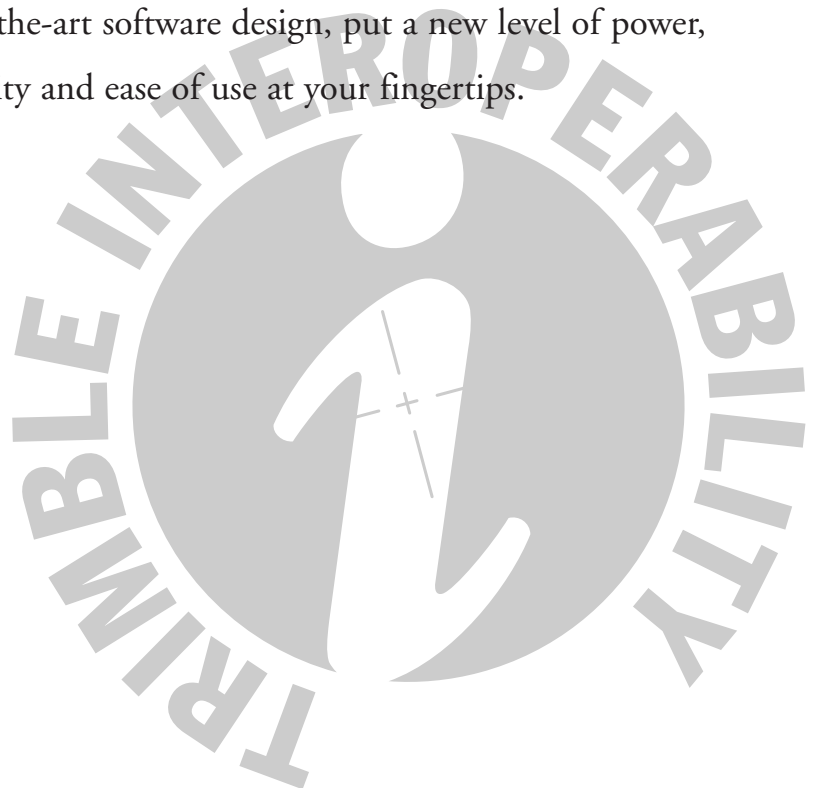


Trimble Reference Station

DISCOVER THE NEW GENERATION OF REFERENCE STATION TECHNOLOGY

For a worldwide user community of surveyors, mappers, GIS professionals, engineers, scientists and others, GPS reference stations provide an essential service of making high accuracy GPS data available, when they need it, where they need it—and in the format they need it in.

The Trimble Reference Station software brings a new generation of reference station technology to GPS reference station providers. Innovative features, coupled with a state-of-the-art software design, put a new level of power, flexibility, data availability and ease of use at your fingertips.



FROM A SINGLE USER SITE to a global network of GPS reference stations, the Trimble Reference Station (TRS™) software has all the flexibility and power you need. The Trimble Reference Station software has been designed to provide power, flexibility and ease-of-use, regardless of the size or configuration of the reference station network. The Trimble Reference Station software is *the* GPS reference station solution—from a single receiver at a single site, to arrays of GPS receivers spread over a city, a state, or the entire globe. The software has also been designed with expansion in mind, so as your network or business grows, your network of reference stations can grow with it. And, as Trimble is the world's leading supplier of GPS solutions, you can be sure that we will be there when you need us.

TRIMBLE REFERENCE STATION—A POWERFUL CLIENT-SERVER APPLICATION

It is easy to manage a multiple-receiver reference station network with Trimble Reference Station's **Client-Server** technology, even if the GPS reference station's installations are located at remote sites.

Client-Server technology is used extensively in computer systems that are networked together, to facilitate quick and easy user access to data and information. In principle, it means that the software is split into two components—known as a client and a server.

The Trimble Reference Station **client** is the user interface used to configure, control and monitor the GPS reference station, be it a single GPS receiver located at one site, multiple GPS receivers at one site, or an array of many GPS receivers located at remote sites spread over a wide area.

The Trimble Reference Station **server** runs on the computer located at the GPS reference station site. It is configured and controlled by the Trimble Reference Station client and, once it has been set up, it will run automatically whenever the computer is started. The server runs continuously in the background of the Windows operating system, automatically logging and routing data as scheduled.

Quick and easy setup with the Basic Installation

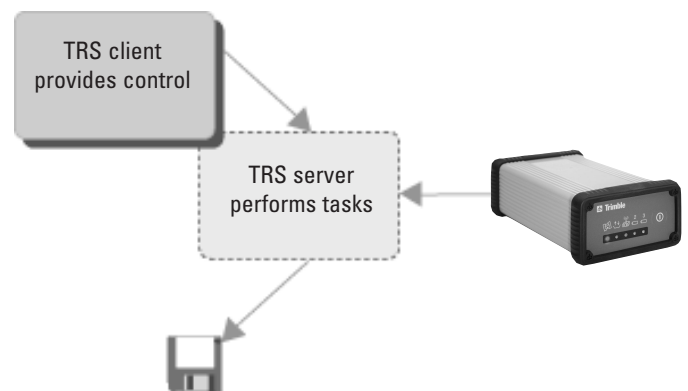
Some reference station sites do not require advanced remote access and networking capabilities, for example, a single user site where the data is logged to the hard drive of a PC connected directly to the GPS receiver. In a **Basic Installation** such as this, the client and the server are installed on the same computer.

This installation is quick, simple and is ideal for single or multiple user sites where there are no requirements for accessing the GPS receiver or logged data from a different location.

Unleash powerful networking capabilities with the Advanced Installation

The **Advanced Installation** of the software allows one or more central control centers to connect to, configure, and log data from multiple GPS reference stations located at remote locations—whether they are in the next building or spread around the globe. In these cases, the Trimble Reference Station client might reside on a computer at a control station, while a Trimble Reference Station server would be installed on a computer at each GPS reference site.

The Advanced Installation also allows data to be logged to Local or Wide Area Networks (LANs & WANs) and allows full World Wide Web and File Transfer Protocol (FTP) functionality for those who want to publish their data using the internet.



FAST AND POWERFUL REMOTE SITE ACCESS USING TRIMBLE REFERENCE STATION

The Trimble Reference Station client can be used to connect to remote GPS reference station receivers via the Trimble Reference Station servers using data links such as computer networks, landline telephone modems, cellular telephone modems, or satellite data links. As long as a data-ready link can be established, the Trimble Reference Station client user can connect to the Trimble Reference Station server at the remote site and carry out configuration or monitoring of the GPS receiver as though they were actually sitting at the remote site itself.

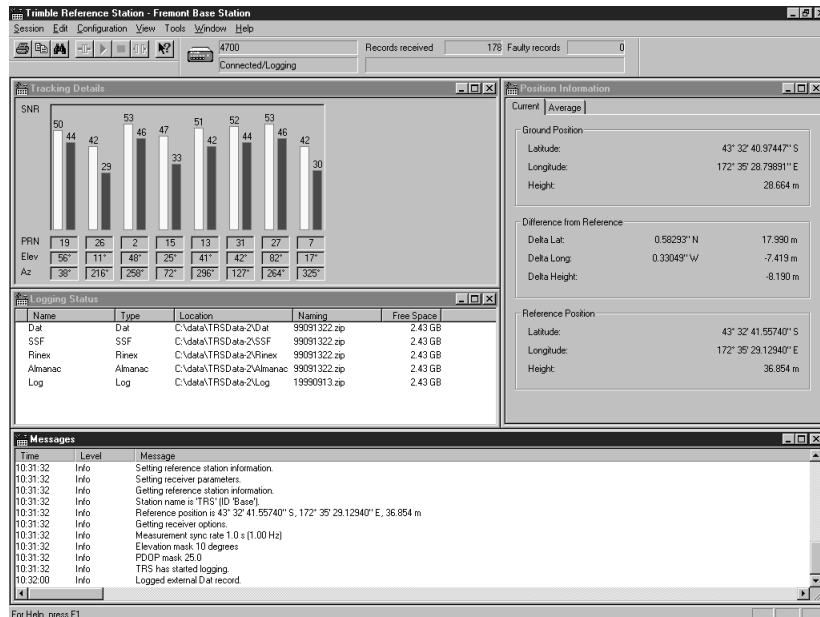
The Trimble Reference Station software interfaces to a range of Trimble GPS receivers suited to different accuracy requirements. And the ability to connect to multiple GPS receivers allows redundancy to be built into the reference station, for example to provide continuity of data or integrity monitoring.

AUTOMATIC RECOVERY FROM POWER FAILURES AT REMOTE SITES

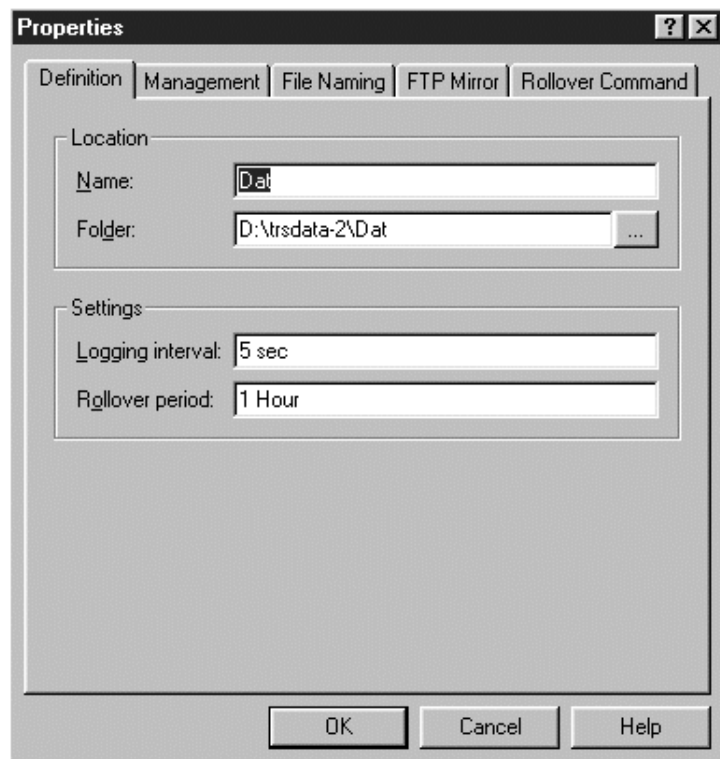
In the event of a power failure, the Trimble Reference Station software will automatically re-start once the power returns and the computer reboots, without any need for user intervention. And, because every measurement is written directly to the data file without waiting for long periods in the computer memory, data is recorded on file right up to the instant of power failure—minimizing data loss.

Note that it is always good practice to power the computer and GPS receiver at a remote site via an Uninterruptable Power Supply (UPS) to reduce the possibility of power surges, spikes and interruptions.

*“With the TRS Solution,
making your data
available to those who need it
has never been so easy”*

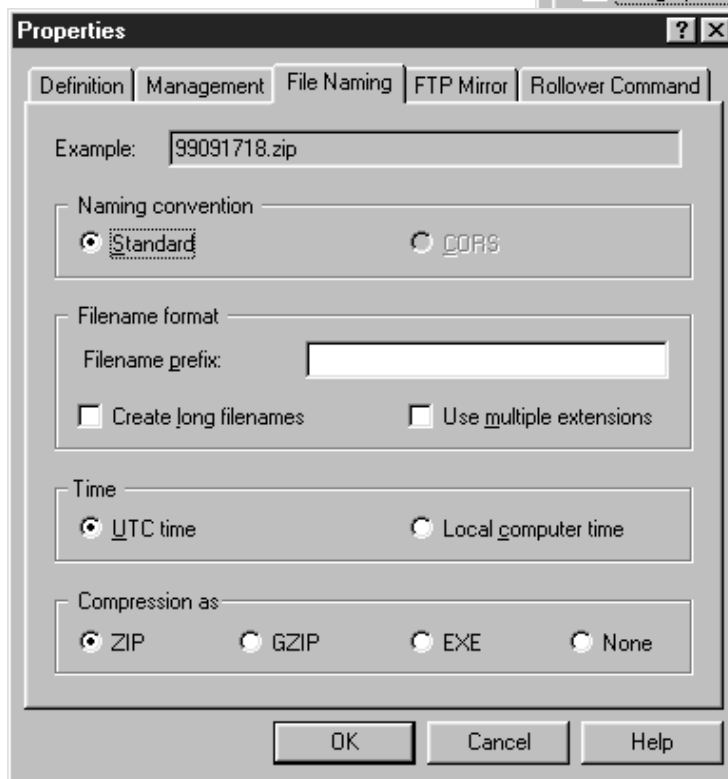
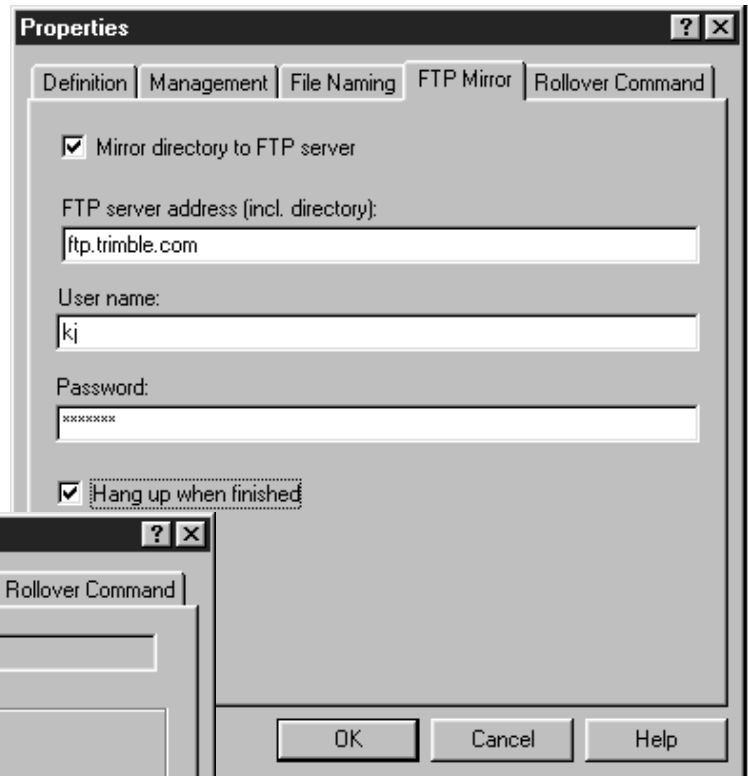


GPS reference stations need to make the right data available to those who need it, when they need it. Trimble Reference Station offers a wealth of options for making GPS data available to users. **File Definitions** place fast and flexible control over datalogging, filenames and data routing at your fingertips.



You can log raw data in any combination of DAT, SSF and RINEX formats, to a local hard drive or to a network drive on a Local Area Network (LAN). The Trimble Reference Station software can also interface to MET3 from Paroscientific, Inc. meteorological sensors to automatically create and log RINEX MET files.

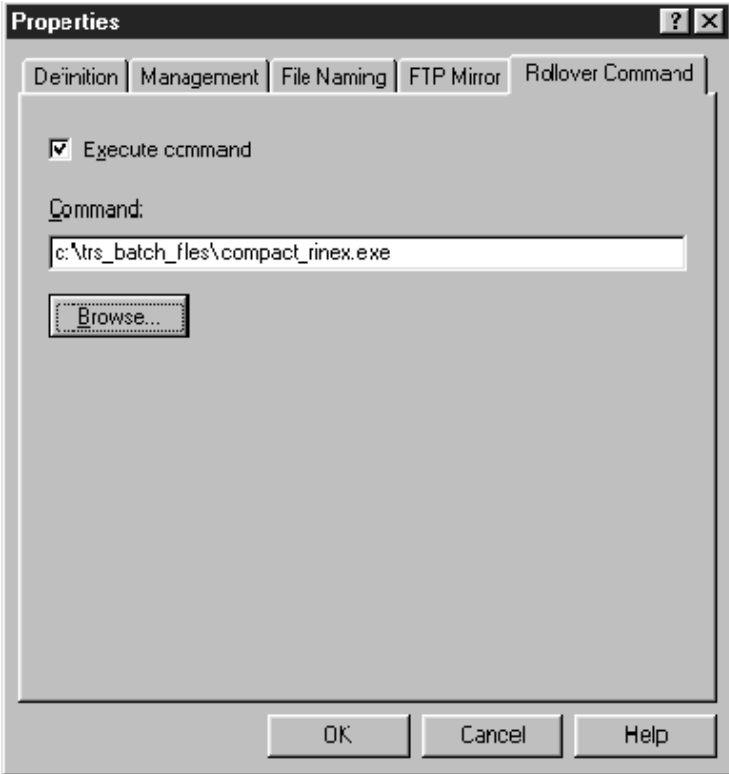
As many file definitions as you need can be created, so multiple versions of the same file type can be logged at different intervals to different locations, if required. The **File Management** settings allow files to be deleted after a certain period of time or when file space exceeds your defined limits.



The Trimble Reference Station software can be set up to write data automatically to an FTP server allowing user access via the World Wide Web. Using an FTP mirror means that data is logged to the local computer before being transferred to the FTP server. This way, data is not lost in the event of a break in connection between the Trimble Reference Station server computer and the FTP server. When the internet connection is resumed, the files are updated on the FTP server to include those that could not be transferred before and logging then continues as usual.

Customize your file names for easy identification. File compression options, including self-extracting ZIP, save disk space and allow for quick user download over Wide Area Networks (WAN), the Internet or World Wide Web.





SET UP AUTOMATIC EVENTS USING THE ROLLOVER COMMAND

Using this feature, batch files can be set up and run automatically from within a Trimble Reference Station file definition. For example, you may decide that you want to make Compact RINEX files available to users as well as standard RINEX. A standard to compact RINEX converter can be obtained and a RINEX file definition set up with a rollover command to operate it. The Trimble Reference Station software will then do the conversion automatically, so that every time a RINEX file is created the rollover command uses the conversion software to make a compact RINEX file as well.

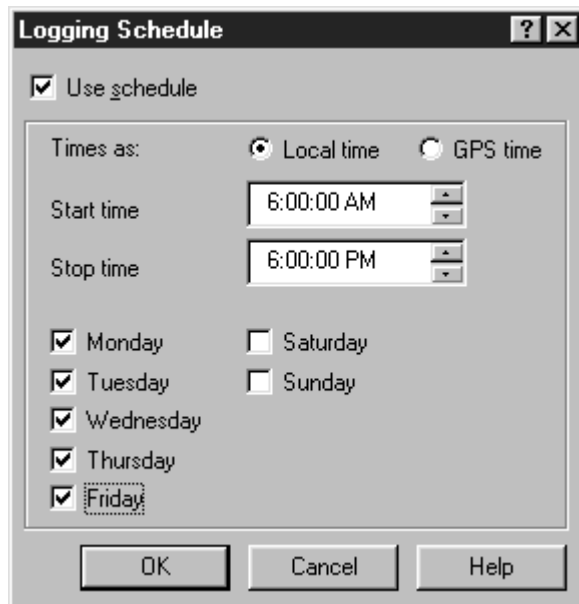
Or you may want to use a command line email package with attachment capability to send the network supervisor an email at a regular interval, with an event log attached. This way, the supervisor can be sure that all remote stations are working correctly, without having to actually connect to them.

TECHNICAL NOTES

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FLEXIBLE AND USER DEFINED LOGGING OPTIONS WITH TRIMBLE REFERENCE STATION SCHEDULES

Some reference stations are operated to provide data continuously, whilst others only need to collect data at certain times, such as during normal working hours. **Schedules** allow a timetable of logging periods to be set up, so that data is recorded only when it is needed—Monday to Friday 6 am to 6 pm, for example.



MAKE YOUR DATA AVAILABLE ON THE WORLD WIDE WEB!

For many data users, downloading the data logged from a reference station from a World Wide Web or FTP site is a fast and convenient option. With Trimble Reference Station making your data available for internet users is quick and easy. No specialist programming skills or knowledge are required to set this up.

Publish GPS data on the Internet using a Web or FTP Server on a Local Area Network (LAN)

Computers running the Trimble Reference Station software are often connected to a company World Wide Web or FTP Server via a Local Area Network (LAN). For these cases, the software has the ability to quickly set up an automatic transfer, or mirror, of the logged data to the Web page or FTP site residing on that server.

Once the data is written to a Web page or FTP site, standard web functionality can be employed to restrict access to the data, for example using usernames and passwords. Such tools can even be used to charge users for access to the data.

Publish Trimble Reference Station data on the Internet using an Internet Service Provider's Web Server

Even if the Trimble Reference Station computer is not connected to the World Wide Web or FTP server via a Local Area Network, data can often still be published on a World Wide Web Page or FTP site, using an external internet service. Many Internet Service Providers (ISP's) allow their users to create Web pages or FTP sites on their ISP web server. In these cases, the computer running the Trimble Reference Station software would usually be connected to the ISP's World Wide Web server using a modem.

In conjunction with Windows dial-up networking tools and Microsoft Internet Explorer 4 or later, the Trimble Reference Station software can be configured to automatically dial in to the external Web server and update the Web page every time a new file is created. To control the amount of data held at the site, the software can also automatically delete files when they reach a certain age. To help you get your web page up-and-running in record time, the Trimble Reference Station software even comes with a standard **Web Page Template** that you are free to use and customize!

Trimble Reference Station Web Page

File Edit View Go Favorites Help

Back Forward Stop Refresh Home Search Favorites History Channels Fullscreen Mail Print

Address <http://www.basestationcompany.com/> Links

The GPS Base Station Company

Reference Station Files

Site Details:

Datum: WGS-84	Elevation Mask: 10°	Data collected with Trimble 4700 GPS receiver and Trimble Reference Station software
Latitude: 37° 32' 41".5574 N	Logging Interval: 1 s	
Longitude: 122° 26' 29".1294 W	Rollover period: 1 hour	
Ground height: 35.633m	Antenna ht: 1.221m	

Data Files:

DAT **SSF** **RINEX** **Almanac**

File Naming:

Each file is named using a YYMMDDHH.zip format. YY is the year, MM the month, DD the day of the month (local day) and HH is the start time of the data file in Pacific Standard Time (24-hour format).
For example, a file containing data for 1:00 pm to 2:00 pm on May 10, 1999 would be named 99051013.zip.

My Computer

TRIMBLE REFERENCE STATION HAS EVEN MORE USER ACCESS OPTIONS—USE A REMOTE ACCESS SERVER OR BBS

In cases where internet access is not available or preferable for the data provider or the data users, or where higher data security is required, a Remote Access Server (RAS) can be used instead.

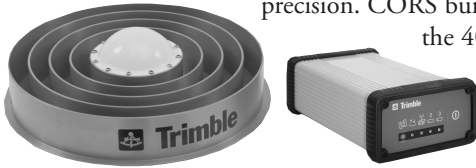
This is a standard feature of the Windows NT operating system that allows external users who need access to the data to log on to the Trimble Reference Station computer using Windows Dial-Up Networking. They then access the GPS data via a web or FTP page which has been created on the Trimble Reference Station computer using simple Web Server or FTP Server tools. Bulletin Board Services (BBS) can also be used to make data available to users.

With the Trimble Reference Station solution, making data available to those who need it has never been so easy.

TRIMBLE CORS—CONTINUOUSLY OPERATING REFERENCE STATIONS

Trimble CORS bundles provide a convenient package of a high quality, dual-frequency GPS receiver, the Trimble Reference Station software, and a choice of antennas—including the Trimble Choke Ring Antenna with sub-millimeter phase center stability for the highest geodetic precision. CORS bundles with either

the 4000SSi or 4700 GPS receivers are available.



BROADCAST DGPS OR RTK DATA FOR REAL-TIME USERS

When connected to a suitable Trimble GPS receiver and an appropriate radio transmitter, the Trimble Reference Station software can enable the broadcast of RTCM or CMR correction data to enable real-time GPS users within range to carry out Real-time Differential (DGPS) or Real-time Kinematic (RTK) surveys.

PROVIDE OVERLAPPING RTK COVERAGE—ALL ON THE SAME RADIO FREQUENCY

Overlapping RTK coverage using a *single* radio frequency is possible using the Trimble Reference Station software with Trimble 4700 GPS receivers.

These receivers, when used with suitable Trimble radio modems, use the precise timing abilities of the GPS system to divide up each second into slots and then to allocate each base station in the network one of those time slots to transmit its data. This way, each base station takes a turn to send its data—but all stations still send their data every second. And because the base stations do not transmit at the same time, they can all share a single radio frequency without interfering with each other—even when their coverage areas overlap.

This feature is particularly useful when overlapping RTK coverage is required from up to three reference stations—but only one radio frequency is available. RTK users can work in the entire coverage area using a single radio frequency.

CONCLUSION

The Trimble Reference Station software brings a new level of control, data access and ease of use for reference station providers and users. A powerful Client-Server architecture makes remote access fast and efficient and provides unrivalled flexibility of installation.

From a single reference station serving a single user, to a global network demanding worldwide data access, the Trimble Reference Station software brings you the power and flexibility you need.

MINIMUM HARDWARE REQUIREMENTS

The minimum PC requirements for the computer running Trimble Reference Station client or server applications are:

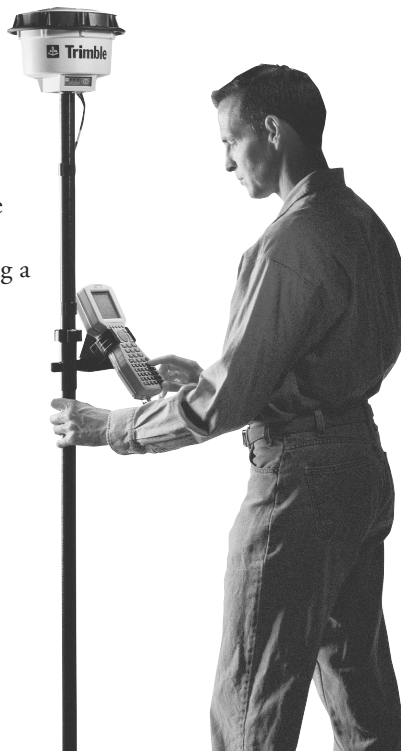
- Pentium computer 133 MHz or faster with 32 MB RAM and a 1 GB hard drive
- SVGA color 800 x 600
- Dedicated RS232 port for GPS receiver (one port per receiver)
- Keyboard with mouse or trackball
- CD ROM drive

The Trimble Reference Station software operates under Microsoft Windows NT 4.0 or later, and Microsoft Windows 95/98. Microsoft Internet Explorer version 4 may be required for some of the features described.

Trimble Reference Station supports the following Trimble GPS receivers: 4000 (firmware 5.68 and up), 4400, 4700, 4800, 7400, GPS Pathfinder® Pro XL/Pro XR/Pro XRS, MS750™.

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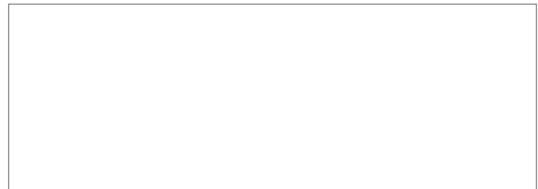




Trimble Navigation Limited
Corporate Headquarters
645 North Mary Avenue
Sunnyvale, CA 94086
+1-408-481-8940
+1-408-481-7740 Fax
www.trimble.com

Trimble Navigation
Europe Limited
Trimble House
Meridian Office Park
Osborne Way, Hook,
Hampshire RG27 9HX U.K.
+44-1256-760-150
+44-1256-760-148 Fax

Trimble Navigation
Singapore PTE Limited
70 Anson Road #05-02
Singapore 079906
+65-325-5668
+65-225-9989 Fax



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