Introduction to WinPrism and WinPrism L1 Software Suites

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How To Use The WinPrism Manuals

Documentation for WinPrism consists of this introductory manual and a book for each major function of WinPrism.

This manual, *Introduction to WinPrism:*

- Describes each major function of WinPrism generally, system configuration, manual notations, using the mouse, and making a selection.
- Provides installation instructions.
- Gets you started running WinPrism and setting up the temporary files directory and printer parameters.

If you are new to GPS-based surveying and computer assisted processing, we recommend that you step through this entire book before using WinPrism.

For quick access to information, refer to the subject index at the end of this manual.

The remaining books provide specific, detailed instructions for running each of the WinPrism functional modules. Refer to the following table for a quick overview of the WinPrism software suite and the manuals that accompany it. The first portion lists the standard modules and corresponding documentation. The second portion lists the optional software and manuals.

Table 1.1: Standard Software and Documentation

Software	Documentation
WinPrism Suite	*Introduction to WinPrism* Document 630050
Mission Planning software package*	*Mission Planning WinPrism User's Guide:* Document 630049
Transfer module*	*File Transfer WinPrism User's Guide*, Document 630051
Process module	*Processing WinPrism User's Guide*, Document 630053
Fillnet adjustment software package*	*Fillnet WinPrism User's Manual*, Document 630055
SNAP adjustment software package	
Terramodel software package*	*Terramodel Reference Manual*, Plus 3 Software, Inc.
Tools software	*File Tools WinPrism Utility Modules User's Guide*, Document 630056
PNAV software*	*WinPrism's Precise Differential GPS Navigation and Surveying (PNAV-WinPrism) Software User's Guide*, Document 630052
Survey Database*	*Database Manager WinPrism User's Guide*, Document 630054
Terramodel Solution Pack	*Terramodel Reference Manual*, Plus 3 Software, Inc.

*Can run as standalone.

Introduction

General

The WinPrism software suite is Ashtech's survey and navigation post-processing software. It runs on the Windows95 and Windows NT v4.0 or later operating systems, and takes advantage of the convenient features offered such as multi-tasking capabilities.

If you are upgrading from WinPrism v1.0, you will notice several important enhancements. A new kinematic processing engine has been added that handles GPS+GLONASS data, providing impressive performance both in terms of accuracy and processing speed. We also continue to include PNAV for those users who are comfortable with it. The static processing engine has been updated for improved performance on longer baselines, and has a new automatic processing mode that will select the optimum set of processing parameters for you. Both engines now include the ability to use antenna phase centre offsets, In line with Ashtech's development of GPS+GLONASS products, the RINES conversion module has been completely rewritten to accommodate the changes required for using both positioning systems, and features a new user interface.

The WinPrism suite provides a complete field-to-finish solution for your GPS+GLONASS surveying needs, allowing you to increase your productivity and attain the best results possible.

Hardware Requirements

Your computer and peripherals should meet the minimum requirements listed in Table 2.1

Table 2.1: Hardware Requirements

Item	Minimum Requirement
CPU	486 or equivalent running at 33 MHz or faster
RAM	16 MB
Hard disk	40 MB of free disk space for program installation. Data will require more space.
Operating system	Windows 95 or NT
Printer	Laser, 300 dpi
Monitor	Color, VGA, resolution 640 x 480 or higher
CD ROM	2x Speed

Software Requirements

Before installing the WinPrism software suite, ensure you have installed the Terramodel software. For more information, please refer to the Terramodel product documentation.

Installation

Install the WinPrism software as described in the following steps.

1. Turn on your computer. Do not have any applications running during WinPrism installation.
2. Insert the WinPrism CD-ROM into your CD drive.
3. If you have autorun enabled, the WinPrism installation will launch automatically. If autorun is disabled, follow the steps outlined below.
4. **On the task bar** click **START**, then **SETTINGS**, then **CONTROL PANEL**. In **CONTROL PANEL**, click **ADD/REMOVE PROGRAMS**. You should see the Add/Remove Programs Properties display, Figure 2.1.

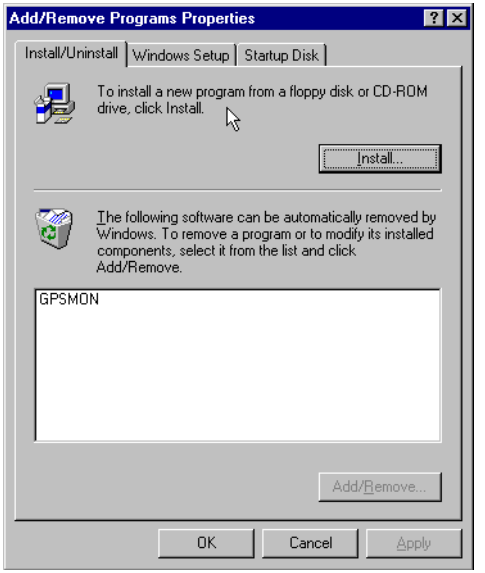

Figure 2.1: Add/Remove Programs Properties Display

5. Click **INSTALL**. You should see the Install Program From Floppy Disk or CD-ROM display.
6. Click **NEXT**.
7. You should see the WinPrism for Windows display, Figure 2.2, followed a few seconds later by the Software License Agreement display, Figure 2.3.

Figure 2.2: WinPrism for Windows Display

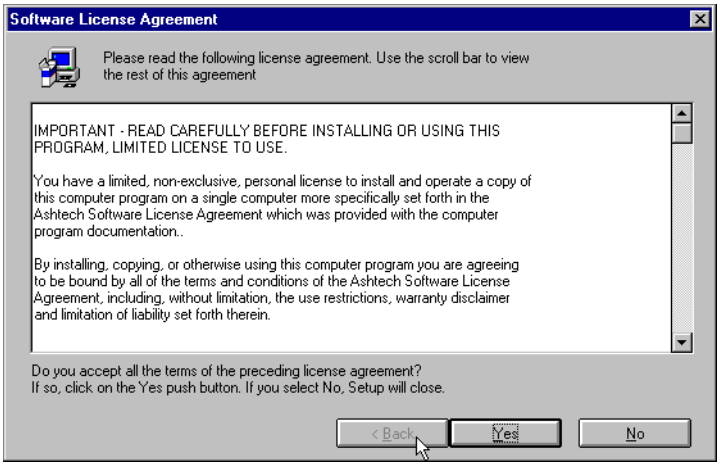

Figure 2.3: Software License Agreement

8. Please read the software license agreement displayed on the screen. If you agree to abide by the terms of the agreement, click **YES** and continue the installation. If you do not accept the terms, click **NO** to terminate the installation.
9. If you clicked **YES** in the preceding step, you should see the Choose Destination Location dialog, Figure 2.4.

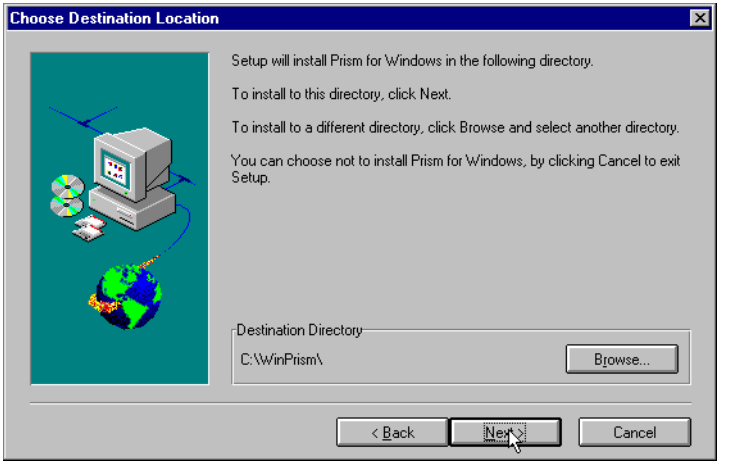

Figure 2.4: Choose Destination Location Dialog

10. At this point you can choose a name for the directory where the WinPrism files will be placed on your hard disk. If you want to name your own directory, click **BROWSE** to get the Choose Directory dialog, type in the directory name you want, and click **OK**; otherwise, click **NEXT** to accept the default directory WinPrism.
11. You should now see the Geoid Models dialog, Figure 2.5.

    This dialog lets you install or not install the geoid models that are included with WinPrism; these models are Geoid 96 and OSU91A. Note the amount

of disk space required by each model. Make your selection(s), then click **NEXT**.

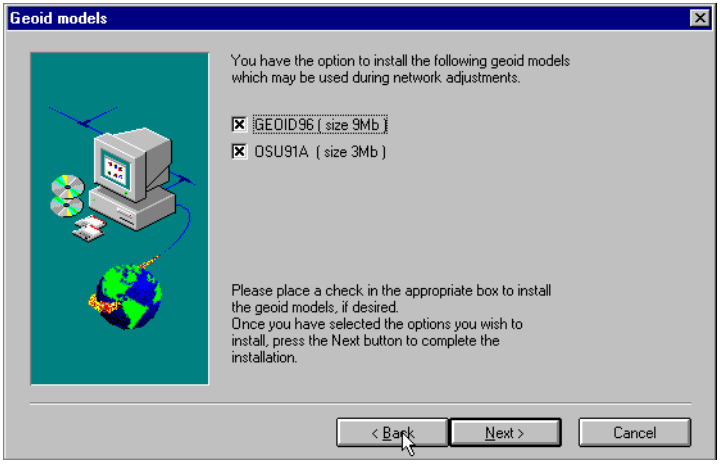

Figure 2.5: Geoid Models dialog

12. You should now see the TERRAMODEL dialog, Figure 2.6. If you wish to use TERRAMODEL for Windows, you should set the TMWPATH variable to the directory containing the TERRAMODEL program (you should install this before WinPrism). To change directories, click **BROWSE**.

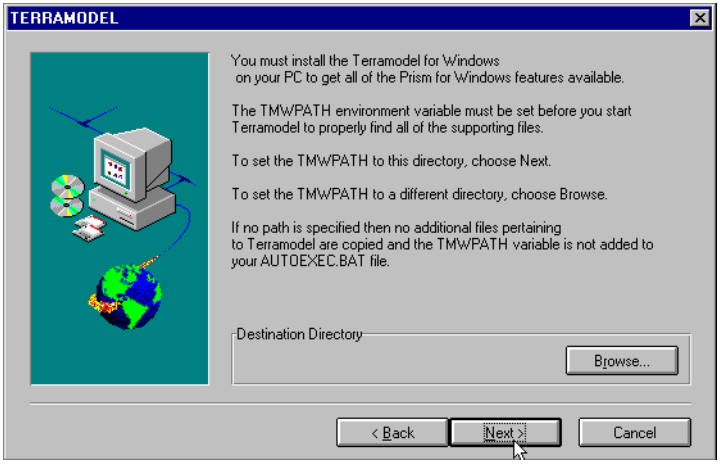

Figure 2.6: Terramodel Menu

13. After naming the TERRAMODEL directory or accepting the default, you should see the Checking Space Requirements display, Figure 2.7. This display tells you if you have enough hard disk space to hold the WinPrism files. Your numbers will probably be different from those shown in the figure. If the display indicates that you have enough disk space, click **NEXT** to continue.

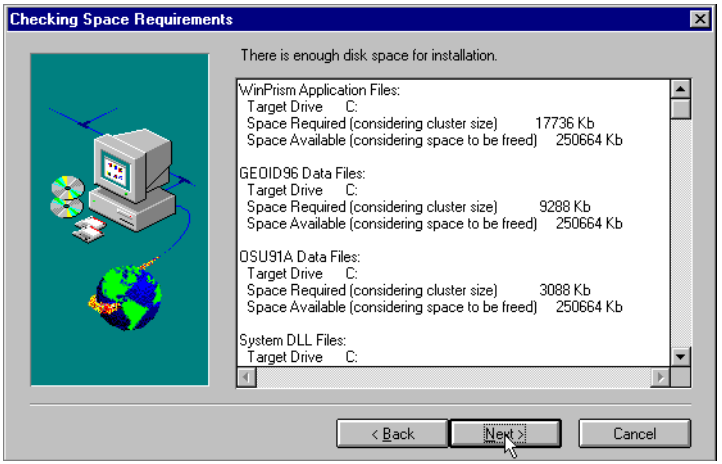

Figure 2.7: Checking Space Requirements Display

14. WinPrism now asks permission to modify your AUTOEXEC.BAT file. If you allow this, certain actions required by WinPrism will automatically perform at boot-up; if you do not allow the modification, you may have to do these operations manually. We recommend you allow the modification.

After making your decision, click **NEXT**. You should see the Installing WinPrism for Windows display, Figure 2.8.

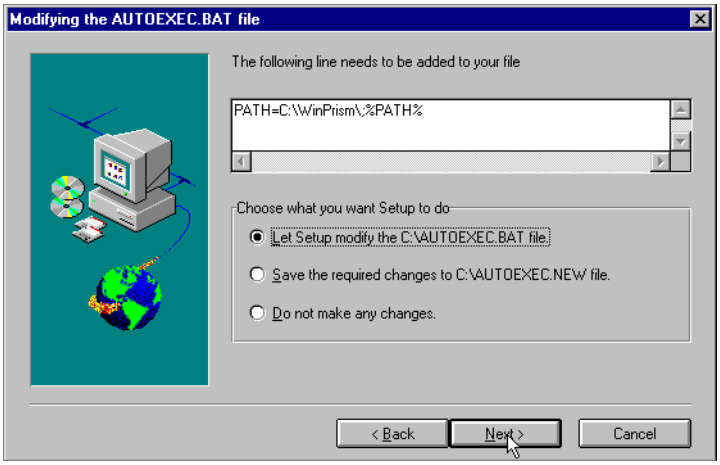

Figure 2.8: Installing WinPrism for Windows Display

15. When the installation is finished, you will see the Setup Complete display, Figure 2.9.

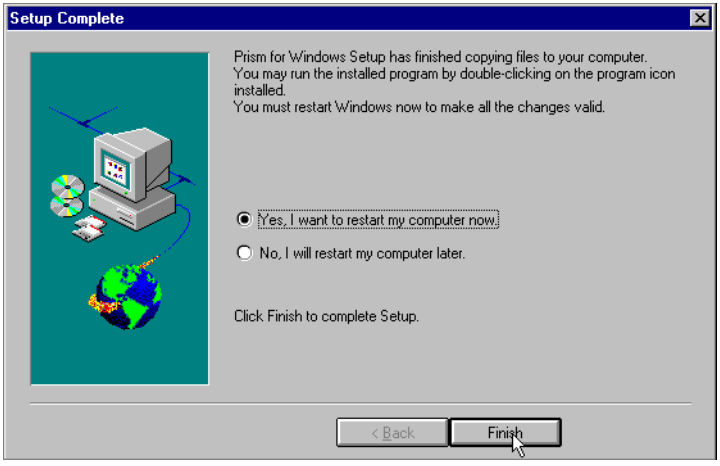

Figure 2.9: Setup Complete Display

16. Click **FINISH** and wait for the computer to reboot.

17. Double-click on **WinPrism For Windows** icon.

    You will see the WinPrism opening menu, Figure 2.10. This menu lets you select the particular WinPrism program you want to use: Mission Planning, Transfer, Process, Database Manager, Setup, Adjust (either Fillnet or SNAP), CAD and TOOLS. Note that you may also access the individual programs through WinPrism as well.

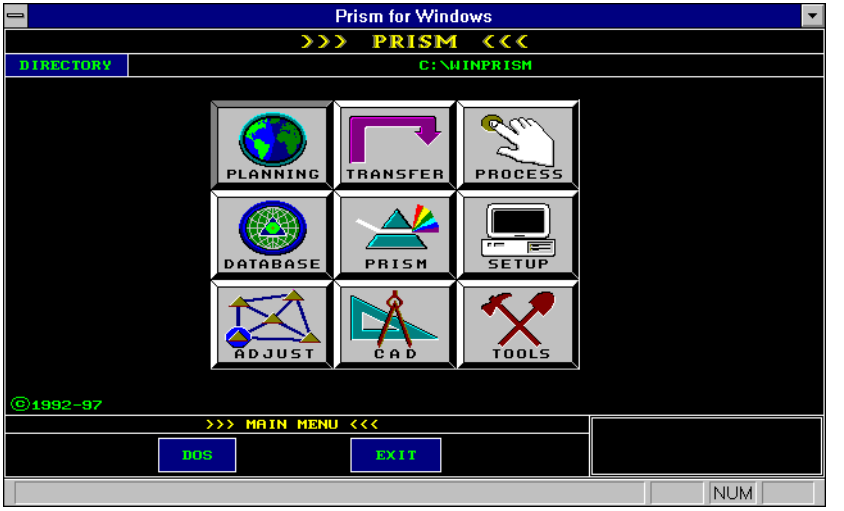

Figure 2.10: WinPrism Opening Menu

About the WinPrism Modules

Designed to consolidate and enhance the functionality of the existing family of Ashtech GPS survey support software, WinPrism offers a comprehensive suite of planning, processing, and presentation programs for manipulating data collected by the GPS and GPS + GLONASS receivers. WinPrism uses a system of multi-level graphical interface screens to provide access to its program modules: PLANNING (Mission Planning), TRANSFER, PROCESS, DATABASE (Survey Database Manager), SETUP, ADJUST (network adjustment), CAD Terramodel, and TOOLS. The modules are fully compatible, enabling you to work back and forth between programs. For example, you can download receiver data, process it into baseline vectors and station positions, and carry that data to the database or to adjustment

packages. WinPrism provides a total integrated environment in which you can complete your project.

Figure 2.11: WinPrism Modules

Some of the WinPrism modules are also available as standalone products. Mission Planning, Transfer, Survey Database Manager, both FILLNET and SNAP Network Adjustment packages, and Terramodel can run independent of the WinPrism interface. Survey Database Manager and the Terramodel Solution Pack are available as options to WinPrism. Each module is briefly described below in the order in which their icons appear in the Options Grid of the WinPrism main menu. (For details, refer to the corresponding user's manual.)

Planning

Figure 2.12: Planning Icon

The **PLANNING** icon accesses the WinPrism Mission PLANNING (MP) module which lets you graphically view satellite availability (both GPS and GLONASS) for a specified date and time, in order to plan surveys for periods of optimum satellite coverage. This was especially valuable before the full constellation of satellites was deployed, providing the survey crew with the specific knowledge about sufficient satellite coverage to accomplish its GPS survey mission. However, it is still a

valuable tool, especially for sites that are obstructed, possibly decreasing the number of visible satellites to less than four. PLANNING allows you to:

- Interpret and modify individual parameters (such as elevation cutoff angle, date, and GMT or local time).
- "Click in" site obstructions from stored project point files to instantly see how the obstructions affect satellite visibility.

Transfer

Figure 2.13: Transfer Icon

The TRANSFER icon accesses all modules that have to do with computer-recevier interaction and data transfer. In the TRANSFER area, you can download data stored in a receiver, externally log receiver data to your computer, communicate with the receiver via the serial ports, set up a modem link with a remotely located receiver (for receivers with the REMOTE capability), and transfer waypoint navigation files to the receiver. The DOWNLOAD module in the TRANSFER area is used to download the data files contained in the receiver including raw binary phase data (B-files), deciphered binary satellite ephemeris data files (E-files), ASCII site information files (S-files), and if available, descriptor files (D-files). For receiver files in data mode 2, DOWNLOAD will extract position files (C-files) as well as S-files. DOWNLOAD will also extract a receiver’s almanac file containing orbit information. This file is used in the Mission Planning module.

Process

Figure 2.14: Process Icon

The **PROCESS** icon accesses the WinPrism module which processes survey data files (B-, E, and S-files), obtained from the receiver using TRANSFER, into precise baseline vectors, station positions, and accuracy statistics. PROCESS handles both GPS and GLONASS single-and dual-frequency data (WinPrism L1 is single-frequency only). The PROCESS module lets you:

- Specify the processing parameters to match the survey method: static, pseudo-kinematic, or kinematic.
- Select session-specific file sets and verify, change, add or delete field entry information contained in the files. You can modify site specific parameters (such as antenna height and meteorological data).
- Process static or pseudo-kinematic data automatically or manually to produce output listing files (L-files), vector output files (O-files) and residual plot files (P-files).
- Process kinematic data.

Once all data from a survey session is processed, you can pass the output files to the DATABASE program module (Survey Database Manager) for storage or to the ADJUST package for least-squares network adjustments.

Database

Figure 2.15: Database Icon

The **DATABASE** icon accesses the WinPrism Survey Database Manager (SDBM) module where you can store all your GPS observations, baseline vectors, and the positions of known, existing control stations and information about each control. DATABASE constantly monitors for duplication and variations in station positions to ensure that the position of any control station is accurate and unique. With DATABASE you can:

- Import vectors and station information from various sources, including NGS control point and attribute files, output from standard network adjustment packages (such as FILLNET), and from the WinPrism/PROCESS function.
- Easily edit imported data, query points and vectors based on geographical location or other attributes, such as NGS quality.
- Graphically display vectors and station information to aid in project planning, evaluation of network design, and selection of baselines for export.
- Export tagged vectors to create input files for network adjustment.
- Print out station and vector information for reconnaissance or final reports.

Setup

Figure 2.16: Setup Icon

The **SETUP** icon accesses the WinPrism module that lets you assign a directory for temporary files produced during WinPrism operation and specify your printer. This top-level SETUP applies to the other WinPrism modules. (There are SETUP functions in other modules to configure parameters specific to those modules.)

Adjust

Figure 2.17: Adjust Icon

The **ADJUST** icon accesses an Ashtech network adjustment program. In this release, you can choose between two network adjustment packages, i.e., FILLNET and SNAP. With ADJUST you can:

- Import GPS delta-X, delta-Y, delta-Z baseline vectors calculated by WinPrism/PROCESS (or stored in WinPrism/DATABASE).
- Access and modify setup parameters. You can perform adjustments on many ellipsoids in the U.S.A.; the adjustment programs automatically calculate WGS84 geoid separations for each station if the NGS geoid model is available to it.
- Edit coordinates for known value entry; identify all stations as fixed, free, or weighted with a specified standard error; de-weight or exclude both stations and vectors.

- Perform a three-dimensional least-squares network adjustment and rotate and scale the results into an existing survey network.
- On completion of the adjustment, produce output files with adjusted positions for the DATABASE, GPS/CADD, and TOOLS/TRANSFORM modules of WinPrism.

If a sufficient number of stations have been fixed, the programs can solve rotation and scale parameters during the adjustment. It includes statistical information in an easy-to-read file. The network adjustment gives you a quality check of the data results and will indicate if there were any measurement problems.

Terramodel

Figure 2.18: CAD Icon

The **CAD** icon accesses the accompanying Terramodel CADD program module that allows you to turn GPS survey data into high-quality survey network plots for analysis and inclusion in final reports. With Terramodel, you can import ASCII points files created in the WinPrism/TOOLS/ TRANSFORM function with plane coordinates and manipulate the points to produce CAD drawings. WinPrism includes a basic module and offers an optional set of advanced functions in an optional Survey Pack.

Please see the documentation in the Terramodel software for an overview of its capabilties.

Tools

Figure 2.19: Tools Icon

The **TOOLS** icon accesses the WinPrism module that allows you to convert among time systems, edit raw receiver data files, create printed barcodes, convert data in RINEX format, translate data from one datum to another, and examine output files. WinPrism gives you access to TOOLS through the WinPrism MAIN MENU screen and through the PROCESS module icon.

The TOOLS options comprise the following:

Table 2.2: Tool Option Descriptions

Option	Description
FILETOOL	Lets you view and edit raw measurement data files and ephemeris files, combine files and create ASCII files, and correct for erroneous receiver settings and eliminate malfunctioning satellites.
RESULTS	Lets you examine output files produced by PROCESS.
TRANSFORM	Performs various transformations, data translations, and plane projections.
TIMESYS	Converts among four time systems: GPS, modified Julian, Gregorian, and year/day.
BARCODE	Creates and prints barcodes so that field personnel can enter information into a GPS receiver by means of a barcode reader wand. (BARCODE requires optional barcode printing software.)
RINEX	This utility allows you to convert RINEX data into Ashtech format and Ashtech data into RINEX format.
BLUEBOOK	Stores files in NGS BlueBook formats.
D-File and PTS File	Allows averaging of static epochs in PTS files and combining attributes in D-files collected with Ashtech's Survey Control Software.

Manual Notations

This section describes the notational conventions used in the WinPrism manuals.

- Bulleted (e.g., E, o, etc.) lists set off items of equal validity.
- Numbered description items indicate a sequence of actions the program takes.
- Numbered instruction steps indicate a sequence of steps you are to perform.
- Typed commands are given in **BOLD CAPITAL** letters. This is often on a separate line like this:

  WinPrism<ENTER>
- Displayed data entry fields and labels are **bold**.
- Keys on your computer keyboard are enclosed in "**<**" and "**>**" (angle brackets); you are to press the corresponding key.

Examples:

<F10> means press the function key labeled "F10" (the function keys are typically arranged along the top of the keyboard or along the left side).

<ESC> means press the key labeled "Esc" (escape).

<ENTER> means press the enter key; it may be labeled CR, Return or ↵.

<6> means press the number "6" key.

- Keys required in combination use the notation "+" between the two keys. The plus sign indicates that you should press both keys simultaneously. Press and hold the first key as you press the second.

Some examples:

<SHIFT>+<PRINT SCREEN> means press and hold the "Shift" key followed by the "Print Screen" key.

<SHIFT> + <ARROW> means press Shift and an arrow key (→, ←, ↑, or ↓).

<ALT>+<O> means press Alt and O key

Using the Mouse

Once you start WinPrism, you will use the mouse extensively to navigate through its screens and select options.

Moving the Pointer

The white arrow on your screen is the *pointer*; it moves when you move the mouse. To move the mouse without moving the pointer, pick it up first.

Clicking

To *click* means to press and immediately release the mouse button. You click to make selections on the screen. WinPrism recognizes all buttons on the mouse as "the mouse button" except for the PLANNING module which uses the left button to select options and the right button to exit the PLANNING program.

Dragging

To *drag* means to press and hold the mouse button, move the mouse, and then release the mouse button.

Getting Started

This chapter shows you how to run WinPrism and setup some basic configuration parameters using WinPrism/SETUP.

Running WinPrism

After you have installed the WinPrism and Terramodel software on your computer's hard disk, and have restarted your system, you are ready to begin using the WinPrism system.

1. On the Windows Task Bar, click on the START button and select the Programs E WinPrism for Windows menu item. A popup menu will be displayed showing the WinPrism icon as well as the icons of the other modules that may be run as standalones. Select the WinPrism module.
2. This launches WinPrism and brings up the title screen. Clicking in the client area will move you onto the copyright screen - otherwise just wait and you will be taken there in a couple of seconds.
3. The next screen is the copyright screen. Once again, you can move on by clicking the mouse.
4. You have now reached the WinPrism main menu screen.
5. The WinPrism MAIN MENU screen illustrates the user interface common to the high-level screens of most WinPrism modules. There are several areas on the screen:
   - Top title bar (unchanging)
   - DIRECTORY Button and Current Path Line
   - Options Selection Area and Options Grid
   - Control Button Menu
6. The current path line next to the **DIRECTORY** button reflects the full path name to the current directory. Initially this directory is the one from which you issued the WinPrism command. Click on the DIRECTORY button to change directories.
7. The Options Grid contains the icons for each WinPrism option.
8. The Control Button Menu is the area below Options Selection Area; for this top-level WinPrism it is labeled MAIN MENU. In the WinPrism manuals this label identifies the WinPrism screen; its title changes to reflect the option selected. For this MAIN MENU screen, the Control Button Menu contains buttons for shelling out to DOS or exiting the current procedure; **DOS** and **EXIT**.

9. Typically, whenever the mouse pointer tracks over an option (icon, button, or data entry field) that is available for selection, that display element is highlighted. If the option is not highlighted, it is usually not available.
10. To select an option, move the pointer to the area you want to select or change, and click on it.

Directory Selection: Directory Button

All the WinPrism modules except SETUP require input files. WinPrism requires you to specify the source directory containing the files that a particular module is to use as input **before** you select the module. Then the selected module uses that same source directory as the **target** repository for its output files. In any case, a given module will find no files to work on unless you first select the proper directory. If you need to change the drive or directory to find the files of interest, you do so in any screen that contains a DIRECTORY button.

1. Select **DIRECTORY**; WinPrism then displays a popup screen, listing the subdirectories in the current directory, e.g. for a typical root directory on drive volume C:

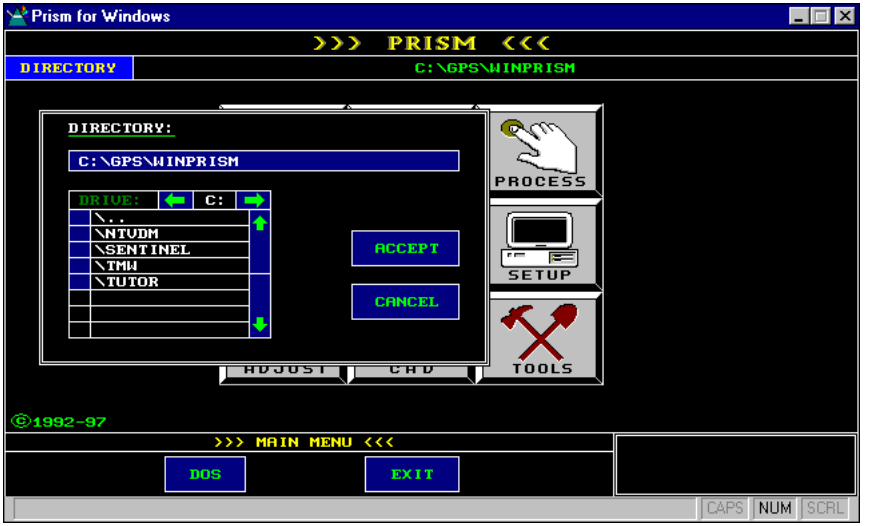

Figure 3.1: Directory

This screen lets you select the desired directory using the mouse or type its name at the cursor in the **DIRECTORY** data entry field.

2. To change the drive, move the pointer to the **DRIVE** arrow buttons.
3. To reach a drive volume earlier in the alphabet, select the left arrow repeatedly until the desired letter appears; for a drive later in the alphabet, select the right arrow.

The DRIVE arrow buttons display only valid logical drives.

4. The panel below the DRIVE buttons opens into the list of subdirectories in the current directory. Beside the panel is a vertical bar containing up- and down-arrows. If the list contains more subdirectories than the panel can accommodate, you can:
   - Move the mouse pointer to the ↑ or click ↓ and click on it to scroll through the list line-by-line.
   - A beep indicates that you have reached the end of a list. You cannot page or scroll further.
5. To look further down into a directory tree, select one of its subdirectories; the panel will display the subdirectories within the selected subdirectory.
6. To move up a tree, select the **\..** designator. This selects the parent directory and displays the subdirectories at that level. The **DIRECTORY** data entry field always displays the selected path and is always active for typed input.
7. The **ACCEPT** button accepts the directory specification, making the new one the current directory, and returning you to the WinPrism MAIN MENU screen (or the screen from which you selected **DIRECTORY**.)
   a. If you type in a directory path that does not already exist and then **ACCEPT** it, WinPrism prompts:

      ```
      Directory Does Not Exist, Create One?
      ```

   b. Select **YES** or **NO**.
   c. If you type in an invalid logical drive, WinPrism prompts:

      ```
      ILLEGAL DRIVE LETTER
      Press mouse button to continue...
      ```

8. The **CANCEL** button cancels any changes you made to the current directory specification while in the **DIRECTORY** screen.

WinPrism/Setup Icon

On the top-level WinPrism/SETUP screen, you specify the WinPrism temporary files directory and printer parameters. (Specifying current working directories is discussed above in the section *Directory Selection: Directory Button*.) The WinPrism icon functions TRANSFER, PROCESS, DATABASE, and ADJUST have their own

SETUP functions that differ from the top-level WinPrism SETUP. You must run the lower-level function's SETUP option to specify parameters for its purposes. The first time you run WinPrism, the parameters affected by the various SETUP screens assume *factory default* values. Each time you change any values in a Setup screen, WinPrism overwrites any existing AIO_SET.UP file in the WinPrism directory. The parameter settings in this file override the factory defaults. Each time you run WinPrism, it uses the values in AIO_SET.UP until you change them again. (Should you wish to restore all factory default values, delete the AIO_SET.UP file.)

1. Select **SETUP**; observe, typically:

Figure 3.2: Main Menu Setup Screen

2. You need to initialize WinPrism the first time you use it and whenever you change the **Temporary Files Directory** or **Printer Parameters** you establish here. All of WinPrism's functional modules use these parameters. The procedure for working with SETUP is:
   a. Assign the **Temporary Files Directory** using the **DRIVE** panel.
   b. Select a printer from the **PRINTERS** panel and set the **PRINT PORT**, **PAGE SIZE**, and **FORM FEED** parameters.
   c. Select the **ACCEPT** button to accept the changes or **CANCEL** to cancel them.

SETUP Control Button Menu

ACCEPT Button

Saves the parameters you have specified on this screen and returns you to the WinPrism MAIN MENU screen. When the parameters are saved, they are used automatically whenever you execute WinPrism's modules.

CANCEL Button

Cancels any changes to the displayed values and returns you to the WinPrism MAIN MENU screen. The previous specifications are retained with WinPrism and will be used automatically the next time you execute WinPrism.

Temporary Files Directory

WinPrism uses this directory internally as a workspace for temporary files that it creates as it runs. The full pathname for this directory appears in the **DIRECTORY** data display field. The factory default value for this directory (used the first time you run WinPrism) is the installation directory. If you do not specify this directory in SETUP (i.e., select **ACCEPT** with the desired pathname), it defaults to the current directory selected by the **DIRECTORY** button. Use the **DRIVE** panel to select the **Temporary Files Directory** as described earlier in this chapter in the section *Directory Selection: Directory Button*.

Printer Parameters

Before you can print any WinPrism results, you must identify to WinPrism the type of printer you have attached to your system.

Figure 3.3: Printer Menu

PRINTER

Selected from the **PRINTERS** panel. Scroll through the panel to see the complete list of printers that WinPrism supports. Select the one corresponding to the one you have connected to your computer. When you click on it, WinPrism puts a check mark (4) by its name and you will see your selection echoed opposite the **PRINTER** label. WinPrism uses this specification as the printer for all its modules. Conversely, any changes you make to the printer specification in another module such as Mission Planning are reflected in this top-level Setup screen.

PRINT PORT Button

A toggle that specifies the computer port to which your printer is connected. You can choose **LPT1** (line printer port 1) or **LPT2** (line printer port 2). The factory default is **LPT1**.

PAGE SIZE Button

A toggle that establishes the number of lines per printed page. You can choose 66 or 72. The factory default is 66.

FORM FEED Button

When set to **YES** (factory default) inserts a formfeed character at the end of each physical page and at the end of printing to clear the print buffer.

Exiting

When you are ready to exit the WinPrism program, select the button that leaves the current screen and returns you to the next higher level of WinPrism.

If you wish to exit from the WinPrism MAIN MENU screen, select **EXIT**. This terminates WinPrism and sends you to the DOS prompt. For some modules, it is also possible to leave WinPrism briefly, perform a DOS command, and return to WinPrism. That choice is presented in a menu such as this:

Figure 3.4: Tools Menu

The DOS button shells out to the operating system where you can execute DOS commands while WinPrism keeps running. Type EXIT <ENTER> to return to WinPrism. (In the example above, the QUIT button sends you from the TOOLS top-level screen to the WinPrism MAIN MENU screen).

Global Product Support

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

- telephone
- email
- Ashtech BBS system
- Internet

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

Ashtech customer support:

Sunnyvale, California, USA

800 Number: 1-800-229-2400

Local Voice Line: (408) 524-1680

fax Line: (408) 524-1500

Email: support@ashtech.com

Ashtech Europe Ltd. Oxfordshire UK

TEL: 44 1 993 883 533

fax : 44 1 993 883 977

Solutions for Common Problems

- Check cables and power supplies. Many hardware problems are related to these simple problems.
- If the problem seems to be with your computer, re-boot it to clear the system's RAM memory.
- If you are experiencing receiver problems, power cycle the receiver or try a different port.
- Verify the batteries are charged.

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

Table 4.1 GPS Product Information

Information Category	Your actual numbers
Receiver model	
Receiver serial #	
Software version #	
Software key serial #	
Firmware version #	
Options*	
A clear, concise description of the problem.	
* The firmware version # and options can be obtained using the $PASHQ,RID (receiver identification) command.	

Corporate Web Page

You can obtain data sheets, GPS information, application notes, and a variety of useful information from Ashtech's Internet web page. In addition, you can access the BBS through the web site, and locate additional support areas such as frequently asked questions and training previews. The Internet address is:

http://www.ashtech.com

Ashtech Bulletin Board

General

If your computer contains a modem and communications software, you can access information from Ashtech's computer Bulletin Board System (BBS). Two data lines are available 24 hours a day, 7 days a week, except for short periods when the system is off-line for maintenance. The Ashtech BBS uses the TBBS BBS software and provides several important services. You can download a current almanac, get the status of the GPS satellites, get NANUS (Notices Advisory to Navstar Users), and look at solar and geomagnetic data from SESC (Space Environment Services Center) in Boulder, Colorado. On occasion, the BBS has been used to carry software updates and document files.

The first time you call, you will be able to log on and browse for up to 30 minutes, but you will not be able to download. During this initial logon, you will be asked for identifying information and a password; anonymous callers will not be given access to the system. Remember exactly how you entered your name and how you spelled your password; write them on paper, they will be your entry into the system in the future.

After you have logged on and registered, the SYSOP verifies your status as a customer, and establishes your security code commensurate with the hardware and software you are using.

The BBS phone numbers are:

- Line 1 408-524-1527 2400 to 28800 baud
- Line 2 Automatic rollover 2400 to 14400 baud if line 1 is busy

Parameters: N,8,1 (No parity, 8 bits, 1 stop bit, full duplex)

Supported Protocols

Table 4.2 lists the protocols supported by the Customer Support BBS**.**

Table 4.2 Protocols

Protocol	Description
XMODEM	Widely supported, uses 128-byte blocks. Good for moderately noisy lines. May cause file integrity problems by rounding.
XMODEM-1k	Uses 1024-byte blocks. Supposedly better for 2400 baud+. May cause file integrity problems by rounding.
YMODEM	Also known as YMODEM Batch, passes filename and size, eliminating rounding problems. Capable of multiple file transfer (batch).
YMODEM-G	Fast protocol for use only with error-free data links. Not recommended.
SEAlink	Passes filename and size, eliminating rounding problems. Capable of file transfer (batch). Good for noisy line conditions and links where delays occur (satellite-based long distance, or packet-switched networks).
KERMIT	Slow, but works with almost any transmission medium.
SuperKERMIT	Same as KERMIT, but faster. Good for noisy line conditions and where delays occur (satellite-based long distance, or packet-switched networks).
ZMODEM	Newer protocol that supports batch and exact file size. Good for noisy conditions. Includes all ZMODEM-90Ô extensions.
ASCII	Only for users with no other protocols available. No error checking, not recommended.

The preferred protocols are ZMODEM, SEAlink, YMODEM.

Training Courses

We provide a full range of GPS training courses for the novice and advanced user. Arrangements can be made for customized, on-site training to fit your specific needs.

Ashtech training courses:

- Conventional GPS Surveying
- Solving Problem Data Sets
- Real-Time Z Applications
- Reliance for GPS/GIS

For detailed information, call or email Ashtech, or contact your local Ashtech dealer. The Ashtech WWW pages contains information on course dates, costs, and content.

Repair Centers

In addition to repair centers in California and England, authorized distributors in 27 countries can assist you with your service needs.

Ashtech Inc., Sunnyvale, California

Voice: (408) 524-1680

or (800) 229-2400

fax: (408) 524-1500

Ashtech Europe Ltd. Oxfordshire UK

TEL: 44 1 993 883 533

fax: 44 1 993 883 977

File Definitions

WinPrism uses several different types of files. Some are differentiated by starting their names with different letters of the alphabet. (For example, the file name would start with the letter B and be called a B-file.) Some are differentiated by a unique file name extension, such as the .PRJ file.

This chapter provides definitions for the file types, listing them in alphabetical order. (Ignore the dot when looking for file name extensions.) We have tried to say where a file comes from, how it is named, which modules operate on its data and what is produced. Where meaningful, a file structure is included.

File-Naming Conventions

We have found that certain file-naming conventions provide the best protection against accidently overwriting a data file and at the same time let you keep track of data files for large projects. This section describes the conventions by which WinPrism functions automatically name their output files. These formats follow the DOS file-naming rules (up to eight characters for the body of the file name, followed by a period and up to three characters for the extension). The various WinPrism options permit you to edit file names to suit your needs.

Downloaded Input Data File Naming

When you download files from a Ashtech receiver, the WinPrism TRANSFER module automatically renames files based on four-character site names to create its output B-, E- and S-files. In the same way, when you type a B-file name in the RINEX-Ashtech conversion routine of the WinPrism TOOLS module, WinPrism automatically generates corresponding E-file and S-file names. (If you do not want the supplied names, simply overtype them when you run WinPrism/TRANSFER/ DOWNLOAD.) The format is:

tsssscyy.ddd

where:

Table A.1: Data file Naming Formats

Item	Description
t	is the file type: B indicates the binary measurement file, E is the ephemeris file, P is the photogrammetry file, and S is the site data file.
ssss	is the four-character site name.

Table A.1: Data file Naming Formats (continued)

Item	Description
c	is the session character (0-9, A-Z) in chronological order (for each day).
yy	is the calendar year - 1900 (00-99).
ddd	is the day of the year (001-366).

These examples use the survey data file-naming convention:

B*sssscyy.ddd* = BHILLA89.304 = phase data file

E*sssscyy.ddd* = EHILLA89.304 = ephemeris file

P*sssscyy.ddd* = PHILLA89.304 = photogrammetry file

S*sssscyy.ddd* = SHILLA89.304 = site information file

These are B-, E-, and S-files for station HILL, observed on the 304th day of 1989 (October 31st) and on the first session of that day.

In some cases a photo-file is downloaded as the file PHOTO.DAT.

Output File Naming

Because two stations are involved during baseline vector processing of static or kinematic data, the WinPrism/PROCESS module uses to create files which have a different naming convention. The format is the last 3 characters of each station's 4 character site name.

tfffooos.ddd

where:

Table A.2: Output File Name Formats

Item	Description
t	is the file type (I, L, O, and P).
fff	are the last three characters of the four-character FROM station name designator; for PNAV this is the Base station site name.
ooo	are the last three characters of the four-character TO station name designator; for PNAV this is the Rover station site name.
s	is the session character (0-9, A-Z) in chronological order (for each day).
ddd	is the day of the year (001-366) of the first record

Examples:

I020134B.305	input parameter file, I. From ?020 to ?134 during session B on day 305.
OPOTACKA.024	vector output file, O. From ?POT to ?ACK during session A on day 024.
P111112A.354	residual plot file, P. From ?111 to ?112 during session A on day 354.

To avoid having duplicate files with this convention, it is important that the last three characters of the four-character station name designator be unique. For example, if we have five stations in a session, they should be named:

0001, 0002, 0003, 0004, 0005

rather than

1000, 2000, 3000, 4000, 5000.

ALM-File

An almanac file. It contains satellite almanac (orbit) information in binary format. An almanac file is named in the form ALM*yy.ddd*, where *yy* is the last two digits of the year and *ddd* is the day of the year. The WinPrism PLANNING module uses this file to predict the orbit and location of a satellite, the almanac must be current. You can get a current almanac in two ways. You can download a current almanac file from a GPS or GPS/GLONASS receiver using the ALMANAC icon under the TRANSFER function of WinPrism. Alternatively, for those with a modem and communications software, you can download a current almanac data from the Ashtech computerized bulletin board.

B-File

A raw binary measurement file, downloaded from a receiver, containing collected pseudo-range, optional carrier-phase, and Doppler measurement. It contains computed positions for every epoch, plus health flags indicating the confidence of the measurements. You can view this file and its structure format with the TOOLS/ FILETOOL function.

C-File

An ASCII file containing a chronological listing of time, site, number of satellites, PDOP, and position for every epoch. It contains position information only. It is output from a receiver that is in Ranger mode 2, or from processing of kinematic data.

When output from Kinematic processing, this file lists the Rover's position in WGS-84 coordinates. Each line in the ASCII C-file is a record for a single epoch. The C-file can be read directly by the WinPrism/TOOLS function. A typical record line item is 103 characters long; the following example is for a single-record line, i.e., a continuous line beginning with **SITE** and ending with **V_UP**:

```
Ashtech, Inc. GPPS-2          Program:   PPDIFF-PNAV
Version: 2.0.00
           Fri Dec 10 11:17:28 1993   Differentially
Corrected: Y
SITE MM/DD/YY HH:MM:SS      SVs PDOP    LATITUDE
_TG3 08/18/92 22:35:30.000000  6   2.3  N 37.37314413
LONGITUDE     HI      RMS  FLAG  V_EAST  V_NORTH  V_UP
W 121.99745786     24.1563       8.992    2     0.000
0.000  0.000
```

where:

Table A.3: Record Line Descriptions

Item	Description
SITE	Rover site name.
MM/DD/YY and **HH:MM:SS**	Date and current GPS time of the current epoch.
SVs	Number of satellites being used in processing the current epoch.
PDOP	Position dilution of precision.
LATITUDE and LONGITUDE	Geodetic coordinates of the Rover.
HI	This height of instrument plus the antenna height in the <ALT-O> other Setup Menu or in the PNAV.PNT file is the ellipsoidal height of the Rover antenna phase center.
RMS	σE is the RMS error in the east position (m). σN is the RMS error in the north position (m). σU is the RMS error in the up position (m). σdX is the RMS error in the earth-centered earth-fixed (ECEF) X-position (m). σdY is the RMS error in the ECEF Y-position (m). σdZ is the RMS error in the ECEF Z-position (m).
FLAG	2 - Kalman filter reset. 1 - ambiguities-free solution. 0 - ambiguities-fixed solution. -1- missing measurement data based on Kalman filter predicted solution.
V_EAST	Eastward velocity of the Rover (m/s).
V_NORTH	Northward velocity of the Rover (m/s).
V_UP	Upward velocity of the Rover (m/s).

C*@-File

Contains the Rover's WGS-84 positions, interpolated to the precise time tag of the input photogrammetry file. The format of the C*@-file is exactly that of the C-file generated during the same processing session.

COMMON.NAV FILE

Binary file generated by the COMNAV program. COMNAV reads in each E-file (ephemeris file) that has been recorded for a given session and generates a common ephemeris file that will be used by other processing modules to compute accurate satellite positions for a given time.

COMMON.ASC FILE

ASCII file containing the navigation information from the binary COMMON.NAV file. COMMON.ASC is generated via **Write ASCII File 'COMMON.ASC'** in the PROCESS/MANUAL/COMNAV screen.

D-File

ASCII descriptor file containing a variety of information depending on the application and software used to collect the data. It can also be used for photogrammetric data downloaded from the receiver and barcode input entered on screen 12 of the receiver by a user. This file gives time in seconds of week (measured from midnight Saturday). The D-file is useful for logging events; a later analysis can correlate the logged time with a position.

.DBD Files

Components of a database created using the WinPrism DATABASE module. BASEP.DBD stores all point records; BASEPI.DBD is an index file for accessing BASEP.DBD. BASEV.DBD stores all vector records, and BASEVI.DBD is an index file for accessing BASEV.DBD.

E-File

Binary file, downloaded from a receiver, containing the GPS and GLONASS satellite ephemeris data. It gives orbit parameters and satellite clock corrections and is used to compute the satellite's position. You can view this file with the WinPrism/TOOLS/ EDIT FILETOOL function.

FILLNET (.FOP) Files

Files output from FILLNET, the network adjustment software package.

I-File

Input Parameter file containing runtime parameters to be used for the MANUAL or AUTOMATIC processing of static or pseudo-kinematic survey data. For SURVEY TYPE: STATIC or PSEUDO, for each pair of known and unknown stations selected for processing, an I-file contains the site identifiers along with the input parameters (runtime parameters) you set in the PROCESS/EDIT RUNTIME or PROCESS/ SETUP, screens; it is the binary input file for baseline vector computation.

Here is a sample:

```
PROJECT NAME: GPS Survey
Known SITE : NBS5             UnKnown SITE : ORM1

Common Epoch To Begin Processing:      1
Last Common Epoch To Process:          -1
Second Between Triple Diff Epochs:     1
Elevation Cut-Off Angle:               15
Processing Mode:                       1
Data Editing Criterion (this * RMS):   3.000000
Convergence Criterion:                 0.010000
SVs To Omit From Processing:           0 0 0 0 0 0 0
Minimum Precent Of Measurements For SV:10
Maximum Iterations To Perform:         10
Forbidden Reference SVs:               0 0 0 0 0 0 0
Apply Tropospheric Corrections:        Y
Use Precise Orbits (If Found):         N
Absolute Contrast Cut-off:             0.01
Contrast Cut-off:                      95.00
Search Range:                          9.00
Maximum Cases to Search:               100000
```

J-File

Kinematic processing generates an ASCII J-file which contain vector solutions for each epoch in either vector solution are relative to the base station. East, North, Up (ENU) or dX, dY, dZ WGS-84 Earth-centered Earth-fixed (ECEF). Section describes these formats.

For a discussion of the the significance to output file analysis of the parameters RESID and Chi2, see the Precise Differential GPS Navigation and Surveying (PNAV-WinPrism) Software User's Guide.

Each line in the J-file is a record for a single epoch. A typical record line item is 160 characters long; each of the following examples is for a single-record line, i.e., a continuous line beginning with **Time** and ending with **m/s**.

East, North, Up (ENU) Format

The ENU epoch format is:

Table A.4: ENU Formats

Time	PDOP	E	sE	N	sN	U	sU
305221.00	1.72	931.753	0.005	5186.942	0.006	535.991	0.013

u	su	v	sv	w	sw	RESID	Chi2	SVs	m/s
-24.126	2.686	-58.503	2.686	0.521	2.687	0.008	3.693	6	1

where:

Time is GPS seconds-of-week for the current epoch.

PDOP is the position dilution of precision.

E is the east distance from the Base or _RBS (m).

σ_E is the RMS error in the east position (m).

N is the north distance from the Base or _RBS (m).

σ_N is the RMS error in the north position (m).

U is the up distance from the Base or _RBS (m).

σ_U is the RMS error in the up position (m).

u is the east velocity of the Rover (m/s).

σ_u is the RMS error in the east velocity (m/s).

v is the north velocity of the Rover (m/s).

σ_v is the RMS error in the north velocity (m/s).

w is the up velocity of the Rover (m/s).

σ_w is the RMS error in the up velocity (m/s).

RESID is the averaged post-fit carrier-phase residual of the measurements (m).

Chi^2 is a "goodness-of-fit" indicator of the solution.

SVs is the number of satellites used in data processing.

m/s is the site flag: **1** for moving or **0** for stationary.

Earth-centered Earth-fixed (ECEF) Format

To generate a J-file in the ECEF dX,dY,dZ format, set the ENU Coordinate flag to **N** in them

Table A.5: ECEF Formats

Time	PDOP	dX	σ_{dX}	dY	σ_{dY}	dZ	σ_{dZ}
305221.00	1.72	145.562	0.010	321.449	0.005	334.219	0.014

V_X	σ_{Vx}	V_Y	σ_{Vy}	V_Z	σ_{Vz}	RESID	Chi²	SVs	m/s
-12.227	1.342	-45.338	2.343	2.122	2.757	0.007	3.547	6	1

where:

Time	is in GPS seconds-of-week for the current epoch.
PDOP	is the position dilution of precision.
d_x	is the ECEF X distance from the Base or _RBS (m).
σ_{dX}	is the RMS error in the ECEF X-position (m).
d_Y	is the ECEF Y distance from the Base or _RBS (m).
σ_{dY}	is the RMS error in the ECEF Y-position (m).
$\mathbf{d_Z}$	is the ECEF Z distance from the Base or _RBS (m).
σ_{dZ}	is the RMS error in the ECEF Z-position (m).
$\mathbf{V_X}$	is the ECEF X velocity of the Rover (m/s).
σ_{Vx}	is the RMS error in the ECEF X velocity (m/s).
$\mathbf{V_Y}$	is the ECEF Y velocity of the Rover (m/s).
σ_{Vy}	is the RMS error in the ECEF Y velocity (m/s).
$\mathbf{V_Z}$	is the ECEF Z velocity of the Rover (m/s).
σ_{Vz}	is the RMS error in the ECEF Z velocity (m/s).
RESID	is the averaged post-fit carrier-phase residual of the measurements (m).
Chi²	is a "goodness-of-fit" indicator of the solution.
SVs	is the number of satellites used in data processing.
m/s	is the site flag: **1** for moving or **0** for stationary.

J*@-File

Contains the Rover's ENU positions, interpolated to the precise time tag of the input photogrammetry file. The format of the J*@-file is exactly that of the J-file generated during the same processing session except that the **Time** (current epoch) field is in GPS seconds-of-week to the nearest microsecond (Photo-file time tag). The following example is of the East, North, Up (ENU) format:

Table A.6: ENU Formats

Time	PDOP	E	σ_E	N	σ_N	U	σ_U
305221.623094	1.6	931.753	0.005	5186.942	0.006	535.991	0.013

u	σ_u	v	σ_v	w	σ_w	RESID	Chi^2	SVs	m/s
-24.126	2.686	-58.503	2.686	0.521	2.687	0.008	3.693	6	1

L-File

WinPrism produces two types of ASCII files called L-files:

- An Output Listing of the results produced by the QUICK program of the WinPrism/PROCESS module. It contains vector solutions from various stages of the processing along with their related statistics for each pair of known and unknown stations selected for processing from the PROJFILE.STA or PROJFILE.PSD file.
- A Message Log file containing a time-history of what occurred while PNAV was processing the data. (These messages appeared in the Processing Results Message Log Window during processing.)

LOGTIMES File

Binary Logtimes File created when you select SURVEY TYPE: KINEMATIC or PSEUDO in PROCESS. It allows you (via the PROCESS/EDIT LOGTIME [EDIT LOG] screen) to edit information regarding common time intervals between sites, to edit antenna height (kinematic only), and to decide whether to reset the ambiguities for the static site (kinematic only).

O-FILE

The O-file is a binary Vector Output file generated during processing of static or pseudo-kinematic survey data or kinematic survey data. An O-file contains, in abbreviated binary form, vector information and solution statistics, for each pair of known and unknown stations selected. It can be read by adjustment packages such as FILLNET, Geolab® or SNAP. It can be inspected via the VECTOR OUTPUT function in the PROCESS/RESULTS screen.

P-File

The P-files is a Residual Plots file generated during processing. It is a graphical plot file representing the noise of the data used in processing. For each pair of known and unknown stations selected for processing, a P-file contains X-Y plots of the residuals resulting from baseline vector computation. The plotted X-axis represents the epoch number, and the plotted Y-axis represents the carrier phase residuals in cycles. Each P-file contains a plot for every double-difference satellite pair as well as one plot including all satellites. The P-file can be viewed by the PROCESS/RESULTS/ RESIDUAL PLOTS function.

PHOTO-File

ASCII descriptor file containing photogrammetric data, typically downloaded from the receiver with the name PHOTO.DAT. It contains precise time tags generated by TTL pulses sent to the "Camera In" port on the receiver. It is useful for logging events; a later analysis can correlate the logged time with a position.

Example:

???? 2 23:25:00.6820077
???? 2 23:27:00.6543654
???? 2 23:28:09.6546546
???? 2 23:29:00.5435437
???? 2 23:30:01.4534534
???? 2 23:31:00.5767567
???? 2 23:32:00.5647657
???? 2 23:32:59.0690044

The format is:

site d hh:mm:ss

where:

site is the site name.

d is the GPS day of the week (measured from GPS midnight Sunday 0:00:00 am).

hh is GPS hours from midnight.

mm is GPS minutes.

ss is GPS seconds.

PLOT File

Generated by PNAV or JPE. It is a graphical plot file containing Kinematic data processing results. It can be viewed by the PROCESS/RESULTS/RESIDUAL PLOTS function.

PNAV Program Control Input Files

Four files control PNAV execution when processing in either Survey Mode or Navigation Mode: PNAV.CNF, PNAV.PMT, PNAVSIM.SIM, and PNAV.WAY. In Navigation Mode, PNAV also uses the files PNAV.POS and PNAV.PNT; in Survey Mode, it uses the file PROJFILE.KIN and the LOGTIMES file. When it begins automatic execution, PNAV uses the parameter settings in the PNAV.CNF and PNAV.WAY files, and (in Navigation Mode only) PNAV.POS and PNAV.PNT files if they exist in the current directory; otherwise it creates the files with default parameter settings. When PNAV displays the Setup Menu screen you can edit the parameters in all these files except PROJFILE.KIN using the appropriate

PNAV.CNF File

A binary configuration file which contains the menu attribute information and your selections from the

PNAVCOMP.DIF File

Contains an ASCII tabular comparison of two J-files or C-files. Each line in the file is a record for a single epoch. The data is organized into 23 columns. A typical record line item is 160 characters long; the following examples are for single-record lines. The column headings are for reference only and do not appear in the listing.

A comparison of J-files is shown below:

Column	1	2	3	4	5	6	7
	257252.00	0.254	1.995	26.153	-0.000	0.578	0.578
Column	8	9	10	11	12	13	14
	1.072	1.732	23.283	-0.003	0.577	0.578	3.982
Column	15	16	17	18	19	20	21
	4.678	54.725	0.010	0.578	0.579	0.002	0.001
Column	22	23					
	0.013	0.005					

where:

Table A.7: J-File Column Descriptions

Column	Meaning
1	GPS seconds-of-week for the current epoch
2	East position difference (meters)
3	East position RMS from file 1 (meters); zero for C-files
4	East position RMS from file 2 (meters); zero for C-files
5	East velocity difference (meters/ses)
6	East velocity RMS from file 1 (meters/sec); zero for C-files
7	East velocity RMS from file 2 (meters/sec); zero for C-files
8	North position difference (meters)
9	North position RMS from file 1 (meters); zero for C-files
10	North position RMS from file 2 (meters); zero for C-files
11	North velocity difference (meters/sec)
12	North velocity RMS from file 1 (meters/sec); zero for C-files
13	North velocity RMS from file 2 (meters/sec); zero for C-files

Table A.7: J-File Column Descriptions (continued)

Column	Meaning
14	Up position difference (meters)
15	Up position RMS from file 1 (meters); zero for C-files
16	Up position RMS from file 2 (meters); zero for C-files
17	Up velocity difference (meters/sec)
18	Up velocity RMS from file 1 (meters/sec); zero for C-files
19	Up velocity RMS from file 2 (meters/sec); zero for C-files
20	averaged post-fit carrier-phase residual of the measurements from file 1 (meters)
21	averaged post-fit carrier-phase residual of the measurements from file 2 (meters)
22	Chi2 "goodness-of-fit" indicator of the measurements from file 1
23	Chi2 "goodness-of-fit" indicator of the measurements from file 2

In a comparison of C-files, all position RMS, velocity RMS, phase residual, and Chi^2 columns are always zero.

You may inspect PNAVCOMP.DIF via the WinPrism/TOOLS/RESULTS function.

PNAVCOMP.PLT File

A binary plot file (default name PNAVCOMP.PLT) generated from Overview Menu option C) POST MISSION/COMPARE NAV SOLUTIONS. When comparing comparing J-files, PNAVCOMP.PLT contains the following plot screens:

- East Difference (meters).
- North Difference (meters).
- Up Difference (meters).
- East Velocity Difference (meters/second).
- North Velocity Difference (meters/second).
- Up Velocity Difference (meters/second).
- Phase Residuals (comparitive-meters).
- Post-fit Chis (Chi values-dimensionless).

For comparison of C-files, PNAVCOMP.PLT omits Phase Residuals and Post-fit Chis.

You may inspect this file via the RESIDUAL PLOTS function in the PROCESS/ RESULTS screen.

PNAV.PMT FILE

An ASCII file containing the Kalman filter parameters and runtime parameters used to control data processing and modified via the ????

PNAVPMT.DFT FILE

The binary Default Parameters file (a PNAV support file) containing the default Kalman filter parameter settings for STATIC, WALKING, AUTOMOBILE, SHIP, or AIRCRAFT Rover Motion Dynamics.

PNAVPMT.FAC FILE

The binary read-only Backup Factory Default Parameters file (a PNAV support file) from which PNAV can restore the factory default settings. The first time you access the MODIFY DEFAULT PARAMETERS Setup Menu Screen (via Overview Menu Option D) PNAV UTILITY copies the current contents of PNAVPMT.DFT to PNAVPMT.FAC.

PNAV.PNT FILE

An ASCII file containing information about the relationship between the Rover's positioning point and the Rover's antenna phase center. It is used for Navigation Mode only. For example:

```
Antenna Position relative to the Reference Point ------------------------
---
  xx.xxx                      | (units in meters, Assuming Vertical
Mounting)
   2.125                      | Slant
   0.132                      | Radius
   0.000                     | Vertical between Slant pt. and reference pt.
```

If this file does not already exist in the current directory, PNAV creates a file with zero default values. For a Rover antenna mounted directly on a tripod or bipod, the antenna height (slant and radius) should be entered in the Antenna Position relative to the Reference Point. In this example, a slant height of 2.125 meters and a radius of 0.132 meters were entered. There is 0.000 meters of additional vertical offset.

PNAV.POS FILE

The Site Position File for the Navigation Mode and Relative Nav Mode. It is an ASCII file containing the site list. At least one entry should have the correct Base station site name and coordinates. By default, the Base station is the site from which the Rover's east, north, up (ENU) vectors are determined. Another entry with a site name "**_RBS**" can be used as a reference point with which all the Rover's ENU positions will be computed. The antenna height of the Base station or _RBS site will be ignored when computing ENU position. For example:

```
Site Information ----------------------------------------------------------------
-----
Name Slant   Radius  D_Vert        LAT              LON          ELLIP. HT.    RMS
cccc xx.xxxx xx.xxxx xx.xxxx  c xx xx xx.xxxxxx  c xxx xx xx.xxxxxx
xxxxx.xxxxxxx.xxxx
1111  1.5000  0.1318  0.0000  N 37 25 23.293160  W 122  4 48.308670    -28.9220
0.0000
2222  0.0000  0.0000  0.0000  N 37 25 23.312700  W 122  4 48.122500    -28.9330
0.0000
3333  0.0000  0.0000  0.0000  N 37 25 23.459500  W 122  4 48.146000    -28.9890
0.0000
SSSS  0.0000  0.0000  0.0000  N 37 25 23.440300  W 122  4 48.331700    -28.9520
0.0000
CHSX  0.0000  0.0000  0.0000  N 37 25 24.122700  W 122  4 47.408500    -29.0810
0.0000
HYD1  0.0000  0.0000  0.0000  N 37 25 23.740870  W 122  4 43.845410    -29.8400
0.0000
HYD3  0.0000  0.0000  0.0000  N 37 25 23.208900  W 122  4 59.302600    -30.5790
0.0000
HYD4  1.6300  0.1318  0.0000  N 37 25 22.751360  W 122  5  2.972400    -30.5740
0.0000
_DH1  0.0000  0.0000  0.0000  N 37 25 24.537840  W 122  5 10.826860    -26.5110
0.0000
_TRN  0.0000  0.0000  0.0000  N 37 25 25.009610  W 122  5 17.896820    -30.4270
0.0000
--------------------------------------------------------------------------------
```

Ensure that the site name, the antenna height, and the coordinates for the Base station have been entered and are correct in order to get accurate WGS-84 results for the Rover.

PNAVSIM.SIM FILE

An ASCII simulation file automatically generated by PNAV that describes the input data files and the common epochs to process.

Example:

```
1.00                          |Timing scale factor
N BSSSPA92.232                (Nav Data in Output, Y or N) BENDATA File
F BS 0 R CA                 [F]ixed or [R]over Site (rrr = RCVR ID) (COMM)
Y B_TG3A92.232                (Nav Data in Output, Y or N) BENDATA File
R 01 1 R CA                 [F]ixed or [R]over Site (rrr = RCVR ID) (COMM)
COMMON.NAV                    COMMON.NAV File
345000                        Start epoch
                              End epoch
____                         |Process epochs whose base site matches this
ID
____                         |Process epochs whose rovr site matches this
ID
```

In all these parameters, only the fields with bold characters are important for PNAV post-processing; other fields are reserved for future implementation.

BENDATA File

Second line and fourth line list the B-files used for post-processing as specified in Menu 3.1. PNAV DATA PROCESSING OPTIONS.

[F]ixed or [R]over Site

Third line and fifth line specify the B-file above current line is a **F**ixed (Base) site or a **R**over site.

Common.NAV File

Sixth line specifies the ephemeris data (COMMON.NAV) file used for post-processing.

Start epoch and End epoch

Seventh line and eighth line list the starting epoch (second of week) or ending epoch (second of week) of post-processing as specified in the

Process epochs whose base/rovr site matches this ID

Last two lines list base and rover from the MATCH SITE ID data entry fields specified in the

PNAV.WAY FILE

An ASCII file containing a list of waypoints (sites) relating to the expected trajectory of the Rover at the time of data collection. If this file does not already exist in the current directory, PNAV extracts these waypoints from the PNAV.POS file if you are processing in the Navigation Mode or from the PROJFILE.KIN file if you are

processing in the Survey Mode. PNAV uses PNAV.WAY to generate the graphics display.

Example:

```
Way Point Navigation Site List ----------------------------------------
--
  1 1111
  2 _ROV
------------------------------------------------------------------------
---
Navigation Mode -------------------------------------------------------
--
 0            | [0] Auto scaled map   [1] Fixed area map
 1            | [0] To Base   [1] Nearest   [2] Heading_for
              | Map center site name
------------------------------------------------------------------------
---
```

The **Way Point Navigation Site List** area contains the site names of points the Rover will either occupy or be in the vicinity of during the time period given by a collected data set.

The Navigation Mode area lists current settings via the <Alt-W>ayPoint Setup Menu of the commands, **^F2 MapMode**, **^F3 NavMode**, and **<F7> Map Ctr**:

- On the first line, the Map Mode,

where:

0 AUTO SWITCH mode (Auto scaled map)

1 FIXED MAP mode (**Fixed area map)**

- On the second line, the Navigation Mode:

where:

0 TO BASE mode. The way point navigation target is always the Base station.

1 NEAREST mode. The way point navigation target is the site which is closest in distance from the current position.

2 HEADING FOR mode, The way point navigation target is the site which has the smallest azimuth angle (determined based on the current Rover position and course-over-ground) and is closest in distance from the current position.

- On the third line, the Map Center site name when the FIXED MAP mode is selected.

Once the target is selected, the graphics display will automatically draw a map around the target. Also, the scale will automatically be determined.

.PRJ FILE

Two types of files have a .PRJ extension. Each is called "project file" and is named *xxxxxxxx*.PRJ, where *xxxxxxxx* is the project name and can be up to eight characters.

- In the WinPrism/PLANNING module, the .PRJ file contains a list of sites and their locations, and other information such as obstructions.
- In the WinPrism/DATABASE, the .PRJ file contains pointers to point and vector information that is stored in the database files (see .DBD files).

PROJFILE

A binary project file created in the PROCESS module containing site information such as site name, position, and meteorological data. It is editable via the PROCESS/ EDIT PROJECT [EDIT SITE] screen. PROJFILE.STA, PROJFILE.PSD, and PROJFILE.KIN is created when you select SURVEY TYPE: STATIC, PSEUDO, and KINEMATIC, respectively.

.PRT FILE

A single file into which you collect all your vector solutions and preliminary positions that will subsequently be input to the WinPrism/ADJUST module. When WinPrism creates an adjustment input file for you in the adjustment program, FILLNET, it asks you to name it. It is named in the form *xxxxxxxx*.PRT, where you supply any meaningful and legal DOS string, up to eight characters, for the *xxxxxxxx*. WinPrism supplies the .PRT extension.

.PTS FILE

The Ashtech projection points file from the WinPrism/TOOLS/TRANSFORM function for input to the Terramodel software.

The Ashtech 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 an Ashtech 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.

```
                  1         2         3         4         5         6         7

1234567890123456789012345678901234567890123456789012345678901234567890123456789
        Ashtech POINTS FILE
        PROGRAM:           WinPrism v2.0.00       Sep 30 1993
opt.    CREATED FROM:      Database File       sdbmtran.out
GEOG    SYSTEM:           SPC83               State Plane Coordinate 1983
WGS84   DATUM:            GRS80               North American 1983
opt.    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
opt.    SEMI-MAJOR AXIS:                       6378137.0
opt.    INVERSE FLATTENING:                    298.25722
opt.    PROJECTION:       LC83                Lambert Conformal
dep.    ZONE:             CA__      0403      California (Zone3)
ELLIP   HEIGHT:            GEOD                Geoidal
METER   UNITS:             USFT                U.S. SURVEY FEET
```

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    LATITUDELONGITUDEHEIGHTSITEATTRIBUTE
00001    37 22 56.39742 N122 02 02.38628 W00011.937ASH1This is a sample
point.
or
POINT    NORTHINGEASTINGHEIGHTSITEN_SIGE_SIGHT_SIG
00001    0187927.91512345678.01200011.937ASH100.00000.00000.000
00002    0187927.91512345678.012-9.99E+29ASH200.00000.00000.000
```

.PRO FILE

is the project file output from the Terramodel software package.

.QRY FILE

is an ASCII file containing the point and vector records of a project file that have met search criteria specified in the WinPrism DATABASE module's QUERY option. If you have specified only vectors and DATABASE encounters a vector with both stations meeting all criteria, both the vector record and the point records describing each station will be sent to the .QRY file.

R-FILE

WinPrism uses two types of files called R-files.

- The REMOTE option of the WinPrism/TRANSFER module downloads an R-file as an ASCII image of the data as stored in the receiver. This R-file is a condensed version of the B-, E-, and S-files. The naming convention for the destination file is R*nnnnsyy.ddd*, where R indicates RAM image, *nnnn* is a four-character site name, *s* is a code for session, *yy* is the last two digits of the year and *ddd* is the day of the year.
- The KINSRVY program and PNAV output R-files (rover trajectory files) which contain epoch-by-epoch solutions between the roving receiver and the base receiver. By default, PNAV does not create the R-file during processing

because of the large amount of output data that is generated; however, you can instruct PNAV to do so in the

```
00025 g f:24_7 r:24_4 1992-10-27 18:20: 0.000 5 s:   4 t:  2.76 ...
fxyz:    1503.041     -676.563       -3.907  ...
Af:  89.95856  Ef:  -0.20798  Df:     1648.297  ...
nf:        0.929  ef:     1648.288  uf:       -5.771 ...
Rn:   51,   5  46.99456 Rw:  114,  22  23.71757 Rh:   1201.784  ...
r:24_4   1
```

where:

00025 is the epoch counter number for each entry.

g is the position computed good/bad flag.

f: is the Base station's site name.

r: is the Rover's site name.

1992-10-27is the date the GPS data was collected.

18:20:00is the GPS time (hours:minutes:seconds).

5 is the number of satellites.

s: 4 is the 1-sigma error value of the position (mm).

t:2.76 is the "trace" of the satellite geometry.

fxyz: is the relative earth-centered earth-fixed (ECEF) xyz vector between the Base and Rover (m).

Af: is the azimuth angle of the Rover from the Base station (deg).

Ef: is the elevation angle of the Rover from the Base station (deg).

Df: is the linear distance between the Base and Rover (m).

nf: is the northing distance of the Rover from the Base station (m).

ef: is the easting distance of the Rover from the Base station (m).

uf: is the upping distance of the Rover from the Base station (m).

Rn: is the "n"orth latitude of the Rover (deg, min, sec).

Rw: is the "w"est longitude of the Rover (deg, min, sec).

Rh: is the ellipsoidal height of the Rover (m).

r: is the Rover's site name.

1 is a KINSRVY flag not applicable to PNAV.

RAWSTRUCT.LST FILE

Contains the C-language file format of data in your B-files when you select PRINT STRUCTURE FORMAT via the WinPrism/TOOLS/EDIT FILETOOL function. For a listing of the structure, see Appendix A of the *Tools User's Guide*.

.RPT FILES

ASCII files that contain the reports on a project file in the REPORT option of the WinPrism DATABASE module. The report file can be a project summary or database summary and can be sent to your printer.

S-FILE

An ASCII file containing site information entered by a field surveyor; it includes site name, antenna height, meteorological information, and receiver type.

SUMMARY.OUT File

WinPrism generates two types of ASCII SUMMARY.OUT files:

- A brief summary of the last solution generated by the WinPrism/PROCESS/AUTOMATIC function for static or pseudo-kinematic data. WinPrism includes in this summary which E-files were used in the COMNAV program, and a summary of each vector computed.
- A summary of the results of PNAV processing. When SUMMARY.OUT results from processing in the Survey Mode, it contains the main input control parameters, vector solutions, and statistics; from processing in the Navigation Mode, it contains input control parameters only.

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