLU.

   GPS FieldMate should be computing a RTK position. The system status at the bottom left of the screen should display two characters for Z receivers or three characters for GG receivers. Press shift+H to display more information. Press DIFF for more detailed information regarding system status.
3. In the DIFFERENTIAL MODE STATUS screen,
4. Check the QA field. This field displays the percent of successful radio messages received.
5. Check the DL field. This field displays the status of the data link. A + represents data is being received and a - represents data not being received.
6. Check the SV tracking columns for base/rover usage. A BR displayed under the SV number represents the base and rover is tracking that satellite. A B represents the base is tracking that satellite. A R represents the rover is tracking that satellite.
7. If the base and rover receivers don't appear to be communicating, check the cable connections and verify that the base and rover setup operations were properly set.
8. Once the system is operational, press RETN until you reach the main screen.

RTK Data Logging

Log RTK data in the Feature screen (FEAT) and in all of the navigation/stakeout screens. Point codes can only be entered in the Feature screen. In the navigation/stakeout screens, the point code is pre-assigned to the point in the mission file:

To select a mission file:

1. In the main screen, press GO.
2. In the MISSION SETUP screen, press DATA

3. In the MISSION FILE SELECTION screen, highlight a mission file.
4. Press OK to accept the selected file and to return to the MISSION SETUP screen.
5. Press SURV.
6. From the SURVEY SETUP screen, press FEAT.

   The Feature screen contains fields for entering a point code, point id, memo, and antenna height. In the feature screen, continuous data logging by time or distance, point offsetting by a grid, bearing, side, current line defined in the line navigation screen, and laser range finder taskis are done. Status is displayed with HRMS, VRMS, number of SV used in the RTK solution, current RTK position, and ambiguity fix status.
7. Press SAVE to store the current static position and point data to the output files.
8. Enter an interval by time or distance value in the feature screen.
9. Press TOPO to log data continuously.

To edit or delete static point data stored in the output file:

1. In the MISSION SETUP screen (GO), press DATA.
2. Press DLOG.
3. Highlight the point of interest.
4. Press EDIT. The point code and memo can be changed.
5. Press REMV to delete the point. Press REMV to undelete the point.

Offsetting

Collect data offset from the current position in the feature screen (FEAT):

1. In the feature screen (FEAT), highlight the OFFSET field.
2. Press the SP key to toggle between selections.
3. Select BY GRID.
4. Press OFST.
5. In the POINT OFFSET screen, enter an easting, northing, and/or delta height value.

   The calculated offset value based on the current position is stored in the output files. Only the offset coordinates are stored. The * symbol is stored with the position information in a column of the output files.

Stakeout

Stakeout points are stored in mission files. Mission files reside in the MSDATA subdirectory where the program files reside on the data collector. An example mission file, SAMPLE.DAT, resides in the MSDATA subdirectory.

To copy points logged to the output file to the mission file:

1. In the MISSION SETUP screen (GO), press DATA.
2. Press DLOG.
3. Highlight the point of interest.
4. Press EDIT.
5. Press 2DAT. The highlighted point has been copied to the end of the mission file.

A mission file must exist in the MSDATA subdirectory.

Staking points can be accomplished with four navigation modes. A navigation mode (NAVI) displays off line error left and right, course to target, distance to target, and other navigation aids. The bull's eye mode (BULL) displays a graphical bull's eye with the point being staked centered in the graph, speed over ground, course over ground, course to target, distance to target, and cut/fill value.

The line display mode (LINE) displays a line defined from points in the mission file or from the current position to a mission file point, distance traveled down line, distance off line, course to target, distance to target, and cut/fill values.

The large font mode displays azimuth and distance from the point being navigated in a large font. This mode is turned on and off using the PgUp and PgDn keys on the data collector.

To stake a point:

1. In the main screen, press GO.
2. In the MISSION SETUP screen, press DATA
3. In the MISSION FILE SELECTION screen, highlight a mission file.
4. Press OK to accept the selected file and to return to the MISSION SETUP screen.
5. Press SURV.
6. In the SURVEY SETUP screen, press PT to select a point in the mission file.
7. In the POINT SELECTION screen, highlight a point.
8. Press OK to accept the selection and to return to the SURVEY SETUP screen.

You can either use the arrow keys to highlight the desired point or press the first characters of the desired point for the data collector to perform a search.

9. In the SURVEY SETUP screen, press NAVI.

   The Navigation screen displays various navigation aids. The most widely used fields are the course to target (CTT) and distance to target (DTT). As you move, notice the change in these two values. You can navigate to the point using these two fields. An audible alarm sounds when you're within a user defined distance from the target. This parameter is set in the ALARM SETUP screen (ALST).

10. In the navigation screen, press BULL.

    The Bull's Eye screen displays a graphical bull's eye. The point of interest is in the center of the graph. Course to target (CTT) and distance to target (DTT) are also displayed to aid navigation. As you move, notice the movement of the cursor displayed in the graph. An audible alarm sounds when you're within a user defined distance from the target. This parameter is set in the ALARM SETUP screen (ALST).

11. In the Bull's Eye screen, press LINE.

The Display Line screen displays a graphical line. The pointof interest is at the top of the line. The start point, defined as either your current position or a point in the mission file, is at the bottom of the line. As you move, notice the movement of the cursor displayed in the graph. An audible alarm sounds when you're within a user defined distance from the target. This parameter is set in the ALARM SETUP screen (ALST).

12. From the NAVI, BULL, or LINE screens, press PgUp or PgDn to turn on the large font display and press PgUp or PgUp again to turn off the large font display.

The points in the mission file are listed in the order the points are stored. Press NEXT to select the next point in the mission file. The NEXT feature can be set to select a point down the mission file or up the mission file. This parameter (DIRECTION) is set in the SURVEY SETUP screen.

You can add new points or edit existing points in the mission file from the POINT SELECTION screen (PT).

You can log RTK data to the output files from the NAVI, LINE, and BULL screen. Press the SHIFT and L keys simultaneously.

You can store a memo to the output file during RTK data logging. Press shift+D to call the memo entry screen before pressing shift+L. When you press shift+L to log the point, the memo string is stored with the position information. The POINT SELECTION screen (PT) displays the * symbol adjacent to those mission points

logged using shift +L. This signifies that those points have been staked and logged to the output files.

Coordinate Geometry

You can access coordinate geometry functions from either the SURVEY SETUP screen or the NAVI, BULL, and LINE navigation mode screens:

1. In the main screen, press GO.
2. In the MISSION SETUP screen, press DATA
3. In the MISSION FILE SELECTION screen, highlight a mission file.
4. Press OK to accept the selected file and to return to the MISSION SETUP screen.
5. Press SURV.
6. In the SURVEY SETUP screen, press PT to select a point in the mission file.
7. In the POINT SELECTION screen, highlight a point.
8. Press OK to accept the selection and to return to the SURVEY SETUP screen.

You can either use the arrow keys to highlight the desired point or press the first characters of the desired point for the data collector to perform a search.

9. In the SURVEY SETUP screen, press COGO.
10. In the COORDINATE GEOMETRY screen, highlight LOCATION BY AZIMUTH AND DISTANCE.
11. Press STRT.
12. Enter the FROM POINT coordinates.
13. Press NEXT to accept the entry.

The FROM POINT coordinates can be entered three ways:

- The current RTK computed by the GPS receiver- press HERE
- A point stored in the mission file can be selected from a list by pressing PT
- The coordinates can be manually entered in the coordinate fields.

  Ifyou selected a point from the mission file, enter the coordinate display/ output settings before entering the COORDINATE GEOMETRY screen.

14. Enter the DISTANCE component.
15. Enter the AZIMUTH component.
16. Enter the GRADE component.
17. Press NEXT to accept the entry.
18. Return to the previous step (PREV),

19. Store the calculated coordinates in the mission file (SAVE),
20. Cancel the operation (CNCL).

GPS FieldMate displays the calculated coordinates.

21. You can enter a POINT ID.

    The POINT ID is used for identifying the point in the mission file. The FOR point id is used for cross referencing the COGO calculated point to the FROM POINT.

The FOR point id feature is used in the seismic survey market and only stored in the binary output file.

Points created in COGO are stored in the mission file and can be used for point staking.

Data Output Files

RTK

RTK data are stored in a binary file with the same name as the mission file, but with the extension .OUT. Data are continuously stored to this file. If you exit the GPS FieldMate and restart start GPS FieldMate, the subsequent data collected append to the existing output file if you select the same mission file. Download the output files after each day's work. Use MConvert to convert the binary files to ASCII format.

Post Process

Data for post processing are stored in the receiver as B, E, S, and D-files and in the Husky as the binary output file. The binary file name is the same as the mission file, but with the extension .OUT. Use Ashtech Solutions to process the raw GPS data and link the results to the binary output file. Use MConvert to convert the binary files to ASCII format.

4

Reference

This chapter presents detailed descriptions of the handheld screens. Use these screens to monitor operation, change parameters, and enter data. Table 4.1 briefly summarizes the screens.

Table 4.1. Screen Summary

Screen	Mnemonic	Description	Page
Main	MAIN	Allows access to all other screens	87
Solution	SOLU	Displays current position and solution quality	89
Horizontal history	HORZ	Displays 8-minute history of HRMS and HDOP values	91
Vertical history	VERT	Displays 8-minute history of VRMS and VDOP values	92
Residuals	RRES	Displays instantaneous value of satellite range residuals	93
Differential status	DIFF	Displays status of differential operations	94 96
Satellite constellation	SATS	Displays status of current satellite constellation	98
File management	FILE	Lets you control files stored in receiver	99
Information	INFO	Displays equipment and software information	100
Reset receiver	RSET	Lets you reset various receiver parameters	101
Mission Setup	GO	Lets you start navigation, set up navigation parameters, display solution data, choose layout mission	102
Survey	SURV	Lets you prepare a system for navigation	103
Display setup	DSST	Lets you configure the display format	104 107

Table 4.1. Screen Summary (continued)

Screen	Mnemonic	Description	Page
Zone selection	ZONE	Lets you select UTM zone to be used	109
Datum select	DATM	Lets you select the datum to be used	110
User datum definition	USER	Lets you edit a datum translation from WGS84.	111
User ellipsoid definition	ELLP	Lets you define an ellipsoid.	112
Datum transformation	TRNS	Lets you define seven parameter transformation from WGS84	113
System selection	SYST	Lets you select a system to be displayed	115
Grid to grid conversion	GRID	Lets you define a grid-to-grid transformation from a local grid system	116
Projection selection	PROJ	Lets you select projection for coordinate computation	117
Projection parameters	PARM	Lets you enter projection-specific parameters	118
Mission data file	DATA	Lets you select a mission for layout from a stored list	119
Data header	DHDR	Lets you create a header for a log file.	120
Data log history	DLOG	Displays point ids stored in the current output file.	121
Edit Logged point	EDIT	Lets you edit point code memo information.	122
Exclusion zones	XZON	Lets you select zone files.	123
Alarm setup	ALST	Lets you define user alarms	124
Differential setup	DFST	Lets you set up the system for differential operation	126
Base coordinates	COOR	Lets you set up coordinates for the base station	134
Message Frequency	FREQ	Lets you set the RTCM message frequency for base station transmission.	135
Log point	LGPT	Lets you define logging parameters to receiver memory	136
Log	LOG	Displays data logging status while logging to receiver	138
Data logging setup	LGST	Lets you set logging functions	139
Satellite selection	SSEL	Lets you select or deselect satellites used for computation	141
Point selection	PT	Lets you select one of the points currently loaded	142
Enter new point	NEW	Lets you add a point to the current navigation file	143
Edit point	EDIT	Lets you edit a point in the current navigation file	145
Point Measurements	VIEW	Lets you view data stored for a specific point ID.	147

Table 4.1. Screen Summary (continued)

Screen	Mnemonic	Description	Page
Point Details	DETL	Lets you view additional data stored for a specific point ID.	148
Feature Logging	FEAT	Displays logged point information	149
Point offset	OFST	Lets you offset a point or series of points	151 to 155
Cut/fill	CUFL	Provides real-time cut/fill calculations	156
3D Cut/Fill	3DCF	Provides real-time 3D cut/fill calculations	158
Display points	DISP	Displays currently loaded layout points	161
Navigation	NAVI	Displays status of navigation mission	162
Bullseys	BULL	Displays status of navigation mission	164
Line display	LINE	Displays status of navigation mission	167
Coordinate Geometry	COGO	Lets you perform coordinate geometry on point data.	169
Filter point list	FILT	Lets you filter and sort waypoint list	202

With GPS FieldMate, you access the screens with the function keys. Figure 4.1 is a map showing the screen flow. The underlined functions denote controls which are displayed when the SHIFT key is pressed. The double-underlined functions denote controls which are displayed using the OPTION function with the SHIFT key.

Exit the program from any screen by pressing the SHIFT + ESC key.

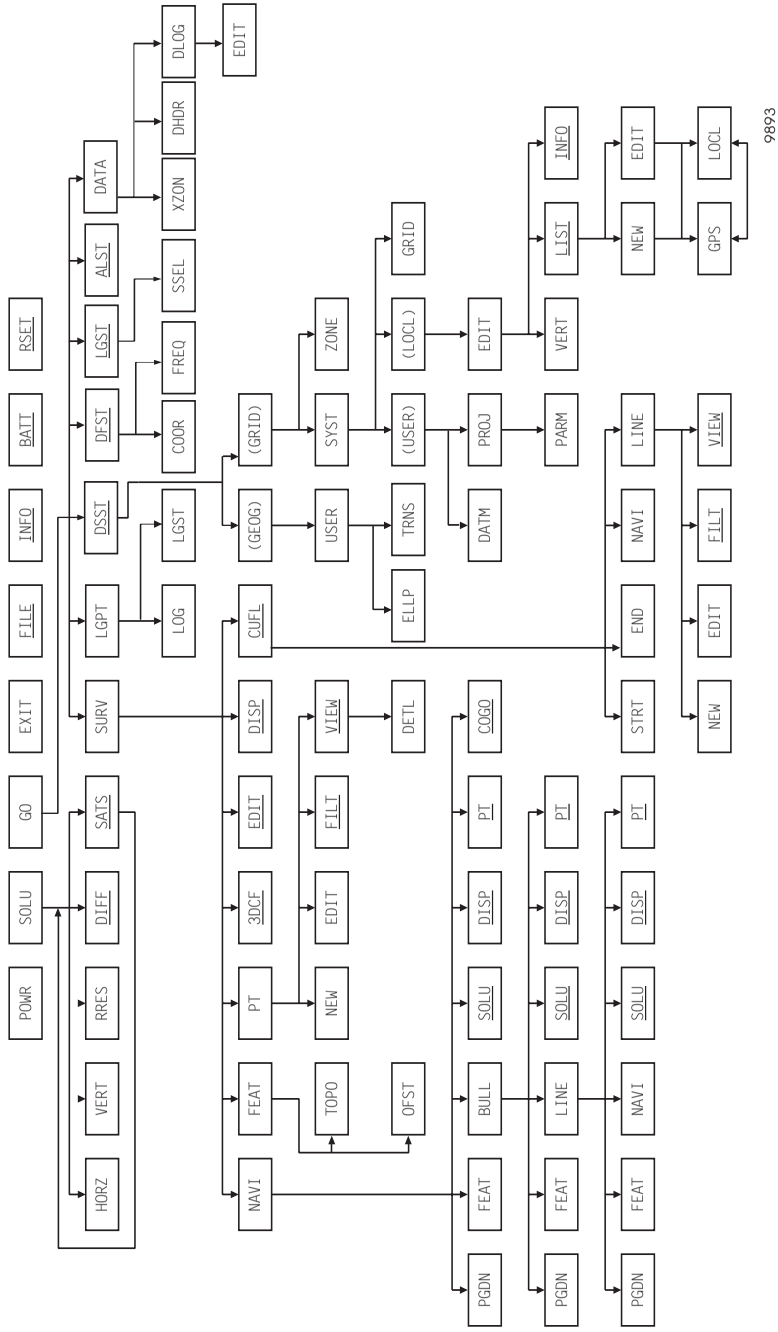

Figure 4.1. GPS FieldMate Screen Map

Main Screen (MAIN)

The main screen (Figure 4.2) displays memory and power values for the receiver and the handheld controller.

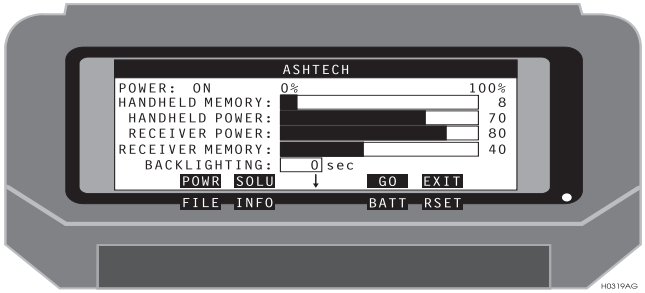

Figure 4.2. Main Screen

Table 4.2 describes the main screen parameters.

Table 4.2. Main Screen Parameters

Item	Description
POWER	ON/OFF: Indicates current power status of the receiver
HANDHELD MEMORY	Displays the percentage of handheld memory remaining
HANDHELD POWER	Displays the percentage of handheld power remaining
RECEIVER MEMORY	Displays the percentage of receiver memory remaining
RECEIVER POWER	Displays the percentage of power remaining
BACKLIGHTING	An editable field that sets backlight duration. Default is 120 seconds. To enter a new setting, type in the desired value and press the YES key
POWR	Turns the receiver on or off
SOLU	Calls the Solution Status screen
GO	Calls the Mission Setup screen
EXIT	Exits the program. You can exit the program from any screen by pressing shift ESC
FILE	Calls the Receiver File Management screen

Table 4.2. Main Screen Parameters (continued)

Item	Description
INFO ⇑	Calls the System Information screen
BATT ⇑	Calls the Battery Management screen
RSET ⇑	Calls the Receiver Reset screen.

Solution Screen (SOLU)

The Solution screen (Figure 4.3) displays the current position and solution quality information.

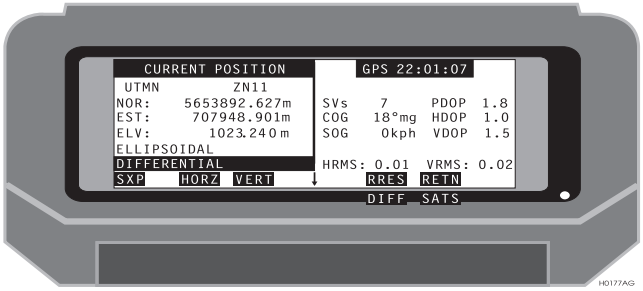

Figure 4.3. Solution Screen

Table 4.3 describes the solution screen parameters.

Table 4.3. Solution Screen Parameters

Item	Description
UTMN ZN11	Displays the grid system/zone or the datum according to which the current position is calculated.
ELLIPSOIDAL	Displays the elevation mode being used in the current position. Choices are ellipsoidal or orthometric.
DIFFERENTIAL	Displays the current position mode. AUTONOMOUS is displayed when the receiver is not configured for differential operation.
COG	Displays current Course Over Ground. A **tr** indicates true north; **mg** indicates magnetic north.
SOG	Displays current Speed Over Ground. Choices are kph, mph, and kn (knots).
SXP	Three way indicator for current canopy setting (1st), position computation status (2nd), position computation setting (3rd). Canopy setting is available only with GG-Surveyor receivers running in RTK mode. The available indicators are (S) open sky and (T) dense trees. The setting can be toggled by pressing SHIFT+T. Position computation status is available with Z and GG-Surveyor receivers running in RTK mode. The available status indicators are (X) fixed, (F) float, and (A) autonomous. Position computation setting is available with Z and GG-Surveyor receivers running in RTK mode. The available settings are (P) precision and (C) coarse. The setting can be toggled by pressing SHIFT+C. Pressing SHIFT+H displays a quick guide of the indicators.

Table 4.3. Solution Screen Parameters (continued)

Item	Description
HORZ	Calls the Horizontal Precision History screen.
VERT	Calls the Vertical Precision History screen.
RRES	Calls the Satellite Residuals screen.
RETN	Calls the Solution screen.
DIFF ⇑	Calls the Differential Status screen.
SATS ⇑	Calls the Satellite Status screen.

Horizontal Precision History Values Screen (HORZ)

The Horizontal Precision History Value screen (Figure 4.4) displays an 8-minute history of the HRMS and HDOP values.

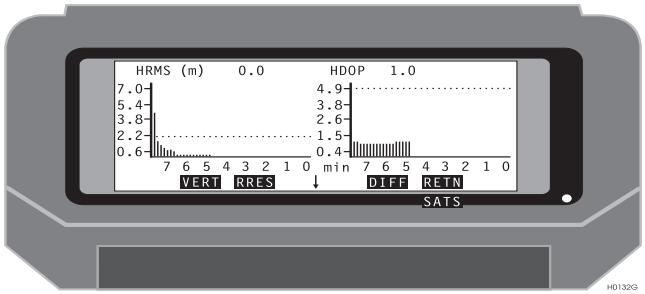

Figure 4.4. Horizontal Precision History Value Screen

Table 4.4 describes the horizontal precision history parameters.

Table 4.4. Horizontal Precision History Parameters

Item	Description
HRMS Graph	The X axis represents time in minutes. The Y axis represents horizontal RMS value. The dashed line represents the HRMS cutoff value as selected in the Alarm Setup screen.
HDOP Graph	The X axis represents time in minutes. The Y axis represents horizontal DOP value. The dashed line represents the HDOP cutoff value as selected in the Alarm Setup screen.
VERT	Calls the Vertical Precision History screen.
RRES	Calls the Satellite Residuals screen.
DIFF	Calls the Differential Status screen.
RETN	Calls the Solution screen.
SATS ⇑	Calls the Satellite Status screen.

Vertical Precision History Values Screen (VERT)

The Vertical Precision History Value screen (Figure 4.5) displays an 8-minute history of the VRMS and VDOP values.

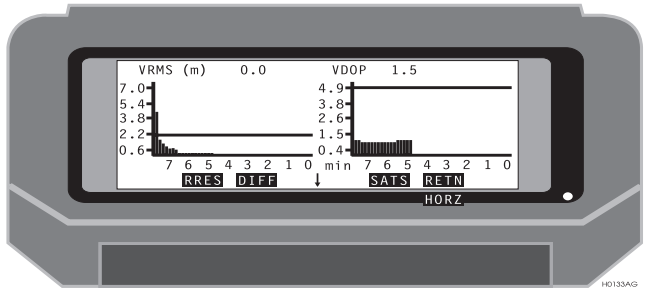

Figure 4.5. Vertical Precision History Values Screen

Table 4.5 describes the vertical precision history parameters

Table 4.5. Vertical Precision History Parameters

Item	Description
VRMS Graph	The X axis represents time in minutes. The Y axis represents vertical RMS value. The dashed line represents the VRMS cutoff value as selected in the Alarm Setup screen.
VDOP Graph	The X axis represents time in minutes. The Y axis represents vertical DOP value. The dashed line represents the VDOP cutoff value as selected in the Alarm Setup screen.
RRES	Calls the Satellite Residuals screen.
DIFF	Calls the Differential Status screen.
SATS	Calls the Satellite Status screen.
RETN	Calls the Solution screen.
HORZ ⇑	Calls the Horizontal Precision History screen.

Residuals Screen (RRES)

The residuals screen (Figure 4.6) displays the instantaneous value of the range residuals for each satellite.

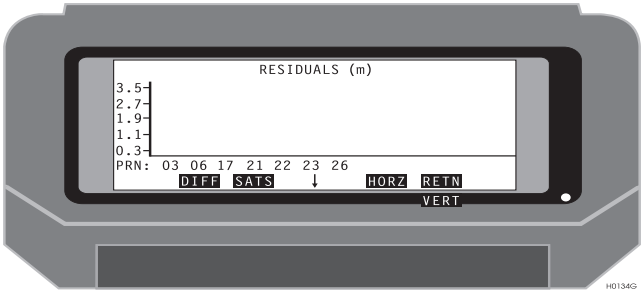

Figure 4.6. Residuals Screen

Table 4.6 describes the residuals parameters.

Table 4.6. Residual Parameters

Item	Description
Range Residual Graph	Displays the current range residual for each satellite being tracked. The graph is updated once a second. The X axis shows the PRN numbers of the satellites being tracked. The Y axis shows the value of the range residual in meters.
DIFF	Calls the Differential Status screen.
SATS	Calls the Satellite Status screen.
HORZ	Calls the Horizontal Precision History screen.
RETN	Calls the Solution screen.
VERT ⇑	Calls the Vertical Precision History screen.

Differential Status Screen (DIFF) - Code

The Differential Status screen (Figure 4.7) displays the status of the RCTM code phase differential operations.

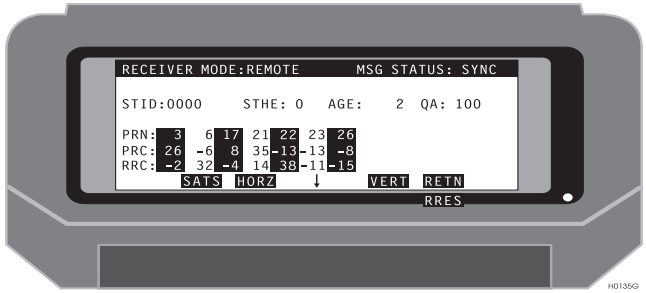

Figure 4.7. Differential Status Screen

Table 4.7 describes the differential status parameters.

Table 4.7. Differential Status Parameters

Item	Description
Receiver Mode	Displays the receiver's current mode setting.
MSG Status	Displays the receiver's synchronization status with the latest RTCM message. SYNC is displayed when the receiver is synchronized with at least one RTCM message. s not true for the Z-12. DCS 585 details shortcomings with correct reading of receiver parameters. I will have to know what
STID	Displays a user-defined base station ID number. The ID can be set to any number from zero to 1023. Base and remote stations must be set with the same ID number in order to communicate. The default ID number is zero.
STHE	Displays the health code being transmitted by the base station.
AGE	Displays the age of the received RTCM message in seconds.
QA	Displays a percentage value for communication quality defined as 100 * (number of good messages/total number of messages).
PRN	Displays the pseudo-random noise (PRN) code number of each satellite for which the remote receiver has obtained a correction. Each satellite transmits its own distinct pseudo-random noise code.
PRC	Displays the pseudo-range correction value in meters of each satellite for which the remote receiver has obtained a correction.

Table 4.7. Differential Status Parameters (continued)

Item	Description
RRC	Displays the range-rate correction in centimeters per second of each satellite for which the remote receiver has obtained a correction.
SATS	Calls the Satellite Status screen.
HORZ	Calls the Horizontal Precision History screen.
VERT	Calls the Vertical Precision History screen.
RETN	Calls the Solution screen.
RRES⇑	Calls the Satellite Residuals screen.

Differential Status Screen (DIFF) - CPD

The Differential Mode Status screen (Figure 4.8) displays the current status of carrier phase differential (CPD) operations.

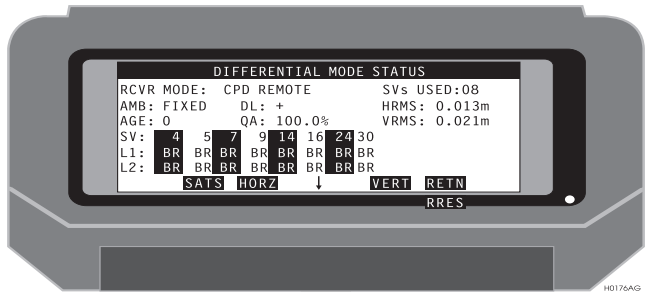

Figure 4.8. CPD Remote Differential Screen

Table 4.8 describes the CPD remote differential parameters.

Table 4.8. CPD Remote Differential Parameters

Item	Description
SVS USED	Displays the number of satellites used in CPD computations.
AMB	Displays the status of carrier phase ambiguities. FIXED is displayed when ambiguities have been solved. FLOAT is displayed when ambiguities have not been solved.
HRMS	Displays the horizontal RMS value of the current position.
VRMS	Displays the vertical RMS value of the current position.
AGE	Displays the age in seconds of the received differential correction.
DL	Displays data link activity. A plus sign (+) is displayed when differential corrections are registered in the receiver's data port. A minus sign (-) is displayed when no differential corrections are detected.
QA	Displays a percentage value for communication quality defined as 100 * (number of good messages/total number of messages).
SV	Displays the PRN code number of each satellite for which the remote receiver has obtained a correction. Each satellite transmits its own distinct pseudo-random noise code
L1	Displays L1 signal lock status for each satellite being tracked by the base and remote receivers. The BR appearing under the SV number indicates that both base and remote are tracking a given satellite.

Table 4.8. CPD Remote Differential Parameters (continued)

Item	Description
L2	Displays L2 signal lock status for each satellite being tracked by the base and remote receivers. The BR appearing under the SV number indicates that both base and remote are tracking a given satellite.
← / →	An arrow appearing in the bottom right or left corner of the display indicates that more satellites are being tracked than can be displayed. Pressing the right or left arrow key will scroll the display to show the additional satellites.
SATS	Calls the Satellite Status screen.
HORZ	Calls the Horizontal Precision History screen.
VERT	Calls the Vertical Precision History screen.
RETN	Calls the Solution screen.
RRES⇑	Calls the Satellite Residuals screen.

Satellite Constellation Screen (SATS)

The Satellite Constellation screen (Figure 4.9) displays the status of the current satellite constellation.

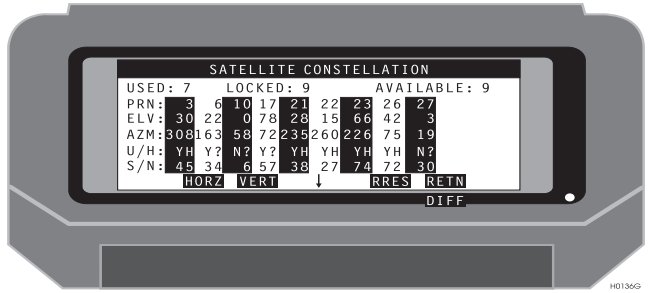

Figure 4.9. Satellite Constellation Screen

Table 4.9 describes the satellite constellation parameters.

Table 4.9. Satellite Constellation Parameters

Item	Description
PRN	The number assigned to a satellite's pseudo-random noise code. Each satellite transmits its own distinct pseudo-random noise code.
ELV	Displays the elevation in degrees above the horizon for each satellite being tracked.
AZM	The azimuth for each satellite being tracked referenced to true north.
Y/H	Displays the health status of each satellite being tracked and whether a given satellite will be used. A "Y" indicates that a satellite can be used in calculating the position. An "N" indicates that a satellite will not be used. An "H" indicates that a given satellite is healthy. U denotes an unhealthy satellite.
S/N	Displays the signal-to-noise ratio for each satellite being tracked.
← / →	An arrow appearing in the bottom right or left corner of the display indicates that more satellites are being tracked than can be displayed. Pressing the right or left arrow key will scroll the display to show the additional satellites.
HORZ	Calls the Horizontal Precision History screen.
VERT	Calls the Vertical Precision History screen.
RRES	Calls the Satellite Residuals screen.
RETN	Calls the Solution Screen
DIFF⇑	Calls the Differential Status screen.

Receiver File Management (FILE)

The Receiver File Management screen (Figure 4.10) displays a list of the files stored in the receiver. Use this screen to delete existing files and close the file currently being recorded. Only one file at a time can be selected. When the current file is closed, a new file is opened automatically.

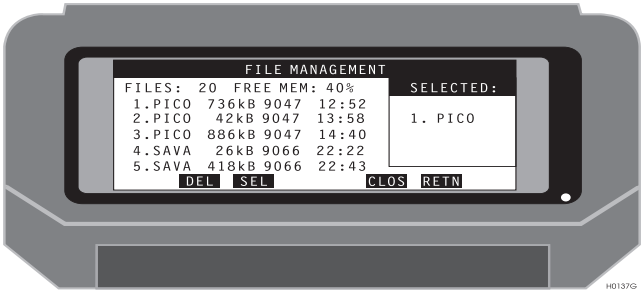

Figure 4.10. Receiver File Management Screen

Table 4.10 describes the file management parameters.

Table 4.10. Receiver File Management Parameters

Item	Description
FREE MEM	Displays the percentage of receiver memory still available.
DEL	Deletes the selected file. Only a file displayed in the “SELECTED:” box can be deleted.
SEL	Selects the highlighted file and displays it in the “SELECTED:” box. Pressing select again deselects the file. Only one file can be selected at a time.
CLOS	Closes the file currently being recorded and automatically opens a new file.
RETN	Returns to the Main screen.

Information Screen (INFO)

The Information screen (Figure 4.11) displays options and serial numbers for the hardware and version numbers for the software and firmware.

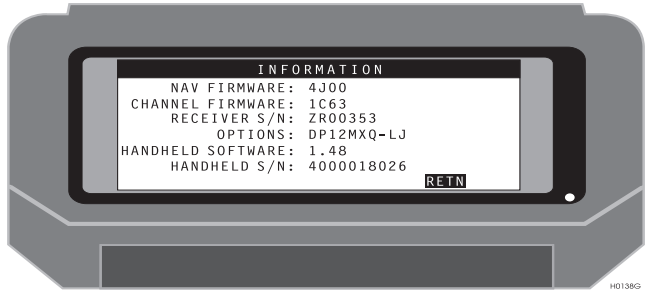

Figure 4.11. Information Screen

Table 4.11 describes the information parameters.

Table 4.11. Information Screen Parameters

Item	Description
NAV FIRMWARE	Displays the receiver navigation firmware version number.
CHANNEL FIRMWARE	Displays the receiver channel firmware version number.
RECEIVER S/N	Displays the serial number of the receiver.
OPTIONS	Displays the options that are installed in the receiver.
HANDHELD SOFTWARE	Displays the version number of the handheld software.
HANDHELD S/N	Displays the serial number of the handheld
RETN	Returns to the Main screen.

Receiver Reset Screen (RSET)

The receiver reset screen (Figure 4.12) allows you to clear receiver memory and reset the receiver with default parameters.

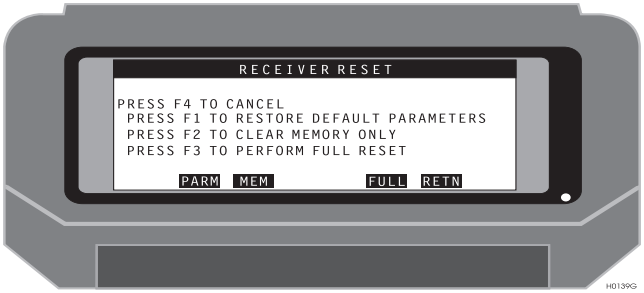

Figure 4.12. Reset Receiver Screen

Table 4.12 describes the reset parameters.

Table 4.12. Reset Parameters

Item	Description
PARM	Resets the receiver with default parameters.
MEM	Clears receiver memory but does not change receiver parameters.
FULL	Clears receiver memory and resets the receiver with default parameters
RETN	Returns to the Main screen.

The TDS keyboard layout does not coincide with the text instructions in this screen. Refer to the functions keys located under the program menu solutions.

Mission Setup Screen (GO)

The Mission Setup screen (Figure 4.13) lets you configure the system for survey operation.

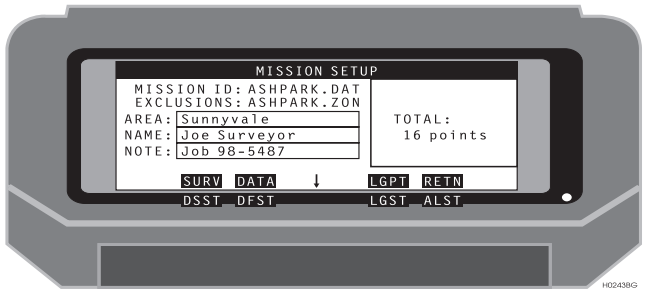

Figure 4.13. Mission Setup Screen

Table 4.13 describes the mission setup parameters**.**

Table 4.13. Mission Setup Screen Parameters

Item	Description
MISSION ID	Displays the currently selected mission file (*.DAT).
EXCLUSIONS	Displays the currently selected exclusion zone file (*.ZON).
AREA	An editable field used for the entry of a project area name (up to 20 characters).
NAME	An editable field used for the entry of a project operator's name (up to 20 characters).
NOTE	An editable field used for the entry of remarks on the project (up to 20 characters).
TOTAL	Displays the total number of points contained in the mission file.
SURV	Calls the Survey Setup screen.
DATA	Calls the Mission File Selection screen.
LGPT	Calls the Log Point screen.
RETN	Returns to the Main screen.
DSST ⇑	Calls the Display Setup screen.
DFST ⇑	Calls the Differential Setup screens.
LGST ⇑	Calls the Logging Setup screen.
ALST ⇑	Calls the Alarm Setup screen.

Survey Screen (SURV)

The survey screen (Figure 4.14) lets you configure the system for a layout survey.

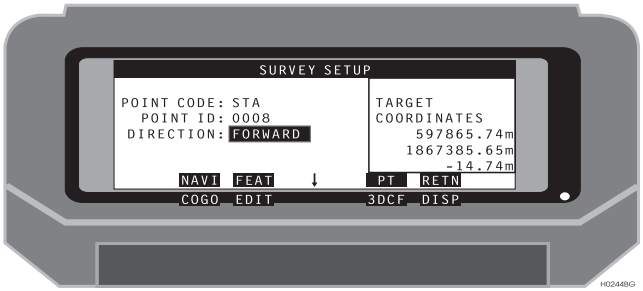

Figure 4.14. Survey Screen

Table 4.14 describes the survey parameters.

Table 4.14. Survey Screen Parameters

Item	Description
POINT CODE	Displays the point code of the currently selected navigation point.
POINT ID	Displays the ID number of the currently selected navigation point.
DIRECTION	A toggle field for setting the direction by which you will move through the list of points. FORWARD indicates that you will move through the list of points in the order they appear in the mission file. BACKWARD indicates that you will move through the list of points in reverse order.
TARGET COORDINATES	Displays the coordinates of the currently selected navigation point.
NAVI	Calls the Navigation screen.
FEAT	Calls the Feature Logging screen.
PT	Calls the Point Selection screen.
RETN	Returns to the Mission Setup screen.
COGO⇑	Calls the Coordinate Geometry screen.
3DCF ⇑	Calls the 3D Cut/Fill screen.
CUFL⇑	Calls the Cut/Fill screen.
DISP⇑	Calls the Mission Display screen.

Display Setup Screen (DSST)--Grid Format

The Display Setup screen (Figure 4.15) lets you configure the coordinate display format for Grid coordinates.

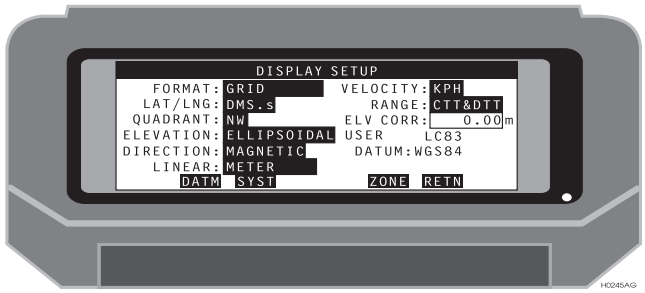

Figure 4.15. Display Setup Screen--GRID

Table 4.15 describes the display setup parameters.

Table 4.15. Display Setup Parameters

Item	Description
FORMAT	Toggle field that allows you to select the coordinate display format. Choices are GEOGRAPHIC or GRID.
LAT/LNG	Toggle field that allows you to select the display format for geographic coordinates. Format choices are D.d, DM.m, or DMS.s.
QUADRANT	Toggle field that allows you to set the appropriate quadrant for displaying positive latitude and longitude.
ELEVATION	Toggle field that allows you to select the elevation reference. Choices are ELLIPSOIDAL or ORTHOMETRIC. See notes on ELEVATION on page 105.
DIRECTION	Toggle field for selection of the north reference. Choices are TRUE for true north or MAGNETIC for magnetic north.
LINEAR	Toggle field for selection of a linear unit reference. Choices are meter, U.S. foot, international foot, U.S. yard, international yard, rod, chain, VARA, or Texas VARA. Meter is the default unit.
VELOCITY	Toggle field for selection of a velocity unit reference. Choices are KPH, MPH, or KN (knots).
RANGE	Toggle field for selection of the range/vector format. Choices are course and distance to target (CTT/DTT) or easting and northing to target (ETT/NTT).
ELV-CORR	Editable field that allows you set an offset value for the elevation. See notes on ELV-CORR on page 106.

Table 4.15. Display Setup Parameters (continued)

Item	Description
USER LC83 DATUM: WGS84	Information on the currently selected coordinate system is displayed here. If format is set to GRID and a predefined grid system has been selected, the name of the system and the zone (if applicable) are displayed. If format is GRID and the system is user-defined, the selected datum, ellipsoid, and projection are displayed.
DATM	Calls the Datum Selection screen. This key is present only when the selected format is GEOGRAPHIC or when format is set to GRID and the system is set to USER.
SYST	Calls the System Selection screen. This key is present only when the format is set to GRID.
ZONE	Calls the Zone Selection screen. This key is present only when the format is set to GRID and a predefined grid coordinate system with more than one zone has been selected.
PROJ	Calls the Projection Selection screen. This key is present only when the format is GRID and the grid system is user-defined.
RETN	Returns to the Mission Setup screen.

ELEVATION

The ORTHOMETRIC setting applies the geoid separation to the ellipsoid elevation in select areas of the program. The solution screen (SOLU), feature screen (FEAT), and coordinates logged to the output file display elevations adjusted with the receiver geoid model. The ORTHOMETRIC setting uses the geoid model installed in the GPS receiver. This model is coarse and based on the 1991 world model. The use of this feature is not recommended for high-accuracy elevation requirements.

Table 4.16 explains the ELEVATION field and when to set the field to ELLIPSOIDAL or ORTHOMETRIC.

Table 4.16. Elevation Parameter Usage

Situation	ELLIPSOIDAL	ORTHOMETRIC
Base station coordinates are ellipsoidal and desired rover output is ellipsoid heights.	**X**	
Base station coordinates are ellipsoidal and desired rover output is orthometric heights.		**X**
Base station coordinates are mean sea level and desired rover output is mean sea level.	**X**	

ELV-CORR

The ELV-CORR setting applies a height separation to the ellipsoid elevation in all areas of the program. The binary output file does not store elevations with the elevation correction applied, but stores the ELV-CORR value separately.

Display Setup Screen (DSST)--GEOGRAPHIC Format

The Display Setup screen (Figure 4.16) lets you configure the coordinate display format for geographic coordinates.

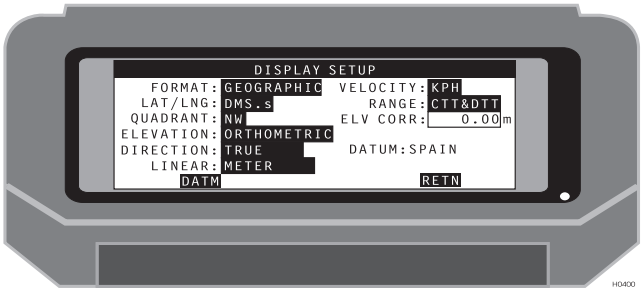

Figure 4.16. Display Setup Screen--Geographic

Table 4.17 describes the display setup parameters.

Table 4.17. Display Setup Geographic Parameters

Item	Description
FORMAT	Toggle field that allows you to select the coordinate display format. Choices are GEOGRAPHIC or GRID.
LAT/LNG	Toggle field that allows you to select the display format for geographic coordinates. Format choices are D.d, DM.m, or DMS.s.
QUADRANT	Toggle field that allows you to set the appropriate quadrant for displaying positive latitude and longitude.
ELEVATION	Toggle field that allows you to select the elevation reference. Choices are ELLIPSOIDAL or ORTHOMETRIC. See notes on ELEVATION on page 105.
DIRECTION	Toggle field for selection of the north reference. Choices are TRUE for true north or MAGNETIC for magnetic north.
LINEAR	Toggle field for selection of a linear unit reference. Choices are meter, U.S. foot, international foot, U.S. yard, international yard, rod, chain, VARA, or Texas VARA. Meter is the default unit.
VELOCITY	Toggle field for selection of a velocity unit reference. Choices are KPH, MPH, or KN (knots).
RANGE	Toggle field for selection of the range/vector format. Choices are course and distance to target (CTT/DTT) or easting and northing to target (ETT/NTT).

Table 4.17. Display Setup Geographic Parameters (continued)

Item	Description
ELV-CORR	Editable field that allows you set an offset value for the elevation. See notes on ELV-CORR on page 106.
DATUM	If format is set to GEOGRAPHIC, the reference datum is displayed.
DATM	Calls the Datum Selection screen.
RETN	Returns to the Mission Setup screen.

Zone Selection Screen (ZONE)

The zone selection screen (Figure 4.17) allows you to select the appropriate zone for the survey area.

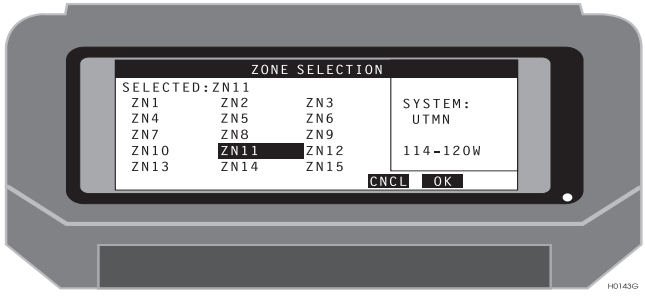

Figure 4.17. Zone Selection Screen

Table 4.18 describes the zone selection parameters.

Table 4.18. Zone Selection Parameters

Item	Description
SELECTED	Displays the currently selected grid zone.
SYSTEM	Displays the predefined grid coordinate system that is currently selected.
ZN1-ZN15	Displays the list of zones for the relevant predefined grid system.
CNCL	Cancels any changes and returns to the Display Setup screen.
OK	Saves any changes and returns to the Display Setup screen.

Datum Selection Screen (DATM)

The datum selection screen (Figure 4.18) allows you to select the appropriate datum for your project. Refer to Appendix A for datum information tables.

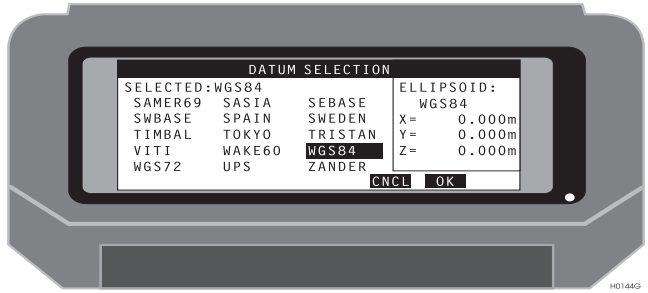

Figure 4.18. Datum Selection Screen

Table 4.19 describes the datum selection parameters.

Table 4.19. Datum Selection Parameters

Item	Description
CNCL	Cancels any changes and returns to the Display Setup screen.
OK	Saves any changes and returns to the Display Setup screen.

User Datum Definition Screen (USER)

The user datum definition screen (Figure 4.19) allows you to select a defined datum or define a new datum. This screen is present only when the coordinate format is set to GRID and the system is set to USER.

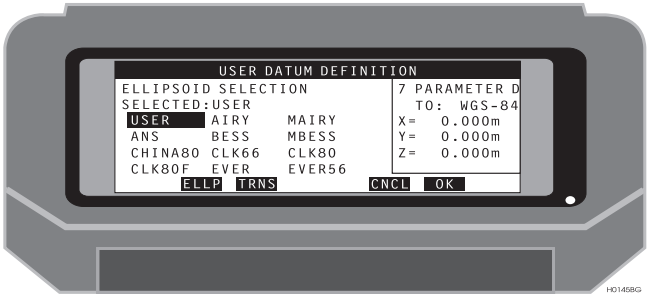

Figure 4.19. User Datum Definition Screen

Table 4.20 describes the user datum definition parameters.

Table 4.20. User Datum Definition Parameters

Item	Description
SELECTED	Displays the currently selected ellipsoid.
7 PARAMETER D	Displays the user-defined translations entered on the TRNS screen.
ELLP	Calls the User Ellipsoid Definition screen.
TRNS	Calls the user-defined datum parameters screen.
CNCL	Cancels any changes and returns to the Datum Selection screen
OK	Saves any changes and returns to the Datum Selection screen.

User Ellipsoid Definition Screen (ELLP)

The User Ellipsoid Definition screen (Figure 4.20) allows you to define an ellipsoid. Two parameters can be entered: major semiaxis and inverse flattening.

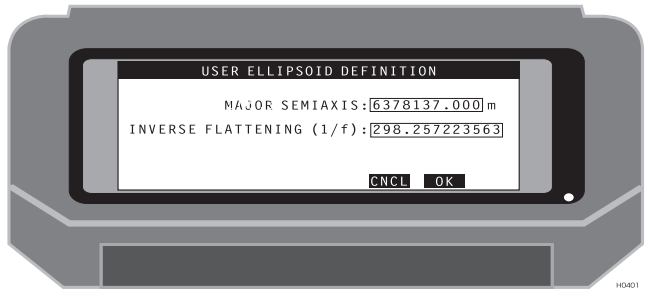

Figure 4.20. User Ellipsoid Definition Screen

Table 4.21 describes the user ellipsoid definition parameters.

Table 4.21. User Ellipsoid Parameters

Item	Description
MAJOR SEMIAXIS	Editable field for the entry of a value for the major semi-axis of the ellipsoid.
INVERSE FLATTENING	Editable field for the entry of a value for the inverse flattening of the ellipsoid.
CNCL	Recalls the previous screen without any changes in receiver settings.
OK	Accepts the current settings and recalls the previous screen.

Seven Parameter Datum Transformation Screen (TRNS)

The Seven Parameters Datum Transformation screen (Figure 4.21) allows you to define a seven parameter transformation from the WGS84 datum. This screen is available when the coordinate format is set to GEOGRAPHIC and the datum is set to USER, and the USER button is selected on the Datum Selection screen.

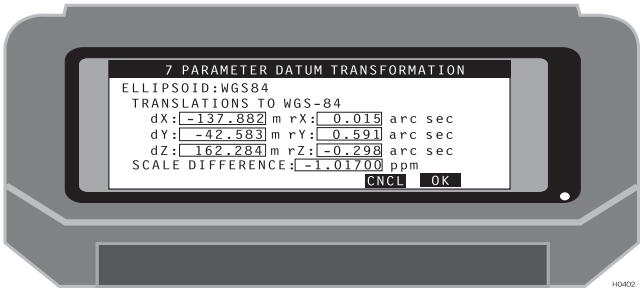

Figure 4.21. Seven Parameter Datum Transformation Screen

Table 4.22 describes the seven parameter datum transformation parameters.

Table 4.22. Seven Parameter Datum Transformation Parameters

Item	Description
ELLIPSOID	Displays the currently selected ellipsoid.
dX	Editable field for the entry of a value for translations in the X axis in meters.
dY	Editable field for the entry of a value for translations in the Y axis in meters.
dZ	Editable field for the entry of a value for translations in the Z axis in meters.
rX	Editable field for the entry of a value for rotation in the X axis in arc seconds.
rY	Editable field for the entry of a value for rotation in the Y axis in arc seconds.
rZ	Editable field for the entry of a value for rotation in the Z axis in arc seconds.
SCALE DIFFERENCE	Editable field for the entry of a value for a scale in ppm.

Table 4.22. Seven Parameter Datum Transformation Parameters (continued)

Item	Description
CNCL	Recalls the previous screen without any changes in receiver settings.
OK	Accepts the current settings and recalls the previous screen.

If only the scale factor value is available, convert to PPM using the following formula: PPM=(SF-1)*(106)**

System Selection Screen (SYST)

The coordinate system selection screen (Figure 4.22) allows you to select the appropriate grid coordinate system for your survey.

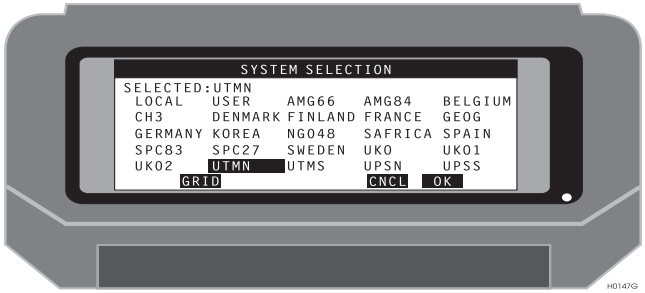

Figure 4.22. System Selection Screen

Table 4.23 describes the system selection parameters.

Table 4.23. System Selection Parameters

Item	Description
SELECTED	Displays the currently selected grid coordinate system. Selections are made by highlighting the desired system and pressing OK. A quick selection method allows you to highlight the system you want by typing in the first few letters of the system name. Typing “DE”, for example, will cause the highlight to be positioned over the Denmark system.
GRID	Calls the Grid-to-Grid conversion screen.
EDIT	Calls the Local System Parameters screen. This key is present only when the selected system is LOCAL.
CNCL	Cancels any changes and returns to the System Selection screen
OK	Saves any changes and returns to the System Selection screen.

Grid-to-Grid Conversion Screen (GRID)

The grid-to-grid conversion screen (Figure 4.23) allows you to define a grid-to-grid conversion from a local grid system. This screen is available when the coordinate format is set to GRID.

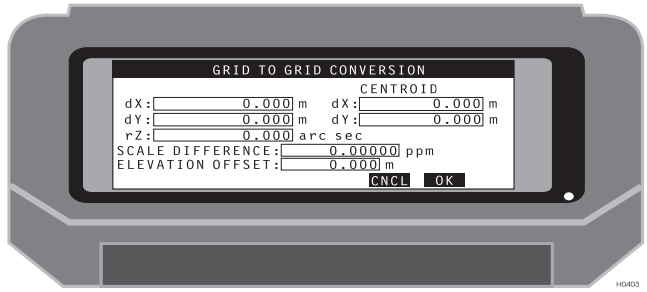

Figure 4.23. Grid-to-Grid Conversion Screen

Table 4.24 describes the grid-to-grid conversion parameters.

Table 4.24. Grid-to-Grid Conversion Parameters

Item	Description
dX	Editable field for the entry of a value for translation in the x axis in meters.
dY	Editable field for the entry of a value for translation in the y axis in meters.
rZ	Editable field for the entry of a value for rotation in the z axis in arc seconds.
SCALE	Editable field for the entry of a value for scale.
ELEVATION OFFSET	Editable field for the vertical offset used in the grid-to-grid conversion.
CNCL	Recalls the previous screen without any changes in receiver settings.
OK	Accepts the current settings and recalls the previous screen

Projection Selection Screen (PROJ)

The Projection Selection Screen (Figure 4.24) allows you to select a map projection that will be used as a reference for your grid coordinate computations.

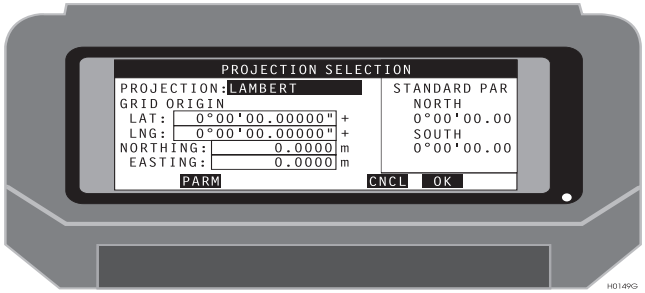

Figure 4.24. Projection Selection Screen

Table 4.25 describes the projection selection parameters.

Table 4.25. Projection Selection Parameters

Item	Description
PROJECTION	Toggle field that allows you to select a map projection. Choices are Lambert Conformal, Transverse Mercator, Oblique Mercator, Polar Stereographic.
LAT / LNG	Editable fields used for entering the coordinates of the grid origin.
NORTHING / EASTING	Editable fields used for entering the coordinates of the false origin.
RIGHT PANE DISPLAY	Displays additional details for the currently selected projection.
PARM	Calls the Projection Parameters screen.
CNCL	Cancels any changes and returns to the Display Setup screen.
OK	Saves any changes and returns to the Display Setup screen.

Projection Parameters Screen (PARM)

The Projection Parameters screen (Figure 4.25) allows you to enter projection-specific parameters.

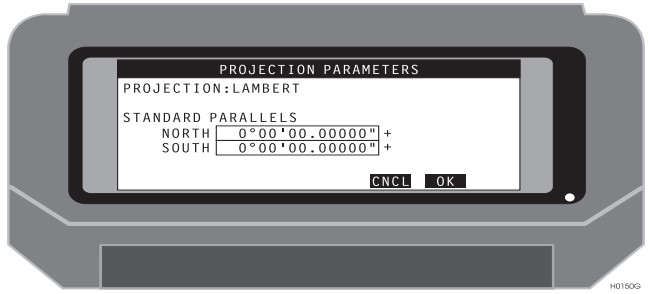

Figure 4.25. Projection Parameters Screen

Table 4.26 describes the projection parameters.

Table 4.26. Projection Parameters

Item	Description
PROJECTION	Displays the name of the currently selected projection.
EDITABLE FIELDS	The Projection Parameters screen contain different editable fields for entry of projection parameters depending on which projection has been chosen: • Standard parallels for Lambert projection • Central meridian & inverse scale for Transverse Mercator projection • Tangent of axis azimuth and inverse scale for Oblique Mercator • Scale for Polar Stereographic projection
CNCL	Cancels any changes and returns to the Projection Selection screen.
OK	Saves any changes and returns to the Projection Selection screen.

Mission Data File Selection Screen (DATA)

The mission data file selection screen (Figure 4.26) allows you to select a mission data file (*.DAT) for your survey project.

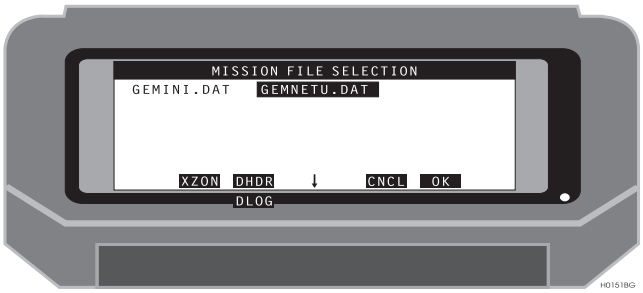

Figure 4.26. Mission Data File Selection Screen

Table 4.27 describes the mission data file selection parameters.

Table 4.27. Mission Data File Selection Parameters

Item	Description
MISSION FILE LIST	Displays up to 48 mission files (*.DAT) stored on the handheld controller. Select the file you want by highlighting it and pressing OK.
XZON	Calls the Exclusion Zone file selection screen.
DHDR	Calls the Data Header screen.
CNCL	Cancels any changes and returns to the Mission Setup screen.
OK	Saves any changes and returns to the Mission Setup screen.
DLOG ⇑	Calls the Data Log History screen.

Data Header Screen (DHDR)

The Data Header screen (Figure 4.27) allows you to create and populate a header for a data log file. Header labels are listed on the left side of the screen. You can enter up to thirty characters for each label. The header label is defined in the LOG.INI file. If a LOG.INI file is not found in the MSDATA directory, default labels are listed as shown in Figure 4.27 The information entered in this screen is stored in a file named LOG.TXT.

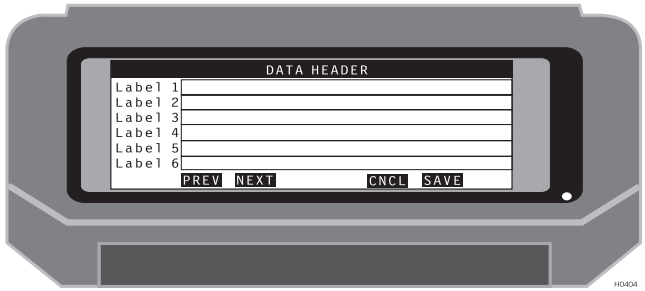

Figure 4.27. Data Header Screen

Table 4.28 describes the data header parameters.

Table 4.28. Data Header Parameters

Item	Description
Label 1-6	Editable fields for the entry of information defining the header, limited to thirty characters for line.
PREV	Recalls the previous record in the header file.
NEXT	Recalls the next record in the header file.
CNCL	Recalls the previous screen without any changes in the receiver settings.
SAVE	Accepts the current settings and recalls the previous screen.

Data Log History Screen (DLOG)

The Data Log History screen (Figure 4.28) displays the point ids of all points stored in the current output file. The corresponding mission file must have been selected in the DATA screen prior to entering the DLOG screen. Points displayed can be edited for point id and memo content. Points displayed with square brackets ([]) are labeled as removed from the output file.

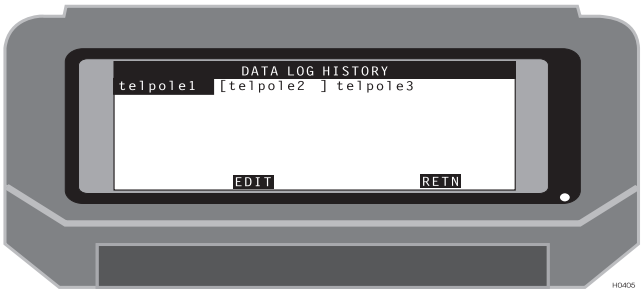

Figure 4.28. Data Log History Screen

Table 4.29 describes the data log history parameters.

Table 4.29. Data Log History Parameters

Item	Description
Highlighted POINT ID	Point ID to be displayed in the Edit Logged Point screen.
EDIT	Calls the Edit Logged Point screen with the highlighted point.
RETN	Recalls the previous screen.

Edit Logged Point Screen (EDIT)

The Edit Logged Point screen (Figure 4.29) allows you to review and edit point code memo information stored with each point in the output file. Points can be removed from the current output file and points can be copied from the output file to the mission file. Points that were generated using the OFFSET function displays two sets of coordinates. The left coordinate set is the OFFSET coordinate. The right coordinate set is the original GPS derived coordinate.

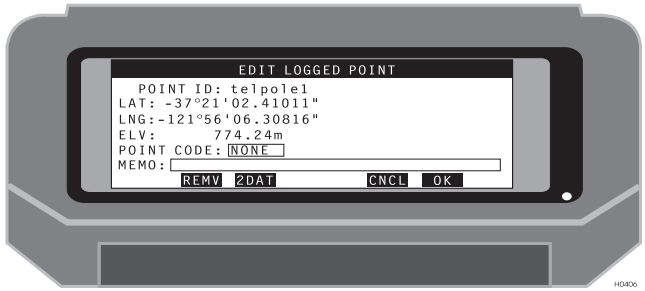

Figure 4.29. Edit Logged Point Screen

Table 4.30 describes the edit logged point parameters.

Table 4.30. Edit Logged Point Parameters

Item	Description
POINT ID	Displays the current point ID.
NOR	Displays the Northing coordinate stored.
EST	Displays the Easting coordinate stored.
ELV	Displays the Elevation coordinate stored.
POINT CODE	Editable field. The point code can be changed.
MEMO	Editable field. The memo can be changed.
REMV	Flags the point as removed from the data file.
2DAT	Copies the point to the current mission file (*.DAT). If the point had been offset, the offset coordinate set is copied, not the original GPS coordinate set.
CNCL	Recalls the previous screen without any changes.
OK	Accepts changes and recalls the previous screen.

Exclusion Zones Screen (XZON)

The exclusion zones screen (Figure 4.30) allows you to select exclusion zone files (*.ZON) for your project. Exclusion zones are used to define areas within the project area that are off-limits.

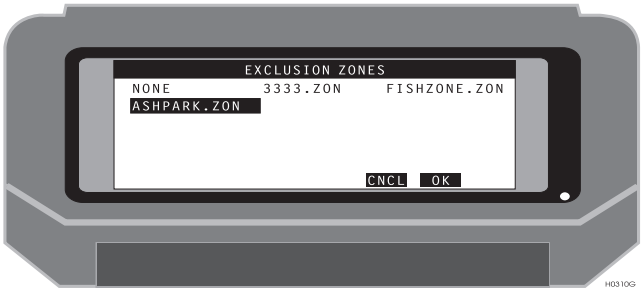

Figure 4.30. Exclusion Zone File Selection Screen

Table 4.31 describes the exclusion zone selection parameters.

Table 4.31. Exclusion Zone Selection Parameters

Item	Description
EXCLUSION ZONE FILE LIST	Displays all exclusion zone files (*.ZON) stored on the handheld controller. Select the file you want by highlighting it and pressing OK.
CNCL	Cancels any changes and returns to the Mission File Selection screen.
OK	Saves any changes and returns to the Mission File Selection screen.

Alarm Setup Screen (ALST)

The alarm setup screen (Figure 4.31) allows you to configure each of the supported alarms.

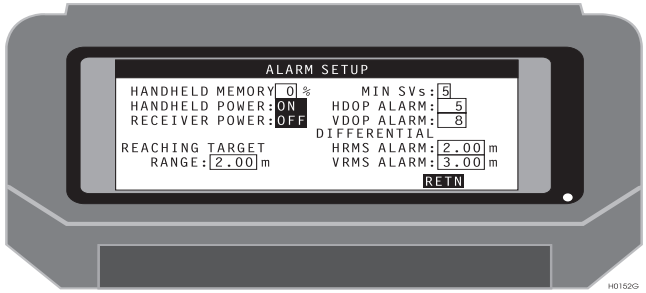

Figure 4.31. Alarm Setup Screen

Table 4.32 describes the alarm setup parameters.

Table 4.32. Alarm Setup Parameters

Item	Description
HANDHELD MEMORY	Editable field. Handheld beeps when the remaining handheld memory reaches the value entered.
HANDHELD POWER	Toggle values are ON and OFF. If HANDHELD POWER is ON, handheld signals low power of the computer.
RECEIVER POWER	Toggle values are ON and OFF. If RECEIVER POWER is ON, handheld signals low power warning.
REACHING TARGET RANGE	Handheld will beep when you are closer to the target point than the range value entered. The tone and frequency of the alarm change as you approach the point.
MIN SVs	Minimum number of satellites used in position fix. Zero indicates no alarm.
HDOP ALARM	Editable field where you enter a threshold value for horizontal DOP. If this value is reached or exceeded, an alarm is indicated. Valid values for this field are blank and 0 - 99. Zero indicates no alarm.
VDOP ALARM	Editable field where you enter a threshold value for vertical DOP. If this value is reached or exceeded, an alarm is indicated. Valid values for this field are blank and 0 - 99. Zero indicates no alarm.
HRMS ALARM	Editable field where you enter a threshold value for horizontal RMS. If this value is reached or exceeded, an alarm is indicated. Valid values for this field are blank and 0 - 999. Zero indicates no alarm.

Table 4.32. Alarm Setup Parameters (continued)

Item	Description
VRMS ALARM	Editable field where you enter a threshold value for vertical RMS. If this value is reached or exceeded, an alarm is indicated. Valid values for this field are blank and 0 - 999. Zero indicates no alarm.
RETN	Recalls the previous screen.

Differential Setup Screens (DFST)

The Differential Setup screens (Figure 4.32 through Figure 4.38) are used to set up the system for differential or autonomous position computation mode. Seven screens are available to configure the system. These screens are available by toggling the RECEIVER MODE field to Autonomous, Remote, Base, RZ Remote, RZ Remote, RZ Base, RTCM/CPD Remote, and RTCM/CPD Base.

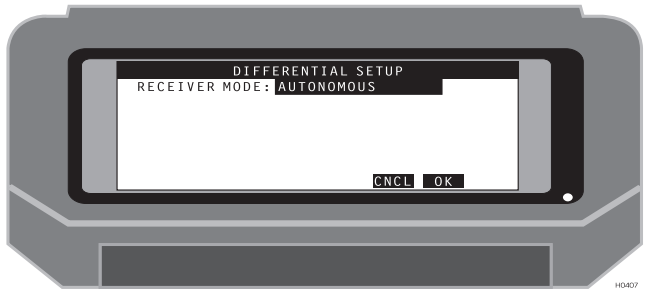

Figure 4.32. Autonomous Mode Screen

Table 4.33 describes the autonomous setup parameters.

Table 4.33. Autonomous Parameters

Item	Description
RECEIVER MODE	AUTONOMOUS mode configures the receiver.
CNCL	Recalls previous screen without any changes in receiver settings.
OK	Accepts current settings and recalls the previous screen.

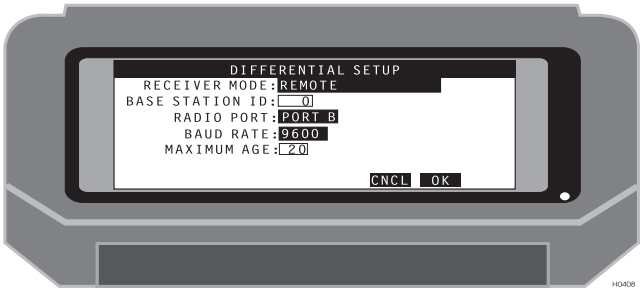

Figure 4.33. Remote Mode Screen

Table 4.34 describes the remote setup parameters.

Table 4.34. Remote Parameters

Item	Description
RECEIVER MODE	REMOTE mode configures the receiver as a RTCM rover.
BASE STATION ID	RTCM modes only. Editable field allowing you to enter ID of the base station. Valid values are 0 - 1023. Default value is 0. If the receiver operates as a base station, this ID is sent out along with differential corrections. If the receiver operates as a remote station and this value is zero, the receiver accepts differential corrections from any base station. If the receiver operates as a remote station and this value is not zero, the receiver accepts differential corrections only from a base station with this ID.
RADIO PORT	Remote station only. Toggle allowing you to select the port for collection of differential corrections. Toggle values are PORT A, PORT B, PORT C, and PORT D. Default is PORT B. If an internal radio modem is installed in the GPS receiver, select Port D.
BAUD RATE	Toggle allowing you to select the baud rate for collection (remote station) or output (base station) of differential corrections. Toggle values are 300, 600, 1200, 2400, 4800, 9600, 19200, and 38400. Default is 9600.
MAXIMUM AGE	This field is the maximum age of corrections (in seconds) allowable before the remote receiver discontinues position computation.
CNCL	Recalls previous screen without any changes in receiver settings.
OK	Accepts current settings and recalls the previous screen.

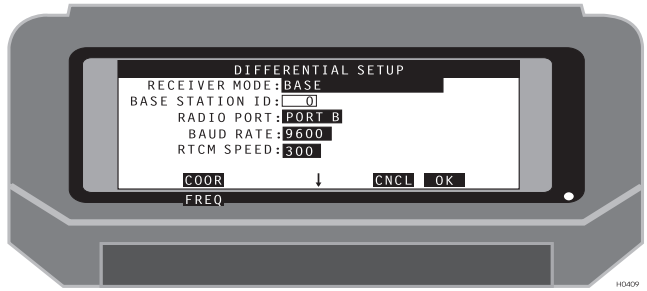

Figure 4.34. Base Mode Screen

Table 4.35 describes the base setup parameters.

Table 4.35. Base Parameters

Item	Description
RECEIVER MODE	BASE mode configures the receiver as a RTCM base station.
BASE STATION ID	RTCM modes only. Editable field allowing you to enter ID of the base station. Valid values are 0 - 1023. Default value is 0. If the receiver operates as a base station, this ID is sent out along with differential corrections. If the receiver operates as a remote station and this value is zero, the receiver accepts differential corrections from any base station. If the receiver operates as a remote station and this value is not zero, the receiver accepts differential corrections only from a base station with this ID.
RADIO PORT	Remote station only. Toggle allowing you to select the port for collection of differential corrections. Toggle values are PORT A, PORT B, PORT C, and PORT D. Default is PORT B. If an internal radio modem is installed in the GPS receiver, select Port D.
BAUD RATE	Toggle allowing you to select the baud rate for collection (remote station) or output (base station) of differential corrections. Toggle values are 300, 600, 1200, 2400, 4800, 9600, 19200, and 38400. Default is 9600.
RTCM SPEED	This field is the number of bits of RTCM data that will be sent to the radio modem during a given one-second interval. This is a measure of throughput, not a measure of transmission speed (that is, baud rate).
COOR	Calls the Base Station Coordinates Screen. This option is not accessible for autonomous operation or any REMOTE modes.
CNCL	Recalls previous screen without any changes in receiver settings.

Table 4.35. Base Parameters (continued)

Item	Description
OK	Accepts current settings and recalls the previous screen.
FREQ ⇑	Calls the Message Frequency screen. Use only when changing default TRCM message frequency values.

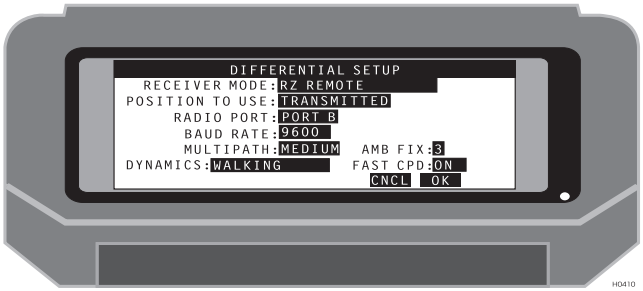

Figure 4.35. RZ Remote Mode Screen

Table 4.36 describes the RZ remote setup parameters.

Table 4.36. RZ Remote Parameters

Item	Description
RECEIVER MODE	RZ REMOTE mode configures the receiver as an Ashtech Z RTK rover.
POSITION TO USE	Real-time-Z remote station only. Toggle allows you to select which coordinates to use in position computation: transmitted from base station or entered in the remote (via the COOR key). Toggle values are TRANSMITTED and ENTERED. Default is TRANSMITTED.
RADIO PORT	Remote station only. Toggle allowing you to select the port for collection of differential corrections. Toggle values are PORT A, PORT B, PORT C, and PORT D. Default is PORT B. If an internal radio modem is installed in the GPS receiver, select Port D.
BAUD RATE	Toggle allowing you to select the baud rate for collection (remote station) or output (base station) of differential corrections. Toggle values are 300, 600, 1200, 2400, 4800, 9600, 19200, and 38400. Default is 9600.

Table 4.36. RZ Remote Parameters (continued)

Item	Description
MULTIPATH	Real-time Z remote station only. Toggle allows you to select multipath conditions. Toggle values are: • NONE (ideal conditions) • LOW (open field, forest ground), • MEDIUM, HIGH (water surface, buildings) • SEVERE (forest, urban canyon). Default is MEDIUM.
DYNAMICS	Real-time Z remote station only. Toggle allows you to select motion dynamics of the remote receiver. Toggle values are: • STATIC (antenna on tripod) • QUASISTATIC (antenna on manual pole) • WALKING • CAR • AIRCRAFT Default is WALKING.
AMB FIX	Editable field that sets the ambiguity fix mode used in CPD operations
FAST CPD	Toggle field allows you to set the Fast CPD mode ON or OFF
CNCL	Recalls previous screen without any changes in receiver settings.
OK	Accepts current settings and recalls the previous screen.

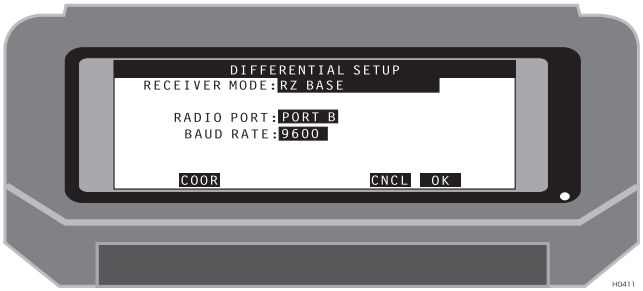

Figure 4.36. RZ Base Mode Screen

Table 4.37 describes the RZ base setup parameters.

Table 4.37. RZ Base Parameters

Item	Description
RECEIVER MODE	RZ Base mode configures the receiver as an Ashtech Z RTK base station.
RADIO PORT	Remote station only. Toggle allowing you to select the port for collection of differential corrections. Toggle values are PORT A, PORT B, PORT C, and PORT D. Default is PORT B. If an internal radio modem is installed in the GPS receiver, select Port D.
BAUD RATE	Toggle allowing you to select the baud rate for collection (remote station) or output (base station) of differential corrections. Toggle values are 300, 600, 1200, 2400, 4800, 9600, 19200, and 38400. Default is 9600.
COOR	Calls the Base Station Coordinates Screen. This option is not accessible for autonomous operation or any REMOTE modes.
CNCL	Recalls previous screen without any changes in receiver settings.
OK	Accepts current settings and recalls the previous screen.

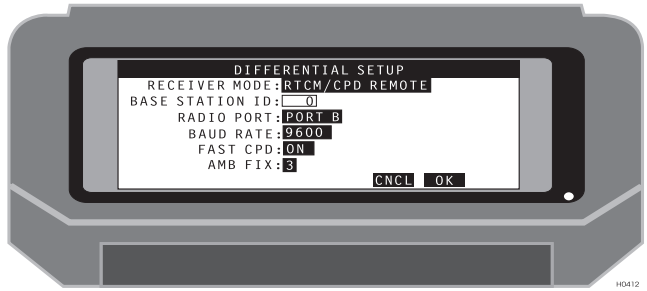

Figure 4.37. RTCM/CPD Remote Mode Screen

Table 4.38 describes the RTCM/CPD Remote setup parameters.

Table 4.38. RTCM/CPD Remote Parameters

Item	Description
RECEIVER MODE	RTCM/CPD Remote mode configures the receiver as am RTCM RTK rover.
BASE STATION ID	RTCM modes only. Editable field allowing you to enter ID of the base station. Valid values are 0 - 1023. Default value is 0. If the receiver operates as a base station, this ID is sent out along with differential corrections. If the receiver operates as a remote station and this value is zero, the receiver accepts differential corrections from any base station. If the receiver operates as a remote station and this value is not zero, the receiver accepts differential corrections only from a base station with this ID.
RADIO PORT	Remote station only. Toggle allowing you to select the port for collection of differential corrections. Toggle values are PORT A, PORT B, PORT C, and PORT D. Default is PORT B. If an internal radio modem is installed in the GPS receiver, select Port D.
BAUD RATE	Toggle allowing you to select the baud rate for collection (remote station) or output (base station) of differential corrections. Toggle values are 300, 600, 1200, 2400, 4800, 9600, 19200, and 38400. Default is 9600.
FAST CPD	Toggle field allows you to set the Fast CPD mode ON or OFF.
AMB FIX	Toggle field which sets the ambiguity fix mode used in CPD operation.
OPEN SKY	Toggle field which sets the multipath mode used in GG-Surveyor RTK operation. NO= Canopy Settings, YES=Open Sky Settings.
CNCL	Recalls previous screen without any changes in receiver settings.
OK	Accepts current settings and recalls the previous screen.

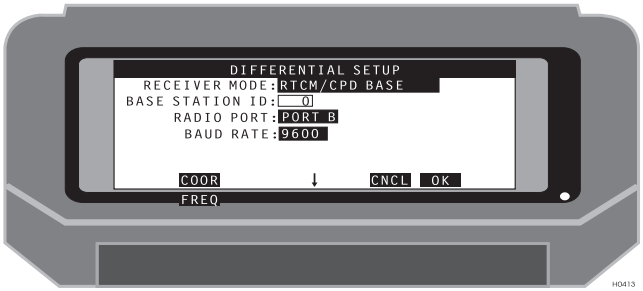

Figure 4.38. RTCM/CPD Base Mode Screen

Table 4.39 describes the RTCM/CPD base setup parameters.

Table 4.39. RTCM/CPD Base Parameters

Item	Description
RECEIVER MODE	RTCM/CPD base mode configures the receiver as an RTCM RTK base station.
BASE STATION ID	RTCM modes only. Editable field allowing you to enter ID of the base station. Valid values are 0 - 1023. Default value is 0. If the receiver operates as a base station, this ID is sent out along with differential corrections. If the receiver operates as a remote station and this value is zero, the receiver accepts differential corrections from any base station. If the receiver operates as a remote station and this value is not zero, the receiver accepts differential corrections only from a base station with this ID.
RADIO PORT	Remote station only. Toggle allowing you to select the port for collection of differential corrections. Toggle values are PORT A, PORT B, PORT C, and PORT D. Default is PORT B. If an internal radio modem is installed in the GPS receiver, select Port D.
BAUD RATE	Toggle allowing you to select the baud rate for collection (remote station) or output (base station) of differential corrections. Toggle values are 300, 600, 1200, 2400, 4800, 9600, 19200, and 38400. Default is 9600.
COOR	Calls the Base Station Coordinates Screen. This option is not accessible for autonomous operation or any REMOTE modes.
CNCL	Recalls previous screen without any changes in receiver settings.
OK	Accepts current settings and recalls the previous screen.
FREQ ⇑	Calls the Message Frequency screen. Use only when changing default RTCM message frequency values.

Base Station Coordinates Screen (COOR)

The Base Station Coordinates screen (Figure 4.39) lets you set up the coordinates of the base station. Base station coordinates can only be entered as WGS84 geographic coordinates.

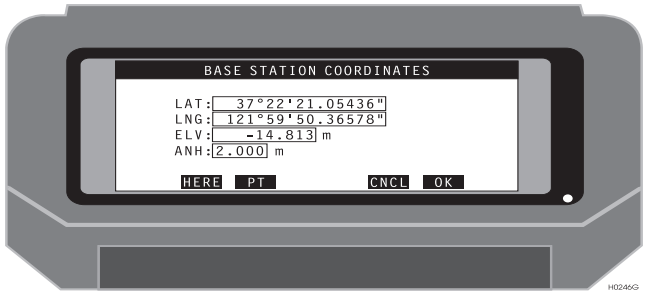

Figure 4.39. Base Station Coordinates Screen

Table 4.40 describes the base station coordinates.

Table 4.40. Base Station Coordinates Parameters

Item	Description
LAT	Editable field allows you to enter latitude of the base station
LNG	Editable field allows you to enter longitude of the base station
ELV	Editable field allows you to enter elevation of the base station
ANH	Editable field allows you to enter antenna height of the base station
HERE	Sets LAT, LNG, and ELV fields to current position.
CNCL	Recalls the previous screen without any changes in base station coordinates.
PT	Calls the point selection screen.
OK	Accepts entered values, sets coordinates of the base station, and recalls the previous screen.

The elevation of the base station should always be an ellipsoidal height.

Message Frequency Screen (FREQ)

The Message Frequency screen (Figure 4.40) is used to set the RTCM message frequency for base station transmission. The parameters in this screen change the default message frequency values. Before these parameters are sent, commands are sent to disable all RTCM message types. Use this screen with caution.

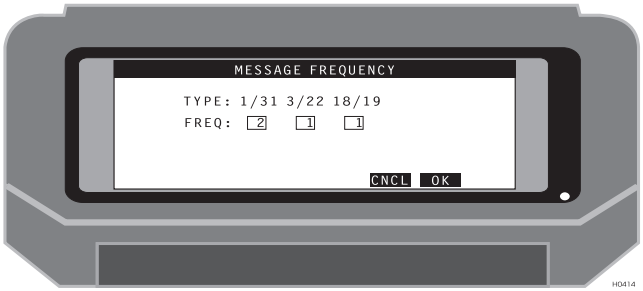

Figure 4.40. Message Frequency Screen

Table 4.41 describes the message frequency setup parameters.

Table 4.41. Message Frequency Parameters

Item	Description
TYPE 1/31	This field specifies the period/frequency for message types 1/31 in seconds. A common value for this message type is 2. This value is used for setting RTCM code differential transmission frequency.
TYPE 3/22	This field specifies the period/frequency for message types 3/22 in minutes. A common value for this message type is 1. This value is used for setting base station antenna parameters transmission frequency.
TYPE 18/19	This field specifies the period/frequency for message types 18/19 in seconds. A common value for this message type is 1. This value is used for setting RTCM RTK differential transmission frequency.
CNCL	Recalls the previous screen without any changes in receiver settings.
OK	Accepts current settings and recalls the previous screen.

The parameters in this screen change the default message frequency values. Before these parameters are sent, commands are sent to disable all RTCM message types. Use this screen with caution.

Log Point Screen (LGPT)

The Log Point screen (Figure 4.41) allows you to define the site parameters for simultaneous data logging to the receiver memory and data collector.

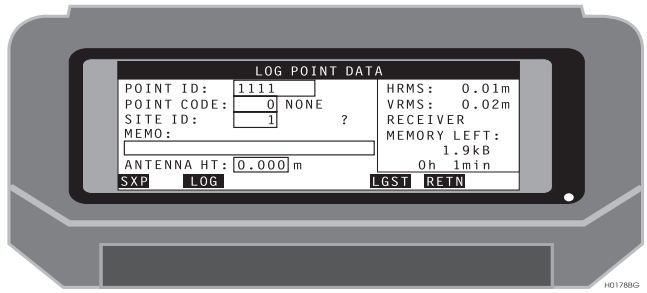

Figure 4.41. Log Point Screen

Table 4.42 describes the log point parameters.

Table 4.42. Log Point Parameters

Item	Description
POINT ID	Editable field allowing you to enter any alphanumeric description.
POINT CODE	Editable field allows you to enter a point code defined in the CODE.DAT file. If a valid point code is entered, the description is displayed to the right of this field.
SITE ID	Editable field. Allowable characters include 0-9, A-Z, (,), &, #, _, -, and ?. When the site ID contains only numerals, the site ID increments by 1.
MEMO	Editable field allows you to enter a memo up to 25 characters.
ANTENNA HEIGHT	Editable field. Height of the antenna which will be stored in the receiver memory. Default value is set on Datalogging Setup screen.
RECEIVER MEMORY LEFT	Displays how much of memory is left for data collection. Number of hours depends on the number of satellites and recording interval.

Table 4.42. Log Point Parameters (continued)

Item	Description
SXP	Three way indicator for current canopy setting (1st), position computation status (2nd), position computation setting (3rd). Canopy setting is available only with GG-Surveyor receivers running in RTK mode. The available indicators are (S) open sky and (T) dense trees. The setting can be toggled by pressing SHIFT+T. Position computation status is available with Z and GG-Surveyor receivers running in RTK mode. The available status indicators are (X) fixed, (F) float, and (A) autonomous. Position computation setting is available with Z and GG-Surveyor receivers running in RTK mode. The available settings are (P) precision and (C) coarse. The setting can be toggled by pressing SHIFT+C. Pressing SHIFT+H displays a quick guide of the indicators.
?	This indicates whether the receiver is logging raw data for post processing. A question mark (?) indicates the receiver is not storing raw data. A rotating dial (-/|\) indicates the receiver is storing raw data. This indicator is displayed only when the occupation time entered in the LGST screen is 0.
LOG	After LOG is pressed, data is logged to the receiver memory and the last epoch is stored in the ASCII and binary output files. Site ID is stored in the receiver. During loading data to the receiver, a box with the countdown counter is displayed on the screen. Time of observation and epoch interval is set on the Data-logging Setup screen. If short observation is required, you can stop logging data by pressing the Esc key.
LGST	Calls the Datalogging Setup screen.
RETN	Recalls the previous screen.

When the LOG button is pressed, fast CPD is turned off during the data logging cycle. Fast CPD is turned on again if the fast CPD parameter in the DFST screen is set to ON.

Log Screen (LOG)

The Log screen (Figure 4.42) is displayed during data logging to the receiver memory.

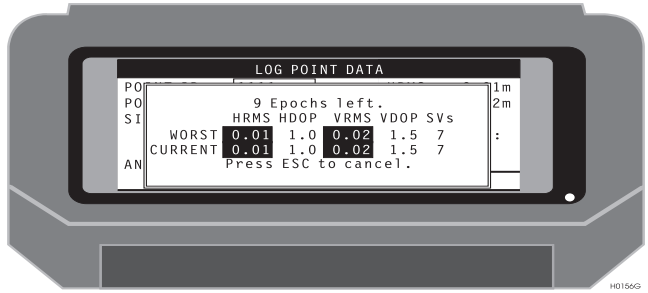

Figure 4.42. Log Screen

Table 4.43 describes the log parameters.

Table 4.43. Log Parameters

Item	Description
Epochs left	Displays the number of epochs remaining to be logged, based on the value input in the LGST screen.
HRMS	The worst and current horizontal RMS values.
HDOP	The worst and current horizontal dilution of precision.
VRMS	The worst and current vertical RMS values.
VDOP	The worst and current vertical dilution of precision.
SVs	The worst and current number of satellites.
ESC	ESC ends the data logging session

The TDS keyboard layout does not coincide with text instructions in this screen. The ESC key is labeled "ESC" in the standard keyboard, and "F1" in the TDS keyboard.

Data Logging Setup Screen (LGST)

The Data Logging Setup screen (Figure 4.43) allows you to set all logging functions.

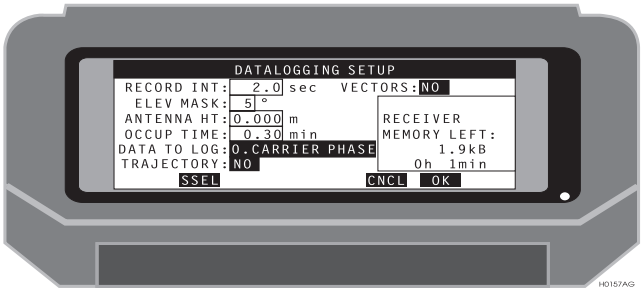

Figure 4.43. Data Logging Setup Screen

Table 4.44 describes the data logging setup parameters.

Table 4.44. Data Logging Setup Parameters

Item	Description
RECORD INT	Editable field to enter the data recording interval. Valid values are 0.5 to 999.5 seconds. Default is 2.0 seconds.
ELEVATION MASK	Editable field used to set the elevation mask for position computation.
ANTENNA HT	Editable field allows you to enter the antenna height. Valid values are 0 - 99.9 meters.
OCCUP TIME	Editable field allows you to enter the amount of time to spend on a static station. Valid values for this field are 0 - 99.9 minutes. The number of epochs collected should be rounded up to the nearest whole epoch. At least one epoch should always be collected. Default value is 1 minute.
DATA TO LOG	Toggle field. Toggle values are: 0 - CARRIER PHASE 1 - PSEUDO RANGES 2 - POSITION ONLY
TRAJECTORY	Toggle field. Toggle values are: NO = do not log trajectory data YES = log trajectory data. Default is NO.

Table 4.44. Data Logging Setup Parameters (continued)

Item	Description
VECTORS	This toggle field allows you to select to store real-time base-rover vectors. This function is available in the RZ REMOTE and RTCM/CPD REMOTE differential modes. The data is stored in a file with the extension *.OBN. The file name is determined by the name of the mission file selected in the MISSION FILE SELECTION screen. If no file is selected, the output name will be NONE.OBN. NO = No vectors will be logged. YES = Vectors will be logged.
RECEIVER MEMORY LEFT	Displays how much receiver memory is left for data collection.
SSEL	Calls the Satellite Selection screen.
CNCL	Calls the previous screen without any changes in receiver settings.
OK	Accepts current settings and recalls the previous screen.

Satellite Selection Screen (SSEL)

The Satellite Selection screen (Figure 4.44) allows you to select/deselect the satellites used for position computation.

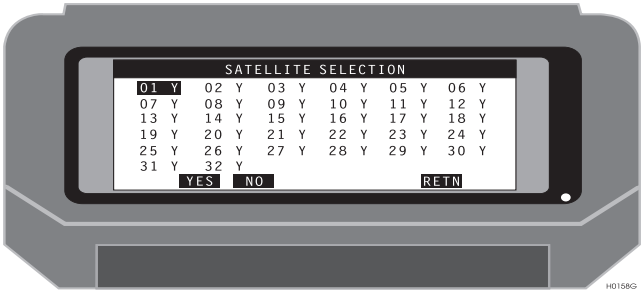

Figure 4.44. Satellite Selection Screen

When connected to a GG receiver, the screen displays SVs 1 through 56. The first 32 are GPS satellites, while 33 through 56 are GLONASS satellites.

Table 4.45 describes the satellite selection parameters.

Table 4.45. Satellite Selection Parameters

Item	Description
YES	Selects highlighted satellite. Select using arrow keys.
NO	Deselects highlighted satellite. Use arrow keys.
RETN	Recalls the previous screen.

Point Selection Screen (PT)

The Point Selection screen (Figure 4.45) allows you to select one of the points from the currently loaded mission.

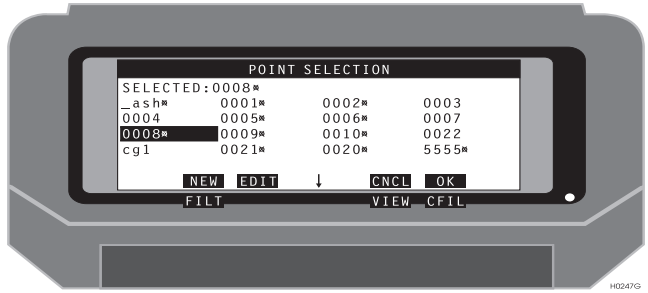

Figure 4.45. Point Selection Screen

Table 4.46 describes the point selection parameters.

Table 4.46. Point Selection Parameters

Item	Description
SELECTED	The point currently selected. To choose a point, highlight the point and press OK.
5555*	A point ID with a "*" symbol indicates this point has been surveyed.
NEW	Calls the New Point screen.
EDIT	Calls the Edit Point screen.
CNCL	Cancels any changes and recalls the previous screen.
OK	Accepts any changes and recalls the previous screen.
FILT⇑	(Filter) Calls the Filter Point List screen.
VIEW⇑	Calls the Point Measurements screen. This function can only be used when a survey point is highlighted. Surveyed points are displayed with a "*" symbol.
CFIL⇑	(Clear Filter) Clears the currently filtered point list.

Enter New Point Screen (NEW)

The Enter New Point screen (Figure 4.46) allows you to enter a new point to be added to the current navigation file.

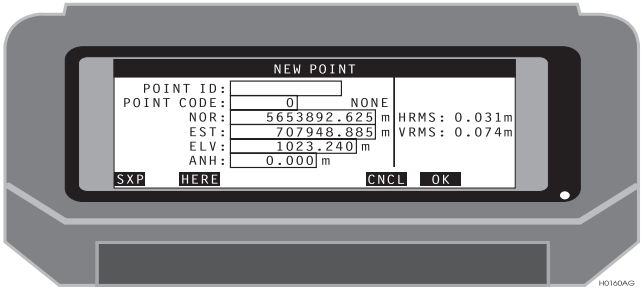

Figure 4.46. New Point Screen

Table 4.47 describes the new point parameters.

Table 4.47. New Point Parameters

Item	Description
POINT ID	Editable field allows you to enter a new point ID.
POINT CODE	Editable field allows you to enter a new point code.
NOR	Editable field allows you to enter a new northing value for the new point
EST	Editable field allows you to enter a new easting value for the new point
ELV	Editable field allows you to enter a new elevation value for the new point
ANH	Editable field allows you to enter the current antenna height.
HRMS	Displays the current horizontal RMS.
VRMS	Displays the current vertical RMS.

Table 4.47. New Point Parameters (continued)

Item	Description
SXP	Three way indicator for current canopy setting (1st), position computation status (2nd), position computation setting (3rd). Canopy setting is available only with GG-Surveyor receivers running in RTK mode. The available indicators are (S) open sky and (T) dense trees. The setting can be toggled by pressing SHIFT+T. Position computation status is available with Z and GG-Surveyor receivers running in RTK mode. The available status indicators are (X) fixed, (F) float, and (A) autonomous. Position computation setting is available with Z and GG-Surveyor receivers running in RTK mode. The available settings are (P) precision and (C) coarse. The setting can be toggled by pressing SHIFT+C. Pressing SHIFT+H displays a quick guide of the indicators.
HERE	Enters the current value into the coordinate fields.
CNCL	Cancels all changes and recalls the previous screen.
OK	Accepts any changes and recalls the previous screen.

Edit Point Screen (EDIT)

The Edit Point screen (Figure 4.47) lets you edit an existing point from the current mission file.

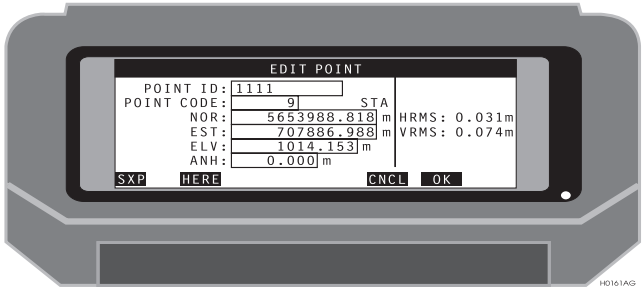

Figure 4.47. Edit Point Screen

Table 4.48 describes the edit point parameters.

Table 4.48. Edit Point Parameters

Item	Description
POINT ID	Editable field allows you to edit the point ID.
POINT CODE	Editable field allows you to edit the point code.
LAT or NOR	Editable field allows you to edit the northing value for the point.
LON or EST	Editable field allows you to edit the easting value for the point.
ELV	Editable field allows you to edit the elevation value for the point.
ANH	Editable field allows you to enter the current antenna height
HRMS	Displays the current horizontal RMS.
VRMS	Displays the current vertical RMS.

Table 4.48. Edit Point Parameters (continued)

Item	Description
SXP	Three way indicator for current canopy setting (1st), position computation status (2nd), position computation setting (3rd). Canopy setting is available only with GG-Surveyor receivers running in RTK mode. The available indicators are (S) open sky and (T) dense trees. The setting can be toggled by pressing SHIFT+T. Position computation status is available with Z and GG-Surveyor receivers running in RTK mode. The available status indicators are (X) fixed, (F) float, and (A) autonomous. Position computation setting is available with Z and GG-Surveyor receivers running in RTK mode. The available settings are (P) precision and (C) coarse. The setting can be toggled by pressing SHIFT+C. Pressing SHIFT+H displays a quick guide of the indicators.
HERE	Enters the current value into the coordinate fields.
CNCL	Cancels all changes and recalls the previous screen.
OK	Accepts any changes and recalls the previous screen.

Point Measurements (VIEW)

The Point Measurements screen (Figure 4.48) displays the data stored for the point ID.

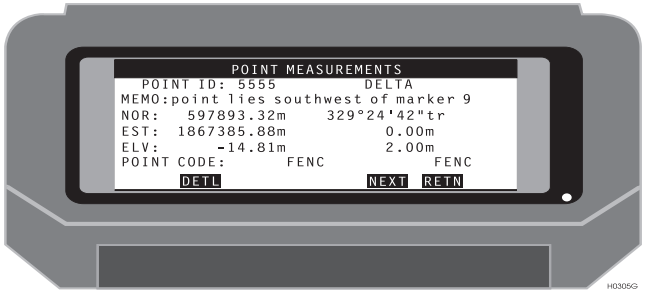

Figure 4.48. Point Measurements Screen

Table 4.49 describes the point measurements parameters.

Table 4.49. Point Measurements Parameters

Item	Description
POINT ID	Displays the point ID.
MEMO	Displays the memo stored for the referenced point ID.
NOR or LAT	Displays the northing or latitude for the referenced point ID.
EST or LNG	Displays the easting or longitude for the referenced point ID.
ELV	Displays the elevation stored for the referenced point ID.
POINT CODE	The point code stored for the referenced point ID.
DELTA	Displays azimuth, distance, and height offset information. In an offset point, the difference between the origin point and the stored offset point. If a navigated point, the difference between the point navigated and the point collected.
DETL	Calls the point details screen.
NEXT	Calls the next point with the same point ID in the database. This is only available if multiple occupations were made with the same point ID.
RETN	Recalls the previous screen.

Point Details (DETL)

The Point Details screen (Figure 4.49) displays additional data stored on the point ID.

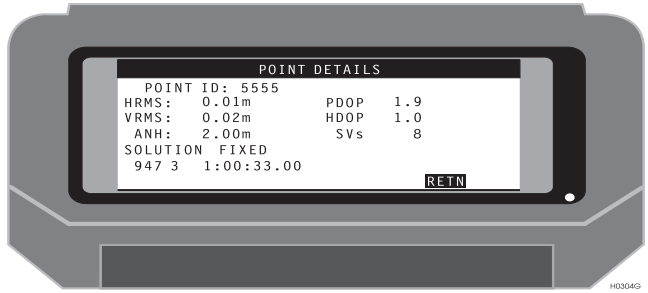

Figure 4.49. Point Details Screen

Table 4.50 describes the point details parameters.

Table 4.50. Point Details Parameters

Item	Description
POINT ID	Displays the point ID.
HRMS	Displays the stored HRMS of the referenced point ID.
VRMS	Displays the stored VRMS of the referenced point ID.
ANH	Displays the stored antenna height of the referenced point ID.
SOLUTION	Displays the point solution (FIXED, FLOAT, or AUTONOMOUS)
DATE/TIME	Displays the GPS week number, day of the week, and the time of day.
PDOP	Displays the stored PDOP of the referenced point ID.
HDOP	Displays the stored HDOP of the referenced point ID.
VDOP	Displays the stored VDOP of the referenced point ID.
SVs	Displays the stored number of satellites used for position computation of the referenced point ID.
RETN	Recalls the previous screen.

Feature Screen (FEAT)

The Feature screen (Figure 4.50) lets you enter information to be associated with points logged to the handheld controller.

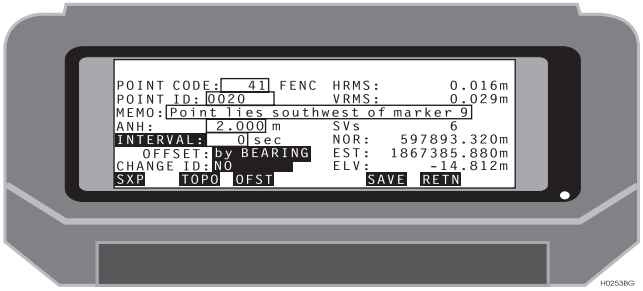

Figure 4.50. Feature Screen

Table 4.51 describes the Feature parameters.

Table 4.51. Feature Screen Parameters

Item	Description
POINT CODE	Editable field allows you to enter the point code which will be logged with the next point. Point code descriptions are associated with the definitions in the CODE.DAT file. The description associated with the chosen point code is displayed to the right of this field.
POINT ID	The point ID which will be logged with the next point.
MEMO	Editable field allows you to enter a memo up to 32 characters.
ANH	Antenna height to be applied to and logged with next point. All real-time elevation displays are adjusted by this height.
INTERVAL	The interval for logging during the TOPO function. Can be toggled to “DISTANCE” using the <space> key.
INTERVAL/ DISTANCE	Editable field. The time interval or distance value for TOPO logging.
OFFSET	The current offset function selected.
CHANGE ID	The function which will be applied to the point ID after logging, i.e., INCREMENT will increment the point ID after logging. DECREMENT will decrement the point ID after logging. NO will leave the point ID the same after logging a position. The applicable only to numeric port IDs.
HRMS	Displays the current horizontal RMS.

Table 4.51. Feature Screen Parameters (continued)

Item	Description
VRMS	Displays the current vertical RMS.
SVs	Displays the current number of SVs used in the solution.
NOR	Displays the current northing value.
EST	Displays the current easting value.
ELV	Displays the current elevation value.
SXP	Three way indicator for current canopy setting (1st), position computation status (2nd), position computation setting (3rd). Canopy setting is available only with GG-Surveyor receivers running in RTK mode. The available indicators are (S) open sky and (T) dense trees. The setting can be toggled by pressing SHIFT+T. Position computation status is available with Z and GG-Surveyor receivers running in RTK mode. The available status indicators are (X) fixed, (F) float, and (A) autonomous. Position computation setting is available with Z and GG-Surveyor receivers running in RTK mode. The available settings are (P) precision and (C) coarse. The setting can be toggled by pressing SHIFT+C. Pressing SHIFT+H displays a quick guide of the indicators.
TOPO	Starts logging points, at the interval entered in the INTERVAL/DISTANCE field, to the output file.
OFST	Calls the Offset screen, if an offset mode has been selected.
SAVE	Logs the current position to the output file if the format is selected GRID on the Display Setup screen.
RETN	Recalls the previous screen.

Any of the editable fields (POINT CODE, POINT ID, MEMO, ANH and INTERVAL) can be cleared by moving the cursor to the desired field and pressing SHIFT+U.

Point Offset By Grid Screen (OFST)

The Point Offset screen (Figure 4.51) allows you to enter the offset distance for a point or series of points.

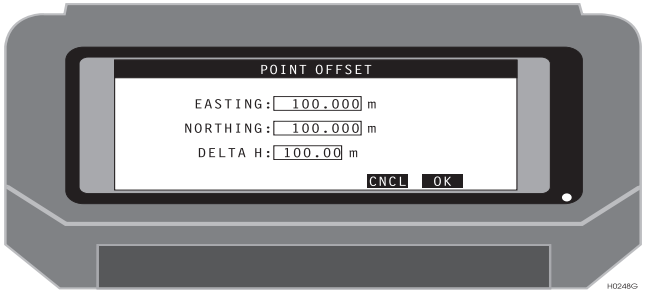

Figure 4.51. Point Offset by Grid Screen

Table 4.52 describes the point offset parameters.

Table 4.52. Point Offset Parameters

Item	Description
EASTING	Editable field. The logged point is offset by the value entered here.
NORTHING	Editable field. The logged point is offset by the value entered here.
DELTA H	Editable field. The logged point is offset by the value entered here.
CNCL	Cancels any changes to this screen and recalls the previous screen.
OK	Accepts any changes made to this screen and recalls the Feature screen.

Press SAVE on the Feature screen to apply the offset.

Point Offset By Bearing Screen (OFST)

The Point Offset by Bearing screen (Figure 4.52) lets you enter the offset distance and azimuth for a point or series of points.

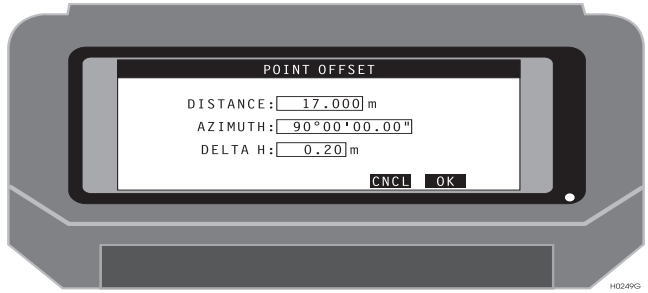

Figure 4.52. Point Offset by Bearing Screen

Table 4.53 describes the point offset by bearing parameters.

Table 4.53. Offset by Bearing Parameters

Item	Description
DISTANCE	Editable field. The point logged is offset by the value entered here.
AZIMUTH	Editable field. The point logged is offset by the value entered here.
DELTA H	Editable field. The point logged is offset by the value entered here.
CNCL	Cancels any changes to this screen and recalls the previous screen.
OK	Accepts any changes made to this screen and recalls the Feature screen.

Press SAVE on the Feature screen to apply the offset.

Point Offset By Side Screen (OFST)

The Point Offset by Side screen (Figure 4.53) allows you to enter the offset distance for a point or series of points.

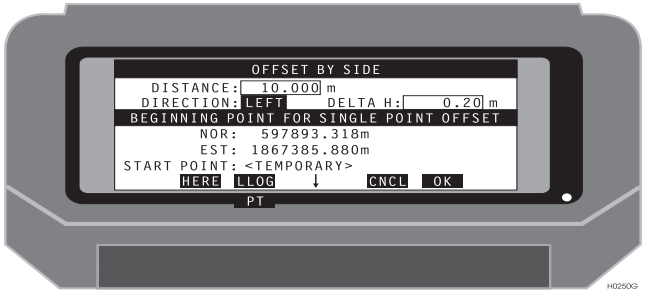

Figure 4.53. Point Offset by Side Screen

Table 4.54 describes the point offset by side parameters.

Table 4.54. Point Offset by Side Parameters

Item	Description
DISTANCE	Editable field. The point logged is offset by the value entered here.
DIRECTION	Toggle field. The point logged is offset to the side entered here.
DELTA H	Editable field. The point logged is offset by the value entered here.
BEGINNING POINT...	Entered using HERE or LLOG. This point provides the reference for single point, by side offsets.
START POINT	The descriptor for the reference point. This point is chosen with the PT function.
HERE	Sets the currently calculated position as the reference point.
LLOG	Sets the last logged point as the reference point.
CNCL	Cancels any changes to this screen and recalls the previous screen.
OK	Accepts any changes made to this screen and recalls the Feature screen.
PT⇑	Selects the Point Selection screen

Press SAVE on the Feature screen to apply the offset.

Point Offset By LRF Screen (OFST)

The Point Offset by LRF (Laser Range Finder) screen (Figure 4.54) lets you enter the offset distance for a point or series of points using data collected from a Laser Range Finder (LRF).

Figure 4.54. Point Offset by LRF Screen

Table 4.55 describes the point offset by LRF parameters.

Table 4.55. Point Offset by LRF Parameters

Item	Description
DISTANCE	Editable field. The point logged is offset by the value collected from the LRF or entered manually.
BEARING	Editable field. The point logged is offset by the value collected from the LRF or entered manually.
DELTA H	Editable field. The point logged is offset by the value entered here.
APPLY DELTA H	Toggle field. You can select to use the height calculated by the LRF or to use the height currently computed by GPS.
LRF	Toggle field. You can select the model of LRF currently interfaced.
CLR	Resets the DISTANCE and BEARING fields to zero.
READ	Obtains a new value from the LRF. Criterion models only.
RETN	Recalls the previous screen.

Data retrieved from the Laser Range Finder is stored in memory and can be edited in the Offset By Bearings screen.

Press SAVE on the Feature screen to apply the offset.

Point Offset From Current Line Screen (OFST)

The Point Offset from Current Line screen (Figure 4.55) lets you enter the offset distance for a point or series of points from the currently defined line.

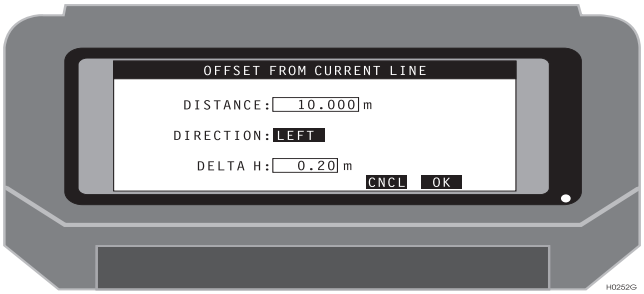

Figure 4.55. Point Offset from Current Line Screen

Table 4.56 describes the point offset from current line parameters.

Table 4.56. Point Offset from Current Line Parameters

Item	Description
DISTANCE	Editable field. The point logged is offset by the value entered here.
DIRECTION	Toggle field. The point logged is offset to the side entered here.
DELTA H	Editable field. The point logged is offset by the value entered here.
CNCL	Cancels any changes to this screen and recalls the previous screen.
OK	Accepts any changes made to this screen and recalls the feature screen

Press SAVE on the Feature screen to apply the offset.

Cut/Fill Screen (CUFL)

The Cut/Fill screen (Figure 4.56) displays real-time cut/fill calculations.

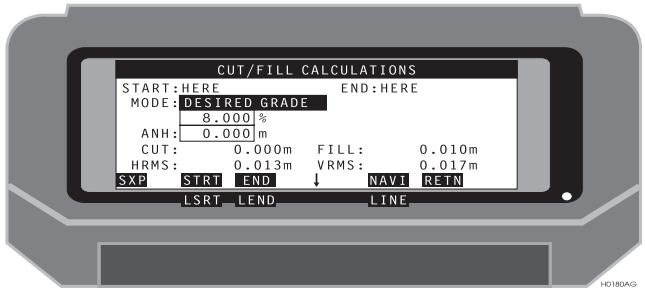

Figure 4.56. Cut/Fill Screen

Table 4.57 describes the cut/fill parameters.

Table 4.57. Cut/Fill Parameters

Item	Description
START	The name of the point from which the cut/fill vector begins.
END	The name of the point of the end of the cut/fill vector.
MODE	Toggle field. DESIRED GRADE allows you to change the grade calculated from the START and END points, and adjusts the END coordinate elevation to reflect the desired grade. EXTENDED GRADE indicates that the vector used for the cut/fill vector is extended through the START and END points for a distance indicated in the DIST field.
DIST	Editable field. Allows you to extend the grade calculation vector through the END point for the distance entered.
CUT	The calculated cut value for the current position.
FILL	The calculated fill value for the current position.
HRMS	Current horizontal RMS value.
VRMS	Current vertical RMS value

Table 4.57. Cut/Fill Parameters (continued)

Item	Description
SXP	Three way indicator for current canopy setting (1st), position computation status (2nd), position computation setting (3rd). Canopy setting is available only with GG-Surveyor receivers running in RTK mode. The available indicators are (S) open sky and (T) dense trees. The setting can be toggled by pressing SHIFT+T. Position computation status is available with Z and GG-Surveyor receivers running in RTK mode. The available status indicators are (X) fixed, (F) float, and (A) autonomous. Position computation setting is available with Z and GG-Surveyor receivers running in RTK mode. The available settings are (P) precision and (C) coarse. The setting can be toggled by pressing SHIFT+C. Pressing SHIFT+H displays a quick guide of the indicators.
STRT	Allows you to choose the starting point from which the cut/fill vector begins.
END	Allows you to choose the end point from which the cut/fill vector will be calculated.
NAVI	Calls the Navigation screen.
RETN	Recalls the previous screen.
LSRT⇑	Allows you to log the current position as the START location for the cut/fill vector.
LEND⇑	Allows you to log the current position as the END location for the cut/fill vector.
LINE⇑	Allows you to display a graphic representation of the grade vector.

3D Cut/Fill Screen (3DCF)

The 3D Cut/Fill screen (Figure 4.57) displays real-time 3D cut/fill calculations. Two planes are supported with a common center line. Each plane may have independent percent grade values to support multiple grade functions. Real-time displays include distance travelled along the center line; distance travelled away from the center line; and cut/fill. Grid spacing within the two planes is supported. Spacing is defined parallel to the center line (on line) and perpendicular to the center line (off line). Real-time displays include distances to the nearest grid spacing intersection.

Six parameters allow the definition of the two planes (one left of the center line and one right of the center line) sharing a center line as well as grid spacing inside the two planes. The center line is defined with two points called origin and center. A change in elevation from the origin point to the center point defines the center line grade. The grade for the left and right planes may be entered as percent grade or calculated from the COGO routines and retrieved from the LGRA and RGRA buttons.

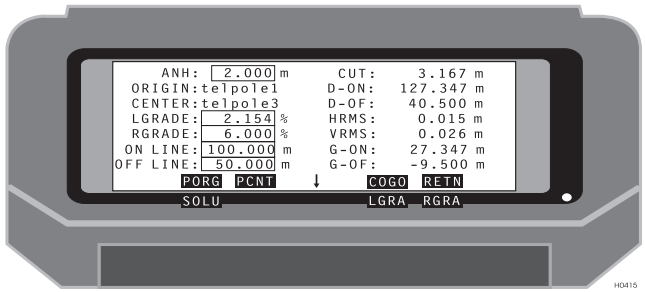

Figure 4.57. 3D Cut/Fill Screen

Table 4.58 describes the 3D cut/fill parameters.

Table 4.58. 3D Cut/Fill Parameters

Item	Description
ANH	Antenna height to be applied to and logged with next point. All real-time elevation displays are adjusted by this value.
ORIGIN	The name of the first point defining the center line.
CENTER	The name of the second point defining the center line.
LGRADE	A value in percent defining the left grade away from the center line. Positive values are positive grade and negative values are negative grade.

Table 4.58. 3D Cut/Fill Parameters (continued)

Item	Description
RGRADE	A value in percent defining the right grade away from the center line. Positive values are positive grade and negative values are negative grade.
ON LINE	A value in linear units defining the grid spacing parallel to the center line within the left and right planes.
OFF LINE	A value in linear units defining the grid spacing perpendicular to the center line within the left and right planes.
CUT/FILL	Displays the calculated cut value or fill value for the current position.
D-ON	Displays the distance travelled down the center line from the origin point. If you are between the origin point and center point, the value will be positive. If you are beyond the origin point away from the center point, the value will be negative.
D-OF	Displays the distance travelled off line from the origin point (cross track error). If you are off line to the right of the center line, the value will be positive. If you are off line to the left of the center line, the value will be negative.
HRMS	Displays the current horizontal RMS value.
VRMS	Displays the current vertical RMS value
G-ON	Displays the distance on line (parallel to the center line) away from the nearest grid spacing intersection.
G-OF	Displays the distance off line (perpendicular to the center line) away from the nearest grid spacing intersection.
SXP	Three way indicator for current canopy setting, position computation status, position computation setting. Canopy setting is available only with GG-Surveyor receivers running in RTK mode. The available settings are open sky (S) and dense trees (T). Position computation status is available with Z and GG-Surveyor receivers running in RTK mode. The available status indicators are fixed (X), float (F), and autonomous (A). Position computation setting is available with Z and GG-Surveyor receivers running in RTK mode. The available settings are precision (P) and coarse (C).
PORG	Calls the Point Selection screen. The point selected is assigned as the origin point.
PCNT	Calls the Point Selection screen. The point selected is assigned as the center point.
COGO	Calls the Coordinate Geometry Screen. Grade values can be computed in the inverse function or entered in the distance/azimuth function. Grade calculations are stored in memory and are retrievable from the LGRA and RGRA buttons.
RETN	Recalls the previous screen.
SOLU ⇑	Calls the Solutions screen.

Table 4.58. 3D Cut/Fill Parameters (continued)

Item	Description
LGRA ⇑	Grade values calculated in COGO are stored in memory. The grade value for the left plane can be retrieved from memory by pressing this button.
RGRA ⇑	Grade values calculated in COGO are stored in memory. The grade value for the right plane can be retrieved from memory by pressing this button.

Display Points Screen (DISP)

The Display Points screen (Figure 4.58) displays the currently loaded layout points.

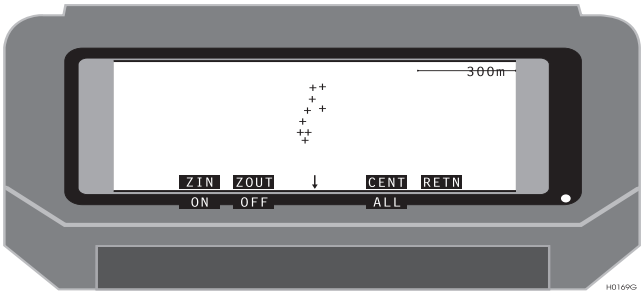

Figure 4.58. Display Points Screen

Table 4.59 describes the display points parameters.

Table 4.59. Display Points Parameters

Item	Description
ZIN	Causes the display to zoom in.
ZOUT	Causes the display to zoom out.
CENT	Centers the display on the current position.
RETN	Recalls the previous display.
ON⇑	Displays the names of the points.
OFF⇑	Turns off the name display.
ALL⇑	Zooms the display out until all points are displayed.

Navigation Screen (NAVI)

The Navigation screen (Figure 4.59) displays the status of the navigation mission with a horizontal line display showing your location with reference to the true line. Your perspective is from a cross section of the line looking forward to the next waypoint.

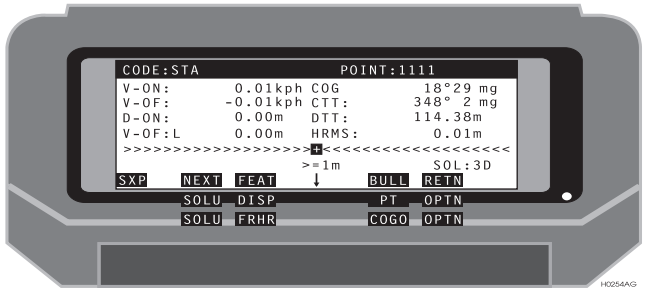

Figure 4.59. Navigation Screen

Table 4.60 describes the navigation parameters.

Table 4.60. Navigation Parameters

Item	Description
TOP LINE	Displays ID and code of the current navigation point.
V-ON	This field indicates the velocity in the direction of the line.
V-OF	This field indicates the velocity in the direction perpendicular to the line if you are travelling off line.
D-ON	This field indicates the distance travelled down the line, referenced to the From waypoint.
D-OF	This field indicates your distance off line (cross track error). If you are off line to the right of line, there will be an R after the off line amount indicating off line to the right. There will be an L if you are off line to the left.
COG	Display of course over ground; tr indicates true north, mg indicates magnetic north.
CTT	Displays the course to target. The target is the next waypoint being navigated; tr indicates true north, mg indicates magnetic north.
DTT	Displays the distance to target. The target is the currently selected point.
HRMS	Displays current horizontal RMS value.

Table 4.60. Navigation Parameters (continued)

Item	Description
Off-Line Error Display	The off-line error display indicates how far off line you are. The + indicates on line. The ⇔ on the display indicates your position with reference to the line. If the ⇔ is on left side of the +, then you must go right to get back on line. Each > indicates a certain distance off line. The value of each > changes depending upon how far off line you are. **>=100 m** Indicates the scale of each >. If the ⇔ is on the 4th > to the left of the +, this indicates that you are left of line by 400 meters and you must go right to get back on line. The scale changes automatically.
SXP	Three way indicator for current canopy setting (1st), position computation status (2nd), position computation setting (3rd). Canopy setting is available only with GG-Surveyor receivers running in RTK mode. The available indicators are (S) open sky and (T) dense trees. The setting can be toggled by pressing SHIFT+T. Position computation status is available with Z and GG-Surveyor receivers running in RTK mode. The available status indicators are (X) fixed, (F) float, and (A) autonomous. Position computation setting is available with Z and GG-Surveyor receivers running in RTK mode. The available settings are (P) precision and (C) coarse. The setting can be toggled by pressing SHIFT+C. Pressing SHIFT+H displays a quick guide of the indicators.
SHIFT+D	Shift+D calls the memo screen where you can enter a 32 character memo. The memo is stored when Shift+L is used to log the point.
SHIFT+U	Shift+U is available when in the memo screen via Shift+D. Shift+U clears the memo screen.
SHIFT+L	Shift+L logs the current position to the output file if the format selected is GRID on the Display Setup Screen.
PGUP/PGDN	Pressing the PGUP or PGDN keys toggles between the large font display and the current navigation screen. Shift+D/U/L are not available in this screen.
NEXT	Switches to the next point in the file.
FEAT	Calls the Feature Log screen.
BULL	Calls the Bullseye screen.
RETN	Recalls the previous screen.
SOLU⇑	Calls the Solution screen (when first option set is active).
DISP⇑	Calls the Display screen (when first option set is active).
PT⇑	Calls the Point Selection screen (when first option set is active).
OPTN⇑	Changes the list of the function buttons.
FRHR⇑	Selects the currently computed position as the starting point (when the second option set is active).
COGO⇑	Calls the Coordinate Geometry screen.

Bullseye Screen (BULL)

The Bullseye screen (Figure 4.60) displays the status of the navigation mission in the form of a bullseye where the position being navigated to is at the center of the screen.

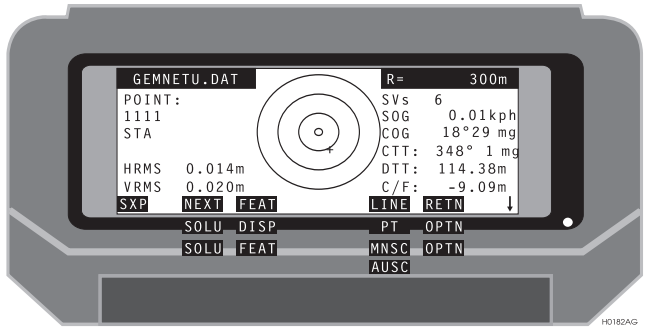

Figure 4.60. Bullseye Screen

Your perspective is from above. The top of the bullseye is north. Table 4.61 describes the bullseye parameters.

Table 4.61. Bullseye Parameters

Item	Description
MISSION NAME	Displays ID of current mission.
POINT	Displays name of the waypoint.
R	Displays the radius of the bullseye. This value becomes editable when you select manual scaling (MNSC).
SVs	Indicates the number of satellites used in the computation of the displayed position.
SOG	Display of speed over ground.
COG	Display of course over ground; tr indicates true north, mg indicates magnetic north.
CTT	Displays the course to target; tr indicates true north, mg indicates magnetic north.
DTT	Displays the distance to target.
C/F	Displays the difference in height from the position you are navigating to minus your actual position.

Table 4.61. Bullseye Parameters (continued)

Item	Description
HRMS	Displays current horizontal RMS value.
VRMS	Displays current vertical RMS value.
SXP	Three way indicator for current canopy setting (1st), position computation status (2nd), position computation setting (3rd). Canopy setting is available only with GG-Surveyor receivers running in RTK mode. The available indicators are (S) open sky and (T) dense trees. The setting can be toggled by pressing SHIFT+T. Position computation status is available with Z and GG-Surveyor receivers running in RTK mode. The available status indicators are (X) fixed, (F) float, and (A) autonomous. Position computation setting is available with Z and GG-Surveyor receivers running in RTK mode. The available settings are (P) precision and (C) coarse. The setting can be toggled by pressing SHIFT+C. Pressing SHIFT+H displays a quick guide of the indicators.
SHIFT+D	Shift+D calls the memo screen where you can enter a 32 character memo. The memo is stored when Shift+L is used to log the point.
SHIFT+U	Shift+U is available when in the memo screen via Shift+D. Shift+U clears the memo screen.
SHIFT+L	Shift+L logs the current position to the output file if the format selected is GRID on the Display Setup Screen.
PGUP/PGDN	Pressing the PGUP or PGDN keys toggles between the large font display and the current navigation screen. Shift+D/U/L are not available in this screen.
NEXT	Switches to the next point in the file.
FEAT	Calls the Feature Logging screen.
LINE	Calls the Line screen.
RETN	Recalls the previous screen.
SOLU⇑	Calls the Solutions screen (when first or second option set is active).
DISP⇑	Calls the Display screen (when first option set is active).
PT⇑	Calls the Point Selection screen (when first option set is active).
OPTN⇑	Changes the functions of SHIFT+F1, SHIFT+F2, and SHIFT+F3.
FEAT⇑	Calls the Feature Logging screen (when second option set is active).
MNSC⇑	(when second option set is active) Toggles the receiver from automatic scaling of the bullseye display to manual scaling. In manual mode, MNSC, you must enter the scale of the display. In automatic mode, AUSC, the display scale changes as you get closer to the point being navigated.

Table 4.61. Bullseye Parameters (continued)

Item	Description
Bullseye Display	The center of this display is the location of the point being navigated to. Your current position is indicated by +. A dashed line indicates your trajectory travelled. The radius indicates the size of the outer ring. The AUSC function changes the scale as the trajectory enters the inner ring.
Spinning Arrow	This indicator points to the target if speed over ground is greater than 1 kph.

Line Display Screen (LINE)

The Line Display screen (Figure 4.61) displays the current position in relation to a line. The line is defined from points in the data file or from the current position to a data file point. The perspective is from above the line being navigated, with the direction of travel at the top of the screen.

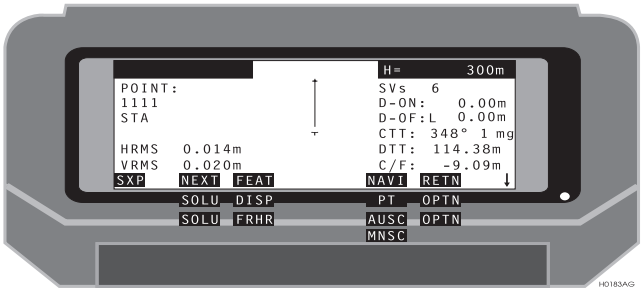

Figure 4.61. Line Display Screen

Table 4.62 describes the line display parameters.

Table 4.62. Line Display Parameters

Item	Description
POINT	Displays name of the currently selected point.
H	Indicates the scale (height) of the line display. This value becomes editable when you select MNSC.
D-ON	This field indicates the distance travelled down the line, referenced to the start point.
D-OF	This field indicates the distance you are off line (cross track error). R indicates off line to the right, L indicates off line to the left.
CTT	Displays the course to target. The target is the next waypoint being navigated.
DTT	Displays the distance to target. The target is the next waypoint being navigated.
C/F	Displays the difference in height from the position you are navigating to minus your actual position. The exception is when you access this screen from the cut/fill screen (CUFL). In this case, this field displays the cut or fill value. Where cut is displayed positively and fill is displayed negatively.
HRMS	Displays current horizontal RMS value.
VRMS	Displays current vertical RMS value.

Table 4.62. Line Display Parameters (continued)

Item	Description
SXP	Three way indicator for current canopy setting (1st), position computation status (2nd), position computation setting (3rd). Canopy setting is available only with GG-Surveyor receivers running in RTK mode. The available indicators are (S) open sky and (T) dense trees. The setting can be toggled by pressing SHIFT+T. Position computation status is available with Z and GG-Surveyor receivers running in RTK mode. The available status indicators are (X) fixed, (F) float, and (A) autonomous. Position computation setting is available with Z and GG-Surveyor receivers running in RTK mode. The available settings are (P) precision and (C) coarse. The setting can be toggled by pressing SHIFT+C. Pressing SHIFT+H displays a quick guide of the indicators.
SHIFT+D	Shift+D calls the memo screen where you can enter a 32 character memo. The memo is stored when Shift+L is used to log the point.
SHIFT+U	Shift+U is available when in the memo screen via Shift+D. Shift+U clears the memo screen.
SHIFT+L	Shift+L logs the current position to the output file if the format selected is GRID on the Display Setup Screen.
PGUP/PGDN	Pressing the PGUP or PGDN keys toggles between the large font display and the current navigation screen. Shift+D/U/L are not available in this screen.
NEXT	Selects the next point in the file.
FEAT	Calls the Feature Logging screen.
NAVI	Calls the Navigation screen.
RETN	Recalls the previous screen.
SOLU⇑	(when first option set is active) Calls the Solutions screen.
DISP⇑	(when first option is active) Calls the Display Screen.
PT⇑	(when first option set is active) Calls the Point Selection screen.
OPTN⇑	Changes the list of the function buttons.
FRHR⇑	(when second option set is active) Selects the currently computed position as the starting point..
MNSC⇑	(when second option set is active) Toggles the receiver from automatic scaling of the line display to manual scaling. In manual mode, MNSC, you must enter the scale of the line display. In automatic mode, AUSC, the line display scale changes as you get closer to the line being navigated.
Line Display (center of screen)	This display shows the line being navigated. The line is shown with the end point at the top and the start point at the bottom. The current position is indicated by +. The dashed line displays your trajectory.

The coordinate geometry selection screen (Figure 4.62) allows you to select a COGO function. There are nine options available. Scroll down to view the remaining options.

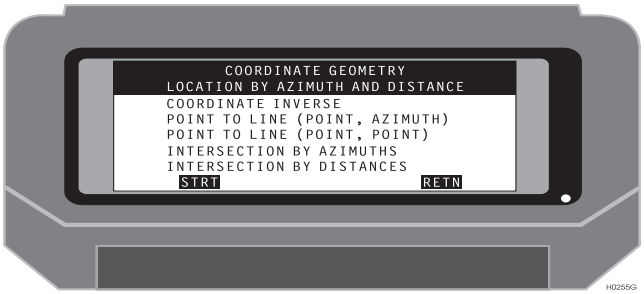

Figure 4.62. Coordinate Geometry Selection Screen

Table 4.63 describes the coordinate geometry selection parameters. Refer to the specific option in this manual for further details.

Table 4.63. Coordinate Geometry Selection Options

Item	Description
STRT	Calls the coordinate geometry function displayed in reverse video.
RETN	Recalls the previous screen.

Coordinate Geometry - Location by Azimuth and Distance

The location by azimuth and distance function is a three screen process. Screen 1 (Figure 4.63) prompts for a From point.

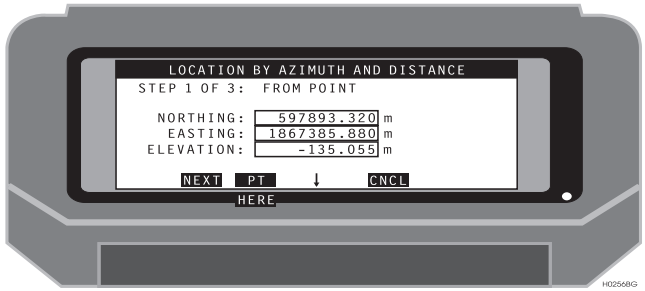

Figure 4.63. Location by Azimuth and Distance - Screen 1

Table 4.64 describes this screen.

Table 4.64. Location by Azimuth and Distance - Screen 1

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
NEXT	Calls Screen 2.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
HERE⇑	Enters the current calculated position as the from point.

Screen 2 (Figure 4.64) prompts for a distance and azimuth value.

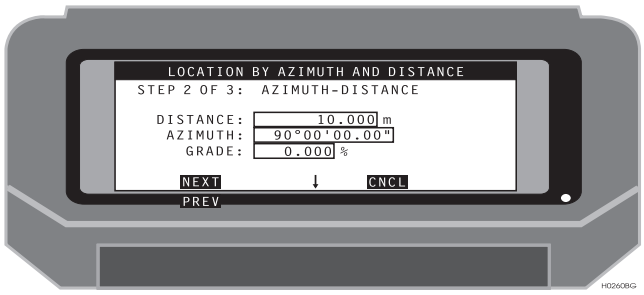

Figure 4.64. Location by Azimuth and Distance - Screen 2

Table 4.65 describes this screen.

Table 4.65. Location by Azimuth and Distance - Screen 2

Item	Description
DISTANCE	The distance value from the from point.
AZIMUTH	The azimuth value from the from point.
GRADE	The grade in percent of slope from the from point.
NEXT	Calls Screen 3.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
PREV ⇑	Recalls Screen 1.

Screen 3 (Figure 4.65) displays the solution.

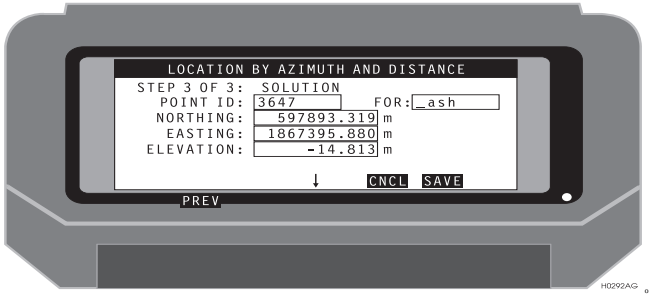

Figure 4.65. Location by Azimuth and Distance - Screen 3

Table 4.66 describes this screen.

Table 4.66. Location by Azimuth and Distance - Screen 3

Item	Description
POINT ID	The point identifier for the point being stored in the mission file.
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate. If a value was entered in the grade field, the elevation will be adjusted accordingly.
FOR	The FOR point is derived in the FROM POINT selection in the first COGO screen. If the PT screen is used to select a FROM POINT, then the FOR point ID is the point ID selected. If the PT screen is not used, the point ID is the current point ID in the navigation screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
SAVE	Saves the point in the mission file and prompts if the new point is to be set as the navigation target in the stakeout screens.
PREV⇑	Recalls Screen 2.

The coordinate inverse function is a three screen process. Screen 1 (Figure 4.66) prompts for a from point.

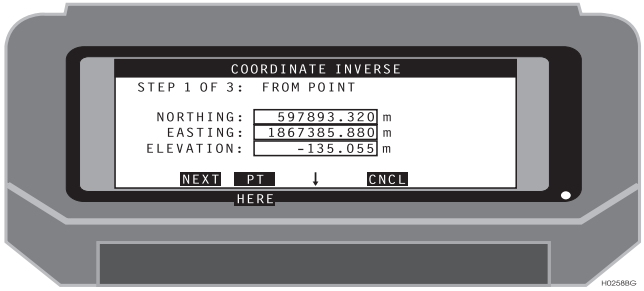

Figure 4.66. Coordinate Inverse - Screen 1

Table 4.67 describes this screen.

Table 4.67. Coordinate Inverse - Screen 1

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
NEXT	Calls Screen 2.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
HERE⇑	Enters the current calculated position as the from point.

Screen 2 (Figure 4.67) prompts for a to point.

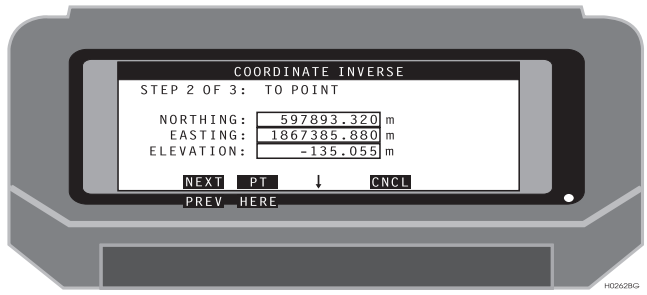

Figure 4.67. Coordinate Inverse - Screen 2

Table 4.68 describes this screen.

Table 4.68. Coordinate Inverse - Screen 2

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
NEXT	Calls Screen 3.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
PREV⇑	Recalls Screen 1.
HERE⇑	Enters the current calculated position as the to point.

Screen 3 (Figure 4.68) displays the solution.

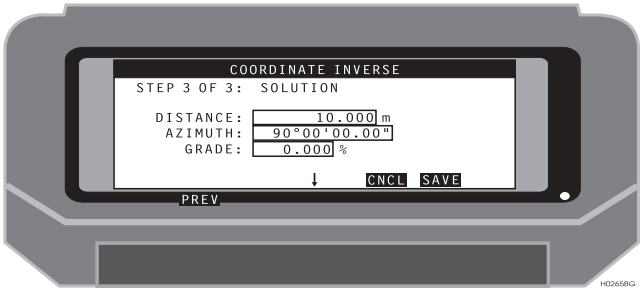

Figure 4.68. Coordinate Inverse - Screen 3

Table 4.69 describes this screen.

Table 4.69. Coordinate Inverse - Screen 3

Item	Description
DISTANCE	The distance value from the points entered in Screens 1 and 2.
AZIMUTH	The azimuth value from the from point entered in Screen 1 to the to point entered in Screen 2.
GRADE	The grade in percent slope from the first point to the second point.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
SAVE	Saves the distance and azimuth values in memory. These values are displayed in the distance and azimuth fields in the second screen of the Location by Azimuth and Distance function.
PREV⇑	Recalls Screen 1.

Coordinate Geometry - Location by Point to Line (Point, Azimuth)

The location by point to line (point, azimuth) function is a three screen process. Screen 1 (Figure 4.69) prompts for data to define the line.

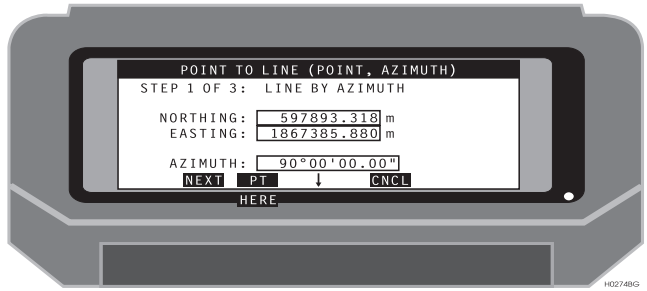

Figure 4.69. Location by Point to Line (Point, Azimuth) - Screen 1

Table 4.70 describes this screen.

Table 4.70. Location by Point to Line (Point, Azimuth) - Screen 1

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
AZIMUTH	The azimuth value to define the line.
NEXT	Calls Screen 2.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
HERE ⇑	Enters the current calculated position as the line point.

Screen 2 (Figure 4.70) prompts for a from point.

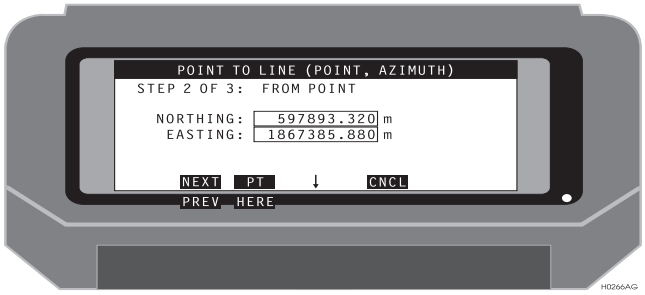

Figure 4.70. Location by Point to Line (Point, Azimuth) - Screen 2

Table 4.71 describes this screen.

Table 4.71. Location by Point to Line (Point, Azimuth) - Screen 2

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
NEXT	Calls the screen 3 Screen.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
PREV⇑	Recalls the screen 1 screen.
HERE⇑	Enters the current calculated position as the from point.

Screen 3 (Figure 4.71) displays the solution.

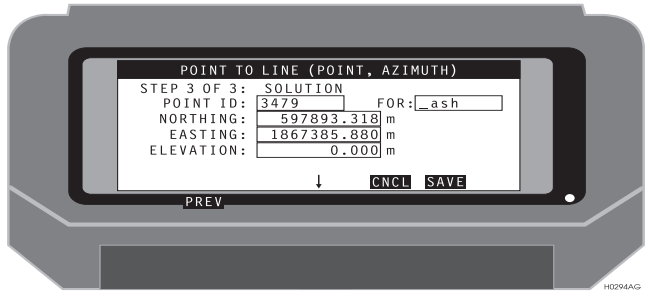

Figure 4.71. Location by Point to Line (Point, Azimuth) - Screen 3

Table 4.72 describes this screen.

Table 4.72. Location by Point to Line (Point, Azimuth) - Screen 3

Item	Description
POINT ID	The point identifier for the point being stored in the mission file.
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
FOR	The FOR point is derived in the FROM POINT selection in the first COGO screen. If the PT screen is used to select a FROM POINT, then the FOR point ID is the point ID selected. If the PT screen is not used, the point ID is the current point ID in the navigation screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
SAVE	Saves the point in the mission file and prompts if the new point is to be set as the navigation target in the stakeout screens.
PREV⇑	Recalls Screen 2.

Coordinate Geometry - Location by Point to Line (Point, Point)

The location by point to line (point, point) function is a four screen process. Screen 1 (Figure 4.72) prompts for data to define the first point on the line.

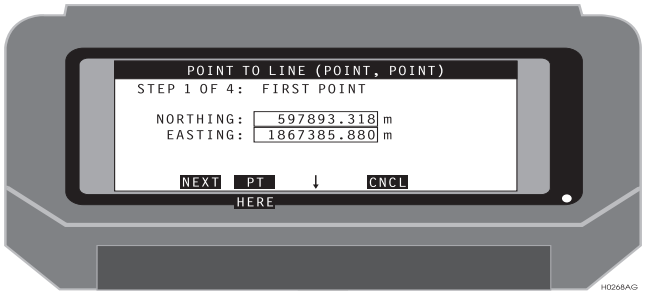

Figure 4.72. Location by Point to Line (Point, Point) - Screen 1

Table 4.73 describes this screen.

Table 4.73. Location by Point to Line (Point, Point) - Screen 1

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
NEXT	Calls Screen 2.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
HERE⇑	Enters the current calculated position as the first point.

Screen 2 (Figure 4.73) prompts for the second point to define the line.

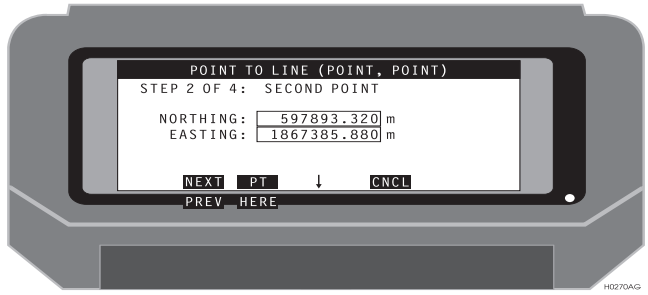

Figure 4.73. Location by Point to Line (Point, Point) - Screen 2

Table 4.74 describes this screen.

Table 4.74. Location by Point to Line (Point, Point) - Screen 2

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
NEXT	Calls Screen 3.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
PREV⇑	Recalls Screen 1.
HERE⇑	Enters the current calculated position as the second point.

Screen 3 (Figure 4.74) prompts for the from point.

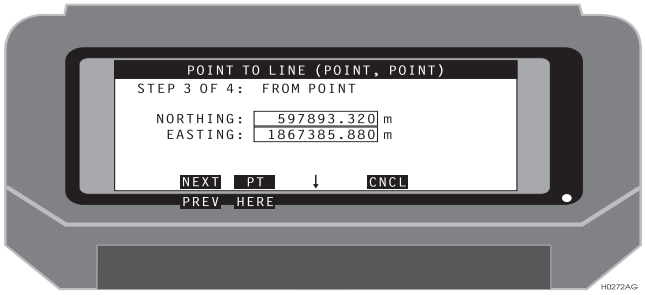

Figure 4.74. Location by Point to Line (Point, Point) - Screen 3

Table 4.75 describes this screen.

Table 4.75. Location by Point to Line (Point, Point) - Screen 3

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
NEXT	Calls Screen 4.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
PREV⇑	Recalls Screen 2.
HERE⇑	Enters the current calculated position as the from point.

Screen 4 (Figure 4.75) displays the solution.

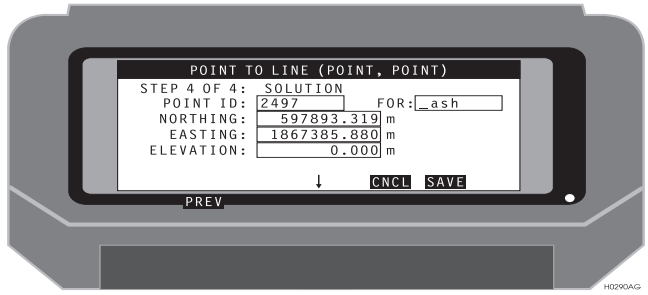

Figure 4.75. Location by Point to Line (Point, Point) - Screen 4

Table 4.76 describes this screen.

Table 4.76. Location by Point to Line (Point, Point) - Screen 4

Item	Description
POINT ID	The point identifier for the point being stored in the mission file.
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
FOR	The FOR point is derived in the FROM POINT selection in the first COGO screen. If the PT screen is used to select a FROM POINT, then the FOR point ID is the point ID selected. If the PT screen is not used, the point ID is the current point ID in the navigation screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
SAVE	Saves the point in the mission file and prompts if the new point is to be set as the navigation target in the stakeout screens.
PREV⇑	Recalls Screen 3.

Coordinate Geometry - Location via Intersection by Azimuths

The location via intersection by azimuths function is a three screen process. Screen 1 (Figure 4.76) prompts for data to define the first line.

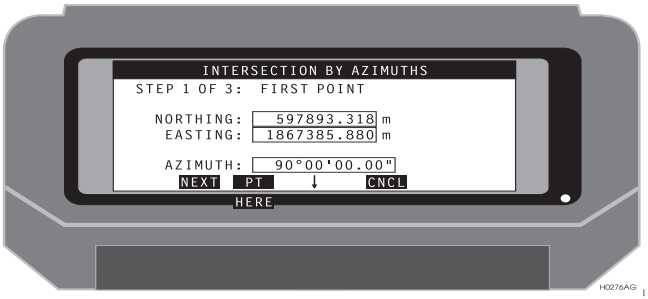

Figure 4.76. Location via Intersection by Azimuths - Screen 1

Table 4.77 describes this screen.

Table 4.77. Location via Intersection by Azimuths - Screen 1

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
AZIMUTH	The azimuth value to define the line.
NEXT	Calls Screen 2.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
HERE⇑	Enters the current calculated position as the first point.

Screen 2 (Figure 4.77) prompts for a from point.

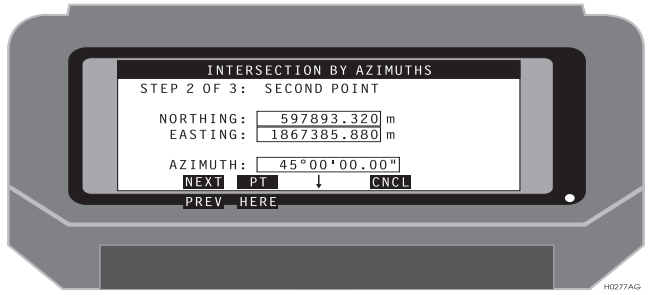

Figure 4.77. Location via Intersection by Azimuths - Screen 2

Table 4.78 describes this screen.

Table 4.78. Location via Intersection by Azimuths - Screen 2

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
AZIMUTH	The azimuth value to define the line.
NEXT	Calls Screen 3.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
PREV⇑	Recalls Screen 1.
HERE⇑	Enters the current calculated position as the second point.

Screen 3 (Figure 4.78) displays the solution.

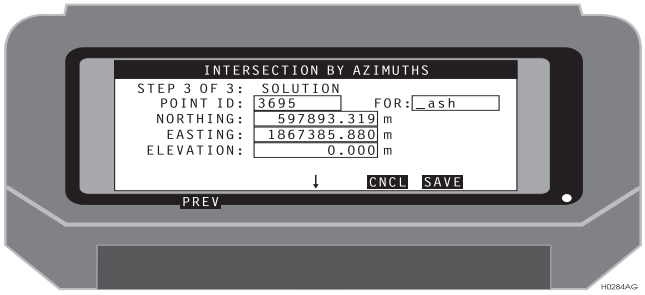

Figure 4.78. Location via Intersection by Azimuths - Screen 3

Table 4.79 describes this screen.

Table 4.79. Location via Intersection by Azimuths - Screen 3

Item	Description
POINT ID	The point identifier for the point being stored in the mission file.
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
FOR	The FOR point is derived in the FROM POINT selection in the first COGO screen. If the PT screen is used to select a FROM POINT, then the FOR point ID is the point ID selected. If the PT screen is not used, the point ID is the current point ID in the navigation screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
SAVE	Saves the point in the mission file and prompts if the new point is to be set as the navigation target in the stakeout screens.
PREV⇑	Recalls Screen 2.

Coordinate Geometry - Location via Intersection by Distances

The location via intersection by distances is a four screen process. Screen 1 (Figure 4.79) prompts for data to define the first point radius.

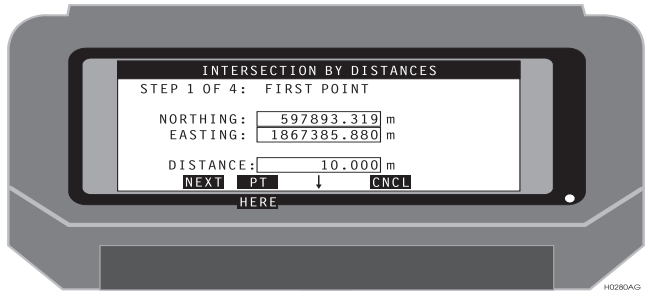

Figure 4.79. Location via Intersection by Distances - Screen 1

Table 4.80 describes this screen.

Table 4.80. Location via Intersection by Distances - Screen 1

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
DISTANCE	The distance value defining the radius for point 1.
NEXT	Calls Screen 2.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
HERE⇑	Enters the current calculated position as the first point.

Screen 2 (Figure 4.80) prompts for data to define the second point radius.

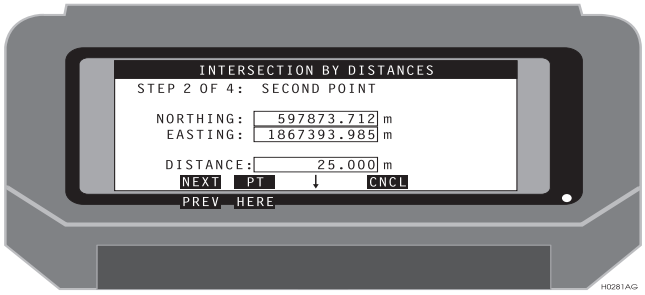

Figure 4.80. Location via Intersection by Distances - Screen 2

Table 4.81 describes this screen.

Table 4.81. Location via Intersection by Distances - Screen 2

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
DISTANCE	The distance value defining the radius for point 2.
NEXT	Calls Screen 3.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
PREV⇑	Recalls Screen 1.
HERE⇑	Enters the current calculated position as the second point.

Screen 3 (Figure 4.81) displays the first of two solutions.

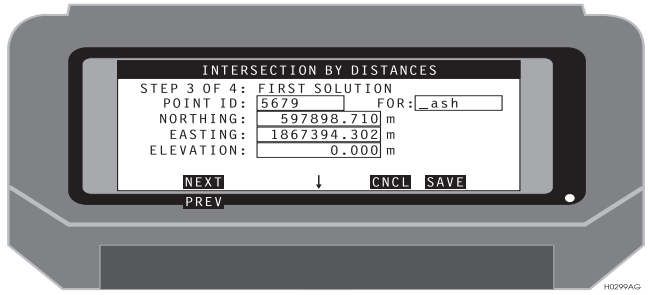

Figure 4.81. Location via Intersection by Distances - Screen 3

Table 4.82 describes this screen.

Table 4.82. Location via Intersection by Distances - Screen 3

Item	Description
POINT ID	The point identifier for the point being stored in the mission file.
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
FOR	The FOR point is derived in the FROM POINT selection in the first COGO screen. If the PT screen is used to select a FROM POINT, then the FOR point ID is the point ID selected. If the PT screen is not used, the point ID is the current point ID in the navigation screen.
NEXT	Calls Screen 4.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
SAVE	Saves the point in the mission file.
PREV⇑	Recalls the screen 2 Screen.

Screen 4 (Figure 4.82) displays the second of two solutions.

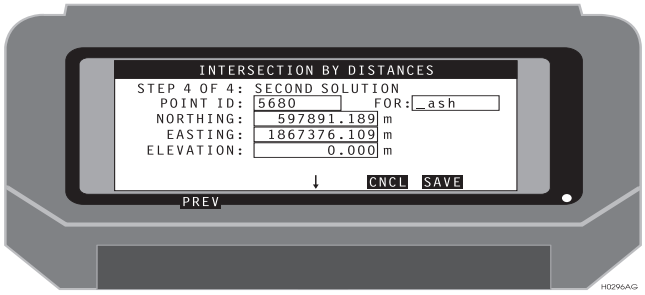

Figure 4.82. Location via Intersection by Distances - Screen 4

Table 4.83 describes this screen.

Table 4.83. Location via Intersection by Distances - Screen 4

Item	Description
POINT ID	The point identifier for the point being stored in the mission file.
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
FOR	The FOR point is derived in the FROM POINT selection in the first COGO screen. If the PT screen is used to select a FROM POINT, then the FOR point ID is the point ID selected. If the PT screen is not used, the point ID is the current point ID in the navigation screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
SAVE	Saves the point in the mission file and prompts if the new point is to be set as the navigation target in the stakeout screens.
PREV⇑	Recalls Screen 3.

Coordinate Geometry - Location via Intersection by Distance and Azimuth

The location via intersection by distance and azimuth is a four screen process. Screen 1 (Figure 4.83) prompts for data to define the first point radius.

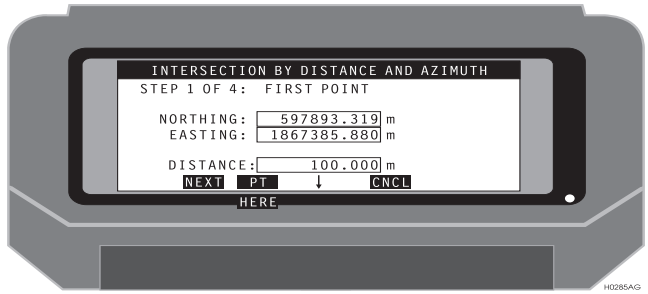

Figure 4.83. Location via Intersection by Distance and Azimuth - Screen 1

Table 4.84 describes this screen.

Table 4.84. Location via Intersection by Distance and Azimuth - Screen 1

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
DISTANCE	The distance value defining the radius for point 1.
NEXT	Calls Screen 2.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
HERE⇑	Enters the current calculated position as the first point.

Screen 2 (Figure 4.84) prompts for data to define the intersecting line.

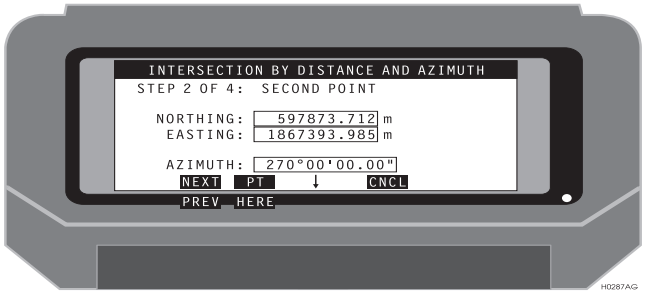

Figure 4.84. Location via Intersection by Distance and Azimuth - Screen 2

Table 4.85 describes this screen.

Table 4.85. Location via Intersection by Distance and Azimuth - Screen 2

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
AZIMUTH	The azimuth value to define the line.
NEXT	Calls Screen 3.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
PREV⇑	Recalls Screen 1.
HERE⇑	Enters the current calculated position as the second point.

Screen 3 (Figure 4.85) displays the first of two solutions.

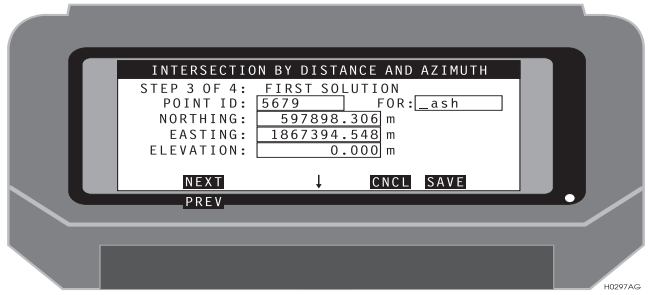

Figure 4.85. Location via Intersection by Distance and Azimuth - Screen 3

Table 4.86 describes this screen.

Table 4.86. Location via Intersection by Distance and Azimuth - Screen 3

Item	Description
POINT ID	The point identifier for the point being stored in the mission file.
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
FOR	The FOR point is derived in the FROM POINT selection in the first COGO screen. If the PT screen is used to select a FROM POINT, then the FOR point ID is the point ID selected. If the PT screen is not used, the point ID is the current point ID in the navigation screen.
NEXT	Calls Screen 4.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
SAVE	Saves the point in the mission file and prompts if the new point is to be set as the navigation target in the stakeout screens.
PREV⇑	Recalls Screen 2.

Screen 4 (Figure 4.86) displays the second of two solutions.

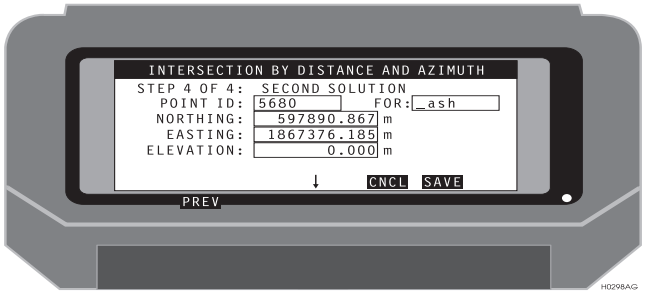

Figure 4.86. Location via Intersection by Distance and Azimuth - Screen 4

Table 4.87 describes this screen.

Table 4.87. Location via Intersection by Distance and Azimuth - Screen 4

Item	Description
POINT ID	The point identifier for the point being stored in the mission file.
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
FOR	The FOR point is derived in the FROM POINT selection in the first COGO screen. If the PT screen is used to select a FROM POINT, then the FOR point ID is the point ID selected. If the PT screen is not used, the point ID is the current point ID in the navigation screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
SAVE	Saves the point in the mission file and prompts if the new point is to be set as the navigation target in the stakeout screens.
PREV⇑	Recalls Screen 3.

Coordinate Geometry - Subdivide Line By Segments

The subdivide line by segments is a four screen process. Screen 1 (Figure 4.87) prompts for data to define the from point.

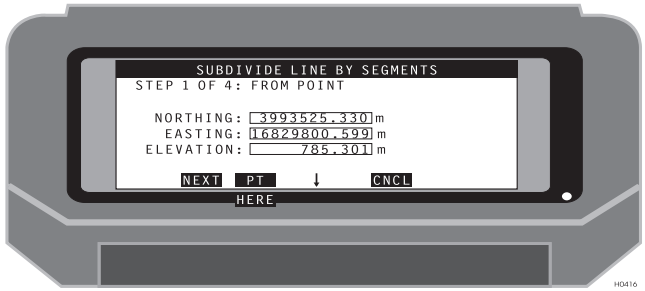

Figure 4.87. Subdivide Line by Segments - Screen 1

Table 4.88 describes this screen.

Table 4.88. Subdivide Line by Segments Parameters - Screen 1

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
NEXT	Calls Screen 2.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
HERE⇑	Enters the current calculated position as the from point.

Screen 2 (Figure 4.88) prompts for data to define the to point.

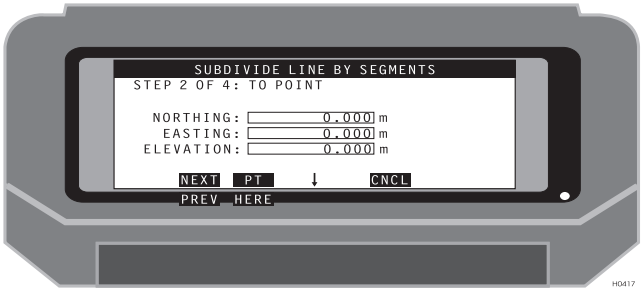

Figure 4.88. Subdivide Line by Segments - Screen 2

Table 4.89 describes this screen.

Table 4.89. Subdivide Line By Segments Parameters - Screen 2

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
NEXT	Calls Screen 3.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
PREV⇑	Recalls Screen 1.
HERE⇑	Enters the current calculated position as the to point.

Screen 3 (Figure 4.89) prompts for data to define the line segments.

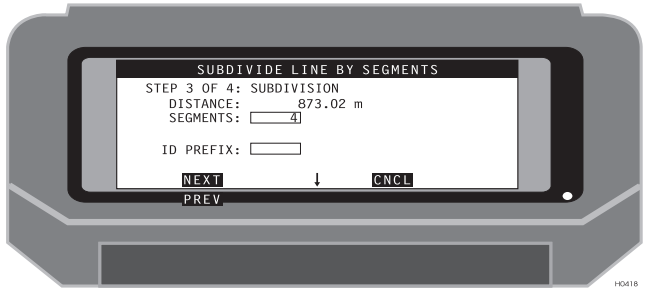

Figure 4.89. Subdivide Line by Segments - Screen 3

Table 4.89 describes this screen.

Table 4.90. Subdivide Line by Segments Parameters - Screen 3

Item	Description
DISTANCE	Displays the distance between the points defining the line.
SEGMENTS	The value defining the number of segments the line will be subdivided. The range is 2 - 9999.
ID PREFIX	A prefix up to four numerals for point id naming.
NEXT	Calls Screen 4.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
PREV⇑	Recalls Screen 2.

Screen 4 (Figure 4.90) displays the range of new point ids and the distance between the new points.

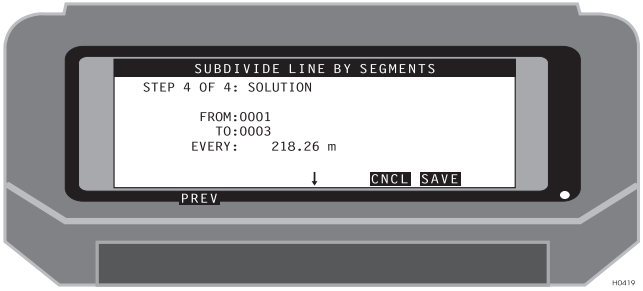

Figure 4.90. Subdivide Line by Segments - Screen 4

Table 4.91 describes this screen.

Table 4.91. Subdivide Line by Segments Parameters - Screen 4

Item	Description
FROM	Displays the name of the first point of the subdivided line.
TO	Displays the name of the last point of the subdivided line.
EVERY	Displays the distance between the points of the subdivided line.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
SAVE	Saves the calculated points and stores the points in the current mission file.
PREV⇑	Recalls Screen 3.

Coordinate Geometry - Subdivide Line By Distance

The subdivide line by distance is a four screen process. Screen 1 (Figure 4.91) prompts for data to define the from point.

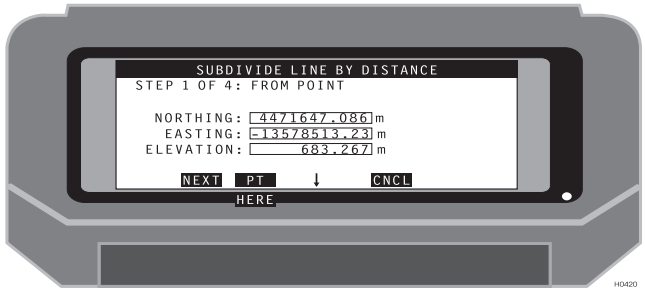

Figure 4.91. Subdivide Line by Distance - Screen 1

Table 4.92 describes this screen.

Table 4.92. Subdivide Line by Distance Parameters - Screen 1

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
NEXT	Calls Screen 2.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
HERE⇑	Enters the current calculated position as the from point.

Screen 2 (Figure 4.92) prompts for data to define the to point.

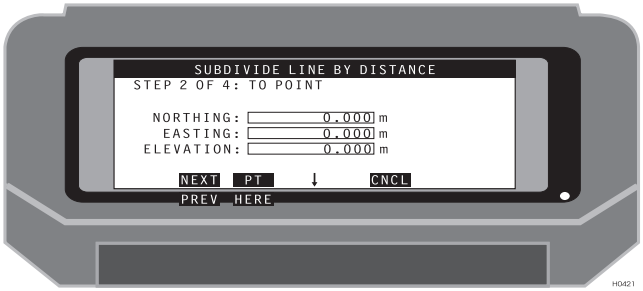

Figure 4.92. Subdivide Line by Distance - Screen 2

Table 4.89 describes this screen.

Table 4.93. Subdivide Line By Distance Parameters - Screen 2

Item	Description
NORTHING	The northing value for the coordinate.
EASTING	The easting value for the coordinate.
ELEVATION	The elevation value for the coordinate.
NEXT	Calls Screen 3.
PT	Calls the Point Selection Screen.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
PREV⇑	Recalls Screen 1.
HERE⇑	Enters the current calculated position as the to point.

Screen 3 (Figure 4.93) prompts for data to define the point spacing.

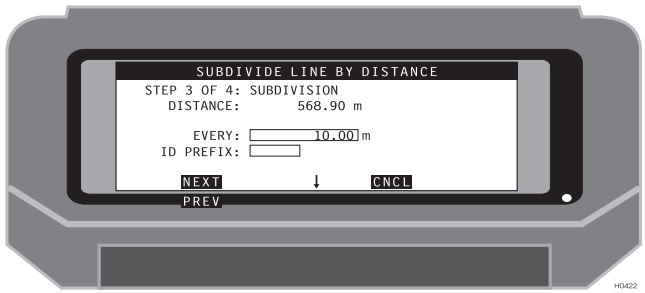

Figure 4.93. Subdivide Line by Distance - Screen 3

Table 4.94 describes this screen.

Table 4.94. Subdivide Line by Distance Parameters - Screen 3

Item	Description
DISTANCE	Displays the distance between the points defining the line.
EVERY	The value defining the distance between points on the line.
ID PREFIX	A prefix up to four numerals for point id naming.
NEXT	Calls Screen 4.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
PREV⇑	Recalls Screen 2.

Screen 4 (Figure 4.94) displays the range of new point ids and the distance between the new points.

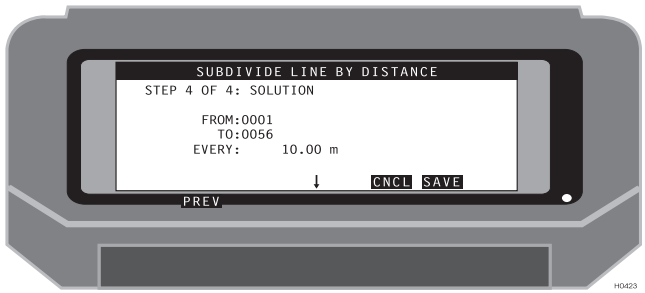

Figure 4.94. Subdivide Line by Distance - Screen 4

Table 4.95 describes this screen.

Table 4.95. Subdivide Line by Distance Parameters - Screen 4

Item	Description
FROM	Displays the name of the first point of the subdivided line.
TO	Displays the name of the last point of the subdivided line.
EVERY	Displays the distance between the points of the subdivided line.
CNCL	Cancels the current entry and returns to the Coordinate Geometry (COGO) Screen.
SAVE	Saves the calculated points and stores the points in the current mission file.
PREV⇑	Recalls Screen 3.

Filter Point List (FILT)

The Filter Point List screen (Figure 4.95) lets you sort and filter the data points to a lesser number of points based on the filter criteria.

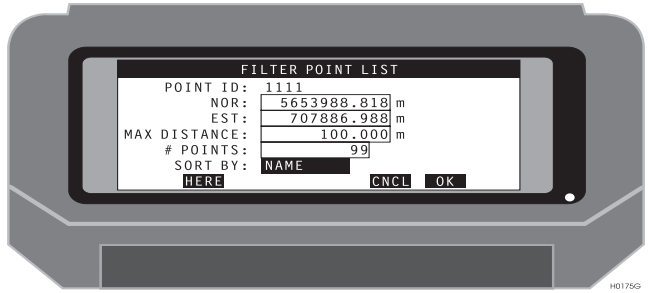

Figure 4.95. Filter Point List Screen

Table 4.96 describes the filter point list parameters.

Table 4.96. Filter Point List Parameters

Item	Description
POINT ID	This field indicates the currently selected point of reference.
NOR or LAT	Editable field displays the northing or latitude of the point of reference.
EST or LON	Editable field displays the easting or longitude of the point of reference.
MAX DISTANCE	Editable field displays the maximum distance to be considered when sorting by distance.
# POINTS	Editable field displays the maximum number of points to be included in the filtered points selection.
SORT BY	Toggle field. This field toggles between DISTANCE and NAME. Sorting by distance will include all points within the data file which are located within the distance specified in MAX DISTANCE. Sorting by name will include all points within the data file which are closest to the point name chosen, up to the limit is set in # POINTS.
HERE	Selects the current calculated position as the reference point.
CNCL	Discards any changes and recalls the previous screen.
OK	Accepts any changes and returns to the previous screen.

5

Troubleshooting

General

GPS FieldMate is a differential system consisting of two GPS receivers linked by a radio data link. To obtain high accuracy, all system components must be operating optimally. This appendix discusses some of the operational problems that can occasionally be encountered with a differential GPS system, and presents suggested remedies.

Handheld Reboot

The handheld controller may sometimes lock up, preventing communication with the receiver or PC. If a hard reboot is necessary, press the following key combination:

- Both ↑ keys and red power key if you have the standard keyboard.
- The ESC and ↑ keys and red power key if you have the TDS keyboard.

This should only be necessary if the handheld completely locks up and does not respond to a normal soft boot.

Handheld Power Management

If a *Warning Battery Level Low* message displays and the Husky keeps turning off, follow these steps to get the Husky working again:

1. Exit normally. You may have to keep turning the Husky back on after each keystroke, but get to the DOS prompt. Do not reboot the Husky to get to the DOS prompt unless you cannot exit normally.
2. Press the **Paw** and **H** keys together. The **Paw** key is the key directly below the **YES** key. It has a green paw symbol on it.
3. Press the right arrow key twice to highlight **Power** and then press the **Yes** key to access to the Power Parameters screen.
4. On the Power Parameters screen, use the up or down arrow keys to toggle the Advanced Power management selection screen to **Yes** then press the **Yes** key.
5. Use the up or down arrow keys to increase the **Power Remaining** to a value at least 5% above the **Low Power** warning onset. Press the **YES** key to accept the changes, then press the **ESC** key to return to the DOS prompt. The **low power** warning should not be present.

Operational Troubleshooting

The GPS system is a line-of-sight system with measurements based on a direct signal from the satellite to the GPS antenna. High accuracy can be obtained only with proper satellite geometry. Care must be taken to ensure the best satellite coverage is available at all times when high accuracy is required.

Satellite coverage is easily predicted using the Mission Planning software and current satellite almanacs. The software gives you an accurate overview of predicted satellite coverage and geometry for several days.

Additionally, the Mission Planning software allows you to model the effects of obstructions (i.e. high walls, heavy equipment, topography, etc.) on the satellite coverage and geometry.

Proper planning with current satellite data will offer the best results under any conditions.

In order to obtain high accuracy, the system must use phase corrections to resolve carrier phase ambiguities. This requires good satellite coverage at both the base and the remote sites, and good correction data via the radio link. Once ambiguities have been resolved, the system should maintain high accuracy for the entire survey. Initial resolution times are usually 1 to 2 minutes under good conditions.

If the system loses lock during the survey, ambiguity resolution and high accuracy should return quickly (usually 30 seconds or less). When the HRMS and VRMS are in the centimeter range the system is again ready for high-accuracy survey.

Certain conditions can prevent initial resolution. For example, in a high multipath area, carrier phase readings vary greatly, causing GPS FieldMate to have difficulty reaching initial ambiguity resolution. Moving even a few meters away from the current position will usually improve the readings and ambiguity resolution.

After a loss of lock, especially after a long period of good surveying, the re-resolution time may be very long. This is caused by a filter in the processing software constantly trying to improve the position estimate. This position estimate process may become constricted, causing long resolution times.

A switch allows you to open up the position estimate. By pressing the ↑ and INS keys, you reset the search filter parameter, and resolution is often immediately improved.

To obtain the best efficiency in the field, pay close attention to the operation of the system. Too few satellites, poor geometry, or lack of correction data will degrade system performance.

The Remote Differential Screen (DIFF) screen displays the operational status of the differential system. By checking this screen when poor field operation occurs, you can see exactly what is causing the problem.

- Check that the base station corrections are being received. Second, check to see that the remote unit is tracking enough satellites.

  If the remote unit is not tracking enough satellites, it may be possible to use lower elevation satellites by lowering the elevation mask to 5 degrees. This is found on the “Data Logging Setup Screen (LGST)” on page 139.
- Check to see if the solution is float (F) or fixed (X). If the solution is float, resetting the search filter (see previous page) may aid in resolution.

Radio Link

The differential GPS system sends corrections from the base GPS receiver to the remote or field unit through a radio/modem link. The corrections are applied to GPS measurements at the remote unit to obtain high accuracy positions. Loss of the radio telemetry will degrade the position accuracy. The system allows for the loss of some of the corrections, while still offering high accuracy.

You may notice that under some conditions the radio telemetry is intermittent, but by carefully monitoring the reported HRMS and VRMS, you can still complete a survey.

GPS FieldMate warns when problems exist with the radio link. The handheld software first reports a poorer solution, and when too many corrections have been missed, it will report "**Old Coordinates**".

If the telemetry link is intermittent or cut off, real-time high-accuracy readings are not possible. Some areas of the survey area may restrict the operation of the real-time differential GPS system. These areas can still be surveyed with GPS, however, this requires post-processing of data and these techniques are not covered in this manual.

Multipath

Multipath is a broad term which describes the effect when a GPS signal is interfered with on the way to the GPS antenna. This interference is usually caused by reflection of the signal from a surface or by an object blocking the GPS signal.

Multipath creates false or poor measurements from one or more satellites. These measurements affect the GPS position solution, causing poor accuracies or failure of resolution.

You must be aware of possible causes of multipath and avoid operations in these areas. Common causes are reflections from vehicles, equipment or buildings, or signal degradation due to interference by trees or radio sources.

If you are experiencing poor results or long resolution times, multipath may be the cause of these problems. Moving even a few meters from a problem area may solve the interference problem. Areas of likely multipath (i.e. close to large buildings or equipment, operations in heavy tree cover) should be surveyed using offsets, to allow for proper system operation.

GPS Mission Planning

As noted elsewhere, good knowledge of GPS coverage and satellite geometry for the given survey area and time are crucial to a successful survey. A full review of the satellite situation should be undertaken before each survey.

Fast Carrier Phase Differential (Fast CPD)

Fast CPD is a mode which allows you to navigate very quickly between points. Fast CPD resolves to an accuracy of approximately one decimeter almost instantaneously. The solution may gradually improve to a few centimeters over time, but generally remains at the decimeter level. Fast CPD offers several advantages for lower accuracy survey: With the fast CPD mode operating, the screen update for position display shows little or no delay. After a loss of lock, fast

CPD returns to decimeter accuracy within a few seconds and maintains this level under poor conditions. Navigation functions are faster by at least a factor of two.

This mode of operation can offer a significant increase in the speed of production for lower accuracy work. Fast CPD can be switched ON or OFF at any time from the RZ Remote Differential Setup (DFST) screen.

Handheld Program

Q: I log a point, but the Point Selection Screen does not display an asterisk adjacent to the point ID.

A: An asterisk is displayed adjacent to a point ID only when the point is logged via Shift+L in one of the navigation screens. The purpose of the asterisk is to inform you that the point has been surveyed as well as staked.

A

Handheld Transfer

Overview

Handheld Transfer provides communication between a PC and a handheld controller, giving you an easy and quick way to copy, move, and delete files, and to change the current drive and directories on the handheld and PC. This version of **Handheld Transfer** supports the Husky FS/2, FS/3 and MP2500 handheld controllers.

Getting Started

Before Using Handheld Transfer

At this point you need to do some preliminary setup operations that depend upon whether you are using a FS/2 or a FS/3.

Setup

1. Connect FS/2 or FS/3 serial port 1 to a COM port on your PC using the appropriate serial data cable.
2. Turn on the PC.
3. Turn on the FS/2 or FS/3 by pressing the red power key.

4. If the FS/2 or FS/3 is being used for the first time, or if the FS/2 or FS/3 has been rebooted since its last use, the FS/2 or FS/3 opening screen appears (Figure A.1). If this is the case, go to step 8, otherwise go to step 5.

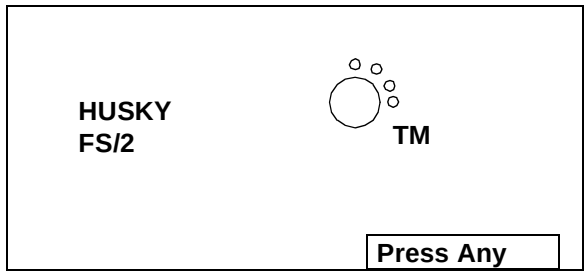

Figure A.1. FS/2 or FS/3 Opening Screen

To reboot the FS/2 or FS/3, simultaneously press SHIFT+SHIFT+POWER (both shift keys and red power key) and hold for about 2 seconds.

5. If the FS/2 or FS/3 has been recharged, or if a power interruption has occurred (e.g., the batteries were replaced), then the FS/2 or FS/3 power parameters screen may appear (Figure A.2) .
6. Change the settings as appropriate (continue or stop recharging), then press **ESC** until you get a DOS prompt, and continue with step 8, otherwise go to step 7.

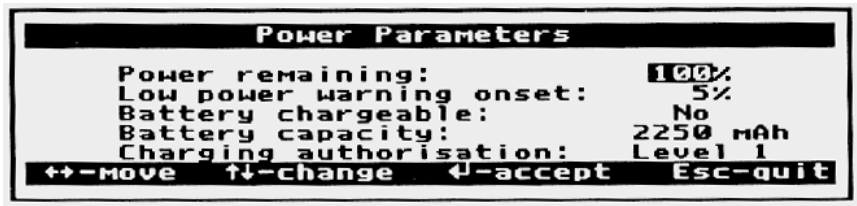

Figure A.2. FS/2 or FS/3 Power Parameters Screen

The FS/2 or FS/3 is recharged as follows: 1. With the DOS prompt on the screen, press the PAW key (shown in FIGURE A.1.) and the H key to access the FS/2 or FS/3 setup screen. 2. Press the right arrow twice and press YES to access the power parameters screen. 3. Set ADVANCED POWER MANAGEMENT (APM) to YES (up or down arrow as necessary, then YES). 4. Press right or left arrow until CHARGING AUTHORISATION is highlighted. 5. Use up or down arrow to select LEVEL 3. 6. Press YES. 7. Press red power key to turn off FS/2 or FS/3. 8. Connect FS/2 or FS/3 power adapter to facility power and to power port on bottom of FS/2 or FS/3; message "CHARGING IN PROGRESS" appears on the FS/2 or FS/3 screen. When charging is complete, the message "CHARGING COMPLETED" appears.

7. If the FS/2 or FS/3 was running a program when last powered off, the program resumes when the FS/2 or FS/3 is turned back on. If this is the case, exit the program and go to step 9.

   The FS/2 or FS/3 should now be displaying the DOS prompt **C:\>**.

8. Start the file transfer utility that is built into the FS/2 or FS/3 by typing **HCOM**, and then press **Yes**.

   The FS/2 or FS/3 file transfer utility screen appears (Figure A.3) (your version and date may be different). This screen indicates that the file transfer program is running, and the FS/2 or FS/3 is ready for communication with the PC.

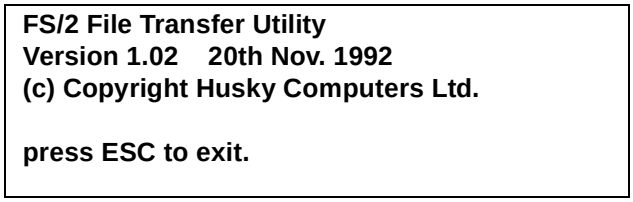

Figure A.3. FS/2 or FS/3 File Transfer Utility (HCOM) Screen

9. Press the **ESC** key on the FS/2 or FS/3 to exit the file transfer utility and return to the DOS prompt.

CAUTION

If any of the above conditions is not fulfilled, Handheld Transfer displays the warning message"Remote was not found".

Using Handheld Transfer

The Main Window

1. Double-click the **Handheld Transfer** icon on the PC to open the main window (Figure A.4).

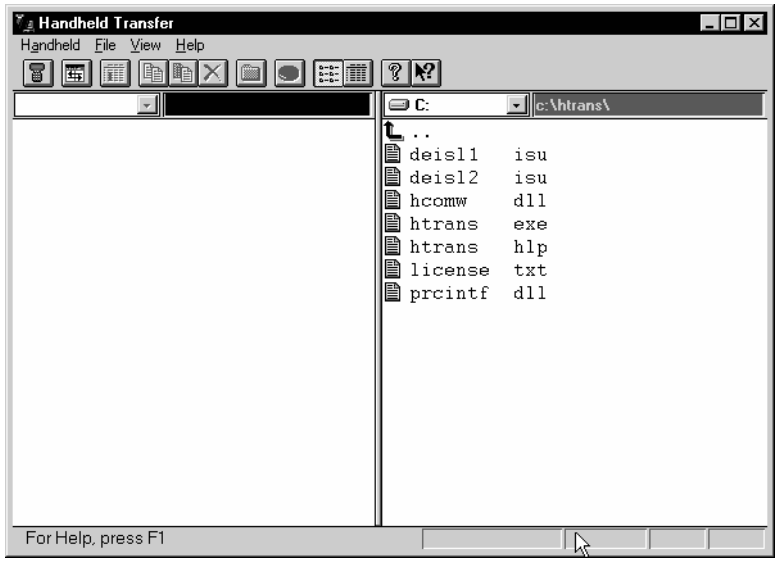

Figure A.4. Handheld Transfer Main Window

The left half of the display is the Handheld pane, which shows the files, if any, in the handheld. The right half of the display is the PC pane, which shows the files, if any, in the indicated directory of the PC. The blue bar along the top edge of the pane shows that the pane is active.

You use these two panes to transfer files from handheld to PC, or from PC to handheld. The files may be data collected from a GPS receiver, executable files, or any kind of information that must be transferred between units.

Operation

Switching Between Panes

To switch between panes, use one of the following methods:

1. Click the pane you want to be the current pane.
2. Use the **Tab** key on your keyboard.
3. Click the **Change pane** button on the toolbar.

Connecting a Handheld

Handheld Transfer provides two methods to connect a handheld: **Connect** and **Auto Connect**.

Connect Method

1. Select **Connect** from the **Handheld** menu or click the **Connect** button to open the Connect to Handheld dialog box (Figure A.5).

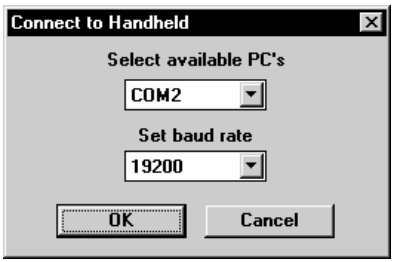

Figure A.5. Connect to Handheld Dialog Box

2. In the **Select available PC's** box, click the down arrow and select the PC COM port that you want to use.
3. In the **Set baud rate** box, click the down arrow and select a baud rate from the list box. When connecting to a Husky FS/2 or FS/3, select 38400.
4. Press **OK**. The Handheld Transfer software now connects your handheld to the PC using the parameters that you selected.

Auto Connect Method

1. Switch to the **Handheld** pane.
2. Select **Auto connect** from the **Handheld** menu.

Once the handheld is connected, a Disconnect option becomes available in the Handheld menu.

Viewing a List of Files and Directories

You can change the appearance of files and directories using the **Brief** or **Full** options from the **View** menu.

- **Brief** displays files and directories as a list.
- **Full** displays files and directories with information about size and day last modified.

Selecting a Drive

Handheld Transfer displays files and directories on one of the drives of your computer or handheld. To change the current drive:

1. Locate the mouse cursor at the handheld or the PC pane depending on the drives you want to change.
2. Click on the **Drive** button **(**Figure A.6) to display the Drive list.

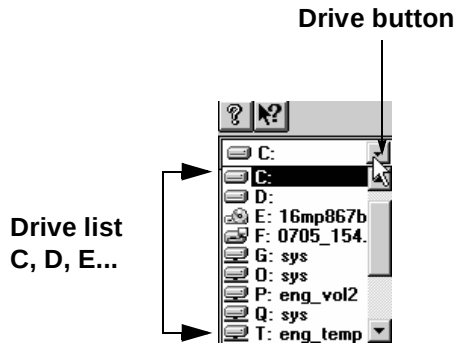

Figure A.6. Drive List

3. Click the letter of the drive. The dialog box closes. You can see the files and directories on the selected drive. The current disk drive is shown in the main window title.

Copying and Moving Files

The following paragraphs summarize the ways in which **Handheld Transfer** allows you to select a single file or multiple files. Once items have been selected,

if you change your mind, you can unselect the items by clicking anywhere on the screen. After selecting, press **OK**.

Handheld Transfer allows you to copy a file or multiple files from the handheld current directory to the PC current directory or vice versa.

To copy a file do the following:

1. Make sure the destination directory is visible and the source directory is current.
2. Select the file or multiple files you want to copy as described above.
3. Choose **Copy to** from the **File** menu or press the **Copy to** button on the toolbar.

You can copy files by using the pop-up menu. Use the right mouse button to click the selected file. Choose COPY TO from the menu that appears.

To move a file or multiple files from the handheld current directory to the PC current directory, or vice versa, do the following:

1. Make sure the destination directory is visible and the source directory is active.
2. Select the file or multiple files you want to move, as described above.
3. Choose **Move to** from the **File** menu or press the **Move to** button on the toolbar

You can move files by using the pop-up menu. Use the right mouse button to click the selected file. Choose MOVE TO from the menu that appears.

B

FSRadio

Configuring the Pacific Crest Radio Modem with the Data Collector

The Pacific Crest UHF/VHF radio modems can be programmed from the data collector. FSRADIO supports the Pacific Crest radio modems and the Ashtech Spread Spectrum Radio. The following details the FSRADIO interface to the Pacific Crest radio modems. For information regarding the Ashtech Spread Spectrum Radio, refer to the *SSRadio Operations Manual, part number 630173-01*.

FSRADIO.EXE is located in the program files directory with GPS FieldMate. Verify the radio is connected to the GPS receiver and powered when programming a base station radio. Disable data transmission before attempting to program the radio. From the data collector DOS prompt, type FSRADIO and press the YES key. If you are connecting directly to the radio, type FSRADIO /D at the prompt. Be sure to insert a space between the last letter of the first word (“O”) and the forward slash (“/”).

If you are using Husky’s COM2 port, type “/2” when you run the FSRADIO program.
“/1” sets COM1 which is the default, so if you are using COM1, you don’t have to type it.

The FSRADIO program menu is character-based, requiring you to select items from menus. The data collector can program the following parameters:

- Daisy Chain Mode
- Sensitivity
- Channel
- Link Speed

The Main screen appears (Figure B-1).

Figure B.1. Main Screen

Daisy Chain Through Screen

Once the data collector has established communication with the GPS receiver, use the **Daisy Chain Through** screen (Figure B-2) to connect the data collector to the radio through a receiver serial port.

Figure B.2. Daisy Chain Through Screen

The selections on this screen are B, C, and D. These are the serial ports on the GPS receiver. Port A (or whatever port the data collector is connected to) on the receiver is not available, as it is used by the data collector. A valid port selection calls the Connect To screen, and the program then activates the daisy chain mode in the receiver using the selected port. If your GPS receiver has an internal radio installed, select Port D.

When direct connection is used, the Daisy Chain Through screen is bypassed.

Connect To Screen

Use the Connect To screen (Figure B-3) to configure a Pacific Crest radio or an SSRadio (not covered in this manual).

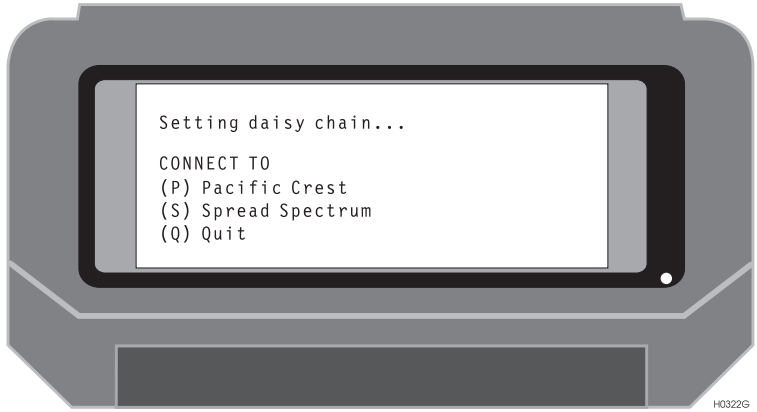

Figure B.3. Connect To Screen

The selections in this screen are:

P – Calls the Pacific Crest radio configuration screen.

S – Calls the SSRadio Status Screen.

Q – Quits the program.

Press the appropriate key to make the desired connection.

Radio Status Screen

The **Radio Status** screen (Figure B-4 and Figure B-5), allows you to view the current configuration, return to the 'Connect To screen,' or advance to the 'Change Parameters screen'.

If the radio firmware supports the software break function, the software communicates directly with the radio. The program displays the communication attempt, then displays the current configuration as shown in Figure B-4.

Figure B.4. Radio Status with Software Break Function

If the radio firmware does not support the software break function, the software prompts you to cycle power on the radio. The program displays the communication attempt, then displays the current configuration as shown in Figure B-5.

Figure B.5. Radio Status without Software Break Function

The selections in this screen are:

C – Change parameters of the radio. This selection calls the ‘Change Parameters’ screen.

Q – Return to the ‘Connect To’ screen.

Change Parameters Screen

Use the **Change Parameters** screen (Figure B-6) to change settings of the radio.

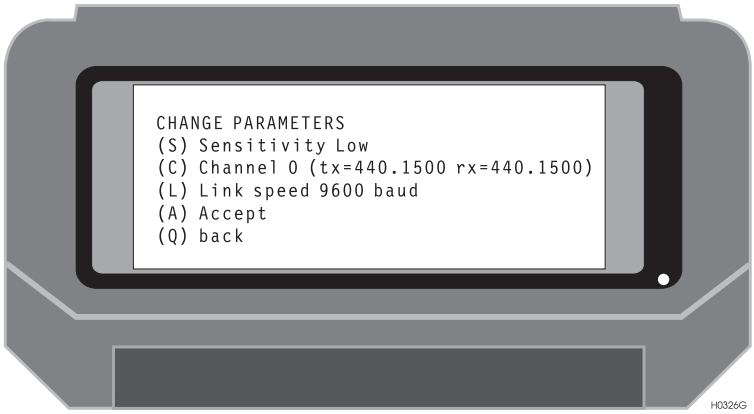

Figure B.6. Change Parameters Screen

The selections on this screen are:

S – Calls the ‘Select Sensitivity’ screen.

C – Calls the ‘Select Channel’ screen.

L – Calls the ‘Select Transmission Speed’ screen.

A – Accepts selected parameters and programs the radio.

Q – Returns to the ‘Radio Status’ screen.

Select Sensitivity Screen

Use the **Select Sensitivity** screen (Figure B-7) to change the radio sensitivity setting.

Figure B.7. Select Sensitivity Screen

The selections on this screen are:

H – This sets the radio sensitivity to high. Use this setting when long distances are expected between the base and rover radios.

M – This sets the radio sensitivity to moderate. Use this setting when medium to long distances are expected between the base and rover radios.

L – This sets the radio sensitivity to low. Use this setting when short distances are expected between the base and rover radios. This is the preferred setting for the base radio.

After you make a selection, the program returns to the ‘Change Parameters’ screen.

Select Channel Screen

Use the **Select Channel** screen (Figure B-8) to change the radio channel setting. Up to 16 channels are available in the radio.

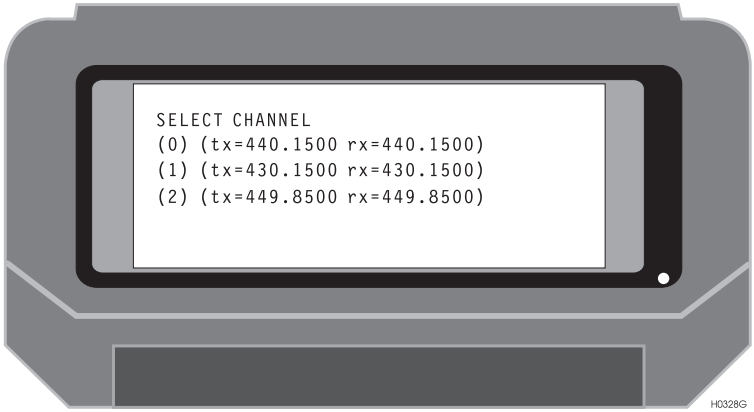

Figure B.8. Select Channel Screen

The selections on this screen are:

0-15 – This sets the radio channel to the selected setting.

After you make a selection, the program returns to the ‘Change Parameters’ screen.

Select Transmission Speed Screen

Use the **Select Transmission Speed** screen (Figure B-9) to change the radio transmission speed setting. 9600 baud is recommended for most RTK applications.

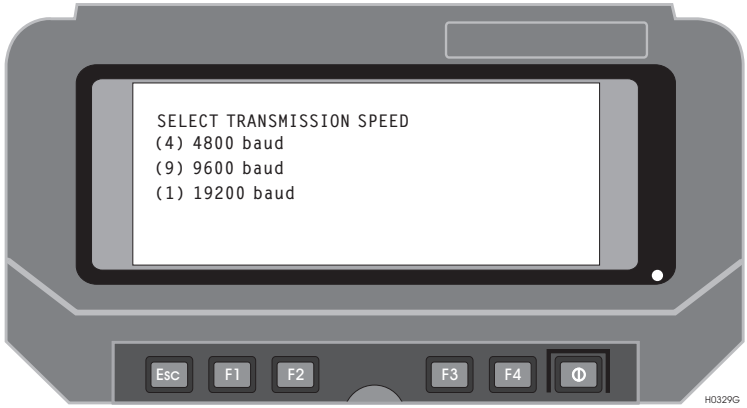

Figure B.9. Select Transmission Speed Screen

The selections on this screen are:

4 – This sets the radio transmission speed to 4800 baud.

9 – This sets the radio transmission speed to 9600 baud.

1 – This sets the radio transmission speed to 19200 baud.

After you make a selection, the program returns to the 'Change Parameters' screen.

Programming the Changed Parameters

After all the necessary parameters have been changed, program the radio with the new settings in the Change Parameters screen (Figure B-10).

Select ‘Accept’ to program the changed parameters.

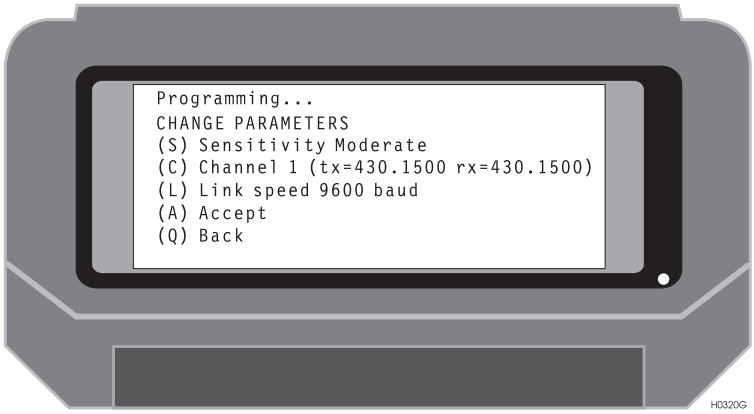

Figure B.10. Change Parameters Screen

After the radio is programmed, the current parameters are displayed in the Change Parameters screen (Figure B-11).

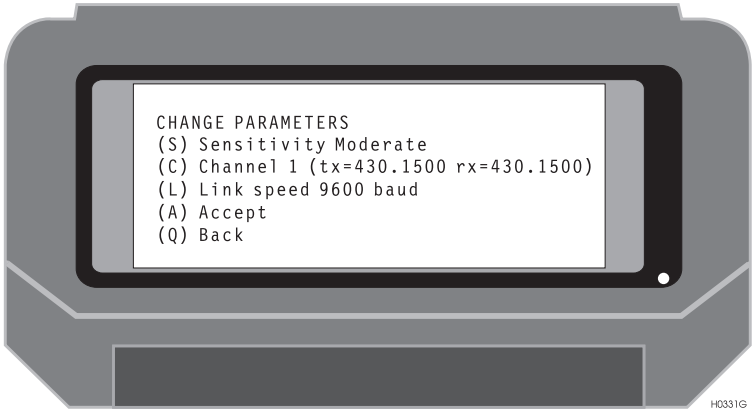

Figure B.11. Change Parameters Screen

- Press ‘Q’ to return to the ‘Radio Status’ screen.
- Press ‘Q’ to return to the ‘Connect To’ screen.
- Press ‘Q’ to exit the program.

It is necessary to exit the program completely in order to disable the daisy chain mode.

C

Global Product Support

If you have any problems or require further assistance, Customer Support can be reached through the following:

- telephone
- email
- Internet

Please refer to the documentation before contacting Customer Support. Many common problems are identified within the documentation and suggestions are offered for solving them.

Phone and Fax Numbers

- Main
  - Voice: 408-615-5100
  - Fax: 408-615-5200
- Sales
  - US: 800-922-2401
  - International: 408-615-3970
  - Fax: 408-615-5200
- Europe
  - Voice: 44-0118-931-9600
  - Fax: 44-0118-931-9601
- Support
  - US: 800-229-2400
  - International: 408-615-3980
  - Fax: 408-615-5200

Internet

- support@ashtech.com
- http://www.ashtech.com
- http://www.magellangps.com

- Check cables and power supplies. Many hardware problems are related to these simple problems.
- If the problem seems to be with your computer, re-boot it to clear the system's RAM.
- If you are experiencing receiver problems, reset the receiver as documented in the set commands section of this manual. Note that the reset command clears receiver memory and resets operating parameters to factory default values.
- Verify that the batteries are charged.
- Verify that the antenna views skyward are unobstructed by trees, buildings, or other canopy.

If none of these suggestions solves the problem, contact Customer Support. To assist Customer Support, please have the following information available:

Table C.1 GPS/GIS Product Information

Information	Your Actual Numbers
Receiver model	
Receiver serial #	
Software version #	
Software key serial #	
Firmware version #	
Options*	

Table C.1 GPS/GIS Product Information (continued)

Information	Your Actual Numbers
A clear, concise description of the problem.	
* The firmware version # and options can be obtained using the $PASHQ,RID (receiver identification) command.	

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