

Tools

User's Guide

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Printed in the United States of America.

Part Number: 630056-01, Revision A

January, 1998

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Introduction

A part of the WinPrism/WinPrism L1 software, Tools provides an effective and efficient way to convert among time systems, edit/view raw receiver data files, and transform data to various projections. It also lets you convert geodetic coordinates, translate data from one datum to another, and examine ASCII files. You can also store data in NGS BlueBook formats. Tools displays its array of functions in the familiar and easy-to-use Options Grid.

The Tools modules are fully compatible with the other WinPrism software programs and give you the ability to work back and forth between programs. They provide a total, integrated environment in which you can complete your project.

Hardware and Software Requirements

All WinPrism modules have been designed to run on an industry-standard personal computer - an IBM or IBM-compatible using either the Windows 95 or Windows NT Operating Systems. Like all computer programs, WinPrism provides results faster when a more powerful computer is used. WinPrism can run on the minimum setup shown in Table 1.1. However to significantly reduce your processing time, use the recommended system; it will better utilize your time and will be a cost-effective investment.

Table 1.1: Hardware and Software Requirements

| Equipment | Minimum | Recommended |
|------------------|---|---|
| Operating System | Windows 95 or Windows NT 4.0 with service pack. | Windows 95 or Windows NT 4.0 with service pack. |
| Processor | 80486/Dx2-66 | Pentium |
| Memory | 16 Megabytes | 32 Megabytes |
| Free Disk Space | 40 Megabytes | 40 Megabytes |
| Mouse | Microsoft or compatible | Microsoft or compatible |
| Graphics card | VGA | SVGA |
| CD Rom | 2x or better | 2x or better |

To use the barcode facility, you need PrintBar II®, barcode printing software from Bear Rock Software, and barcode reader pens.

Accessing the Utility Programs

Tools Main Options Grid

All descriptions in this manual start at this level. It is also the point to which you return when you click on the QUIT button from within each individual Tools module.

Using the Tools Programs

WinPrism provides an easy-to-use and consistent method of executing the various associated modules. Each module is fully compatible with the others and is designed so that no extensive computer knowledge is required. Even if you are not accustomed to using computers, you will find that you can readily become proficient with this software.

The following conventions make it easier for you to get up to speed quickly and work back and forth easily between programs due to the consistency shared by the individual functions: making selections with the pointer, specifying the directory that your data files are coming from and going to, entering text, and exiting from one module to the next higher level of the software.

Making a Selection

Whenever the pointer tracks over an option box that can be invoked or an entry that can be selected, the area will be highlighted. To make a selection, move the mouse so that the pointer is in desired area, and click the left mouse button.

Many items reflect a checkmark next to them once they have been selected. Some echo the selection opposite the label; for example, on the TRANSFORM screen, the file selected from the FILE SELECTION panel is displayed opposite FILE NAME.

Selecting a Directory

If you need to change the default drive to find the files you're interested in, you do this at the top level. Click on DIRECTORY.

A screen will drop down, listing the subdirectories of the current directory. The display lets you select a directory or type in the name of an existing one. You can also create a new directory with this function. Type the name of the desired new directory including the full path, then select ACCEPT. Tools will prompt you whether or not to create.

To change the drive, move the pointer to the drive submenu area. Position it on the left or right arrow and click until the desired drive is displayed.

When you click on the left pointing arrow, the display shows the drive designator with a letter earlier in the alphabet. If you want to indicate a drive with a letter later in the alphabet, click on the right pointing arrow. When the desired drive is displayed, release the mouse button.

You'll see a list of directories residing on that drive. WinPrism displays any subdirectories it finds in that directory. To look further down into a directory tree, click on one of its subdirectories. In response, the software will display the subdirectories of that directory.

If you have more subdirectories at a given level than can be shown in the panel, you can scroll through the list by moving the pointer to the vertical bar on the right, on the ↑ (up-arrow box) or the ↓ (down-arrow box) and clicking on it. A beep indicates that you have reached the end of a list. You cannot scroll further.

Continue to work your way down the tree until the directory you desire is displayed. The full path is displayed in the current directory bar or after the label SOURCE PATH.

To move up a tree, click on the \.. designator. This selects the parent directory and displays the subdirectories at that level. A beep tells you when you have reached the top level. Note that files are not displayed in this screen. Files are displayed within the Tools modules, when appropriate, on the right side of the screen.

Entering Text

There are several entry fields into which you can type information. To make a field active, move the pointer to it and click the left mouse button. (You can also move the pointer by using the arrow and tab keys.) Typically, an entry field into which you can enter information is a blue rectangle. If there is no rectangle, you cannot affect the information in that field from the current screen.

In response to the point-and-click, WinPrism displays an I-shaped cursor. This signals data-entry mode. As you type each character from the keyboard, you are entering it into the leftmost character position. Characters to its right are shifted right one position. Uppercase and lowercase characters are accepted in most fields. (A few fields accept uppercase only.) Erase undesired characters or numbers with the key or overwrite them with spaces.

When you have what you want in a field, press the <enter> key or move the pointer to another field and click the mouse's left button. The cursor will go to that field. In addition, when a field becomes full, the cursor automatically jumps to the next field.

The tab and arrow keys can be used to move the cursor from field to field. The tab key moves the cursor to a field on the same line. You can also move the pointer to a field and click a mouse button to "jump" the cursor to that field.

Within the data-entry fields, <Backspace>, <Home>, <End>, , and <Ins> retain their usual dos functionality.

Exiting

When you are ready to exit any of the WinPrism programs, move the pointer to the **quit** button and click on it. This returns you to the next higher level of the software with the package.

When you are ready to exit the WinPrism environment, move up the various levels until you see the menu labeled **main** menu.

Move the pointer to **exit** and click on it. This returns you to the operating system.

Tools Reference

The next chapter describes each utility program and offers some suggestions for using it. Each discussion starts with a general description of the function and an illustration of its top-level screen. This is generally followed by a step-by-step procedure for doing useful work. The procedure is followed by descriptions of menus and panels.

Where appropriate, you'll find relevant subsections on other matters, for example, installing the necessary printer software to support the Barcode option.

For really quick access to the information, refer to the page index at the end of this manual. If you have any problems or need further help, contact Ashtech Customer Support; details are in "Customer Support" on page 73 .

Program Reference

This chapter briefly describes the functions available with Tools, followed by detailed instructions for executing each option of each utility program. A section is devoted to each option on the Options Grid. Where appropriate, processing and design philosophy are described in greater depth.

When you call up Tools, you'll see the main options menu:



Figure 2.1 WinPrism Tools Main Screen

There are four areas of interest on the screen:

- Top title bar (unchanging)
- Directory bar
- Options Grid - central area of screen
- Tools area - bottom of screen

The three-by-three block in the center of the display is the options grid, which displays the options you have at this point: FILETOOL, TIMESYS, TRANSFORM, D-file and PTS file TOOL, BLUEBOOK, RESULTS, BARCODE, and RINEX. The area at the bottom of the screen shows two more options: go to DOS, or QUIT.

Options Summary

The Options Grid presents the six program modules of the Tools facility in the form of icon "buttons", displayed in the window. To select an option, move the mouse pointer to the option you want to select or change. Whenever the arrow tracks over an option that can be invoked, that box will be highlighted.

When you select an option (i.e., click on it), the menu for that option program fills the screen. When you exit an option, Tools returns to the Tools Options Grid.

The options, from left to right, top to bottom are:

Table 2.1: Tools Menu description

| Button | Description |
|-----------|--|
| FILETOOL | Lets you view and edit raw measurement data files and ephemeris files. Lets you combine files and create ASCII files. Also lets you correct for erroneous receiver settings and eliminate malfunctioning satellites. |
| TIMESYS | Converts among four time systems: GPS, modified Julian, Gregorian, and year/day. |
| TRANSFORM | Performs 3-, 7-, and 10-parameter transformations and projections of user-entered points or various input files. |
| D&PTS | Allows combination of attributes from D-file collected by Survey Control Software and PTS-file |
| BLUEBOOK | Stores files in NGS BlueBook formats. |
| RESULTS | Displays specific WinPrism-generated files as well as any ASCII files. |
| BARCODE | Creates barcodes that can be printed and carried to the field so that field personnel can enter information into a GPS receiver by means of a barcode reader pen. |
| RINEX | Converts RINEX observation, navigation, and meteorological files into Ashtech-format raw data files that can be combined and postpro-cessed with Prism software. Also converts Ashtech format to RINEX format. |

The Tools Menu

The Tools menu, at the bottom of the screen contains a DOS button and a QUIT button.

Table 2.2: Tools Menu

| Button | Description |
|--------|--|
| DOS | Shells out to the operating system. When you shell out to the operating system, you leave WinPrism and go immediately to DOS where you can execute a DOS command. WinPrism remains in memory. In DOS, type EXIT to return to WinPrism. |
| QUIT | Returns you to the next higher level of software; where you go depends on the module from which you summoned Tools. |

The Filetool Option

The Filetool option lets you edit the raw measurement data files and the satellite ephemeris files. It also lets you correct field errors induced by any incorrect settings in the GPS receiver and eliminate malfunctioning satellites. You can also ARCHIVE one or more files to diskette(s), or RECOVER data from diskette(s) into the

individual files used to create the archive. When you click on this icon, you'll see the following display.

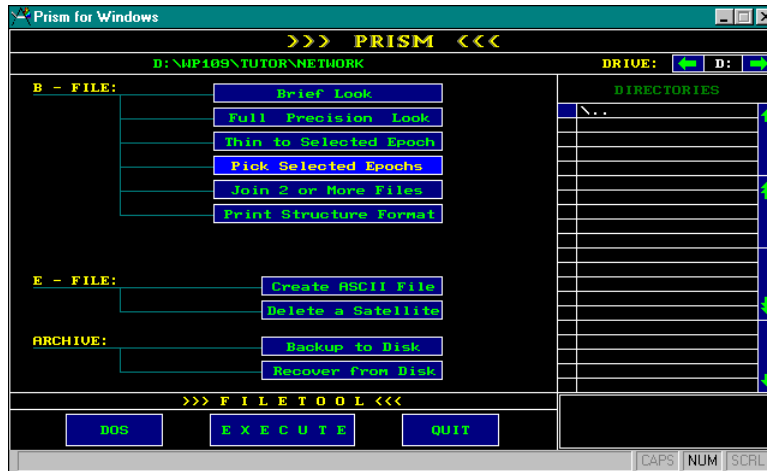


Figure 2.2 Filetool Main Screen

The procedure for working with Filetool is:

1. Select a function such as BRIEF LOOK.
2. Select a file from the DIRECTORIES panel.
3. Click on the EXECUTE button in the Filetool menu.

To return to the Option Grid of Tools, click on the QUIT button.

Selecting a Function

To make one of the operations active, click on a function such as BRIEF LOOK. In response, Filetool displays the flag "ACTIVE" by that function.

Selecting a function also implies the file type (B-, or E-file) that you will be working with. When you select a function, Filetool responds by displaying in the DIRECTORIES panel all files of that type, and only that type, that reside in the current directory. Note that Filetool displays the name of the current directory at the top of this screen. If you inadvertently choose the wrong function, click on the QUIT button to choose another.

In some cases you may want to protect your files, before you use Filetool, copy and rename them so they start with a letter other than the file type you intend to work with, B-, or E-, as the case may be.

The B-files are binary files, downloaded from a receiver; they contain raw data computed pseudo-ranged positions for many epochs plus carrier phase and code phase information.

The E-file is a binary ephemeris file downloaded from a receiver. It gives accurate orbit parameters and time corrections and is used to compute the satellite's position.

Specifying the File

When you initially enter the Filetool option, the DIRECTORIES panel displays all next level subdirectories of the directory you are currently in. If files you want are in the current directory, they will appear after you specify a function.

If the files you want are on the current drive, but not in the current directory, they can be accessed by clicking on the current directory or directories.

If the desired files are not on the current drive, click on the drive box, located just above the directory panel.

Once you have specified a function such as BRIEF LOOK, Filetool will display, in the DIRECTORIES panel, all the files appropriate to the selected function (B-, or E-files) that reside in the current directory, along with the next level lower subdirectory names.

To select a source file, click on its file name in the list of files in the panel on the right (or click on the box just left of its name). The module puts a checkmark by the title.

If you wish to deselect the file you have selected, click on a different file.

Filetool Menu

Table 2.3: Filetool Menu

| Button | Description |
|---------|---|
| DOS | Shells out to the operating system. Type EXIT at the DOS prompt to return to Filetool. |
| EXECUTE | When the parameters are satisfactory, click on the EXECUTE button. Filetool will perform the requested operation and you will see a message letting you know the results. Press a button on the mouse; you'll go back to the Filetool screen. |
| QUIT | To return to other Prism functions, click on the QUIT button. You will go to the Tools Options Grid. If you have an operation active, clicking on QUIT will abruptly terminate the operation. |

B-File Utilities

To work on B-files, click on one of the B-file functions.

In response, Filetool will display the available B-files in the DIRECTORIES panel and the label "ACTIVE" by the function you have chosen.

Brief Look

This function lets you examine data stored in your B-files. (Refer to Appendix A for a listing of the B-file structure). With BRIEF LOOK active, in the DIRECTORIES panel, click on the B-file you want to look at. Then click on the EXECUTE button.

Filetool displays the message "**Checking file, please wait**", the contents of the first selected file, and the BRIEF LOOK menu. See Figure 2.3.

This example of a record under BRIEF LOOK shows the number of epochs, and the beginning and ending session times at the top of the screen.

The screen also lists the record number, as well as the file name, the version number of the file, the receiver number and type, channel and nav boards firmware versions, and CA/L1/L2 capabilities. At the top of the file, the record number is 0.

Brief Look Menu

During the time you have the file information displayed, you also have the BRIEF LOOK menu and the B-file functions. BRIEF LOOK offers these functions:



Figure 2.3 Brief Look Menu Screen

Table 2.4: Brief Look Menu

| Button | Description |
|------------|---|
| WRITE FILE | Lets you write certain or all records from a B-file to disk in ASCII. When you click on this button, you'll see this submenu. Filetool will generate a name for the output file based on the name of the file you selected initially, tacking on a .LST extension. To change the file name, move the pointer to the WRITE as field, click on it and, when you see the L-shaped cursor, type in a new file name. To indicate the FROM record, move the pointer to that field, click on it, and when the cursor appears, type in the number of the first record you want written to the file. In the same way, indicate the number of the TO record (inclusive). Click on the OK button to initiate processing. (Otherwise, click on QUIT to de-select the WRITE FILE option.) When you click on the OK button, you'll see the message " Writing in progress, wait... " After all records have been written to the new output file, Filetool returns to the previous screen. |
| PRINT | Lets you send certain records or a copy of the whole B-file to the printer you have specified under the Setup option. While a file is being displayed, click on the PRINT button to see this submenu. To indicate the BEGINNING record, move the pointer to that field, click on it, and when the cursor appears, type in the number of the first record you want sent to the printer. In the same way, indicate the number of the ENDING record (inclusive). Click on the OK button to initiate processing. (Other-wise, click on QUIT to de-select the PRINT option.) After printing all records, Filetool returns to the previous screen. |
| RESET | Allows you to specify a range of record numbers to examine. To indicate the FROM record, move the pointer to the BEGINNING RECORD field, click on it and when the cursor appears, type the number of the first record you want to look at. In the same way, you can also indicate the number of the last record to examine in the ENDING RECORD field (if not entered, it defaults to the last record). |
| NEXT | Lets you view the next epoch of B-file data. While the content of the file is displayed, you can click on the UP, PGUP, PGDN, or DOWN buttons to look at additional epoch information not currently being displayed. |



These buttons will only be displayed if epoch information does not fit on the screen.

Table 2.5: B-File Button Description

| Button | Description |
|------------------------|--|
| QUIT | Returns to the Filetool screen. |
| FULL PRECISION LOOK | <p>This b-file function performs exactly like BRIEF LOOK, except that it suppresses some fields in order to display others with full precision. The screens displayed by FULL PRECISION look resemble the display shown below.</p> <p>FULL PRECISION LOOK has the same menu as BRIEF LOOK; for the menu functionality, refer to the <i>Brief Look Menu</i> descriptions.</p> |
| THIN TO SELECTED EPOCH | <p>This function lets you thin a B-file to a given epoch interval. You can thin one file or several. Thinning epochs is generally done to place files on a common epoch time. In doing so, you are reducing the amount of data to be processed. (It can be also used simply to reduce the data stored.) For example, if one receiver collected data on 20-second epoch cycles and another receiver collected data on 30-second epoch cycles, you could use this utility to put both on a 60-second common epoch cycle.</p> <p>With THIN TO SELECTED EPOCH active, click on the desired files in the DIRECTORIES panel. Then click on the EXECUTE button. You'll see this submenu. To indicate the THIN TO INTERVAL (in seconds), move the pointer to that field, click on it, and when the cursor appears, type in the number of seconds you want.</p> <p>Click on the OK button to initiate processing. (Otherwise, click on QUIT to return to the Filetool screen.) When you click on the OK button, you'll see the message "Thinning files" and the linear gauge will fill. After the file has been thinned, Filetool will prompt you to press any button to continue. Filetool generates a name for the new thinned file based on the original file. It renames all original files as filename.BAK. Any file that already has a backup version (a file with a .BAK extension) will not be thinned.</p> |

Table 2.5: B-File Button Description

| Button | Description |
|----------------------|--|
| PICK SELECTED EPOCHS | <p>Lets you pick out and store in a separate file the data you want to use. For example, you can pick the first 3 hours of data and discard the rest.</p> <p>With PICK SELECTED EPOCHS active, click on the desired file in the DIRECTORIES panel. That file will supply the data. Then click on the EXECUTE button. When you click on the EXECUTE button, Filetool will display the submenu shown at the right.</p> <p>To indicate the START EPOCH for the first segment (SEG), move the pointer to that field, click on it, and when the cursor appears, type in the desired beginning epoch number. In the same way, click on the END EPOCH field and indicate the last epoch of the first segment. You can also move between epoch fields using the tab key. Continue in this fashion up to 5 segments.</p> <p>When the parameters are satisfactory, click on the OK button to initiate processing. (Otherwise, click on QUIT to return to the Filetool screen.) When you click on the OK button, after all records have been processed, you'll see the message "Operation completed." Press a mouse button to continue.</p> <p>Filetool selects the appropriate epochs from the input file. It generates a name for the new file based on the original file. It renames the original file as filename.bak. Any file that already has a backup version (a file with a .bak extension) will not be processed.</p> <p>If you get an error message and are at a loss to figure it out, check the total number of epochs (upper right in drop-down screen). Make sure that your start and end epochs are within that range.</p> <p>You are allowed to enter up to five intervals per file and you must enter both the starting and ending epoch of each interval. If you want more than 5 intervals, enter the first four and the beginning of the fifth interval and then the last interval in the file. Then run through PICK SELECTED EPOCHS again, making sure to rename the filename.bak file and store it away safely. Note that a new file will have the epoch numbers sequentially and not as selected in pick.</p> |

Table 2.5: B-File Button Description

| Button | Description |
|------------------------|--|
| JOIN 2 OR MORE FILES | <p>There may be occasions where events interrupt an observation and create two or more B-file measurement files for a given station during a single session. This option lets you combine such files.</p> <p>With JOIN 2 OR MORE FILES active, click on at least two file names in the DIRECTORIES panel. Then click on EXECUTE. There is no drop-down screen. The program goes directly to execution. When the function is done, press a mouse button to continue.</p> <p>When selecting files to be joined, be sure to select them in the proper sequence. The original first file will be renamed filename.bak. The data in the first file selected from the list will be put at the top of the combined file.</p> <p>The contents of the second file will be appended to it, and so on. The combined file will carry the name of the first file selected from the list. This option will not let you join selected B-files if a filename.bak file already exists for the first selected file.</p> |
| PRINT STRUCTURE FORMAT | <p>Displays and prints the format of data in B-files. It is available for those users who wish to write their own programs to manipulate the data. When you click on the PRINT STRUCTURE format option, you'll see the question "Write to a printfile -rawstruct.lst?"</p> <p>When you click on YES, the program writes the B-file structure to a file called RAWSTRUCT.LST, otherwise it displays the structure on your screen. The entire listing of RAWSTRUCT.LST is given in Appendix A.</p> |

E-File Utilities

Table 2.6: E-File Button Description

| Button | Description |
|--------------------|---|
| CREATE ASCII FILE | Lets you create an ASCII version of an ephemeris file (either an E-file or a COMMON.NAV file). When you click on CREATE ASCII FILE, the program displays in the DIRECTORIES panel, the E-files that are in the current directory and the "ACTIVE" flag next to the function. If a COMMON.NAV file is present in the current directory, it will be displayed also. With CREATE ASCII FILE active, click on the desired file. Then click on the EXECUTE button. Filetool generates a name for the ASCII output file based on the name of the file you selected, adding the extension ".ASC". To change the file name, move the pointer to the OUTPUT FILE field, click on it and, when you see the L-shaped cursor, type in a new file name. Click on the OK button to initiate processing. (Otherwise, click on QUIT to return to the Filetool screen.) After all records have been written to the new output file, you'll see "Operation completed." Press a mouse button to continue. The program returns to the Filetool screen. |
| DELETE A SATELLITE | Lets you remove a satellite from an ephemeris file (either an E-file or the COMMON.NAV file). Use this function when a satellite broadcasts old or erroneous navigation data. When you click on it, it displays in the DIRECTORIES panel, the E-files that are in the current directory and the "ACTIVE" flag next to the function. If a COMMON.NAV file is present in the current directory, it will be displayed also. With DELETE A SATELLITE active, click on the file name. Then click on the EXECUTE button. Filetool renames the original file as filename.bak . If a file with a .BAK extension already exists for that file, you will not be allowed to delete a satellite. Enter the satellite number. Click on the OK button to initiate processing. (Otherwise, click on QUIT to return to the Filetool screen.) After all data from the specified satellite has been deleted from the new output file, you'll see "Operation completed." Press a mouse button to continue. The program returns to the Filetool screen. |

Archive Utilities

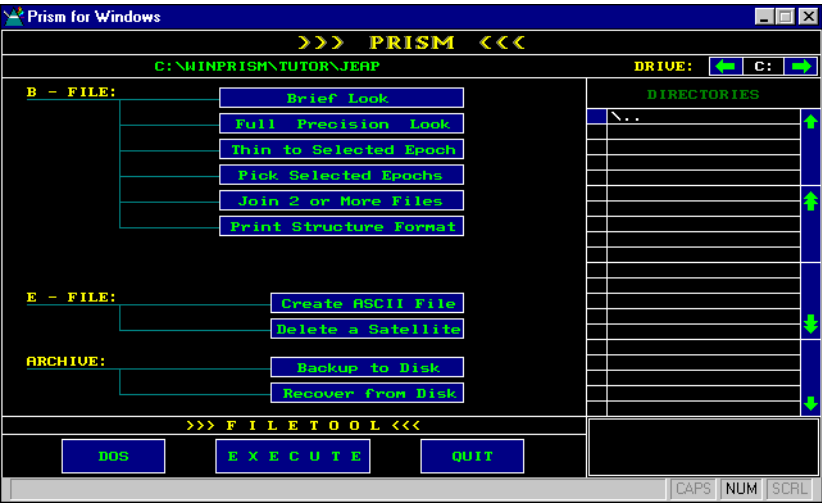


Figure 2.4 Archive Utility Menu

Table 2.7: Archive Utilities

| Button | Description |
|----------------|--|
| BACKUP TO DISK | Lets you select one or more files from a file selection box and archive them to a selected drive (A or B). When you click the Backup to Disk button, you'll see the following display: Choose drive A or B as a destination drive in the Dest. Drive field. Archive Name is an editable field representing the name which will be stored on all diskettes to help you recognize the diskette(s) you want when RECOVER FROM DISK functions are performed. Modify the Search Pattern field to filter files displayed in the FILES panel. |

The FILES panel displays the files in the Source Path directory specified in the Search Pattern field.

You must select the files which you would like to archive. Click on the SELECT ALL button (in the bottom of the FILES panel) to select all files currently in the

FILES list (meeting the search pattern criteria). To select only some of the files in the list, click on the files you want to select and checkmarks appear to the left of the file names. The CLEAR ALL button deselects all previously selected files.

The illustration below shows a typical screen with selected files and all information filled out.



Figure 2.5 Archive Utility Screen

When you click on the GO button, the ARCHIVE operation starts.

When the operation is complete, the following message appears:

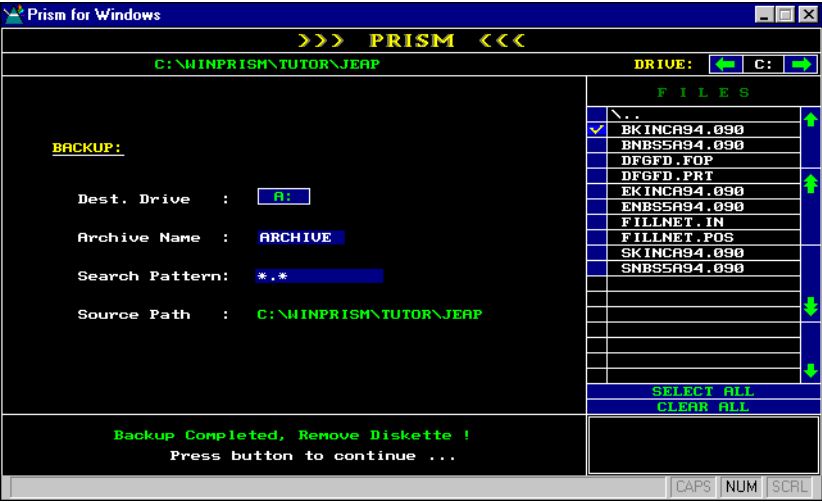


Figure 2.6 Archive Operation Complete message

Once you return to the Archive Utility screen, click on the QUIT button to return to the FILETOOL screen.

Table 2.8: Filetool screen

| Button | Description |
|-------------------|--|
| RECOVER FROM DISK | lets you recover (load) from diskette(s) file(s) which you previously stored (archived) using the BACKUP TO DISK function. When you click on the RECOVER FROM DISK button, you'll see the following display |

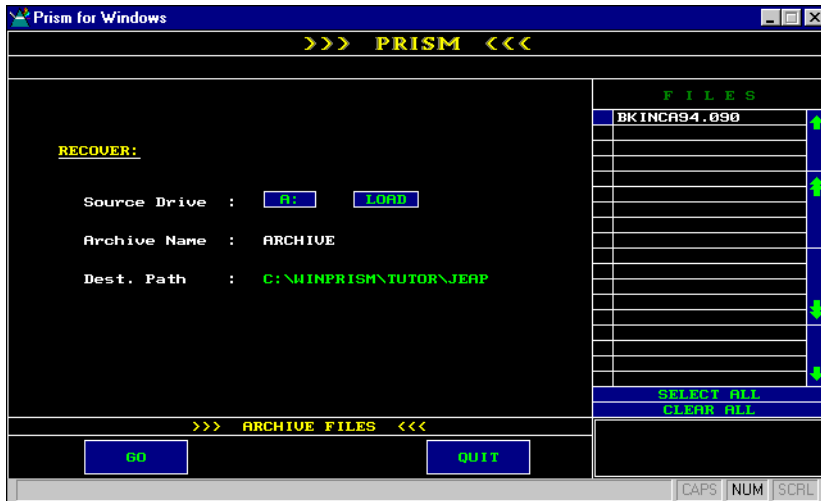


Figure 2.7 Recover From Disk Screen

You can choose drive A or B as a source drive.

When you toggle between A and B and the drive is empty (not ready), the proper message will be displayed.

If a diskette is in a drive when you select it or if you click on the LOAD button when you put a diskette into a selected drive, the program recognizes it as either an archived diskette or a non-archived diskette.

If it is an archive diskette the screen displays the Archive Name (read from diskette) and archived files (read from diskette) in the FILES panel.

If it is not an archive diskette and program displays the following message:

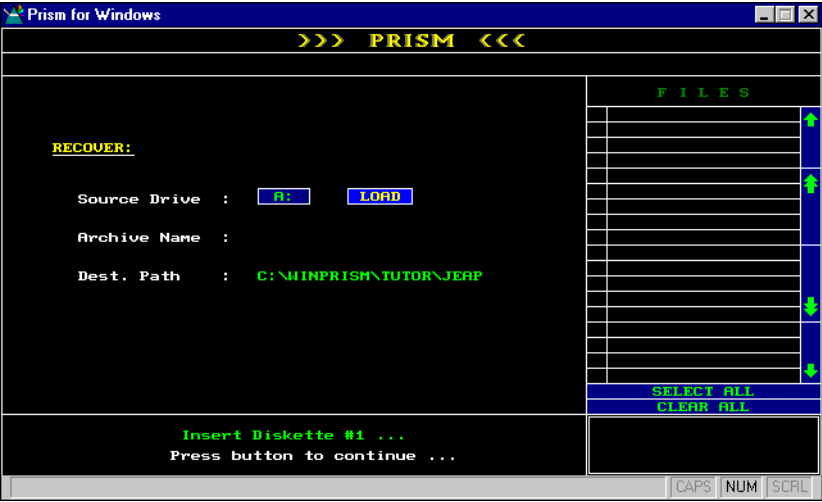


Figure 2.8 Warning message

The Dest Path (Destination Path) field shows the directory to which the archived files will be recovered.

The illustration below shows a typical screen with information read from an archive diskette.



Figure 2.9 Typical screen for an archive diskette

The FILES panel lists all files stored (archived) to the diskettes(s).

You now can select the files you want to recover by clicking on the file names in the list. A checkmark to the left of the file name indicates that the file has been selected as shown below:

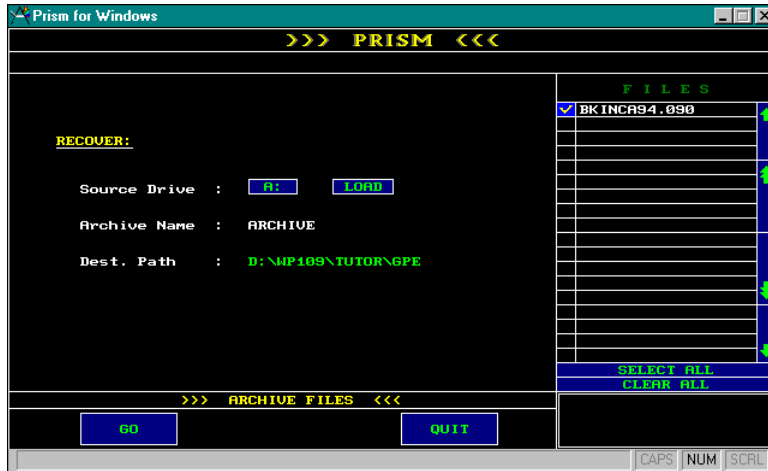


Figure 2.10 File selected to recover

Click on the GO button to start the RECOVER FROM DISK operation.

If a selected file(s) or a part of it is stored on another diskette, the program requests another diskette.

When an operation is finished, you will see the following message:

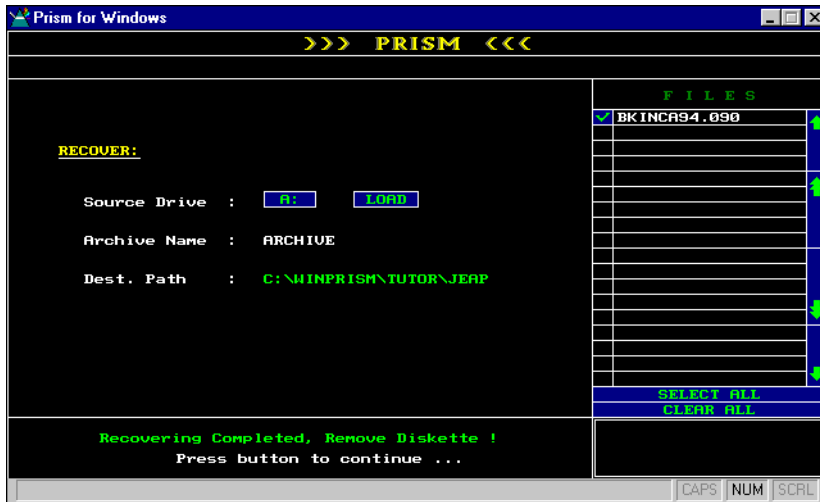


Figure 2.11 Operation complete

Click on the QUIT button to return to the FILETOOL screen.

The Timesys Option

The Timesys option converts among the four time representations used in GPS operations and processing. It is particularly useful for finding the Gregorian date for a given day of the year, finding the day of the year for the current date, or converting to and from GPS time.

When you click on this icon, you'll see the following display.

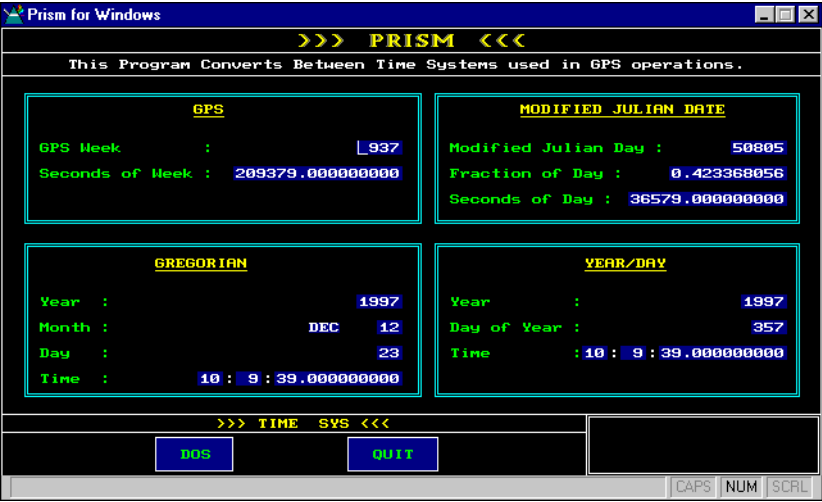


Figure 2.12 Timesys Display

The procedure for working with Timesys is as shown below.

1. Move the pointer to a field where you know its value and press a mouse button.
2. When the L-shaped cursor appears, type in a value.
3. To see the converted values, press ENTER.

Timesys Menu

The Timesys option has this function menu:



Figure 2.13 Timesys Function menu

To return to other functions on the Tools Options grid, click on the QUIT button.

Timesys Formats

Initially, Timesys reports the current computer time in each of the four formats: GPS, MODIFIED JULIAN, GREGORIAN, and YEAR/DAY. Any change to the display fields is reflected in all four formats as soon as you press ENTER.

In the GPS parameters box (upper left), GPS week accepts a 4-digit number. The SECONDS of week field accepts a 6-digit number to 9 decimal places.

In the MODIFIED JULIAN date parameters box (upper right), MODIFIED JULIAN day accepts a 5-digit number. The FRACTION OF DAY field accepts a 1-digit number with 9 decimal places; SECONDS OF DAY field accepts a 5-digit value with 9 decimal places.

For the fields of the GREGORIAN parameters box (lower left), YEAR can contain a 4-digit number; MONTH holds a two-digit number (and displays a corresponding abbreviation); DAY of the month 2 digits. The TIME has 3 fields: 2 digits for hour, 2 for minutes, and a 2-digit number to 9 decimal places for seconds.

In the YEAR/DAY box (lower right), YEAR can contain a 4-digit number. The DAY OF YEAR field accepts a 3-digit value. The TIME has 3 fields: 2 digits for hour, 2 for minutes, and a 2-digit number to 9 decimal places for seconds.

Transform

File Input Mode

Transform allows you to perform coordinate transformations between different coordinate systems, and to project your results onto plane mapping grids, e.g. the State Plane Coordinate System 1983 in the US. You may select to input either files or single user-defined points. Transform is accessed through the Transform icon in the WinPrism/Tools screen. You will see the following screen:

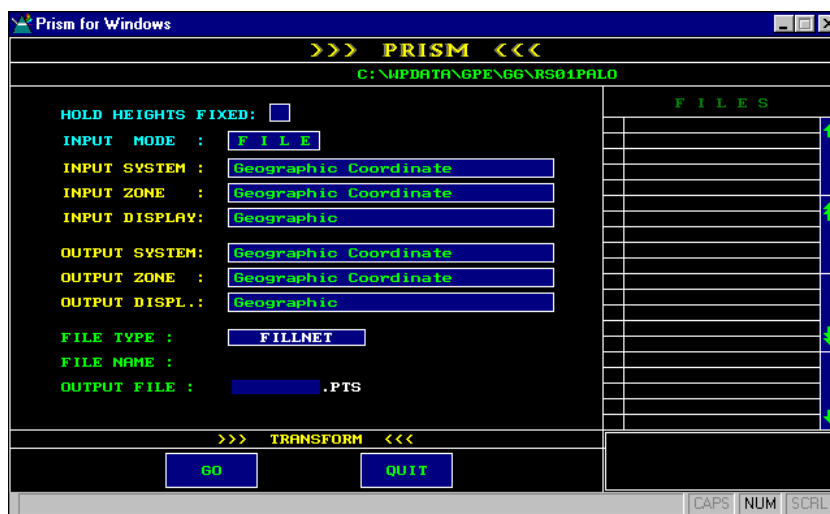


Figure 2.14 Transform Screen

The following controls and fields are initially presented:

Hold Heights Fixed

This check box allows you to constrain the height component of your position during transformation so that it is not transformed. This is intended for users whose input heights are orthometric and want to keep them as such. For example it is common to have geodetic (latitude, longitude) coordinates in the WGS84 system with an orthometric height - perhaps as the output from a FILLNET adjustment. If you wish

to transform these to SPC83 coordinates, keeping the orthometric height, check this box before transforming.



Note that if either the Input Display or the Output Display is ECEF Cartesian, it is not possible to check this box. This is due to two factors:

- 1. ECEF cartesian is an inherently three-dimensional system and there is no single component that can be called “height”.**
- 2. It is very rare that an ECEF coordinate will be derived from an orthometric height - therefore to avoid potential errors where this box would be unintentionally checked, it is disabled.**

Users should be careful as to when they use this feature since its unintentional use will cause erroneous results. For example, transforming a geographic coordinate with height above ellipsoid from one system to another should be done with the box unchecked so that a correct three-dimensional transformation is carried out.

Input Mode

Clicking on this button will toggle between file input or manual coordinate entry. Select FILE if you wish to convert a file, or MANUAL if you want to enter coordinate values by hand. As you toggle between the two, you will see the entry fields in the bottom of the window changing accordingly.

Input System

When this button is selected, the listbox on the right of the window changes to a System selection list and is filled with the available systems. Select the one appropriate for your needs - the Input System field will be updated with your selection.

Input Zone

Selecting this button will display a list of available zones for the System you have selected. Selecting a zone from the Zone List will update this field. If you have selected Geographic as the INPUT SYSTEM, there are no zones as such - there will be a single entry for Geographic.

Input Display

This button allows you to toggle between Geographic, ECEF Cartesian and Grid input formats. If using FILE input, make sure that the Input Display matches the data format in the file; for example when transforming a B-file, always ensure that the Input Display is set to ECEF Cartesian.

Output System/Zone/Display

These three buttons act in a similar manner to their input equivalents - their combined purpose is to allow you to choose the system and format in which you want your output coordinate(s).

Files Selection List

When the Input Mode is toggled to FILE, this list box fills with files of the type selected in the File Type field. Selecting one of these files as the input file will fill the File Name field.

File Type

This allows you to toggle between the various input file types. These are B-file, ASCII, SNAP, FILLNET, and R/C-file. When B-file is selected, the FILES box displays all the B-files in the current directory for user selection. When R/C file is selected, all files beginning with R/C are listed in the FILES box. With B-file or R/C file selected, the input system automatically is set to WGS84. When ASCII is selected, the FILES list box displays all files in the current directory with .PTS extension. When FILLNET is selected, the FILES box lists all files in the current directory with .FOP extension.

Ensure that the Input Display matches the data format in the file; for example when transforming a B-file, always ensure that the Input Display is set to ECEF Cartesian

File Name

Displays the name of the file selected as the input file.

Output File

You may enter the name of the output file for your transformed coordinates. The extension is automatically .PTS and is the standard Ashtech points file format. If the long format is selected, the extension is automatically set to .SPC.

Go

This button is inactive while system definitions are being selected, otherwise it is used to initiate the transformation process. On initiating the transformation process, if INPUT MODE is FILE, the output file name is checked for valid entry before continuing. If INPUT MODE is MANUAL, the coordinates are checked for valid entries. If the output system is a grid system such as UTM or State Plane, the program will query if you would like the long format.

Quit

Exits from Transform and returns to the TOOLS menu.

As mentioned above, there are two methods of coordinate entry - using files or manual entry. Based on your selection, the input fields will change.

Manual Input Mode

When the INPUT MODE is MANUAL, the FILE TYPE, FILE NAME and OUTPUT FILE fields will be replaced with fields where you can input coordinate values - see the screen below.

Prism for Windows

>>> PRISM <<<

C:\WINPRISM\TUTOR\RAPSTAT

HOLD HEIGHTS FIXED: ☐

INPUT MODE :

INPUT SYSTEM :

INPUT ZONE :

INPUT DISPLAY:

OUTPUT SYSTEM:

OUTPUT ZONE :

OUTPUT DISPL.:

LAT: LAT:

LNG: LNG:

HT : HT :

>>> TRANSFORM <<<

FILES

| | |
|--------------|---------|
| TMP1 | .\$\$\$ |
| TMP3 | .\$\$\$ |
| B0002C94.131 | |
| B0003B94.131 | |
| B0003C94.131 | |
| B0004B94.131 | |
| B0005A94.131 | |
| B0005B94.131 | |
| B0006A94.131 | |
| B0006C94.131 | |
| E_ASHA94.131 | |
| E0002C94.131 | |
| E0003B94.131 | |
| E0003C94.131 | |
| E0004B94.131 | |
| E0005A94.131 | |
| E0005B94.131 | |
| E0006A94.131 | |
| E0006C94.131 | |
| E_ASHA94.131 | |

NUM

Figure 2.15 Input Mode Screen

The coordinate format will be dependent on the INPUT and OUTPUT DISPLAY selections. For example, if you have chosen ECEF Cartesian as the input, there will be fields for X, Y and Z entries; if you have chosen Geographic as the input, there will be fields for Lat, Lng and Ht entries, as above.

There is also a FULL VIEW button which will display the following dialog box:

Prism for Windows

>>> PRISM <<<

C:\WINPRISM\TUTOR\NAPSTAT

HOLD HEIGHTS FIXED: ☐

INPUT MODE : **MANUAL**

INPUT SYSTEM : **Geographic Coordinate**

INPUT ZONE : **Geographic Coordinate**

| INPUT | | OUTPUT | |
|-------|-------------------|---------|---------------|
| LAT: | 37°00'00.00000"N | North : | 555610.015 |
| LNG: | 121°00'00.00000"W | East : | 1955493.733 |
| HT : | 0.000 | Height: | 0.000 |
| X : | -2626690.637 | Scale : | 1.0000144 |
| Y : | -4371547.334 | Conv : | -0°18'22.018" |
| Z : | 3817393.160 | SLF : | 1.0000000 |

FILES

- TMP1 . \$\$\$
- TMP3 . \$\$\$
- B0002C94.131
- B0003B94.131
- B0003C94.131
- B0004B94.131
- B0005A94.131
- B0005B94.131
- B0006A94.131
- B0006C94.131
- B ASHA94.131
- E0002C94.131
- E0003B94.131
- E0003C94.131
- E0004B94.131
- E0005A94.131
- E0005B94.131
- E0006A94.131
- E0006C94.131
- E ASHA94.131

Press button to continue ...

NUM

Figure 2.16 Full View Dialog Box

You will see two columns of figures, one for input and one for output coordinates. If ECEF Cartesian or Geographic is chosen for either, you will see the geographic and ECEF coordinates. If Grid is selected for either, you will see the grid coordinates, the grid scale factor at the point, the meridian convergence and the Sea Level Factor.

User Defined Systems and Zones

Prism for Windows allows you to define your own coordinate systems. This is a powerful feature which can be used if your particular coordinate system is not included in the default selection. You may also duplicate an existing system and modify it if there is one particular aspect of the system that you wish to change, for example the units for the system.

To create a new system:

- Click on the Input System button to display the Systems listbox.
- Click on the USER DEFINE button at the bottom of the listbox. This will bring up the System Edit dialog:

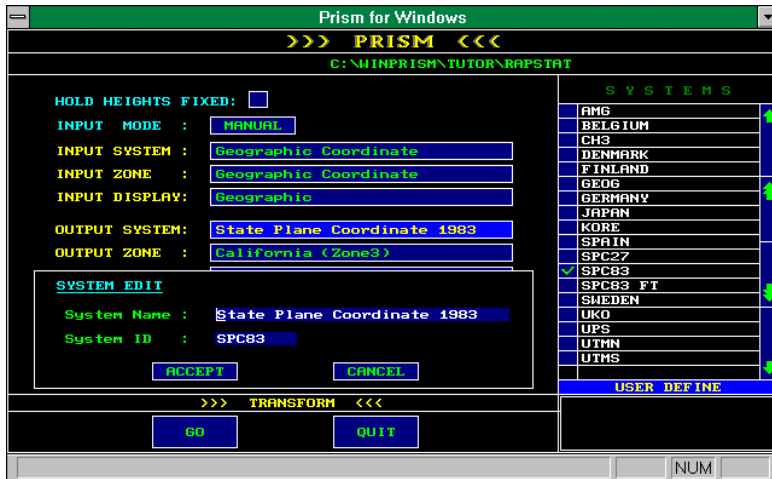


Figure 2.17 System Edit Dialog Box

Here you can enter the System Name and the ID. The ID is the identifier which will be inserted into the System listbox so that you can choose it in the future.

Now you can create a new zone for the system. Select the Input Zone to display the Zone listbox.

- Click on the USER DEFINE button at the bottom of the listbox. This will bring up the Zone Edit screen:

Figure 2.18 Zone Edit Screen

This is where you enter the parameters for the zone. These are:

Zone Name

The name of the new zone.

Zone ID

The identifier of the zone. This is what will be inserted in the Zone listbox for the new zone.

Units

You may toggle between Meters, US Feet and International Feet for the default unit in this zone.

Datum Name

Selecting this button will display all available datums in the listbox on the right. Select the appropriate one, using the scroll bars if necessary to move up and down the list. If you wish to define your own datum, please see below in the User Defined Datum section.

Projection

You may toggle between four available projections:

- Lambert Conformal
- Oblique Mercator
- Stereographic
- Transverse Mercator

As you choose between them, the projection parameter fields will change as appropriate. Select the projection you desire and fill in the fields.

User Defined Datums

You may wish to define your own datum if it is not included in the default selection. New datums are defined with respect to the WGS84 coordinate system, with the use of either a 7 or 10 parameter transformation. You must know the components of the transformation to define the new datum correctly. To define the new datum from within the Zone Edit screen:

1. Click on the Datum Name field to display the list of available datums.
2. Click on the User Define button. This will bring up the Datum Edit screen:

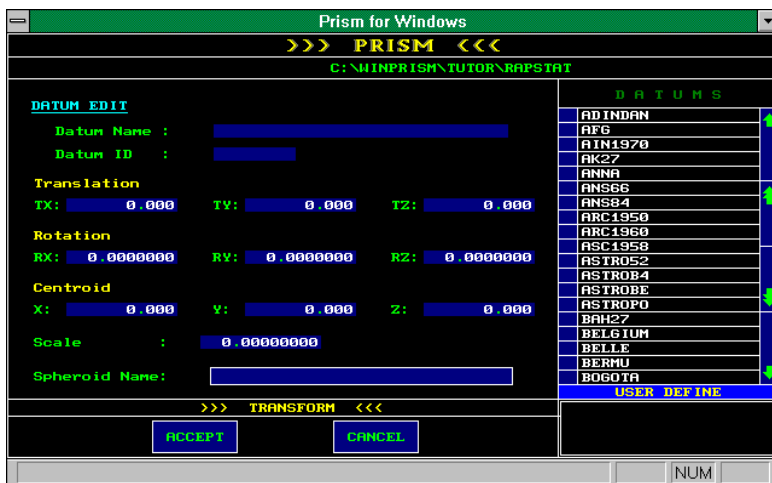


Figure 2.19 Datum within the Zone Exit Screen

The fields are as follows:

Datum Name

The name of the new datum.

Datum ID

The identifier of the datum which will be inserted into the datum list.

Translation-TX, TY, TZ

The translations in meters between the origin of the WGS84 coordinate system and the new datum you wish to define.

Rotation-RX, RY, RZ

The rotation components around the X, Y and Z axes respectively in arcseconds.

Centroid

The Centroid entry fields are only relevant if you intend to use a ten-parameter transformations, otherwise you should leave these fields as zeros. Briefly, the introduction of a Centroid into a transformation can sometimes lead to greater numerical stability since rotations are with respect to the centroid point rather than the centre of the earth. However, the coordinates of the Centroid must always be published along with the other seven parameters to make them of any use.

Scale

This is the difference in the scale factor between the new datum and the WGS84 system, in parts per million.

Spheroid Name

Selecting this field will cause the list box to be filled with the IDs of all available spheroids. When you select one, it will appear in the name field. You may also define your own spheroid, as described:

User Defined Spheroids

From within the Datum Edit screen, select the Spheroid name field, and then click the User Define button. This will bring up the Spheroid Edit dialog box:

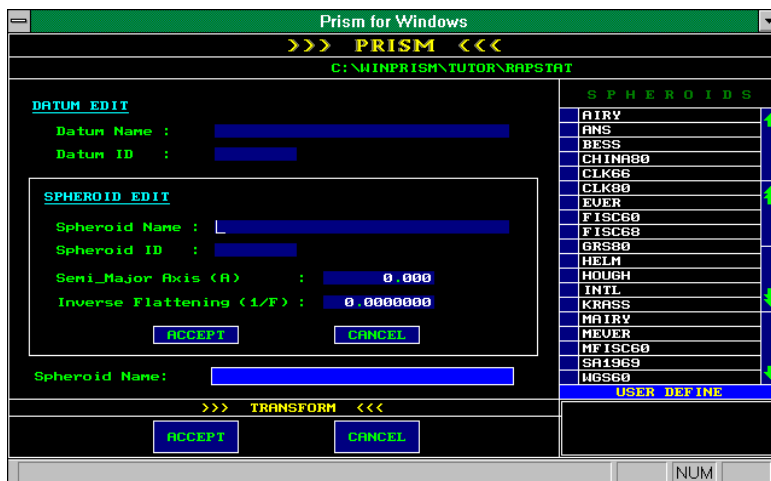


Figure 2.20 Spheroid Edit Dialog Box

The fields to enter here are:

Spheroid Name

Enter the name of the new spheroid.

Spheroid ID

The identifier of the new spheroid - this will be inserted into the spheroid list box.

Semi Major Axis (a)

This is the dimension in meters of the semi major axis of the spheroid, otherwise denoted by the letter a.

Inverse Flattening (1/F)

This defines the shape of the spheroid. It is the reciprocal of the flattening of the spheroid, f, where $f = (a-b)/a$. To avoid common confusion, values should be approximately 297 - 300 in value.

PTS File Utility Program

This utility is supplied to allow users of Ashtech's Survey Control software to combine site attributes they have logged in the field with positions for those sites contained in a corresponding PTS file. It also allows you to average successive entries for a static site in a PTS file into a single entry.

It is intended that this tool be used on a PTS file obtained as output from WinPrism's TRANSFORM module. Additional inputs may be D-Files containing attribute information. Only Survey Control D-Files may be used as input to this utility. The D-Files may be downloaded using the WinPrism TRANSFER module.

Accessing this module is done through the WinPrism TOOLS module. Pressing the D+PTS button will bring up the following dialog:

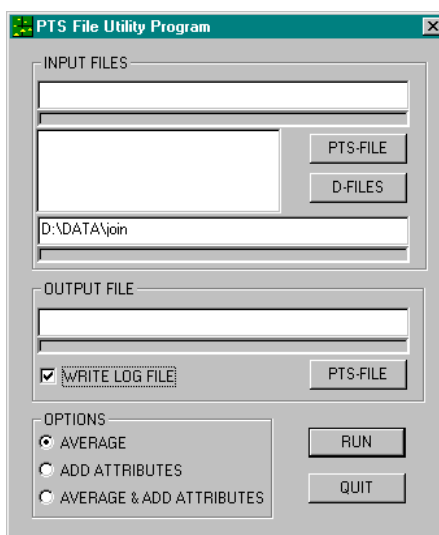


Figure 2.21 PTS File Utility Dialog

This dialog elements are described below:

Table 2.9: PTS File Utility Elements

| Element | Description |
|--------------------------|--|
| Input files | This panel allows you to select the various input files |
| PTS-FILE | Brings up the standard file dialog. You should select the PTS File that will be used for input. The selected file will appear in the first edit field in the dialog. |
| D-FILES | Brings up the standard file dialog. You should select the D-Files that will be searched for attributes. You may select more than one D-File by holding down the CTRL key. The selected files will appear in the listbox to the left of the D-FILES button, and the path to the files will appear in the edit field below. |
| OUTPUT FILES | This panel allows you to select the output PTS file. |
| PTS FILE | Brings up the standard file dialog allowing you to select the name of the output PTS file. |
| WRITE LOG FILE | If this box is checked, a text file will be written summarising the activities that occurred during the processing of the files. |
| OPTIONS | This panel determines the types of actions to be performed when the RUN button is pressed. |
| AVERAGE | Selecting this option will take the input PTS file and average any consecutive lines containing the same sitename (not beginning with a question mark) into a single entry. This is useful for obtaining a single position for a static site. |
| ADD ATTRIBUTES | Selecting this option will match attributes in the selected D-Files with positions in the input PTS file, using the sitenames as the link between the files. If a match is found, the attribute is copied from the D-File and appended to the corresponding line in the output PTS-File. If there is more than one entry in the PTS-File containing the sitename, each line is appended with the sitename. |
| AVERAGE & ADD ATTRIBUTES | Both of the above steps are performed. |
| Other Controls | |
| RUN | Pressing this button will start the selected action on the input files to produce the specified output file. If no files are selected, an appropriate message will appear. |
| QUIT | Closes the dialog and returns to WinPrism. |

Examples of Averaging and Adding Attributes

Consider the case when we have a PTS file which has several entries for site 0001. An excerpt from this file is shown below:

```
00066  37 22 24.44312 N  121 59 51.78968 W      31.056  ????
```

```
00067  37 22 24.43223 N  121 59 51.78865 W      31.611  ????
```

```
00068  37 22 24.42139 N  121 59 51.78723 W      32.114  0001
```

```
00069  37 22 24.40992 N  121 59 51.78405 W      32.643  0001
```

```
00070  37 22 24.39851 N  121 59 51.77970 W      33.136  0001
```

```
00071  37 22 24.38807 N  121 59 51.77320 W      33.640  0001
```

```
00072  37 22 24.37648 N  121 59 51.76717 W      34.141  0001
```

```
00073  37 22 24.36409 N  121 59 51.76140 W      34.657  0001
```

```
00074  37 22 24.35247 N  121 59 51.75615 W      35.143  0001
```

```
00075  37 22 24.33990 N  121 59 51.75081 W      35.634  ????
```

```
00076  37 22 24.32819 N  121 59 51.74577 W      36.106  ????
```

Averaging

Performing averaging on this file will take all entries for site 0001 and merge them into a single line, as shown below.

```
00066  37 22 24.44312 N  121 59 51.78968 W      31.056  ????
```

```
00067  37 22 24.43223 N  121 59 51.78865 W      31.611  ????
```

```
00068  37 22 24.38728 N  121 59 51.77270 W      33.639  0001
```

```
00069  37 22 24.33990 N  121 59 51.75081 W      35.634  ????
```

```
00070  37 22 24.32819 N  121 59 51.74577 W      36.106  ????
```

Adding Attributes

If we have collected attributes using the Survey Control software and have downloaded them, we end up with a D-File. An excerpt from such a file is below:

```
C 174909.000000
PD0001point 0001
C 174925.000000
PD0002point 0002
C 174952.000000
PD0003point 0002
C 174971.500000
PD0004hello 0004
```

Adding these attributes to the above averaged PTS File will result in the example shown below:

```
00066  37 22 24.44312 N  121 59 51.78968 W      31.056  ????
```

```
00067  37 22 24.43223 N  121 59 51.78865 W      31.611  ????
```

```
00068  37 22 24.38728 N  121 59 51.77270 W      33.639  0001  point 0001
```

```
00069  37 22 24.33990 N  121 59 51.75081 W      35.634  ????
```

```
00070  37 22 24.32819 N  121 59 51.74577 W      36.106  ????
```

The BlueBook Option

The BlueBook option gives you the ability to create files in NGS BlueBook formats from the adjusted positions. When you click on this icon, you'll see the following display:

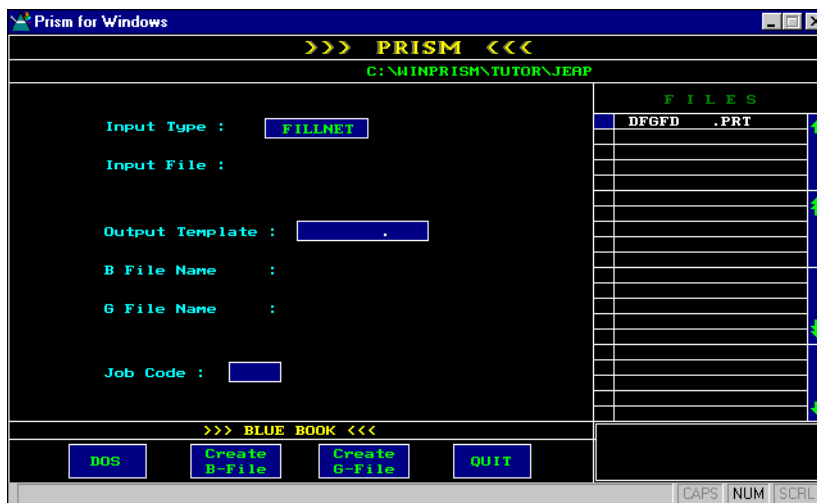


Figure 2.22 BlueBook Screen

The procedure for working with BlueBook is:

1. Select an Input Type.
2. Select an Input File from the FILES selection list.
3. Type in the name of an output file.
4. Select the Create B-File or the Create G-File button, which moves you to the Create B-File or Create G-File screens described later.

The Input Type is either Fillnet (.PRT extension) or Snap (.PRO extension). The Output File template can be up to eleven characters (seven for the name, a period, and three for the extension). The first character is B or G (for a B-File or G-File respectively) and the rest of the characters are the same as in the template. The job code is a unique two-character alphanumeric code used for the entire project.

After steps one through three, the typical screen appears like the example below:

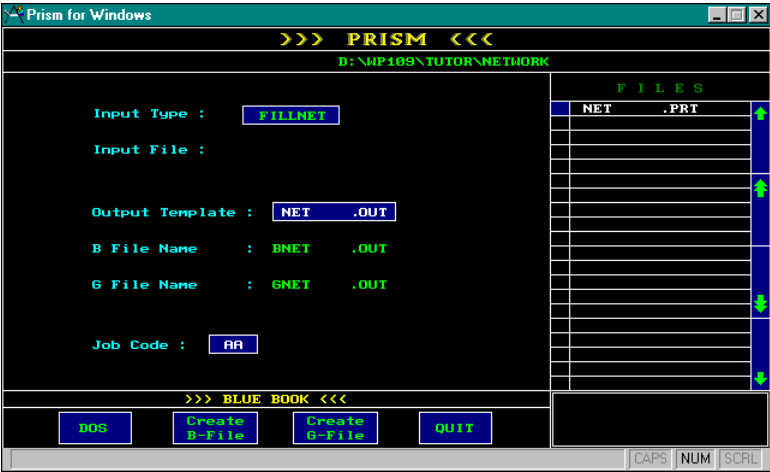


Figure 2.23 Input Type Screen

Create B-File

When you select the Create B-File button, the following screen appears:

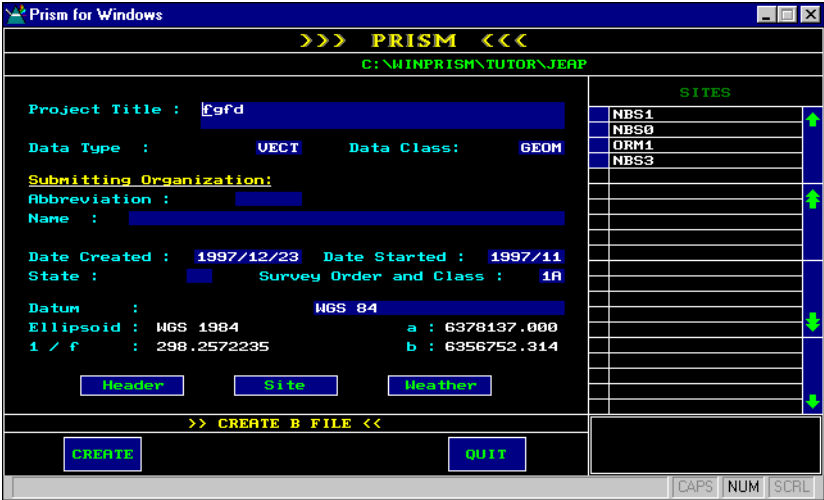


Figure 2.24 Create B-File Screen

This screen provides the following user-definable fields:

Table 2.10: User-Definable Screen Field Descriptions

| Field | Description |
|--------------------------|--|
| Project Title: | Up to seventy character name of the project. |
| Data Class: | Four characters |
| Data Type: | Four characters |
| State: | Two-character state or county code |
| Submitting Organization: | A six character field for the organization abbreviation and a 42-character field for the full name |
| Date Created: | YYYYMMDD format |
| Date Started: | Start date of survey in YYYYMM format |
| Survey Order and Class: | Two character code |
| Datum: | 24-character name of datum |
| Ellipsoid: | 16-character name (non-editable field) |
| a: | Semi-major axis in meters (non-editable field) |
| 1/f: | Inverse flattening in meters (non-editable field) |
| b: | Semi-minor axis in meters (non-editable field) |

There is also a SITES panel on this screen. It is a selection list box that displays all sites of the file specified in the BlueBook main screen. Click the left side of the site to select it.

This screen also contains three function buttons: Header, Site, and Weather. In addition, the CREATE button creates a B file based on the information provided.

The QUIT button returns the BlueBook main screen.

Header

This button opens a dialog box on the top of the current screen to display and accept instrument and other site (selected from the SITES panel) related information.

SITE

This button opens a dialog box on the top of the current screen to display and accept site (selected from the SITES panel) information as shown in the following example.

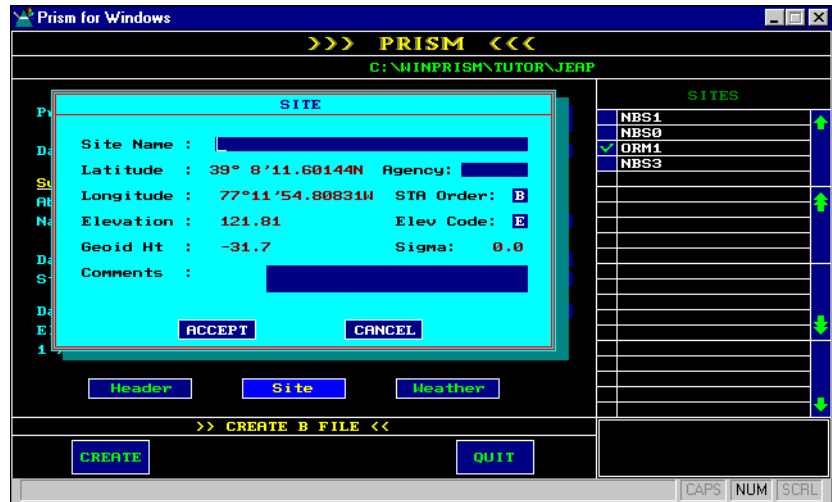


Figure 2.25 Site dialog

Table 2.11: Site dialog description

| Item | Description |
|-----------------|---|
| Site Name: | 30-character site name |
| Latitude: | Latitude of the point in degrees, minutes, seconds and direction in the format DDMMSS.SSSSSD (non-editable) |
| Agency: | Six-character source agency |
| Longitude: | Longitude of the point in degrees, minutes, seconds and direction in the format DDDMMSS.SSSSSD (non-editable) |
| STA Order: | One character |
| Elevation: | Elevation of the point in meters (non-editable) |
| Elevation code: | One character |
| Geoid Ht: | Six-digit geoid height with one decimal point (non-editable) |

Table 2.11: Site dialog description

| Item | Description |
|----------------|--|
| Sigma: | Five-digit character with one decimal point (non-editable) |
| Comments: | 50-character user comment |
| ACCEPT button: | Accepts the changes and returns to the previous screen |
| CANCEL button: | Returns to the previous screen without accepting changes. |

Weather

This button opens a dialog box on the top of the current screen to display and accept weather information for the current site (selected from the SITES panel) as shown in the following example.

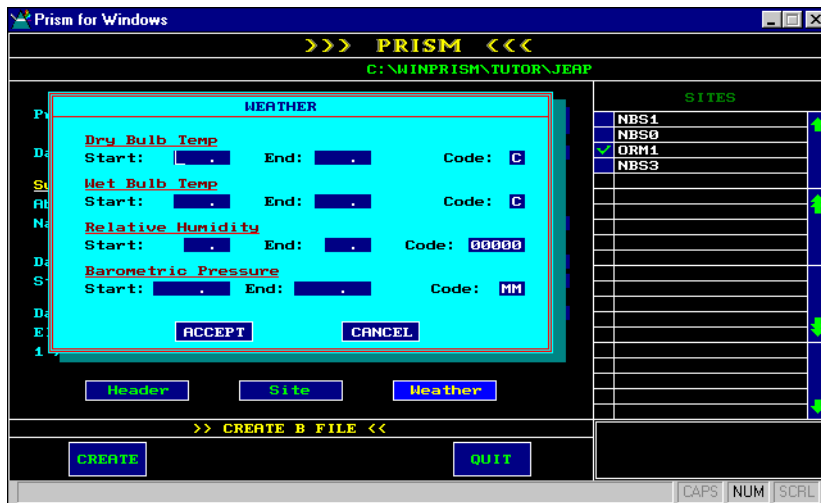


Figure 2.26 Weather dialog

Table 2.12: Weather Button Item Descriptions

| Item | Description |
|----------------------|--|
| Dry Bulb Temperature | Start Temperature, End Temperature and Temperature Code. Can represent a negative value. |

Table 2.12: Weather Button Item Descriptions (continued)

| Item | Description |
|-----------------------|--|
| Wet Bulb Temperature: | Start Temperature, End Temperature and Temperature Code. Can represent a negative value. |
| Relative Humidity: | Start Humidity, End Humidity and Weather Code. |
| Barometric Pressure: | Start Pressure, End Pressure and Pressure Code. |
| ACCEPT button: | Accepts the changes and returns to the previous screen |
| CANCEL button: | Returns to the previous screen without accepting changes. |

Create G-FILE

The VECTORS panel on this screen lists all vectors in the input file selected in the BlueBook main menu.

When you select one of the vectors, the program fills out the fields corresponding to the single vector (not common for a file).

This screen provides the following user-definable fields.

Table 2.13: Vector Field Descriptions

| Field | Description |
|----------------------|---|
| Proj Start/End Date: | Eight-character project start and completion dates in the form YYYYMMDD |
| Obs Start/End Date: | Eight-character observation start and completion dates in the form YYYYMMDD |
| Obs Start/End Time: | Four-character observation start and completion time in the form HHMM |
| Software ID: | 15-character software version and Id number |
| Coord Sys Code: | Two-character coordinate system code |
| Orbit Source: | Five-character orbit data source |
| Time Param Code: | Two-character time parameter code |
| Orbit Accuracy: | Five-digits to one decimal place |
| Meteo Use Code: | Two-character meteorological use code |

Table 2.13: Vector Field Descriptions (continued)

| Field | Description |
|--------------------|---|
| Accuracy Code: | One character |
| Iono Use Code: | Two-character ionosphere use code |
| Processing Agency: | Six-character agency code |
| Date: | Eight-digit processing date in the form YYYYMMDD. |

When you select a file from the VECTORS list, and click on the VECTOR INFO button, the Vector Information screen appears.

This screen contains the following information:

Table 2.14: Vector Information Field Description

| Field | Description |
|-----------------|--|
| Origin: | Three-digit origin station number (position in the file) |
| Data Media ID: | Ten-character data media of the origin station identifier (editable field) |
| Differ: | Three-digit differential station number |
| Data Media ID: | Ten-character data media of the differential station identifier (editable field) |
| Rejection Code: | One-character (editable field) Delta X Delta Y |
| Delta Z: | Delta X, Y, and Z of the selected vector (in meters) Sigma Sigma |
| Sigma Z: | Sigma X, Y, and Z of the selected vector (in meters) |
| Correlation: | Correlation matrix element (for the selected vector) |
| ACCEPT button: | Accepts changes and returns to previous screen |
| CANCEL button: | Returns to previous screen without accepting changes. |

The Results Option

The Results option gives you the ability to examine and print ASCII files, such as the files produced by the Tools options or by the PROCESS options.

Since the Results option lets you view files only in the current directory, before you execute this option, first check that the drive and directory are correct for the file you wish to look at. Then click on the RESULTS icon; you'll see this display.

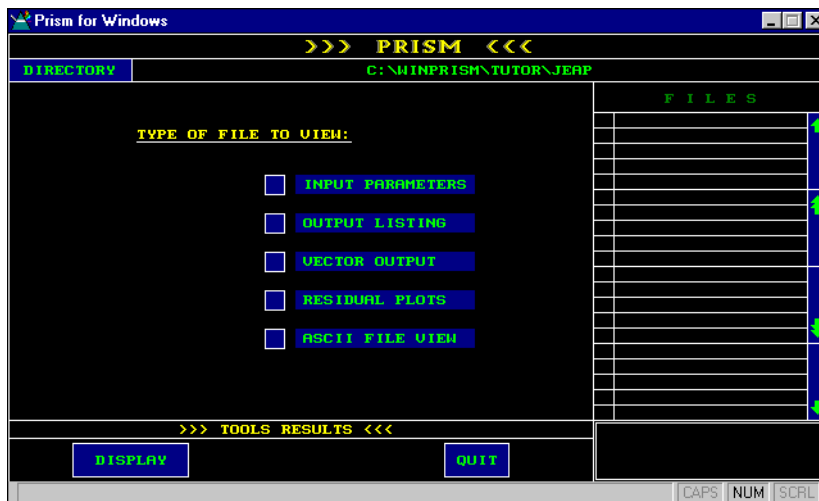


Figure 2.27 Results dialog

This screen contains:

- path;
- **TYPE OF FILE TO VIEW;**
 - **INPUT PARAMETERS** (I-file)
 - **OUTPUT LISTING** (L-file)
 - **VECTOR OUTPUT** (O-file)
 - **RESIDUAL PLOTS** (P-file)
 - **ASCII FILE VIEW** (any ASCII file)
- the **FILES** panel, listing all the filenames whose first letter matches the type of file you select to view (I, L, O, or P) or the FILE MASK.

This is the procedure for examining your files:

1. Select a type of file you want to view.
2. Type in a file mask so a subset of the files is displayed in the FILES panel.
3. Select a file from the FILES panel.
4. Click on the DISPLAY button in the Tools Results menu.

The Results option of Tools works in a way similar to the Results option in Process so that binary files can be displayed, printed or converted to ASCII.

The FILES panel displays all files (*.*) in the current directory.

Results Menu

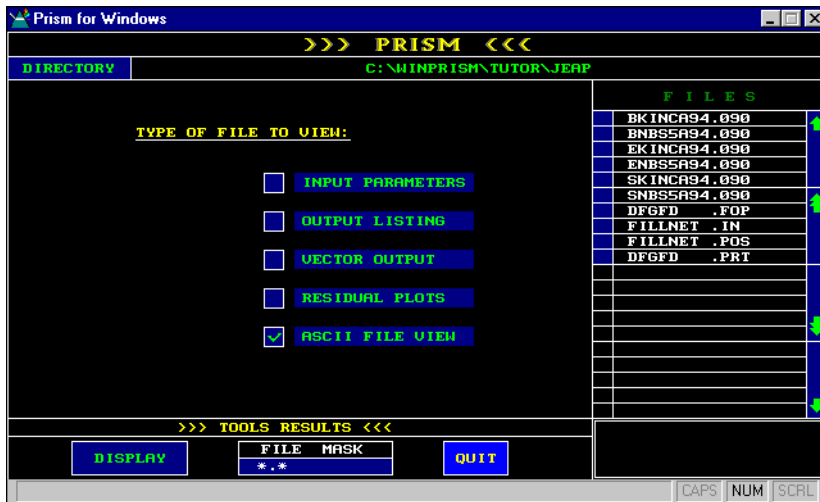


Figure 2.28 Results menu

Table 2.15: Results Menu Field Description

| Field | Description |
|---------|---|
| DISPLAY | Puts the specified file on the screen. If you click on this button prematurely, you'll see a message such as "Warning: no file has been selected." Otherwise, the module will display the contents of the file that you have indicated and display its name at the top. |

There is a vertical bar with arrows along the right side of the display window. You can click on the ↓ to scroll through the file line-by-line. Click on the double down-

arrow to scroll through the file a "page" at a time. (The ↑ and double up-arrow display the file in the opposite direction.)

Table 2.16: Results Menu Display Screen

| Field | Description |
|-----------|--|
| FILE MASK | If you want to limit the displayed list of files, click on the FILE MASK field and create a template by which to filter the list. You can use the DOS wildcard characters, * (any string) and ? (any single character), in your search. Type a file name filter (for example, L*,*) and then press the <ENTER> key. Successful searches display in the FILES panel all files that match the specified file name mask. Click on the file name to select it. |
| QUIT | To return to other Prism functions, click on the QUIT button. You will go up a level to the Tools Options Grid. |

Display-Level Results Menu

During the time you have the file information displayed, you also have the display-level Tools Results menu:

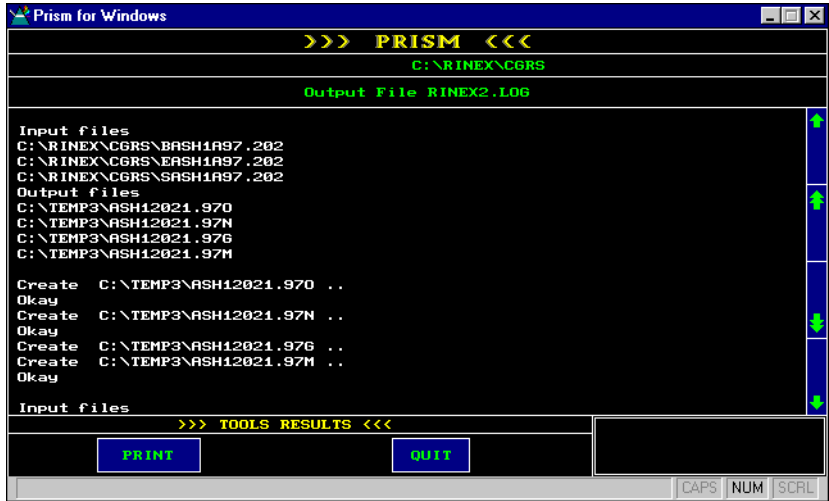


Figure 2.29 Display Level Results Menu

Table 2.17: Display-Level Tool Results menu Buttons

| Field | Description |
|-------|---|
| PRINT | Lets you send the entire ASCII file to the printer. When you click on this button, you'll see this submenu where Results asks if you want to PRINT THE FILE. To confirm, click on ACCEPT to continue. Click on CANCEL to go back to the display-level Tools Result screen without printing. |

Select the QUIT function until you reach the Prism main menu and go to the Setup function. Indicate which type of printer you are using and return to this function.

Table 2.18: QUIT Function

| Field | Description |
|-------|--|
| QUIT | To return to the Tools Results Menu, click on the QUIT button. You will go up a level to the Results screen. |

The Barcode Option

The Barcode option creates barcode sheets that can be carried to the field so that field personnel can readily enter information into a GPS receiver. Field personnel use the printed sheet and a barcode reader (pen) instead of the receiver's key pad.

To use this option, you must have installed PrintBar II® (barcode printing software from the Bear Rock Software Company) on your computer. You must execute the PrintBar PBF.COM and PBC.EXE programs before running Prism.

This is the procedure for creating barcodes from your printer:

1. Start by running Prism.
2. Select the Barcode module.
3. Enter the site and session information.
4. Indicate the keyboard layout and type of printer.
5. Click on the PRINT button in the Barcode menu.

When you click on this icon, you'll see:

Site and Session Information

The display shows two separate areas: the codes that will be printed, and the way to print them. The first data field, TITLE, accepts up to 25 characters. The title will be placed at the top of the barcode sheet as a reference for the surveyor.

The screenshot shows the 'Prism for Windows' application window. The title bar reads 'Prism for Windows'. The main window has a dark background with yellow text. At the top, it says '>>> PRISM <<<'. Below this is a large rectangular area with a cyan border containing input fields for the following labels (all in yellow):

- TITLE : (followed by a long text box)
- SITE NAME : (followed by a 4-character text box)
- RECEIVER # : (followed by a 3-character text box)
- Month/Day : (followed by a 2-character text box)
- CODE : (followed by a 6-character text box)
- SESSION : (followed by a 1-character text box)
- ANTENNA # : (followed by a 3-character text box)
- OPERATOR : (followed by a 4-character text box)

Below these fields is another section with a cyan border containing two rows of options:

- KEYBOARD TYPE : (followed by a button labeled 'TYPE A')
- PRINTER TYPE : (followed by a button labeled 'LASER')

At the bottom of the window, there is a bar with the text '>>> BAR CODER <<<' and three buttons: 'DOS', 'PRINT', and 'QUIT'. The bottom of the window shows a standard Windows taskbar with 'CAPS', 'NUM', and 'SCRL' indicators.

Figure 2.30 Site and Session Information

The next two lines are the actual site-and-session information that can be read into screen 9 of the receiver using the barcode pen reader.

Enter the site and session information into these fields.

The SITE NAME is the name of a site, 4 alphanumeric characters, tagged onto the raw data in order to record which site you were occupying during that time period. This same site identifier is used to name your data files when you are transferring them to your computer.

SESSION is the identifier (letter or number) of the session. The downloading program of Prism takes care of putting in this parameter for you while you are downloading to the PC after data collection. However, if you wish to override the default sessions, you may enter a letter or number here.

RECEIVER # is the receiver identifier, 3 alphanumeric characters; and ANTENNA # is the antenna identifier, 3 alphanumeric characters. Entering the last three digits of the antenna and receiver serial number is good practice in case there are problems with the equipment.

The MONTH/DAY field indicates the month and day of the session, four alphanumeric characters.

The OPERATOR field can be used to identify the operator, 3 alphanumeric characters.

The CODE field can contain up to 13 alphanumeric characters of user comment to further identify a site.

After you enter the desired site and session information, move the pointer and click to go to the KEYBOARD TYPE field:

Toggle the desired keyboard layout and printer type. These specifications will be followed when the barcodes and their descriptions are printed.

Table 2.19: Keyboard Layout and Printer Type

| Toggle | Description |
|---------------|---|
| KEYBOARD TYPE | For a list of ascending alphanumeric codes, click on the KEYBOARD TYPE field until TYPE A is displayed. For a layout that resembles the QWERTY keyboard (the typical typewriter and computer keyboards) with a few additional special characters, toggle the KEYBOARD TYPE field to TYPE Q. |
| PRINTER TYPE | For Hewlett-Packard LaserJet printers, click on the PRINTER TYPE field until LASER is displayed. For Epson or IBM printers and compatibles, specify LINE. Additional printer specifications are covered in the PrintBar II documentation. |

Layouts



These figures are not readable via a barcode reader, but only illustrate the type of output you will get from your printer.

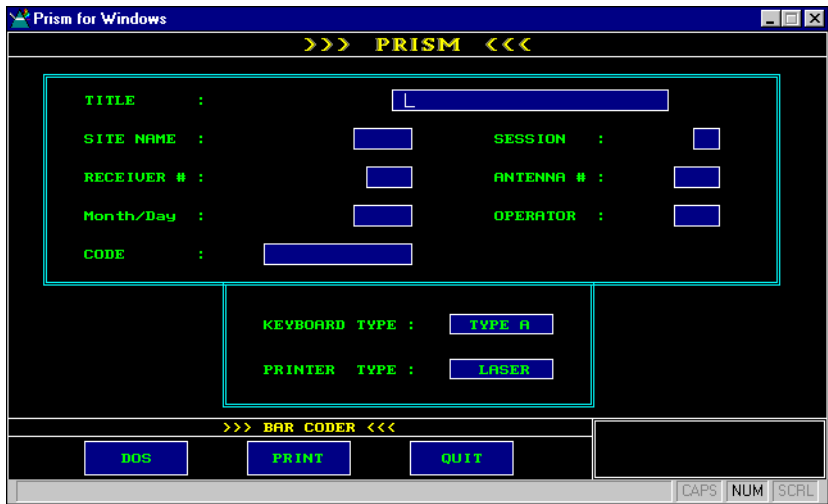


Figure 2.31 Screen 9 Codes with Code Types

Barcode Menu

Table 2.20: Screen 9 Field Descriptions

| Field | Description |
|-------|--|
| DOS | Shells out to the operating system. When you are ready to return to the WinPrism environment, type EXIT at the DOS prompt. |
| PRINT | When the parameters are satisfactory, click on the PRINT but-ton. The printer will print the barcode sheet and you will see a message letting you know that the barcode printing is in progress. When printing is done, you will see a message: "Successfully printed. press button to continue ...". Press a button on the mouse; you'll go back to the Barcode screen. |
| QUIT | To return to other WinPrism functions, click on the QUIT button. You will go up a level to the Tools Options Grid. |

Executing the PrintBar Program

To enable WinPrism's Barcode utility, you must run the PrintBar program before you enter the Prism environment. If you are in Prism, exit it completely before running PrintBar. Do not attempt to shell out and run it.

PrintBar consists of two parts: a memory-resident program called PBF.COM, which can translate the standard text data sent to the printer into various barcode symbologies; and a configuration program called PBC.EXE that allows you to control the format of the printed barcodes.

To execute PrintBar,

1. From the Prism directory, type:

```
pbf <enter>
```

You'll see a message that PrintBar II has been success-fully loaded into memory.

2. PrintBar has a number of options which may be configured to best suit the application in which it is used. The default configuration specifies printer port LPT1, code 39 symbology, and Epson/IBM graphics printer, high barcode density, and 0 printer restrikes, among others.

The format for changing a configuration element is:

```
pbc /xn /xn
```

where x is the code of the option to be changed and n is a value for it. Each option code is preceded by a slash and there must be a space between options.

The option code for printer type is B. There are three assignable values to indicate a particular printer:

- 1 = Epson/IBM graphics printer (default)
- 2 = Hewlett Packard LaserJet printer
- 3 = Epson LQ printer

The option code for density is D. There are three assignable values to indicate a particular density:

- H = high density (default)
- M = medium density
- L = low density

Suppose you wanted to change the printer type to specify the HP LaserJet and change the density to medium. To do this, execute the PBC program with these options:

```
pbc /b2 /dm
```

A screen would appear showing the new configuration.

The other defaults of PCM should be acceptable for most situations. It is beyond the scope of this manual to go into great detail about all the possible options and parameters. For more detail, refer to the PrintBar documentation.

The RINEX Option

RINEX (Receiver INdependent EXchange) is a standard format for GPS, GLONASS, or GPS+GLONASS data supported throughout the industry.

The RINEX Converter Utility provides a simple means to translate single or multiple RINEX formatted data files from any receiver to Ashtech formatted files, and convert Ashtech data files to RINEX format. The RINEX Converter Utility released with WinPrism supports RINEX format version 2.

This chapter describes the tasks necessary to convert RINEX formatted data files to Ashtech formatted data files and to connect Ashtech formatted files to RINEX formatted files.

Starting RINEX Converter

1. Select Tools icon from WinPrism Main Menu Screen. The Tools dialog box opens.
2. Double click on RINEX.



Figure 2.32 Tools dialog

The RINEX Converter opens to the **RINEX to Ashtech** tab (Figure 2.33).

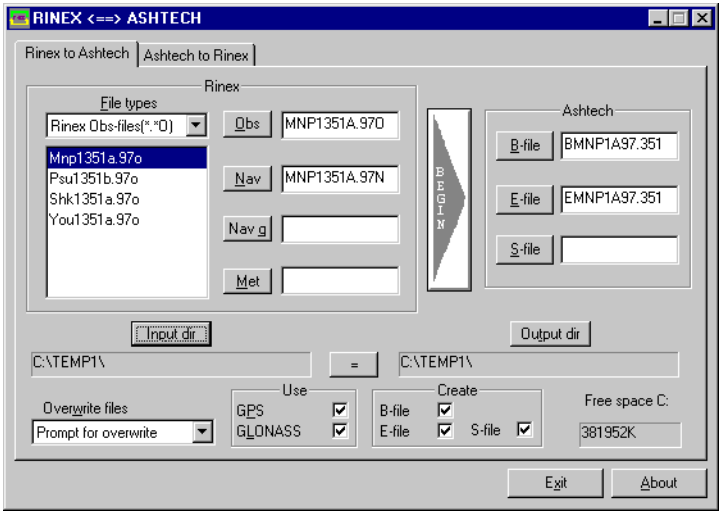


Figure 2.33 RINEX-to-Ashtech Tab

Converting RINEX to Ashtech Format

RINEX data files converted from any GPS or GPS+GLONASS receiver can easily be converted into Ashtech format for post processing.

To convert RINEX data files to Ashtech format,

1. Select RINEX to Ashtech tab so screen displays window as seen in Figure 2.33.

Table 2.21 describes the fields in the **RINEX to Ashtech** Tab.

Table 2.21: RINEX to Ashtech Tab Fields

| Item | Description |
|-------------------------|--|
| File Types | Lists the files types: RINEX Observation (*.O), All files (*.*), RINEX NAV-file*.N, RINEX Navg-file*.G, RINEX Met-file *.M. To select a file type, click the arrow to the right of the field and select file type from the list presented. |
| Available Files Listbox | List of files in current directory. To select a file, click on the file. To select multiple files for batch conversion, select the first file and then hold the [Control] key, while selecting additional files. |

Table 2.21: RINEX to Ashtech Tab Fields (continued)

| Item | Description |
|------------------|---|
| Obs | This field lists the file name of the Observation Data file corresponding to the selected RINEX data file in the Available Files List box. |
| Nav | This field lists the file name of the GPS Navigation Data file corresponding to the selected RINEX data file in the Available Files List box. |
| Navg | This field lists the file name of the GLONASS Navigation Data file corresponding to the selected RINEX data file in the Available Files List box. |
| Met | This field lists the file name of the Meteorological Data file corresponding to the selected RINEX data file in the Available Files List box. |
| BEGIN | Click this button to open the Conversion Status dialog box and begin converting the RINEX files to Ashtech file format. |
| B-File | This field lists the suggested file name for the converted B-file. |
| E-File | This field lists the suggested file name for the converted E-file. |
| S-File | This field lists the suggested file name for the converted S-file. |
| Input Dir | Click this button to open the Set Input Directory dialog box to specify the directory where source data files are stored. |
| Input Directory | This field displays the directory path where the source data files are stored. |
| = | Click this button to set the output directory the same as the input directory. |
| Output Dir | Click this button to open the Set Output Directory dialog box to specify the directory where converted files are stored. To minimize confusion, select a different directory than the source files directory for the output directory. |
| Output Directory | This field displays the directory path where converted data files are stored. |
| Overwrite Files | Select the overwrite privileges: Prompt for overwrite, Always overwrite, or Never overwrite. To select an overwrite privilege, click the arrow to the right of the field and select an overwrite privilege from the list presented. |
| GPS | Check this box if GPS data will be used in conversion. This option is on by default.. |
| GLONASS | Check this box if GLONASS data will be used in conversion (on by default).. |
| B-File | Check this box to create a B-file when converting RINEX files. |
| E-File | Check this box to create a E-file when converting RINEX files. |
| S-File | Check this box to create a S-file when converting RINEX files. |
| Free Space | This field displays the available disk drive space for the selected Output directory. |

Table 2.21: RINEX to Ashtech Tab Fields (continued)

| Item | Description |
|-------|--|
| Exit | Closes RINEX Converter. |
| About | Opens the dialog box which displays information pertaining to the software version number. |

- Click **Input Dir** to open the **Select Input Directory** dialog box (Figure 2.34).

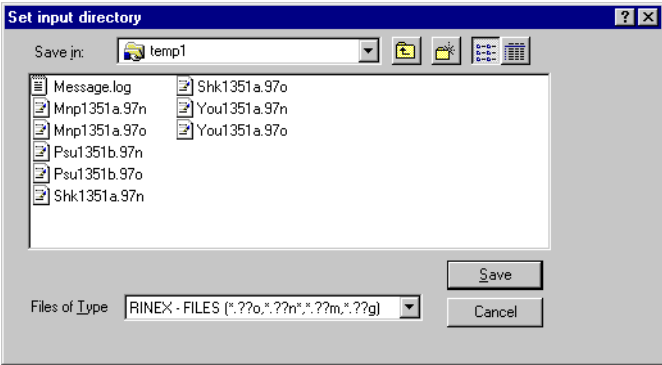


Figure 2.34 Select Input Directory Dialog Box

- Navigate through the directories and drives to select the directory where the files you wish to convert are located.
- Click **OK** to accept the directory and close the **Set Input Directory** dialog box.

The **Available Files** listbox lists all RINEX Observation data files with the filename format ***.*O**, and the **Input Directory** field lists the directory path.



If you are converting RINEX data files translated from a RINEX Converter that does not use the standard RINEX naming format, the filename may not have the format ***.*O**. If the files are not listed in the Available Files listbox, change the File Types to All Files in File Types on the Main screen and all files in the Input Directory.

- Select the file you wish to convert from RINEX to Ashtech format. You may select multiple files to batch convert, by holding down the **[Control]** key while selecting files.

After selecting a file to convert, the **OBS**, **NAV**, **NAV G**, **MET**, **B-File**, **E-File**, and **S-File** fields populate with suggested file names. If you selected

multiple files to batch convert, the filenames listed are associated with the file selected last.



To avoid confusion, do not change the suggested file names. To restore the original suggested output file name, double-click the filename in the available files list box.

6. Click **Output Dir** to open the **Select Output Directory** dialog box.
7. Navigate through the directories and drives to select the directory where you want the converted files stored.



To avoid confusion, save the converted Ashtech files to a different directory than where the RINEX files are located.

8. Click **OK** to accept the directory and close the **Set Output Directory** dialog box.

The **Output Directory** field lists the directory path.

9. Select the overwrite files privileges by clicking the arrow to the right of the Overwrite Files field, and selecting a privilege from the list presented. There are three overwrite privileges:
 - **Prompt for Overwrite** - (Default setting). If RINEX Converter detects that a converted file will overwrite an existing file, a dialog box opens, asking if you wish to overwrite the existing file. If you click NO, then RINEX Converter skips the file, and converts the next file type.
 - **Always Overwrite** - This option writes over existing files with converted data.
 - **Never Overwrite** - This option does not convert data for a given file if the file already exists.
10. By default, RINEX Converter assumes that the RINEX files use both GPS and GLONASS data if there is not a Navg file GLONASS data will not be included in the B-file.
11. By default, RINEX Converter creates a B-file, S-File, E-File, and in Ashtech format. If you do not want one or more of these file types created, uncheck the corresponding check boxes.

12. Click **BEGIN** to convert the selected RINEX files to Ashtech format. The **Conversion Status** dialog Box opens (Figure 2.35).

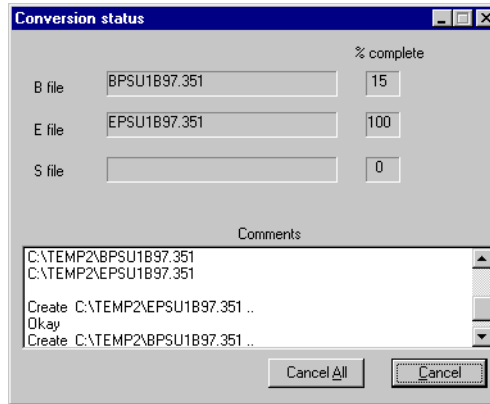


Figure 2.35 Conversion Status Dialog Box

13. The **Conversion Status** dialog box shows the status of each file as it converts. Upon completion, Click **OK**.
- Click **Cancel** to cancel the conversion to the current file type and proceed to the next file type.
 - Click **Cancel All** to cancel the entire conversion.
14. A *.log file will be created in the WinPrism directory containing all conversion activity. Restarting the RINEX converter will overwrite existing log file. To save the log file rename or move the file before restarting the RINEX Converter program.

Once complete, the selected RINEX files are now converted to Ashtech format and can be used with data files from Ashtech receivers in post-processing.

Converting Ashtech Files to RINEX Format

Ashtech data files converted from any GPS or GPS+GLONASS receiver can easily be converted into RINEX format.

To convert Ashtech data files to RINEX format,

1. Select the **Ashtech to RINEX** Tab selected (Figure 2.36).

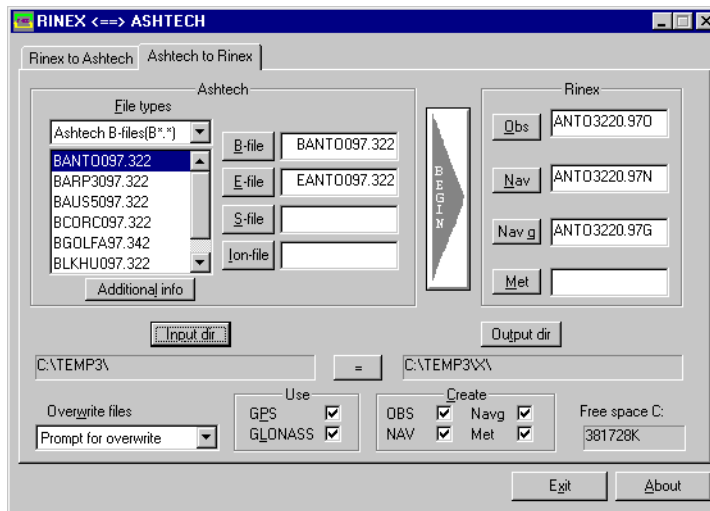


Figure 2.36 Ashtech to RINEX Tab

Table 2.22 describes the fields in the **Ashtech to RINEX** Tab.

Table 2.22: Ashtech to RINEX Tab Fields

| Item | Description |
|-------------------------|---|
| File Types | Lists the files types: Ashtech B-Files (B*.*), Ashtech E-file (E*.*), Ashtech S-file (S*.*) or All files (*.*). To select a files type, click the arrow to the right of the field and select file type from the list presented. |
| Available Files Listbox | List of files in current directory. To select a file, click on the file. To select multiple files for batch conversion, select the first file and then hold the [Control] key, while selecting additional files. |
| B-File | This field lists the file name of the B-File corresponding to the selected Ashtech data file in the Available Files List box. |
| E-File | This field lists the file name of the E-File corresponding to the selected Ashtech data file in the Available Files List box. |
| S-File | This field lists the file name of the S-File corresponding to the selected Ashtech data file in the Available Files List box. |
| BEGIN Button | Click this button to open the Conversion Status dialog box and begin converting the Ashtech files to RINEX file format. |

Table 2.22: Ashtech to RINEX Tab Fields (continued)

| Item | Description |
|------------------|---|
| <u>Q</u> bs | This field lists the suggested file name for the converted Observation Data file. |
| <u>N</u> av | This field lists the suggested file name for the converted Navigation Data file. |
| <u>N</u> avg | This field lists the suggested file name for the converted GLONASS Navigation Data file. |
| <u>M</u> et | This field lists the suggested file name for the converted Meteorological Data file. |
| Input Dir | Click this button to open the Set Input Directory dialog box to specify the directory where source data files are stored. |
| Input Directory | This field displays the directory path where the source data files are stored. |
| = | Click this button to set the output directory the same as the input directory. |
| Output Dir | Click this button to open the Set Output Directory dialog box to specify the directory where converted files are stored. To minimize confusion, select a different directory than the source files directory for the output directory. |
| Output Directory | This field displays the directory path where converted data files are stored. |
| Overwrite Files | Select the overwrite privileges: Prompt for overwrite, Always overwrite, or Never overwrite. To select an overwrite privilege, click the arrow to the right of the field and select an overwrite privilege from the list presented. |
| <u>G</u> PS | Check this box if GPS data will be used in conversion. This option is on by default.. |
| <u>G</u> LONASS | Check this box if GLONASS data will be used in conversion (on by default).. |
| <u>Q</u> bs | Check this box to create an Observation file when converting to RINEX. |
| <u>N</u> av | Check this box to create a Navigation file when converting to RINEX files. |
| <u>N</u> avg | Check this box to create a GLONASS Navigation file when converting to RINEX. |
| <u>M</u> et | Check this box to create a Meteorological file when converting to RINEX. |

Table 2.22: Ashtech to RINEX Tab Fields (continued)

| Item | Description |
|------------|--|
| Free Space | This field displays the available disk drive space for the selected Output directory. |
| Exit | Close RINEX Converter. |
| About | Opens the dialog box which displays information pertaining to the software version number. |

2. Click **Input Dir** to open the **Select Input Directory** dialog box (Figure 2.37).

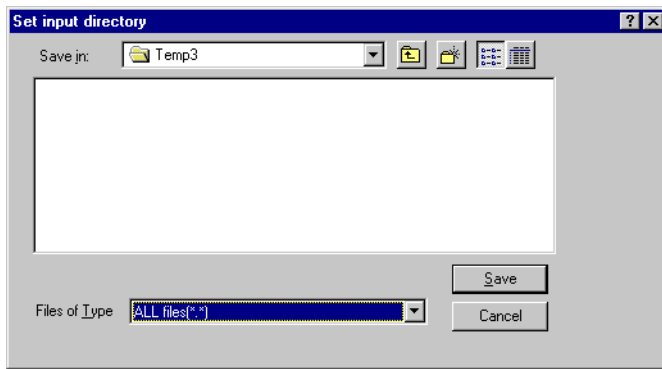


Figure 2.37 Select Input Directory Dialog Box

3. Navigate through the directories and drives to select the directory where the files you wish to convert are located.
4. Click **OK** to accept the directory and close the **Set Input Directory** dialog box.
5. Select the file you wish to convert from Ashtech to RINEX format. You may select multiple files to batch convert, by holding down the **[Control]** key while selecting files.

After selecting a file to convert the **B-File**, **E-File**, **S-File**, **OBS**, **NAV**, **NAV G**, and **MET**, fields populate with suggested file names. If you selected multiple files to batch convert, the filenames listed are associated with the file selected last.



To avoid confusion, do not change the file names.

6. Click **Output Dir** to open the **Select Output Directory** dialog box.
7. Navigate through the directories and drives to select the directory where you want the converted files stored.



To avoid confusion, save the converted Ashtech files to a different directory than where the RINEX files are located.

8. Click **OK** to accept the directory and close the **Set Output Directory** dialog box.

The **Output Directory** field lists the directory path.

9. Click **Additional Info.** to open the **Additional Info for Selected Files** dialog box to the **OBS** Tab (Figure 2.38).

Additional info for selected files

Obs | Nav | Met

Station Name: [] Station Number: [] Observer: []

AGENCY [Observing]: [] AGENCY [Creating Current File]: []

Comments: []

Receiver Serial #: [] All Optional Headers: ☐

Antenna

Offsets north (m): [0.0000] Offsets East (m): [0.0000] Delta Vertical (m): [0.0000]

Radius (m): [0.0000] Slant Distance (m): [0.0000] Type: [] Serial #: []

[Save] [Cancel] [Apply]

Figure 2.38 Additional Info for Selected Files Dialog Box - OBS Tab

Traditionally the information listed in these tabs are stored in RINEX data files to give the user reference information about the data. Although entering this additional information is optional, it provides a useful reference for future use.

10. Complete the fields in the **OBS** Tab. The information entered in the **OBS** Tab is stored in the Observation data file. See Table 2.23 for an explanation of each field.

Table 2.23: Additional Info for Selected Files Dialog Box - OBS Tab

| Field | Description |
|--------------------------------|--|
| Station Information | |
| Station Name | Name of the survey point or station where data was collected. |
| Station Number | Number of the survey point or station where data was collected. |
| Observer | Name or code of the surveyor who collected the data. |
| AGENCY (Observing) | Name of the company or Agency who collected the data. |
| AGENCY (Creating Current File) | Name of the company or Agency who converted the data to RINEX. |
| Comments | Any comments pertaining to the station, data quality, cover, GPS/GLONASS, etc. 50 character length limit. |
| Receiver Information | |
| Receiver Serial # | Serial number on the receiver to identify exactly which receiver collected the data. |
| All Optional Headers | Check this box if you want all non-mandatory fields to be filled-in the RINEX file header. |
| Antenna Information | |
| Offsets North (m) | Horizontal distance, in meters, that the antenna is offset from the marker in the North/South direction. + is north, - is south. |
| Offsets East (m) | Horizontal distance, in meters, that the antenna is offset from the marker in the East/West direction. + is east, - is west. |
| Delta Vertical (m) | True vertical distance, in meters, between the bottom of antenna and the marker. |
| Radius (m) | Radius of the antenna in meters. |
| Slant Distance (m) | Measured distance, in meters, from the edge of the antenna to the marker. |
| Type | Type of antenna used in data collection. |
| Antenna Serial Number | Serial number of the antenna to identify exactly which antenna was used for data collection. |

11. Click **Apply** to save the changes made to the **OBS** Tab, and click on the **Nav** Tab to switch to the **Nav** Tab (Figure 2.39).



You may enter information for all three tabs and save all the data using the Save button. The best practice however, is to save the data for each tab immediately after entering the data in case of a computer or power failure by using the Apply button.



The Save button saves the data entered on the active tab only, and closes the Additional Info for Selected Files dialog box.

Figure 2.39 Additional Info for Selected Files Dialog Box - NAV Tab

12. Complete the fields in the **NAV** Tab. The information entered in the **NAV** Tab is stored in the Navigation data file. See Table 2.24 for an explanation of each field.

Table 2.24: Additional Info for Selected Files Dialog Box - NAV Tab

| Field | Description |
|--------------------------------|---|
| Agency (Creating Current File) | Name of the company or Agency who converted the data to RINEX. |
| Comments | Any comments pertaining to the station, data quality, cover, GPS/GLONASS, etc. 50 character length limit. |

13. Click Apply to save the changes made to the **NAV** Tab, and click on the **MET** Tab to switch to the **MET** Tab (Figure 2.40).

Additional info for selected files

Obs | **Nav** | Met

Station Name :

Agency [Creating Current File] :

Comments :

| Date (Y-M-D) | Time (UTC) | Pressure(mbs) | Dry Temp | Rel. Hum(%) | ZWET(mm) |
|--------------|------------|---------------|----------|-------------|----------|
| 1997.12.23 | 12:3:8 | 1010.0 | 20.0 | 50.0 | 0.0 |

Edit

Save Cancel Apply

Figure 2.40 Additional Info for Selected Files Dialog Box - MET Tab

14. Complete the fields in the **MET** Tab. The information entered in the **MET** Tab is stored in the Meteorological data file. See Table 2.25 for an explanation of each field.

Table 2.25: Additional Info for Selected Files Dialog Box - MET Tab

| Field | Description |
|--------------------------------|---|
| Station Name | Name of the survey point or station where data was collected. |
| Agency (Creating Current File) | Name of the company or Agency who converted the data to RINEX. |
| Comments | Any comments pertaining to the station, data quality, cover, GPS/GLONASS, etc. 50 character length limit. |
| Meteorological Data Listbox | Date and time atmospheric data was collected (atmospheric pressure, temperature, relative humidity, and ZWET (Zenith Wet Tropospheric Delay). |
| Add | Click this button to add a new atmospheric data line to the file. A new data line appears in the Meteorological Data listbox with the current time, and STP conditions listed. Click the Edit button to enter the data. |

Table 2.25: Additional Info for Selected Files Dialog Box - MET Tab (continued)

| Field | Description |
|--------|---|
| Edit | Click this button to open the Edit dialog box and edit the selected Meteorological data line. |
| Delete | Click this button to delete the selected Meteorological data line. |

15. Click **Edit** to open the **Edit** dialog box and change the Meteorological data.

Figure 2.41 Edit Dialog Box

16. Enter the Meteorological data and the data and UTC time the data was taken, and press **OK**. Table 2.26 explains the fields in the **Edit** dialog box.

Table 2.26: Edit Dialog Box

| Field | Description |
|----------------|--|
| Date | The year the data was recorded. |
| Time | The time the data was recorded. |
| D | The day of the month (not Julian day) the data was recorded. |
| H | The hour of the day the data was recorded in UTC time (24 hour time scale) |
| M | The minute of the hour the data was recorded in UTC time. |
| S | The second of the minute the data was recorded in UTC time. |
| Pressure (mbs) | The recorded barometric pressure of the atmosphere in millibars. |

Table 2.26: Edit Dialog Box (continued)

| Field | Description |
|--------------|---|
| Dry Temp (C) | The recorded temperature of the air not corrected for humidity, in degrees Celsius. |
| Rel. Hum (%) | The recorded relative humidity of the air in percent of 100. |
| ZWET (nm) | Zenith Wet Tropospheric Delay—in millimeters (default=0) |

17. Click **OK** to accept the data in the **Meteorological Data Line** and close the **Edit** dialog box.
18. Click **Save** to save the changes made to the **Met** Tab and close the **Additional Info for Selected Files** dialog box.
 - The **Apply** button saves any changes made to the active tab, and does not close the **Additional Info for Selected Files** dialog box.
 - The **Save** button saves any changes made any tab, and closes the **Additional Info for Selected Files** dialog box.
19. Select the overwrite files privileges by clicking the arrow to the right of the Overwrite Files field, and selecting a privilege from the list presented. There are three overwrite privileges:
 - **Prompt for Overwrite** - Default setting. If RINEX Converter detects that a converted file will overwrite an existing file, a dialog box opens, asking if you wish to overwrite the existing file. If you click NO, the RINEX Converter skips the file, and converts the next file type. If you click yes, the RINEX Converter overwrites the old file.
 - **Always Overwrite** - This option writes over existing files with converted data.
 - **Never Overwrite** - This option does not convert data for a given file if the file already exists. A “File Already exists” error message will appear in the conversion Status Box and log file.
20. By default, RINEX Converter assumes that the RINEX files use both GPS and GLONASS data. If the RINEX files do not use GLONASS data the Navg file will not be created.
21. By default, RINEX Converter creates Obs, Nav, Navg files in RINEX format. If you do not want one or more of these file types creates, uncheck the corresponding check boxes.

22. Click **BEGIN** to convert the selected Ashtech files to RINEX format. The **Conversion Status** dialog Box opens (Figure 2.27).

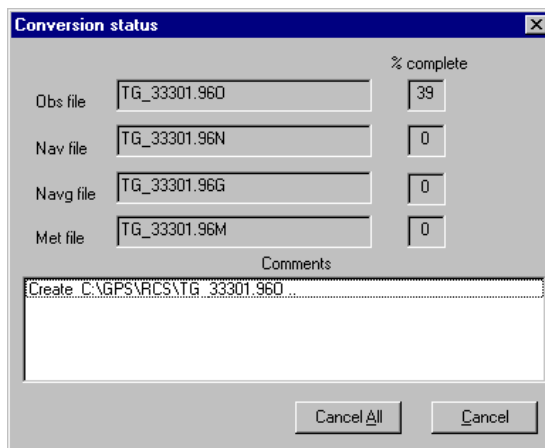


Figure 2.27: Conversion Status Dialog Box

23. The **Conversion Status** dialog box shows the status of each file as it converts. Upon completion, Click **OK**.
- Click **Cancel** to cancel the conversion to the current file type and proceed to the next file type.
 - Click Cancel All to cancel the entire conversion.

The selected Ashtech files are now converted to RINEX format.

24. A *.log file will be created in the WinPrism directory containing all conversion activity. To save the log file, rename or move the file before restarting the program.

Customer Support

If you have any problems or need further help, call Ashtech Customer Support. Before you call, please refer to the documentation that came with your system. Many common problems are identified within the documentation and suggestions are offered for solving them.

- Check cables and power supplies. Many hardware problems are related to these simple problems.
- If the problem seems to be with your computer, reboot to clear RAM.

If none of these suggestions solves the problem, contact Ashtech Customer Support. Have the following information at hand:

Table 3.1: Customer Support Information

| Information Category | Your Actual Numbers |
|--|---------------------|
| Software version # | |
| Software serial # | |
| Firmware version # | |
| Firmware version # | |
| A clear, concise description of the problem. | |

Customer Support Numbers:

Voice: 1-800-257-2552

Voice: 1-913-492-4900, press "0" for Operator

Fax: 1-913-492-0188

Sample Files

This section contains a sample rawstruct.lst file. It is the structure of b-files that can be requested under the Filetool option by using the **print structure format** function.

B-File Structure

Each B-file starts with a rawheader structure

| \ | Field | Bytes |
|---------------|---------------|-------------|
| char | version[10] | 10 |
| unsigned char | raw_version | 1 |
| char | rcvr_type[10] | 10 |
| char | chan_ver[10] | 10 |
| char | nav_ver[10] | 10 |
| int | capability | 2 |
| long | wn_start | 4 // see *) |
| char | num_obs_types | 1 |
| char | spare[42] | 42 |
| | total bytes | 90 |

Each epoch starts with a rawnav structure

| | Field | Bytes |
|--------------|-------------|-------------|
| char | sitename[4] | 4 |
| double | rcv_time | 8 // see *) |
| double | navx | 8 |
| double | navy | 8 |
| double | navz | 8 |
| float | navxdot | 4 |
| float | navydot | 4 |
| float | navzdot | 4 |
| double | navt | 8 |
| double | navtdot | 8 |
| unsigned int | pdop | 2 |
| char | num_sats | 1 |
| | total bytes | 67 |

Chan_obs structure is inside a rawdata structure:

| | Field | Bytes |
|---------------|----------------|-------|
| double | rawrange | 8 |
| float | smth_corr | 4 |
| unsigned int | smth_count | 2 |
| char | polarity_known | 1 |
| unsigned char | warning | 1 |
| unsigned char | goodbad | 1 |
| unsigned char | ireg | 1 |
| char | qa_phase | 1 |
| long | doppler | 4 |
| double | carphase | 8 |
| | total bytes | 31 |

Each epoch has a rawdata structure per SV:

| | Field | Bytes |
|-------------------------|-------------|------------------------------|
| unsigned char | svprn | 1 // see **) |
| unsigned char | elevation | 1 |
| unsigned char | azimuth | 1 |
| unsigned char | chnind | 1 |
| struct chan_obs obs[3] | | 31 * rawheader.num_obs_types |
| | total bytes | 31 * |
| rawheader.num_obs_types | | + 4 |

For all rawnav.num_sats: (31 * rawheader.num_obs_types + 4) *
rawnav.num_sats.



***) If the GG24 receiver clock is synchronized to GPS, then wn_start and rcv_time are given in the standard GPS format (Wn, ToW). Note that wn_start from the header corresponds to the first record in the file.**

If the receiver clock is synchronized to GLONASS, then wn_start and rcv_time are given in the GPS format (Wn, ToW) but in UTC(SU) time rather than in GPS time or in GLONASS Time. This means that these conventional “UTC(SU) weeks” are roughly LEAP_SECONDS seconds behind corresponding GPS weeks.



****) For GLONASS structures, the parameter svprn must be interpreted as satellite system number. Note that this parameter is derived by the GG24 firmware from an GLONASS almanac stored in the battery memory.**

POINTS FILE

The points file has two sections: a **header**, followed by a **list** of the points and their coordinates. The header has a fixed string for its first line, which is used to identify the file as a points file. The header is followed by a series of lines that describe the coordinate system that represents the point positions. Each descriptor is preceded by a key word which starts on the first column, followed by an ID string and/or a description/data. Most of the descriptors are optional, making the file format more flexible. The header format is shown below. The SYSTEM, DATUM, HEIGHT, and UNITS are optional with defaults. The SYSTEM default is GEOG, or geographic coordinates. The DATUM default is WGS84. The HEIGHT default is ellipsoidal heights, and the UNITS default is meters. The ZONE depends on the SYSTEM; if the SYSTEM is GEOG or GEN, the ZONE is not applicable, otherwise it is required. All of the other descriptors labeled ".opt" are completely optional. THE ID starts at column 20 and the description starts at column 40, the exception being the ZONE, which also has the zone number which starts at column 30.

```
ASHTech POINTS FILE
LONG FORMAT
PROGRAM:                PRISM v2.0                Jan 12 1998
CREATED FROM:           Fillnet Output File        NET.FOP
SYSTEM:                 SPC83                     State Plane Coordinate 1983
DATUM:                 NAD83                     North American 1983
TRANSLATION:            {0.000, 0.000, 0.000}      opt.
ROTATION:               {0.00, 0.00, 0.00}         opt.
SCALE:                 0.0000
ELLIPSOID:             GRS80                     Geodetic Ref. Sys. 1980
SEMI-MAJOR AXIS:       6378137.000
INVERSE FLATTENING:    298.2572221
PROJECTION:            LC83                     Lambert Conformal
ZONE:                 CA_3                     403 California (Zone3)
UNITS:                METER                     METER
```

Comments may be placed between the header and the body. The only restriction on comments is that they cannot start in the first column.

The body is preceded by a one-line header and a blank line. The header should start at the first column. The header depends on the SYSTEM to be used, and it also has optional fields. The header identifies the fields in the position data; minimum has POINT start at the first column to specify the point number in the file, three fields to specify the position, and the SITE field to specify the point name. The position fields which would be latitude, longitude, and height for geographic systems, or northing, easting, and height for projections. For a 2-D point, the height is reported as -9.99E+29. The optional fields could be position sigmas and/or attitude information.

The sigmas must be in the same system and units as the position information. The attribute field is a free-form string of up to 80 characters that can include white space characters. All of the data fields are separated by three spaces. The examples below are zero-filled to show the format, you do not need to zero-fill the data when generating an actual file.

| POINT | LATITUDE | LONGITUDE | HEIGHT | SITE | ATTRIBUTE | | |
|--------|------------------|-------------------|-----------|------|---------------|--------|--------|
| 000001 | 37 22 56.39742 N | 122 02 02.38628 W | 00011.937 | ASH1 | sample point. | | |
| or | | | | | | | |
| POINT | NORTHING | EASTING | HEIGHT | SITE | N_SIG | E_SIG | HT_SIG |
| 000001 | 0187927.915 | 12345678.012 | 00011.937 | ASH1 | 00.000 | 00.000 | 00.000 |
| 000002 | 0187927.915 | 12345678.012 | -9.99E+29 | ASH2 | 00.000 | 00.000 | 00.000 |

Naming Algorithms

Experience has shown that certain file naming conventions provide the best protection against accidentally overwriting a data file and at the same time provide enough information about the file to let you keep track of data files for large projects.

The following section describes how rinex and Ashtech files names are generated when you rely on the system to generate them automatically.

Whenever you don't want one of the supplied names, simply overwrite them. Move the pointer to the field and click a mouse button. When you see the l-shaped cursor, overtyping the file name with a new one.

RINEX Naming Convention

When generating the rinex target file names, the program uses the standard rinex naming convention for output files:

`ssssdddf.yyt`

where

ssss is a 4-character station name designator.

ddd is the day of the year of the first record.

f is the file sequence number to within a day.

yy is the year.

t is the file type where o indicates an observation file, n indicates a navigation file, and m indicates a meteorological data file.

Ashtech Naming Convention

The module automatically generates corresponding b-file, e-file, and s-file names. If you don't want the supplied names, simply overtype them. When generating names for the output files, the system uses the Ashtech naming convention.

`tsssscyy.ddd`

where

t is the file type. **b** indicates the measurement file, **e** is the ephemeris file, and **s** is the site data file.

ssss is a 4-character station name designator.

c is the file sequence character to within a day.

yy is the year.

ddd is the day of the year of the first record.

Several examples of filenames using this convention:

bsssscyy.ddd = bhillA89.304 = phase data file

esssscyy.ddd = ehillb90.003 = ephemeris file

bsssscyy.ddd = bd001c90.034 = phase data file

The first file is a binary phase data file for station hill. It was observed on the 304th day of 1989 (October 31st) and was the first session that day.

The second file, also for station hill, is an ephemeris data file and was observed on the third day of 1990 during the second session.

The third file, also a binary phase data file, is station 001 which is part of project "d," observed on day 034 (03 February 1990) and was the third session that day.

Common GPS Acronyms

| | |
|-------|---|
| ALT | Altitude |
| ALM | Almanac |
| AFT | After |
| AGE | Age of Data |
| ANT | Antenna |
| ASCII | American Standard Code for Information Interchange |
| AZM | Azimuth |
| BEF | Before |
| BIN | Binary Index (file) |
| BM | Bench Mark |
| BP | Barometric Pressure |
| C/A | Coarse/Acquisition Clear/Access |
| COG | Course Over Ground |
| CTD | Course To Destination |
| DGPS | Differential GPS |
| DIFF | Differential |
| DMS | Degrees, Minutes, Seconds |
| DOP | Dilution Of Precision |
| DOS | Disk Operating System |
| DTD | Distance To Destination |
| EDOP | Elevation Dilution Of Precision |
| ELEV | Elevation |
| ELIP | Ellipsoid |
| ELLIP | Ellipsoid |
| ELP | Ellipsoid |
| ELV | Elevation |
| EMI | Electromagnetic Interference |
| ENU | East, North, Up |
| EPHM | Ephemeris |
| FCC | Federal Communications Commission |

| | |
|-------|---------------------------------------|
| FREQ | Frequency |
| GH | Geoid Height |
| GLL | Latitude/Longitude for Position |
| GMST | Greenwich Mean Sidereal Time |
| GMT | Greenwich Mean Time |
| GPSS | GPS Post-Processing Software |
| GPS | Global Positioning System |
| GPSIS | GPS Information Service |
| | 7323 Telegraph Road |
| | Alexandria VA 22310-3998 |
| | 703-313-5900 |
| HDOP | Horizontal Dilution Of Position |
| HEL | Health |
| HI | Height of Instrument |
| HTDOP | Horizontal/Time Dilution Of Precision |
| ID | Identification |
| | Integrated Doppler |
| LAT | Latitude |
| LCD | Liquid Crystal Display |
| LNA | Low-Noise Amplifier |
| LNG | Longitude |
| LON | Longitude |
| MMDD | Date format - Month, Date |
| MSG | RTCM Message |
| MSL | Mean Sea Level |
| N | Geodetic Undulation |
| NAD | North American Datum |
| NMEA | National Marine Electronics Assoc. |
| NV | Non-Volatile |
| PDOP | Position Dilution of Precision |
| PE | Precise Ephemeris |
| POS | Position |
| RAM | Random-Access Memory |
| RF | Radio Frequency |

| | |
|--------|---|
| RFI | Radio Frequency Interference |
| RH | Relative Humidity |
| RMS | Root Mean Square |
| RTCM | Radio Technical Commission for Maritime Services P.O. Box 19087 Washington DC 20036-9087 |
| SE | Site Editor Standard Error |
| SESS | Session |
| SOG | Speed Over Ground |
| SS | Static Survey |
| SV | Satellite Visibility Space Vehicle |
| T-DRY | Temperature - Dry (Celsius) |
| T-WET | Temperature - Wet (Celsius) |
| TDOP | Time Dilution Of Precision |
| UT | Universal Time |
| UTC | Universal Time Coordinated |
| VDC | Volts Direct Current |
| VDOP | Vertical Dilution of Precision |
| WGS | World Geodetic System |
| WGS-84 | Reference Ellipsoid |
| WP | Waypoint |

The US Coast Guard GPS Information Service

7323 Telegraph Road, Alexandria VA 22310-3998

Tel 703-313-5900 Fax 703-313-5920

Overview

Since February 1989, the US Coast Guard has developed the requirements and plans for the Civil GPS Service (CGS) and has begun to implement these services. The four CGS functions recognized by the Coast Guard are listed below:

- Provide a GPS Operational Advisory Broadcast (OAB)
- Process applications for the civil use of GPS PPS (Precise Positioning Service)
- Provide precise GPS satellite ephemeris data
- Provide a government interface for civil GPS users

Two agencies perform these functions:

- The GPS Information Center - provides the OAB and precise ephemerides
- The PPS Program Office - processes civil applications to PPS access

The primary source of information for the OAB is the GPS control center at Falcon Air Force Base in Colorado Springs, Colorado. The OAB originates at GPSIS in Alexandria VA and is broadcast during normal working hours, 8AM to 4PM EST, Monday through Friday, except Federal holidays. An answering machine records messages after hours, and calls are returned the next working day. OAB information is updated only during normal working hours, but advisory services are accessible 24 hours, 7 days. OAB presents the following information:

- Status - Current constellation health and availability
- Outages - Recent and future satellite down time
- Almanac - Current projected orbit data for GPS coverage and visibility predictions
- Other - General GPS information and some user documentation



Satellite visibility and coverage predictions are not offered by GPSIS. These services are available from commercial sources or commercially available software.

GPSIS VOICE RECORDING - This is a 90-second tape message which contains current satellite status and outage information. The recording is available 24 hours 7 days and can be heard by dialing 703-313-5907. The recording is updated at least daily during normal GPSIS working hours.

WWV/WWVH VOICE BROADCASTS - These short-wave voice broadcasts contain current GPS status and outage information in a 45-second message. The message is broadcast at minutes 14 and 15 past each hour on WWV and at minutes 43 and 44 past the hour on WWVH. The information is updated at least daily during normal GPSIS working hours. WWV and WWVH operate at 5.0, 10.0, and 15.0 MHz.

US COAST GUARD BROADCAST TO MARINERS - GPS status, future outages, and safety advisories are transmitted on the VHF marine radio band. The information is updated weekly and whenever satellite outages occur.

GPSIS COMPUTER BULLETIN BOARD SERVICE (BBS) - GPSIS operates BBS that lists status, outage, almanac, and other GPS information. The BBS is available to any user free of charge, except for normal telephone fees. To access the BBS, the user will need a computer, a modem, and communication software. Users obtain a User ID password on line during the first session. The following information will be found useful in connecting to the GPSIS BBS.

Call 703-866-3890* for connections at 300 bps/Bell103, 1200 bps/Bell 212A, 2400 bps/CCITT V.22bis, no MNP capability (common US specs, Supramodem 2400).

Call 703-866-3893* for connections at 1200 bps/CCITT V.22bis, 1200 bps/CCITT V.22, 1200 bps/Bell 212A, 2400 bps/CCITT V.22bis, 4800 bps/CCITT V.32, 9600 bps/CCITT V.32 and MNP capabilities level 2,3,4,5, none (DigiCom Systems 9624).

Communications parameters at both numbers:

Asynchronous No parity

8 data bits Full duplex

1 stop bit (10-bit word)

* FTS SUBSCRIBERS: 398-3890/3894 AUTOVON ACCESS IS NOT AVAILABLE.

The BBS ignores the 8th bit of data, restricting the character set to the lower 128 ASCII values. The BBS also checks for ANSI graphics capability, and employs some ANSI graphics if the user's equipment can display them. All users get the same information, but non-ANSI users will not see color images.

DEFENSE MAPPING AGENCY ANMS - The Defense Mapping Agency's Navigation Information Network, Automated Notice to Mariners System is a computer database that contains GPS status, outage, almanac, and other information. GPSIS updates the information at least daily. The information is contained in query

number 85. Users must register with DMA. To obtain a user ID and information booklet, contact:

Defense Mapping Agency
Attention: Navigation Department
4600 Sangamore Road
Bethesda, Maryland 28016-5003 301-227-3296

DMA BROADCAST WARNINGS - GPSIS provides GPS status, future outages, and safety advisories through the DMA HYDROLANT, HYDROPAC, and NAVAREA warning systems. These warnings are updated weekly and whenever satellite outages occur.

DMA WEEKLY NOTICE TO MARINERS - DMA publishes weekly navigation warnings and notices to mariners in a weekly publication "Notices to Mariners." This publication automatically includes active GPS status and outage information generated by both broadcast and NAVAREA warnings.

Distributed by:

Director, DMA
Customer Service Division
Attention: CSIE
Bethesda, Maryland 20315-0010

NAVTEX TEXT BROADCAST - The Coast Guard Local Notice to Mariners and DMA Broadcast Warnings also include text broadcast that contains the same information as the voice broadcasts. NAVTEX data is broadcast in English at 518 KHz from 16 transmitters worldwide. GPS status and outage information is available on NAVTEX.

Reference Documents

Two excellent reference books on GPS theory are:

Wells: *Guide to GPS Positioning* ISBN 0-920-114-73-3

Available from Canadian GPS Associates

Box 5378, Postal Station F Ottawa, Ontario Canada K2C 3J1

King, Masters, Rizos, Stolz, Collins: *Surveying with GPS* ISBN 0-85839-042-6

Available from School of Surveying, University of New South Wales

P.O. Box 1 Kensington, NSW, 2033, Australia

Heavy mathematical treatment:

Leick: *GPS Satellite Surveying* ISBN 0-471-81990-5

Wiley Interscience 605 3rd Avenue New York NY 10158-0012

Excellent overview of geodesy:

Smith: *Basic Geodesy - An Introduction to the History and Concepts of*

Modern Geodesy without Mathematics ISBN 0-910845-33-6

Landmark Enterprises, 10324 Newton Way, Rancho Cordova CA 95670

Sources of GPS Information

- National Geodetic Information Center
National Oceanic & Atmospheric Administration
11400 Rockville Pike
Rockville MD 20852 Tel 301-443-8631
- Institute of Navigation
1626 16th St. NW
Washington DC 20036
- Scripps Orbit and Permanent Array Center (SOPAC)
High-Precision GPS BBS Service
Subscription \$7500/year and \$3000/year
Shelley Marquez, SOPAC Coordinator
- IGPP-UCSD
9500 Gilman Drive
La Jolla CA 92093-0225
Tel 619-534-0229 Fax 619-534-8090
- International GPS Service for Geodynamics (IGS)
Jet Propulsion Laboratory MS 238-540
Pasadena CA 91109
Tel 818-393-6686
Fax 818-354-8330 or -5072
Internet ren@logos.jpl.nasa.gov.

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