

Evaluate™ 5.0

User's Guide

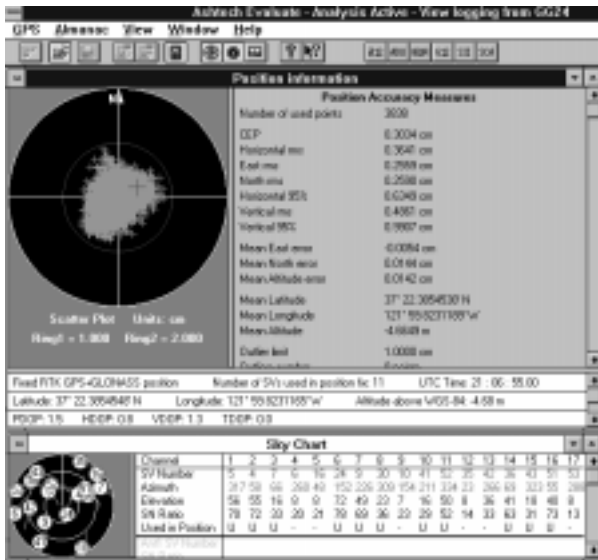
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Ashtech Evaluate

Description

The Ashtech Evaluate software provides system integrators and end users with a quick and simple way to interface with an Ashtech OEM board or sensor product in order to gauge performance and develop an integrated system. Evaluate allows for easy connection to each product and provides a suite of features to view, log, and analyze performance. These features include:

- Support for Ashtech receivers and non-Ashtech receivers that utilize standard NMEA responses
- Convenient **Position Information** window that indicates real-time accuracy, charts receiver position, and graphically displays horizontal speed, vertical speed, altitude, and heading. Pitch, roll, and yaw are also displayed for Ashtech's ADU2 receiver.
- Tabular summary of lat/lon position, altitude above WGS-84, UTC time, DGPS status, number of SVs used in position calculation, and HDOP, VDOP, PDOP, TDOP
- Easy-to-use satellite **Sky Chart** window that charts satellite location in the sky, identifies satellites by number, indicates which satellites are being used in the receiver calculation, and displays relative satellite signal strength
- Facility to download an almanac from Ashtech receivers. Almanacs are compatible with Ashtech's Mission Planning software.
- Data logging functionality that supports data replay for later analysis using the full Evaluate feature set
- Automatic communication programs and pre-defined command sets
- Simple terminal program that gives you the option to open a terminal screen to communicate with the receiver by sending preset command strings, user-defined command strings, or individual set or query commands. All responses can be viewed from the terminal screen
- Print capability that allows you to print a specific window or the entire screen

Products Supported

Evaluate supports the following Ashtech products:

- ADU2
- GG24
- G12
- G8
- Sensor II
- Super C/A
- Z12, Z-Surveyor, Z-Sensor, and Z-Eurocard

Evaluate also supports any other receiver that output data in standard NMEA format.

Installation

Perform the following steps to install the Evaluate software:



We recommend you run this program on a 486/66 machine or better.

1. Start Microsoft Windows 3.x, Windows 95, or Windows NT.
2. Close all open applications.
3. Insert the Evaluate installation disk in your floppy drive.
4. Select File from the Program Menu to activate the drop-down menu.
5. Select Run.

In the Command Line, type: A:\SETUP or B:\SETUP depending on which floppy drive you use for installation.



If you have a previous version of Evaluate installed in the target directory, you must remove the older version with “Uninstall Evaluate.”

6. The Evaluate Setup program guides you through the remainder of the installation procedure.

Operation

1. To ensure proper operation, and before using the Ashtech Evaluate commands, verify the GPS receiver is:
 - Turned on
 - Properly connected to your computer (most require a null modem cable).

If you have the Ashtech Evaluation Kit, the cable is ready to be plugged directly into your computer.

2. Double-click the Evaluate icon.

The Evaluate Startup menu opens, as shown in Figure 1.



Figure 1: Evaluate Startup Menu

3. Select one of the menu options by selecting the radio button to the left of the selection you have chosen.



A “radio button” is the small round icon (in a Windows Graphical User Interface) used to select different options.

Table 1: Startup Menu Options

| Option | Description |
|--|---|
| Connect to GPS Receiver | The Connection Parameters window opens allowing connection to a GPS receiver. Refer to “Connecting to an Ashtech GPS Receiver” on page 5. If you run Evaluate for the first time, Evaluate sets this option as the default. |
| Connect to GPS Receiver with last settings | If Evaluate has been run and closed without disconnecting the GPS receiver, Evaluate sets this option as the default. This option allows you to start initialization of a GPS receiver with the settings of the previous session. On running Evaluate for the first time, the Connection Parameters window appears. |
| View log file | Evaluate will open the Open dialog box. Refer to “Viewing a Log File” on page 20. |
| Emulation | Evaluate activates emulation mode. Refer to “Emulation” on page 4. |
| Info about Ashtech GPS Receivers supported by Evaluate | Evaluate opens an information window describing products supported by the software. |
| Display this menu on startup | Uncheck this box if you no longer wish to see it displayed. |
| Activate Analysis | Refer to “Using Evaluate for Analysis” on page 22. |
| Cancel | Closes startup menu without loading options. |
| Help | Launches Help module. |
| OK | Launches Evaluate with the option selected. |

4. Click **OK** to begin session.

Emulation

Evaluate contains a program which emulates a GPS receiver so that you can observe how the most common features of Evaluate work without needing a receiver connected. It is designed as a demonstration module only. To activate, select **Emulation** in the **GPS** menu or select **Emulation** from the **Ashtech Evaluate Startup menu**. Evaluate must be disconnected from all GPS receivers for Emulation mode to work.



The emulation mode is designed to provide a wide range of positions, velocities, and satellite parameters. While this feature demonstrates how the position and Sky chart screens work, it does not represent actual GPS data.

3. Click the drop-down arrow and select the communication port connected to the receiver as indicated in Figure 4 (COM2 is shown, your setup may be different).

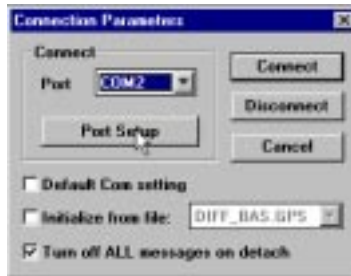


Figure 4: Connection Parameters Window with COM2 Selected

4. Click **Port Setup** (in the **Connection Parameters** window) to view the following settings (Figure 5):
 - Baud rate
 - data bits
 - parity
 - stop bit



Figure 5: COMx Port Settings Window

5. Click the drop-down arrow of any of these settings and select a new setting if a change is necessary.
6. Click **OK** when all the settings are as desired. Evaluate closes the **COM Port Setting** window and returns to the **Connection Parameters** window.



The Evaluate default communication parameters are set to the following: 9600 baud, 8 data bits, no parity checking, 1 stop bit. The default communication parameters for your receiver may be

different. Refer to the reference manual for your receiver to determine default communication parameters. If you are running Evaluate on the WindowsNT or 95 operating system, the maximum baud rate is 57,600.



If you have been experimenting with different connection parameters to connect to the receiver, but would like to return to default parameters, simply select the **DEFAULT COM SETTING** option in the **CONNECTION PARAMETERS** screen.

7. Check the box **Turn off ALL NMEA messages on detach** in the **Connection Parameters** window to automatically disable any enabled NMEA messages when you disconnect or exit from Evaluate.
8. You are now ready to connect to the receiver. Click **Connect** to start initialization. The **Initialization of GPS** window opens, as shown in Figure 6. Evaluate automatically attempts to communicate using the settings you have chosen. If it does not connect immediately, Evaluate may be set to different communication parameters than the receiver. If this is the case, a dialog box appears asking you if you want to try **Autoselect** (for Ashtech receivers) or **Manual Connect** (for non-Ashtech receivers). For non-Ashtech receivers, refer to page 42. For Ashtech receivers, you should choose Autoselect by clicking on **Autoselect**. When you choose **Autoselect**, Evaluate tries different baud rates with different parameters until it connects successfully. When a successful connection is made, a dialog box appears that identifies the receiver parameters for future reference. Click **OK** to continue. Evaluate connects and issues three commands:
 - PWR (power) set command
 - PRT (port) query
 - RID (receiver identification) query

Your receiver responds accordingly. Click **OK**, and the initialization window disappears. You are now ready to continue communication with the receiver, or open windows to analyze the data from your receiver.



Figure 6: Initialization of GPS Window

Table 2 describes the components of this window.

Table 2: Initialization of GPS

| Component | Description |
|--------------------|---|
| Text within window | Rows beginning with "S" are the send commands. Row beginning with "R" are the responses. |
| AutoSelect | Automatically determines the RS-232 communication parameters of a GPS receiver by sending \$PASHQ, PRT with different parameters of the port. |
| Stop | Allows you to stop and select any command in the window. |
| <<, >> | Scrolls through the commands. |
| Cancel | Terminates initialization. |

Connecting to an Ashtech GPS Receiver Using a Custom *.GPS File

The **Initialize From File** option in the **Connection Parameters** window allows you to customize the receiver initialization process. If you mark this box, commands from the *.GPS file (user-selectable) are used to initialize Evaluate. For information about creating or editing a .GPS file, see "Creating a *.GPS file" on page 21.



You can use the "connect" function at any time to initialize the receiver with a *.GPS file even if you are currently connected to the receiver.

Disconnecting from a GPS Receiver

Once Evaluate is connected to the GPS receiver, the **Disconnect** option is available in the **GPS** menu. To disconnect the receiver, simply select **Disconnect**. The **Disconnect** option is especially useful for viewing a log file. Evaluate must be disconnected from the receiver to view log files. There may be a short delay in your ability to move the cursor while your computer disconnects from the receiver.

Sending Commands to the GPS Receiver

Evaluate provides the user with three methods to send set and query commands to the receiver. Two of the methods can be accomplished from the **GPS Receiver Terminal** window, and the third method from the menu of commands under **GPS** in the main toolbar.



Using *.GPS files also sends commands to the receiver, but only during receiver initialization.

Method 1

1. Select **Terminal** from the **GPS** menu. The **GPS Receiver Terminal** window opens, as shown in Figure 7.

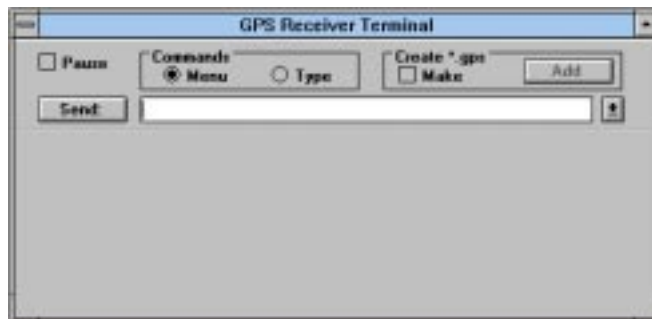


Figure 7: GPS Receiver Terminal window

2. Click the **Menu** radio button.

3. Select a command from the list of predefined commands in the command line field (Figure 8).

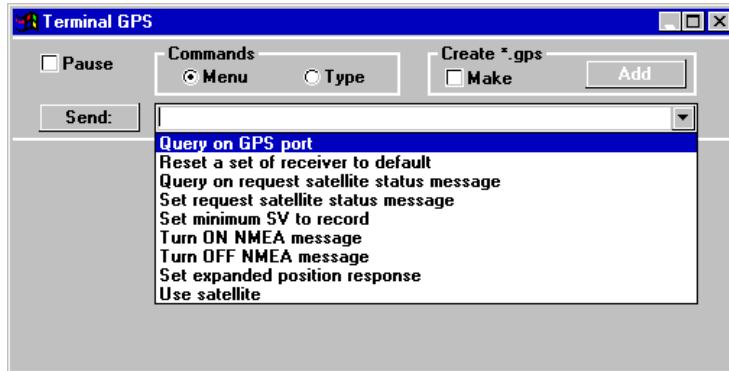


Figure 8: GPS Receiver Terminal Pre-defined List of Commands

The predefined commands are contained within the *.MNU files in the directory where Evaluate was installed (usually C:\EVALUATE). Evaluate allows you to customize this menu for your particular needs. You can edit these files with any text editor to add or delete commands. For additional information refer to “MNU File Type” on page 33.

4. Select the desired command, then click **Send**. You will see the command sent (blue text) and the acknowledgement or response (green text). Some commands will ask for additional information after you click **Send**. In these cases, select the information from the options chosen, and click **Send** again.



Evaluate 5.0 supports a wide range of receivers, each with a potential variety of options. Some of the commands listed here may not work if you do not have the appropriate options loaded on your receiver. Consult the user manual for your particular receiver.

Method 2

1. Select **Terminal** from the **GPS** menu. The **GPS Receiver Terminal** window opens (refer to Figure 7).
2. Click the **Type** radio button.
3. Type in the command you wish to send and click **Send**.

The terminal screen will echo what you typed in blue text, followed by the receiver response (usually an information string or an acknowledgment) in green text. Evaluate retains a limited history of commands you enter. Click on the down arrow at the far right side to the screen to view the command history (Figure 9).

4. An invalid Set command will receive a NAK response.



Figure 9: History of User-entered Commands

Method 3

1. Select **Send** from the **GPS** menu. The **Menu of commands for GPS** window opens (Figure 10).

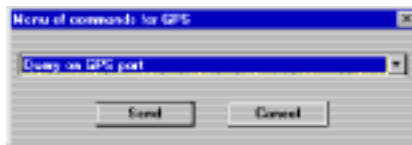


Figure 10: Menu of Commands for GPS Window

- The menu of commands for **GPS** window contains pre-defined commands, as shown in Figure 11.

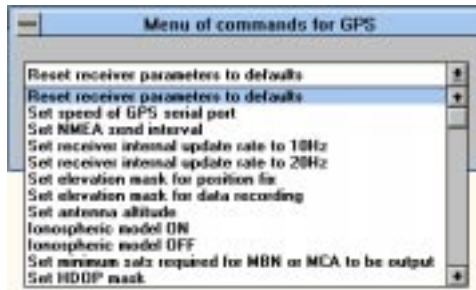


Figure 11: Menu of Commands for GPS Window with List

- Choose a command, then select **Send**. The command is sent, but this screen provides no positive confirmation of command activity. To view the results of your command, simply open the **GPS Receiver Terminal** window to view activity.

Opening the Port Activity window

The **Port Activity** window indicates whether the receiver is operational and which port is in use. Select the **Port Activity** command from the **View** menu. (Figure 12).

| GPS Receiver | Port | R | S |
|--------------|------|---|---|
| G12 | COM2 | | |

Figure 12: Port Activity Window

Blinking colors in the **R** or **S** columns mean the program records receiver responses or the program sends commands to the receiver.

Using Position Information Window to Display Position

The **Position information** window provides real-time graphic display of basic GPS information. This is one of the most commonly used windows for Evaluate users.

To open this window, select **Position** from the **View** menu, or simply click on the **Position** icon on the tool bar. The window, Figure 13, is divided into three panes: Departure Plot, analog dials, and GPS information.

For Ashtech receivers: once you have selected **Position**, Evaluate automatically sends POS (position) and SAT (satellite) set commands to the Ashtech receiver. The receiver returns POS and SAT responses for display of position information; the receiver continues to output POS and SAT responses (even if you close the window) until instructed to stop. Selecting **Disconnect** from the **GPS** menu does this automatically, or you can instruct the receiver from the **GPS Receiver terminal** window.

For non-Ashtech receivers, you must set up the receiver to output the NMEA messages GGA, VTG, GSA, and GSV or as many of these as the receiver supports. Then open the Position window. If you close this window and reopen it later, positions are displayed, beginning from the time you reopened the window. Data from the previous viewing session are no longer displayed.

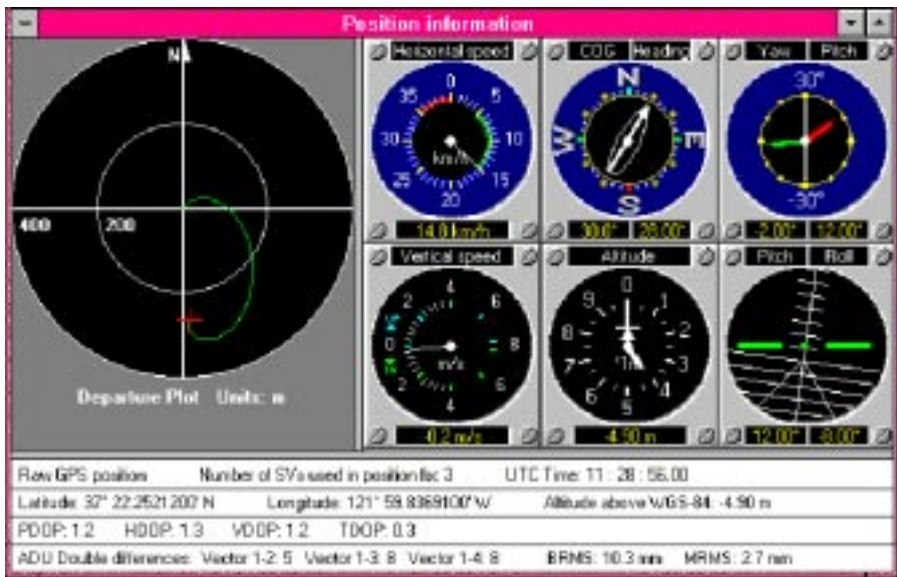


Figure 13: Position Information Window

Departure Plot

The Departure plot displays real-time graphic plotting of the current position relative to the starting point. The concentric circles are automatically scaled and allow for quick determination of the distance from the starting point. The scale of the circles

can be manually adjusted using the **Home** and **End** keys. The default units are meters. The units, as well as other features of the plot (color, background, etc.) can be adjusted by selecting **Options** under the **View** menu, as described in “Colors” on page 41.

Analog Dials

Six analog dials and digital displays provide information on the following:

- horizontal speed
- vertical speed
- course/heading
- altitude
- yaw/pitch
- pitch/roll

The dials are set to standard aeronautical design as a default setting. You can change the look of these dials from the **Options** selection under the **View** menu, as described in “Colors” on page 41. Evaluate determines the maximum value for each dial depending on the current value.

Evaluate grays out the Yaw/Pitch and Pitch/Roll dials for all receivers except the ADU2. Table 3 describes the course heading, yaw/pitch, and pitch/roll dials.

Table 3: Analog Dials Description

| Dial | Description |
|----------------|--|
| Course/Heading | Displays a vehicle heading and course-over-ground (COG). The white arrow points in the direction of the COG. The vehicle figure points toward the heading. The difference between the two is the Yaw heading. |
| Yaw/Pitch | <ul style="list-style-type: none"> • Yaw angle displayed by the red arrow. The range of the yaw angle is $\pm 30^\circ$. The yaw angle is positive when the vehicle yaws clockwise. • The pitch angle of the vehicle is displayed by the green arrow on the dial and by the distance between the first of the parallel lines that represent the horizon and the fixed vehicle line on the Pitch/Roll dial. The distance between these line is 10°. The range of the pitch angle is $\pm 60^\circ$. |
| Pitch/Roll | <ul style="list-style-type: none"> • The roll angle is displayed by the angle between the rotating graduated vertical axis and the fixed vehicle line on the dial. • The range of the pitch angle is $\pm 90^\circ$. |



The measurement units of all available values are set with Options command from the View menu.

Information Summary

Below the departure plot and the analog dials is an information summary for the current position. Table 4 describes each field in the information summary:

Table 4: Satellite Position Information

| Pane line | Description |
|---|--|
| Autonomous/differential GPS position or GPS+GLONASS for GG24) | <ul style="list-style-type: none">Autonomous GPS position—position is not differentially correctedDifferential GPS position—position is differentially corrected with RTCM format corrections |
| Number SVs used in position fix | Number of satellites used in position fix |
| UTC time | Current Universal Coordinated Time |
| Latitude | Latitude component of position. |
| Longitude | Longitude component of position. |
| Altitude above WGS-84 | Altitude above the WGS-84 ellipsoid. |
| PDOP | Position Dilution of Precision. |
| HDOP | Horizontal Dilution of Precision. |
| VDOP | Vertical Dilution of Precision. |
| TDOP | Time Dilution of Precision. |
| Double differences (ADU2 Only) | Double differences for baselines 1 (1-2), 2 (1-3), 3 (1-4) |
| BRMS (ADU2 only) | Measurement of the baseline residuals |
| MRMS (ADU2 only) | Measurement of the measurement residuals |

Using Sky Chart Window to Display Satellite Information

The **Sky Chart** window, Figure 14, provides detailed information regarding the satellite constellation. This is another commonly used window in Evaluate. You can open the **Sky Chart** window by selecting **Sky chart** from the **View** menu, or simply selecting the **Sky Chart** icon on the tool bar.

For Ashtech receivers: when you open **Sky Chart**, Evaluate automatically sends POS (position) and SAT (satellite) set commands to the receiver. The receiver then returns POS and SAT responses for display of satellite information. Closing the window ends the display of satellite information, but the receiver continues to output POS and SAT information until instructed to stop. Selecting **Disconnect** from the **GPS** menu does this automatically, or you can instruct the receiver from the **GPS Receiver Terminal** window.

For non-Ashtech receivers, you must set up the receiver to output the NMEA messages GGA, VTG, GSA, and GSV or as many of these as the receiver supports.

The window is divided into a polar plot and an information summary. Information in the window is delineated by color for ease of viewing.

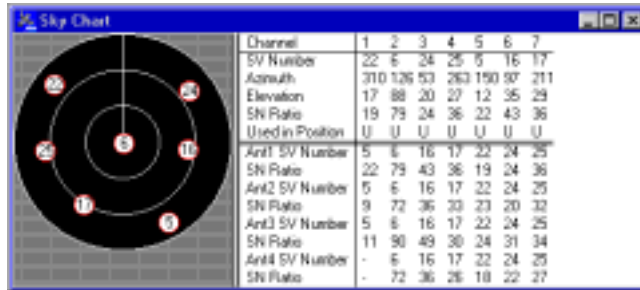


Figure 14: Sky Chart Window

Polar Plot

The polar plot graphically displays the position of satellites in the sky. There are three concentric circles representing elevations above the horizon. The outermost circle represents 0 degrees above the horizon, the next circle in represents 30 degrees above the horizon, and the smallest circle represents 60 degrees above the horizon. The center of the circle represents 90 degrees above the horizon. The line at the top of the circle points north with west on the left side of the circle.

Information Summary

To the right of the polar plot is an information summary of the current satellite constellation. Table 5 describes each field.

Table 5: Satellite Information Summary

| Symbol | Field | Description |
|--------|------------------------------|--|
| Ch | Channel | Shows total number of receiver channels being used |
| N | SV number | PRN number of satellite |
| A | Azimuth | Satellite azimuth angle |
| E | Elevation | Satellite elevation angle in degrees |
| SN | SN ratio | Signal-to-noise ratio for satellite. Scaled from 0 (weakest) to 99 (strongest), or in dB/Hz depending on receiver setup. |
| U or - | Used in position computation | Whether or not satellite is being used in position computation: <ul style="list-style-type: none"> • "U" indicates used • "-" indicates not used |



The symbol column applies only when Sky Chart has been selected for display in a vertical orientation.

If you have connected an ADU2 (or Emulation is active), Evaluate also displays the summary shown in Table 6.

Table 6: Satellite Information—Additional Fields

| Field | Description |
|----------------|--|
| Ant1 SV Number | Satellites being tracked on antenna 1. |
| SNRratio | Signal-to-noise ratio for antenna 1. |
| Ant2 SV Number | Satellites being tracked on antenna 2. |
| SN Ratio | Signal-to-noise ratio for antenna 2. |
| Ant3 SV Nmber | Satellites being tracked on antenna 3. |
| SN RAtio | Signal-to-noise natio for antenna 3. |
| Ant4 SV Number | Satellites being tracked on antenna 4. |
| SN Ratio | Signal-to-noise ratio for antenna 4. |

Epoch Counter

Evaluate has an epoch counter to keep track of the number of epochs recorded in the current file. When file logging is in progress, the **Epoch counter** window, Figure 15, can be opened by selecting **Epoch Counter** from the **View** menu, or simply by clicking on the **Epoch Counter** icon on the tool bar.

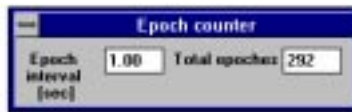


Figure 15: Epoch Counter Window

While the epoch counter is most commonly used for file logging, the **Epoch counter** window can also be opened when the **Position information** or **Sky chart** screens are opened. The epoch counter begins counting epochs from the instant the **Position information** or **Sky chart** screens open. After both of these screens close, the epoch counter resets to zero and disappears (unless there is an active log session). If you close the **Epoch counter** window while these screens are still open, the epoch counter continues counting until the screens are closed.

Printing

Evaluate allows you to print the active window, all open windows, or an image of the entire Ashtech Evaluate screen. You can use print capability if one of the Ashtech windows is open.

1. To print, select **Print....** from the **GPS** menu.
2. When the **Print** window opens, mark one of the following radio buttons:
 - Active window - prints the active window only
 - All windows - prints each of the opened windows wholly
 - Screen copy - prints screen copy
3. Select the **Print** button to start printing, or **Cancel** button to stop.
4. If you need to change the printer setup, select **Print Setup** from the **GPS** menu. When the dialog box opens, choose the appropriate parameters, noting that the **Print Setup** dialog box is standard for Windows applications.
5. Because soft copy (screen) colors and hard copy (paper) colors differ, some hard copy details may not print correctly and some may not print at all. You may need to adjust colors to get meaningful black and white printouts. For example, to print a sky chart, adjust colors in **Sky Chart** by using the **Colors** tab of **Options** from the **View** menu to get clear and distinct details, numbers, and titles on your hard copy.

Logging Files

Evaluate captures output data into a *.LOG file. Evaluate can capture all output up to a rate of 5 Hz, however when using output rates faster than 1 Hz, it is important to use the highest baud rate your system can support. Low baud rates are not capable of capturing large output at a fast update rate.

Evaluate sequentially numbers the log files. A log file will log a maximum of 5000 epochs. After Evaluate logs 5000 epochs into a file, that file closes and a new file opens.



Close all other Windows programs and unnecessary Evaluate screens while logging data. Failure to do so can result in file and data corruption.

To log a file:

1. Ensure that the receiver is on and computing a position.
2. Select **Log** from the **GPS** menu (Figure 16). A check next to **Log** indicates that logging is active. The **Epoch counter** dialog box (Figure 17) opens indicating:

- Epoch interval in seconds
 - Total epochs logged
 - Name of log file
 - Total amount of memory used
 - Amount of memory available (also in percentage).
3. Evaluate will log all information from the receiver. Be sure you have configured your receiver to output the desired data.

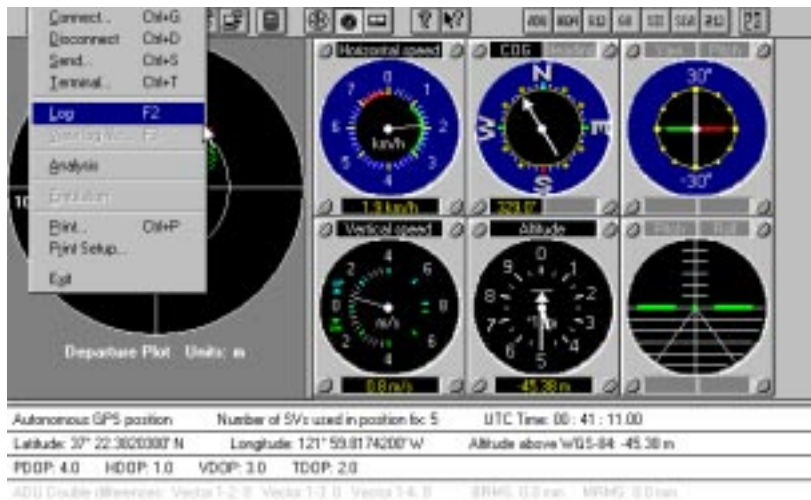


Figure 16: GPS Pull-down Menu

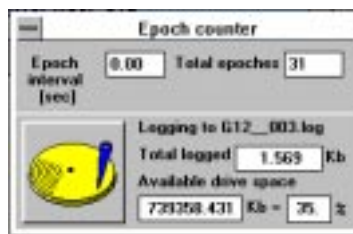


Figure 17: Epoch Counter

4. To end logging, deselect **Log** from the **GPS** menu or press **F2**.
5. The log file is placed automatically in the **Log** subdirectory of the **Evaluate** directory, filed under the name indicated in the **Epoch Counter** window.



Ending the log file session does not automatically stop the receiver from outputting data. You must turn responses off manually.

Viewing a Log File

A logfile can be viewed epoch by epoch after it has been logged using Evaluate or any text editor. To view a log file using Evaluate:

1. Select **Disconnect** from the **GPS** menu or **CTRL+D** to disconnect the GPS receiver.
2. Select **View log file** from the **GPS** menu or press **F3**. The **Open** window opens, Figure 18 (Evaluate displays the last directory used).

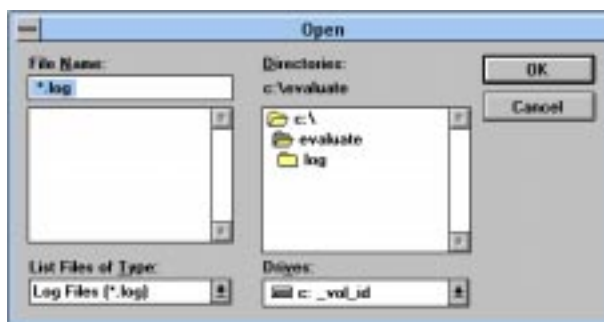


Figure 18: Open Window

3. Select the file you wish to view. Log files are stored in the **Log** subdirectory of the **Evaluate** directory.
4. Click **OK**.
Evaluate rapidly analyzes the log file and opens the **Position Information** window, the **Sky chart** window, and the **Epoch counter** window. All data is displayed when these windows are opened.
5. Use the **Epoch counter** window, Figure 19, to scroll through the log file.

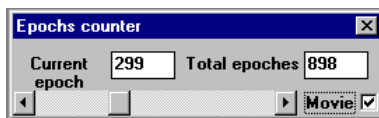


Figure 19: Epoch Counter window

Click on the “movie” box in the Epoch counter window to see a motion picture of the log file. The **Position information** and **Sky chart** screens are updated for each epoch of the log file.

6. Exit the viewing mode by deselecting **View log file** from the **GPS** menu.

Creating a *.GPS file

If you have a certain set of commands and receiver settings that you apply often when starting Evaluate, you can put these commands into a .GPS file and have the commands activated upon receiver connection. In this manner, you can always set up with the parameters of your choice. The .GPS file is actually a text file. As such, it can be created and edited using any ASCII text editor.

Some things to remember when initializing from a file:

- Use \$PASHS,RST (reset) first to reset the receiver.
- If you are logging data, begin with \$PASHQ,RID (receiver identification) to log the receiver and firmware you are using, for future reference.
- Make sure you receive a \$PASHR,ACK (acknowledge) or a configuration response before going to the next command. All set commands respond with an ACK/NACK; all query commands respond with a \$PASHR message.
- Group your commands in logical order (i.e., settings before verification).
- Consider ending with \$PASHS,SAV (save) to save your settings.

You may create a *.GPS file by using the **Terminal GPS** window. To create the *.GPS file:

1. Choose the **Terminal** command from the **GPS** menu.
2. Check the **Make** check box in the **Create *.GPS** box. The **Create File for Initialization** GPS window opens (Figure 20).



Figure 20: Create File for Initialization GPS Window

3. Type the file name in the **File** name field. You must place the new .GPS file in the **Receiver** subdirectory of the **Evaluate** directory. Evaluate looks only in this subdirectory for *.GPS files for initialization.
4. Click **OK**.
5. The **Create File for Initialization GPS** window is displayed with the **Add** button accessible in the Create *.GPS box.
6. Select a command from the drop-down list or type one and click **Send**.
In some cases, the command requires further input such as selecting a specific parameter. Be sure you complete this prior to the next step.
7. Once the command has been sent to the receiver, click **Add** in the Create *.GPS box to add this command.
Evaluate asks if you wish to add this command to the *.GPS file. Click **Yes**.
8. Upon completion of adding all commands necessary to the receiver initialization file, close the GPS Receiver Terminal window.



Evaluate always begins connecting to a receiver with a **PWR** (power) set command, **PRT** (port) query command, and **RID** (receiver identification) query command. It then moves to your custom .GPS file.

Using Evaluate for Analysis

Evaluate enables statistical analysis of position precision from a stationary antenna (or stationary antenna array for ADU2) in real-time mode and on logged data. You can analyze data from log files or view data being taken in real-time and displayed using the Analysis format.

1. Select **Analysis** from the **GPS** menu. A **Warning** dialog box (Figure 21) opens to remind you that you are connected to a receiver and the antenna must be stationary if you are analyzing data in real time. The box appears only if a receiver is connected. If you want to view logged data, you must choose **Cancel**, then select **Disconnect** from the **GPS** menu. You can then

proceed to analyze logged data. If you choose **OK**, you will begin viewing in real time after you have selected the desired settings in step 2 below.



Figure 21: Warning Dialog

2. Click **OK** to continue or **Cancel** to return the previous state.

If you click **OK**, the **Static Position Data** dialog box opens (Figure 22). Choose the desired setting and click **OK**. The static position data window disappears, awaiting your selection of a log file. Or, if you are collecting and analyzing data in real time, the **Position information** window automatically appears and displays data in the analysis format.

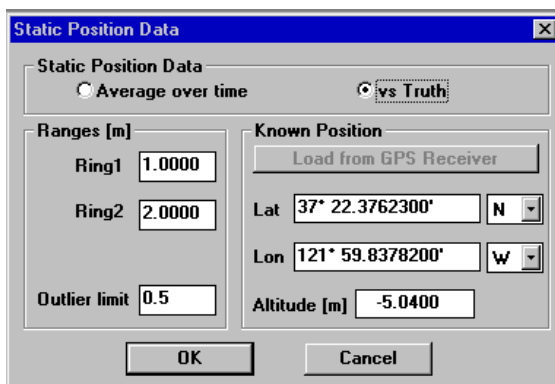


Figure 22: Static Position Data Window

3. If you are viewing data from a log file, open log file.
4. The data from the log file displays in Analysis format. You can now view individual points by using the scroll bar or movie box in the Epoch counter window described on page 17. (Figure 23).



When running analysis in real-time, the number of data points displayed on the scatter plot is limited by available memory. However, the measurement statistics are not limited by memory and will use all data collected up to the current epoch. When running analysis on logged data, all of the data will be displayed in the scatter plot.



When running analysis on logged data, the Movie function and epoch scrolling in the Epochs counter window do not work as in real-time. Precision measures information in the Position information window does not upgrade. The statistics shown once have been done for the whole file, and will not change.

Analysis When True Antenna Position is Not Known

If the true position of your antenna is not known:

1. Click **Average over time** in the **Static Position Data** box.
2. Enter Ring1 and Ring2 (in the same units you selected under Options) in their respective fields if required.

- Click **OK** to begin analysis. The **Position information** window opens (Figure 23).

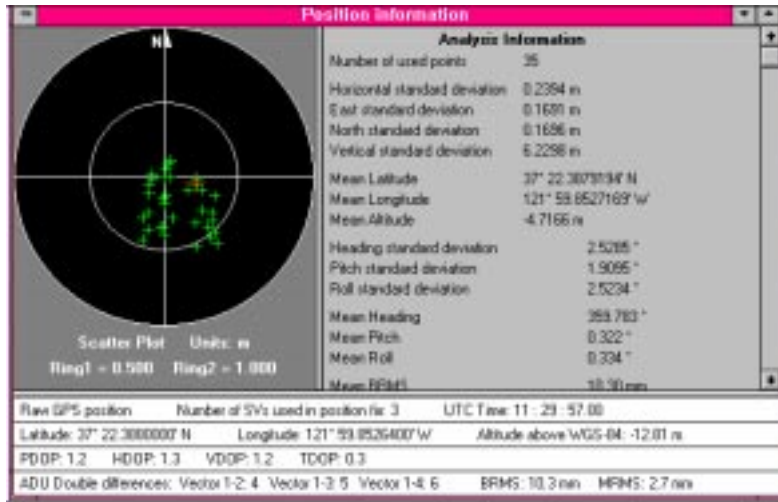


Figure 23: Position Information Window/No Known Position



If analysis is active, the Position information screen changes from Departure Plot and Analog dials to a Scatter Plot and Analysis.

The **Position information** window consists of three sections.

The Scatter Plot section plots the positions relative to the starting point. The starting point is a point with coordinates received when the **Position information** window opens. The present position is denoted by a large red cross.



The units shown on the Scatter Plot are the same as the units chosen for the Departure Plot. To increase resolution (useful when analyzing high accuracy RTK positions), use a smaller unit (such as centimeter).

The second section provides precision measurement information. Table 7 describes the components of this section.

Table 7: Analysis Information Measurements

| Component | Description |
|-------------------------------|---|
| Horizontal standard deviation | <p>A measurement of the dispersion about the mean horizontal position. The square of the horizontal standard deviation is given by:</p> $(\text{Horizontal standard deviation})^2 = (\text{North standard deviation})^2 + (\text{East standard deviation})^2$ <p>A circle with radius of two horizontal standard deviations contains approximately 95% to 98% of the distribution, depending on the shape of the distribution (more elliptical => closer to 95%, more circular => closer to 98%).</p> |
| East standard deviation | <p>A measure of the dispersion of the positions about the mean longitude. If N positions were recorded, then the square of the east standard deviation is given by:</p> $\sigma^2 = \frac{1}{N-1} \sum (lon_i - lon_{mean})^2$ |
| North standard deviation | <p>A measure of the dispersion of the positions about the mean latitude. If N positions were recorded, then the square of the north standard deviation is given by:</p> $\sigma^2 = \frac{1}{N-1} \sum (lat_i - lat_{mean})^2$ |
| Vertical standard deviation | <p>A measure of the dispersion of the positions about the mean altitude. If N positions were recorded, then the square of the vertical standard deviation is given by:</p> $\sigma^2 = \frac{1}{N-1} \sum (alt_i - alt_{mean})^2$ <p>An interval within two standard deviations of the mean latitude, longitude, or altitude contains approximately 95% of the positions.</p> |
| Mean Latitude | The average of the latitude position distributions. |
| Mean Longitude | The average of longitude position distributions. |
| Mean Altitude | The average of the altitude position distributions. |

Table 7: Analysis Information Measurements (continued)

| Component | Description |
|---------------------------------------|--|
| Heading Standard deviation | <p>A measure of the dispersion of the heading about the mean heading. If N headings were recorded, then the square of the heading standard deviation is given by:</p> $\sigma^2 = \frac{1}{N-1} \sum (heading_i - heading_{mean})^2$ <p>An interval within two standard deviations of the mean contains approximately 95% of the headings.</p> |
| Pitch standard deviation | Defined similarly to “Heading Standard deviation” |
| Roll standard deviation | Defined similarly to “Heading Standard deviation” |
| Mean Heading | The average of the heading position distributions. |
| Mean Pitch | The average of the pitch distributions. |
| Mean Roll | The average of the roll distributions. |
| Mean BRMS | The average of BRMS distributions. |
| Percentage good attitude availability | (Number of bad attitude measurements)/Number of epochs |

The third section displays the basic position information for each point as it is collected. This information includes Autonomous/DGPS status, number of SVs used in position calculation, UTC time, latitude, longitude, altitude above WGS-84, and all DOP readings.

Analysis When True Position of Antenna is Known

If the true position of your antenna is known:

1. Click **vs Truth** in the **Static Position Data** box.
2. Enter the latitude, longitude and altitude in the **Known Position** box.



Evaluate will not allow you to delete the measurement characters: °, ‘, “. If you highlight these characters in the Lat and Lon fields and try to replace them with new values, Evaluate will not allow the command. You must highlight each value separately without highlighting the measurement character to modify Lat and Lon.

Or

Click **Load from GPS Receiver** and correct the coordinates in the respective fields (if you press the **Load from GPS Receiver** button, the program loads the coordinates from the line of the **Position Information** window).

The program allows you to set up the format you want to use to enter your true position. The default is dd mm.mmmmm (degrees, minutes, decimal minutes). The altitude units are meters by default. If you have changed the units for the **Position Information** window, the units will also be changed for the Analysis function.



Use the measurement units tab from the **OPTIONS...** command from the **VIEW** menu to set up the coordinate format and altitude units.

3. Click **OK** to begin analysis. Then the **Position information** window opens, as shown in Figure 24.



If analysis is active, the **POSITION INFORMATION** screen changes from **Departure Plot and Analog** dials to a **Scatter Plot and Analysis**.

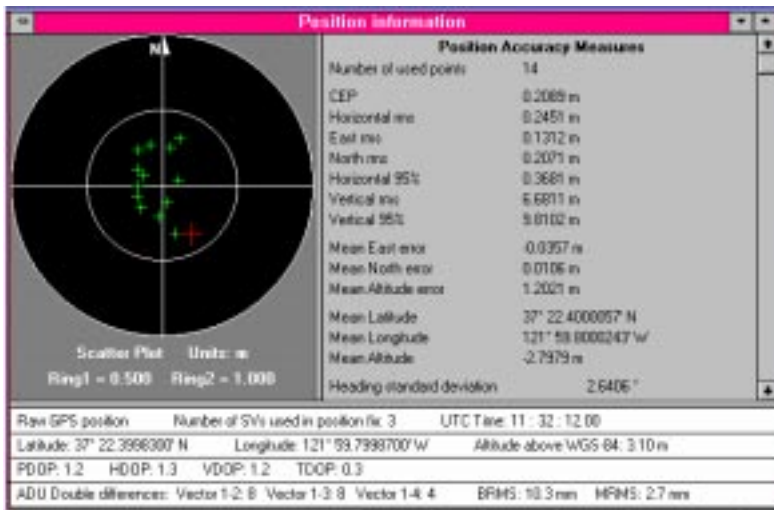


Figure 24: Position Information Window/Known Position

The **Position information** window consists of three sections.

The **Scatter Plot** section plots positions relative to the known position. The present position is denoted by a large red cross.



The units shown on the **Scatter Plot** are the same as the units chosen for the **Departure Plot**.

The second section provides Precision Measures information. Table 8 describes the components of this section.

Table 8: Precision Measurements Information

| Component | Description |
|--|---|
| CEP | Circular Error Probable. The radius of the circle, centered at the known antenna position, that contains 50% of the points in a horizontal scatter plot. This is the same as the typical accuracy, since half the positions are more accurate than this, half are less accurate. |
| Horizontal rms | The root mean square of horizontal errors. |
| East rms | The root mean square of east errors. |
| North rms | The root mean square of north errors. |
| Horizontal 95% | The radius of the circle, centered at the known antenna position, that contains 95% of the points in a horizontal scatter plot. |
| Vertical rms | The root mean square of vertical errors. |
| Vertical 95% | The vertical distance, above and below the known antenna position, that contains 95% of the points in a vertical scatter plot. |
| Mean East error | Error between Mean Longitude and Known Longitude, this should tend towards zero over time. |
| Mean North error | Error between Mean Latitude and Known Latitude, this should tend towards zero over time. |
| Mean Altitude error | Error between Mean Altitude and Known Altitude, this should tend towards zero over time. |
| Outlier limit <ul style="list-style-type: none"> • # Outliers • % Outliers | Defined by user <ul style="list-style-type: none"> • Number of positions outside the outlier limit • Number of outliers expressed as a percent of total points |
| Mean Latitude | The average of latitude position distributions. |
| Mean Longitude | The average of longitude position distributions. |
| Mean Altitude | The average of altitude position distributions. |
| Heading Standard deviation | A measure of the dispersion of the headings about the mean heading. If N headings were recorded, then the square of the heading standard deviation is given by: $\sigma^2 = \frac{1}{N-1} \sum (heading_i - heading_{mean})^2$ An interval within two standard deviations of the mean contains approximately 95% of the headings. |
| Pitch & Roll standard deviations | Defined similarly to "Heading Standard deviation". |
| Percentage good attitude availability | (Number of bad attitude measurements/(Number of epochs) expressed as a percentage. |

Table 8: Precision Measurements Information (continued)

| Component | Description |
|--|---|
| Horizontal and vertical distributions around known positions | The horizontal and vertical distributions are represented on the graphs. Figure 25 is an example of the graphs. |

Below the text in the second section is a pair of histograms showing horizontal and vertical errors. To view these histograms, you may need to scroll down using the scroll bar at the right edge of the screen. The Y-axis numbers show the density of distribution $f(x)$, defined at point x so that $f(x)$ represents the fraction of positions in the interval x to $x+dx$. Typically, you will have so many samples that these Y-axis numbers will be very small (refer to Figure 25). The main benefit of histograms is to provide a graphical indication of the distribution. The top plot shows the horizontal distribution from the known latitude and longitude. The X-axis shows the radial error, R in units selected in the **Options** menu. The X-axis scales automatically to include all positions, so it is a good reference to check the largest outlier in any data set. The bottom plot shows the vertical distribution from the known altitude in the same units as the top plot. To increase the resolution, select smaller units.

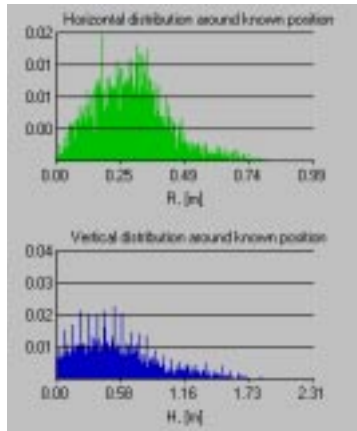


Figure 25: Horizontal and Vertical Distributions

The third section displays basic position information for each point as it is collected. This information includes Autonomous/GPS status, number of SVs used in position calculation, UTC time, latitude, longitude, altitude above WGS-84, and all DOP readings.

Almanac

When a receiver is turned on and locks to the first satellite, it receives information about the GPS constellation. This information, an “Almanac”, contains data on each satellite; ID, Health, Eccentricity, and Argument of Perigee to name a few. When using Evaluate, you can download this information from the receiver to your computer. This capability is not available for the Ashtech ADU2.

Perform the following steps to download an Almanac (Ashtech receivers only):

1. Connect a GPS receiver to your computer.
Ensure the receiver has the almanac information stored prior to downloading. If tracking satellites for 15 minutes or more, the receiver should have a current almanac.
2. Select Download from the Almanac menu.
3. While the receiver is downloading the almanac information to your computer, Evaluate displays the following window which indicates the status of the download (Figure 26).



Figure 26: Downloading Almanac Window

The title of the window includes the amount of information (percentage) downloaded to your computer.



Evaluate may complete downloading though indicate a percentage less than 100% done. This is normal operation and should not be considered a malfunction. Evaluate bases its percentage of completion on the number of satellite slots available vs the number received in the almanac. Down satellites or unused slots will result in a lower percentage of overall completion.

4. As soon as the receiver completes the downloading process, Evaluate displays the Satellite almanac window, Figure 27.



```
*** Week 091 almanac for PRN-01 ***
ID: 001
Health: 000
Eccentricity: 3.536224365e-003
Time of Applicability(s): 4.055048000e+005
Orbital Inclination(rad): 9.548455536e-001
Rate of Right Ascen(r/s): -7.806039439e-009
SQR(A) (m^1/2): 5.153654297e+003
Right Ascen at TOA(rad): 4.914431028e-001
Argument of Perigee(rad): -1.562702625e+000
Mean Anom(rad): -1.213027141e+000
A0(s): 1.239796611e-005
A1(s/s): 0.000000000e+000
week: 091

*** Week 091 almanac for PRN-02 ***
ID: 002
Health: 000
Eccentricity: 1.615571976e-002
Time of Applicability(s): 4.055048000e+005
Orbital Inclination(rad): 9.432927608e-001
Rate of Right Ascen(r/s): 7.692006108e-009
```

Figure 27: Typical Satellite Almanac Window

5. You may save this information as file in your computer by performing the following steps:
 - a. With the Satellite almanac window open, select Save As under the Almanac menu.
 - b. Select either Asttech Binary or Yuma ASCII.
 - c. Evaluate names the almanac files automatically.
6. You may view a previously saved almanac file by selecting Open from the Almanac menu.

File Types

Evaluate uses several file types:

- *.MNU—Command file for **GPS Receiver Terminal** and **Menu** of commands
- *.GPS—GPS receiver initialization file
- *.LOG—Log file
- ALM*.*—Almanac file

MNU File Type

The ASHTECH.MNU file contains the list of commands to send to a GPS receiver by using the **GPS Receiver Terminal** or **Menu** of commands. You can edit or create this file with any text editor. The following symbols in the command line give you the ability to select parameters for each command:

- #—automatically selects the receiver send port
- %N—allows the user to select a numeric value from within a range, with a default
- %L—displays a list of values from which one can be chosen
- %M—displays a list of values from which several can be chosen

The following is an example of a *.MNU FILE:

```
;Here is place for comments
Reset a receiver to default settings
$PASHS, RST
Set request satellite status message
$PASHS,NME,SAT,#,ON
Turn off NMEA message
$PASHS,NME,%L,#,OFF
Select NMEA message;
GLL,GXP,GGA,VTG,GSN,ALM,MSG,DAL,
GSA,GSV,HDT,TTT,RRE,PAT,GRS,GSS,PO
S, SAT
Enable or disable GPS message type 1 or 9, and
select period
$PASHS,RTC,TYP,%L,%N
Select message type;1,9
Enter period;0,99,1
```

Table 9 describes each line of the example *.MNU file.

Table 9: *.MNU Text Descriptions

| Text | Description |
|---|---|
| ; Here is place for comments | You may insert comments in a line starting with a semi-colon. |
| Reset receiver to default settings | Menu text. You can see this text in the list of commands |
| \$PASHS, RST | Command. You can see this command in the Terminal GPS window, after you press Send button. |
| Set request satellite status message | Menu text. |
| \$PASHS,NME,SAT,#,ON | Command The program determines the port automatically and sets specific port in place of #. |
| Turn off NMEA message | Menu text. |
| \$PASHS,NME,%L,#,OFF | Command with two parameters: %L, #. |
| Select NMEA messages; GLL,GXP,GGA,VTG,GSN,ALM,MSG,DAL, GSA,GSV,HDT,TTT,RRE,PAT,GRS,GSS,PO S, SAT | Prompt to select, followed by a “;”, followed by the list of parameter values (values should be delimited with comma). |
| Enable or disable GPS message type 1 or 9, and select period | Menu text |
| \$PASHS,RTC,TYP,%L,%N | Command with two parameters: %L, %N. |
| Select message type;1,9 Enter period;0,99,1 | Prompt to select, followed by a “;”, followed by the list of parameter values Prompt to enter, followed by a “;”, followed by the range of parameter values (in this example 0—minimum, 99—maximum, 1—default) |
| * TITLE | If a line starts with “*” this line appears in the Terminal GPS window, but cannot be selected. This text is used to provide a heading within the menu. |

GPS File Types

These files contain initialization commands for a GPS receiver (see ADU2 receiver initialization example in Table 10). The program supports adu_.gps, g12_.gps, gg24.gps, sen2.gps, sca_.gps, g8_.gps.



Evaluate also provides *.GPS files to help you initialize Differential or RTK Base Stations or Remotes. Before using the files “DIFF_BAS.GPS” or “ZRTK_BAS.GPS”, edit the file to enter the correct base station position.

You can create files or use the *.GPS files included with Ashtech Evaluate (refer to “Creating a *.GPS file” on page 21). You can edit the *.GPS file with any standard text editor. Consult your receiver user manual to determine the functions and options for your receiver.

Table 10: GPS File Descriptions

| adu_gps | Description |
|--|---|
| /Relative position vector from /antenna 1 to antenna 2; X,Y,Z in meters \$PASHS,3DF,V12,+1.173,-0.033,+0.014 /antenna 1 to antenna 3 \$PASHS,3DF,V13,+1.221,+1.379,+0.012 /antenna 1 to antenna 4 \$PASHS,3DF,V14,-0.000,+1.407,+0.026 | <ul style="list-style-type: none">• User comment added to *.gps file with text editor after it was created. Note the “/” added to the beginning of comment line. This is done so Evaluate will ignore line during receiver initialization.• Actual command with parameters added to initialization file from Evaluate.• See first bullet above.• See second bullet above.• See first bullet above.• See second bullet above. |

Log File Types

These files are created by Ashtech Evaluate, if you turn on the **Log** mode. They are stored automatically in the LOG directory. The name for the *.log file is the receiver type and its number, for example:

sen2_001.log

where **sen2** is the receiver type (Sensor II) and **001** is the log session number.

Almanac File Types

These files are created by Evaluate if the **Save As** command has been implemented. Evaluate stores these files in the **almanacs** subdirectory of the **Evaluate** directory. The names of Ashtech binary and Yuma ASCII files differ. Both file types contain year and day of year in the file name:

Typical Ashtech file name:

alm96.123

where **96** is the year and **123** is the day number.

Typical Yuma file name:

almy96.123

where **96** is the year and **123** is the day number

Menu Overview and Shortcut Keys

Figure 28 displays the main menu of the Ashtech Evaluate program.



Figure 28: Main Menu

Table 11 describes each menu item with associated shortcut key

Table 11: Shortcut Key Menu






| Option | Description | Shortcut Key/Button |
|--------------------|--|--|
| GPS | Drop down menu | N/A |
| • Connect... | Opens the Connection Parameters dialog box to connect a GPS receiver | Ctrl+G,  |
| • Disconnect | Disconnects a GPS receiver | Ctrl+D |
| • Send... | Sends command to a GPS receiver | Ctrl+S,  |
| • Terminal... | Opens the Terminal GPS window to communicate with a GPS receiver | Ctrl+T,  |
| • Log... | Logs receiver responses into a file | F2,  |
| • View log file... | Opens a *.log file. | F3,  |

Table 11: Shortcut Key Menu (continued)








| Option | Description | Shortcut Key/Button |
|-------------------------------------|---|--|
| • Analysis Active | Opens the Static Position Data dialog box to define parameters for analysis of position precision |  |
| • Emulation | Turns on/off the Emulation mode | N/A |
| • Print | Prints active window, all windows, or an entire screen copy | Ctrl+P  |
| • Print setup | Sets the printer and the page format | N/A |
| • Exit | Ends Evaluate session | N/A |
| <u>A</u> lmanac | Drop down Menu | N/A |
| • Download | Sets the GPS receiver to almanac transmitting | N/A |
| • Open | Opens the File Open dialog box to view the existing almanac file. | N/A |
| • Save As | Saves almanac file in one of two formats: Ashtech Binary or Yuma ASCII. | N/A |
| <u>V</u> iew | Drop down menu | N/A |
| • Position | Opens the Position information window | Shift+P,  |
| • Sky Chart | Opens the Sky chart window | Shift+S,  |
| • Epoch Counter | Opens the Epochs counter window | Shift+E,  |
| • Ashtech receiver information | Provides a picture and brief description of the product. |  |
| • Generic NMEA receiver information | Provides information on connecting to non-Ashtech receivers that support standard NMEA interface. |  |
| • Port Activity | Displays information on connection between GPS receiver and computer. | Shift+A |
| • Options... | Opens the Option dialog box with three tabs: General, Measurement Units, and Colors | N/A |
| • Toolbar | Displays/hides the Toolbar | N/A |
| • Status Bar | Displays/hides the Status Bar | N/A |
| <u>W</u> indow | Drop down menu | N/A |

Table 11: Shortcut Key Menu (continued)

| Option | Description | Shortcut Key/Button |
|---------------------------|--|---------------------|
| • Cascade | Resizes the open group windows so that each title bar is visible | N/A |
| • Tile Horizontal | Arranges windows on top of each other so that they do not overlap | N/A |
| • Tile Vertical | Arranges windows side by side so that they do not overlap | N/A |
| • Arrange Icons | Arranges windows reduced to icons | N/A |
| Help | Drop down menu | N/A |
| • Index | Displays a comprehensive index to information contained in the Help system | N/A |
| • Using Help | Teaches how to use Help | N/A |
| About Ashtech Evaluate... | Displays information about Ashtech Evaluate | N/A |

Table 12 describes the shortcut keys available when the **Position Information** window is active:

Table 12: Position Information Shortcut Keys

| Shortcut Key | Function |
|--------------|--|
| Home | Decreases the scale of circles in the same proportions as the End key. |
| End | Increase the scale of the circles: .5, 5, 10, 20, 50 and up doubles in size. |

Table 13 describes the shortcut keys available when the **Epochs counter** window is active.

Table 13: Epochs Counter Shortcut Keys

| Shortcut Key | Function |
|--------------|--------------------------------|
| Left Arrow | To scroll 1 epoch to back |
| Right Arrow | To scroll 1 epoch to forward |
| Page Up | To scroll 10 epochs to back |
| Page Down | To scroll 10 epochs to forward |

Options

Evaluate allows you to select specific settings for the program such as color and measurement units. To access optional settings, select **Options** from the pull-down menu under **View**.

General

To select general settings of Evaluate, select **General** within the **Options** menu, Figure 29. Table 14 describes the settings within this window.



Figure 29: General Settings Window

Table 14: General Settings window

| Component | Description |
|------------------|--|
| Course Dial Up | Setting which direction is pointing up: <ul style="list-style-type: none">• North Up• Head/COG Up |
| Sky Chart Layout | Setting which indicates view of Sky Chart: <ul style="list-style-type: none">• Horizontal• Vertical |
| Devices Feature | Settings which indicates style of instruments <ul style="list-style-type: none">• Automobile• Aeronautical• Nautical |

Table 14: General Settings window (continued)

| Component | Description |
|---------------------------------|---|
| Logging directory | Allows you to specify different logging directory. |
| Display startup menu on startup | Determines if startup menu is displayed once Evaluate is started. |



Head/COG Up—When the receiver is an ADU (Altitude Determination Unit), the actual heading of the vehicle is known and the course dial will display Head Up. When the receiver is other than an ADU, the actual heading of the vehicle is not known and the course dial will display COG (course over ground) Up.

Measurements Units

To define measurement units and coordinate formats, select **Measurement Units** window, Figure 30, under the **Options** menu. The program displays units on the Status bar.



These parameters allow Evaluate to convert measurement units. They are not changing the settings in the receiver or changing precision in any way.



Figure 30: Measurement Units Window

The following units are available in the Evaluate program:

Table 15: Measurement Units window

| Value | Unit |
|--|---|
| Distance | nautical mile, mile, kilometer, cable, meter, feet, inches, centimeter |
| Horizontal Speed | knot, mph, km/h, m/s, ft/s |
| Vertical Speed | knot, mph, km/h, m/s, ft/s |
| Altitude | meter, feet |
| Coordinates format <ul style="list-style-type: none"> • ddd.ddddddddd • ddd mm.mmmmmm • ddd mm ss.sssss | <ul style="list-style-type: none"> • Degrees and fractions of degrees • Degrees, minutes, and fractions of minutes • Degrees, minutes, seconds, and fractions of seconds |

Colors

To select display colors of the **Sky Chart** and Departure Plot of the **Position information** window, select **Colors** (Figure 31) within the **Options** menu.



Color changes are especially useful when displaying information on a black and white screen. Evaluate allows changes in the contrast for better visibility.

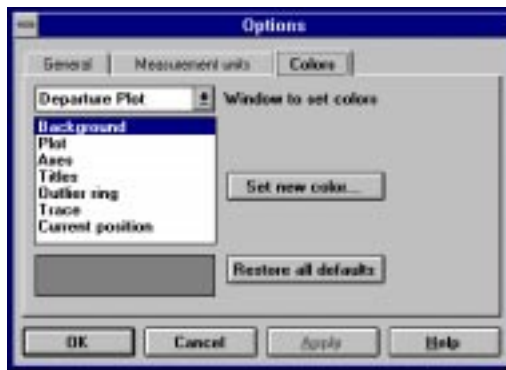


Figure 31: Colors Window

Table 16 describes the components of this window.

Table 16: Available Colors Window

| Component | Description |
|----------------------|---|
| Departure Plot | The following components of the Departure Plot can change color: Background, plot, axes, titles, outlier ring, trace, and current position |
| Sky Chart | The following components of the Sky Chart can change color: Background, sky, elevation rings, satellites, satellites PRN, forward track, and backward track |
| Set new color... | Allows you to select a different color for the selected window component. Choose from a preset list or define a custom color. |
| Restore all defaults | Restores all color setting to factory defaults. |

Connecting to a non-Ashtech Receiver Using a Generic NMEA Interface

Evaluate will connect to any GPS receiver that supports the standard NMEA messages GGA, GSA, GSV, and VTG. Evaluate also works with receivers that support any subset of these four NMEA messages. Evaluate will play back any ASCII data file with these NMEA messages, or any subset of these messages.

Connecting to Receiver

Evaluate will automatically connect to Ashtech receivers, and automatically turn on the Ashtech POS and SAT messages when the **Position information** and **Sky chart** windows are opened. Evaluate can set the baud rate and protocol automatically for Ashtech receivers. For non-Ashtech receivers you must do the following:

1. Set the correct communications port, baud rate, and protocol.
2. Select **Manual Connect** in the **Connection Parameters** window.
3. Set up the receiver to transmit GGA, GSA, GSV and VTG (or as many of these as possible). Refer to “Sending Commands to the GPS Receiver” on page 9.
4. From the **GPS Receiver Terminal** window verify that you are receiving the NMEA messages.
5. Open the **Position information** and **Sky chart** windows to view data as described previously.

Initialize from File

Only Ashtech receivers can initialize from a *.GPS file.

Logging Data

Evaluate will log data from any receiver. For Ashtech receivers the reserved filenames are used. For non-Ashtech receivers the file names are: UNKN_XXX.LOG, where xxx denotes numbers from 001 through 999. Refer to “Logging Files” on page 18.

Viewing Logged Data

To play back data from a file, open the data file; Refer to “Viewing a Log File” on page 20. Evaluate reserves certain file names for Ashtech receivers. For these files Evaluate looks for Ashtech POS and SAT messages. For any other file named *.LOG, Evaluate looks for the four NMEA messages GGA, GSA, GSV, VTG. Reserved Ashtech filenames are:

| | |
|--------------|-------------|
| ADU2_XXX.LOG | SCA_XXX.LOG |
| G8__XXX.LOG | SII_XXX.LOG |
| G12_XXX.LOG | Z12_XXX.LOG |
| GG24_XXX.LOG | |

Almanac Download

Evaluate will download almanacs from Ashtech receivers only (excluding the ADU2).

Analysis

The Analysis feature works with any receiver supporting the GGA message. Refer to “Using Evaluate for Analysis” on page 22.

Heading, Pitch, Roll, and Yaw

These dials work with Ashtech ADU2 only. Note that COG (Course over Ground) is different from Heading. COG works with any Ashtech receiver, and any receiver supporting VTG.

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