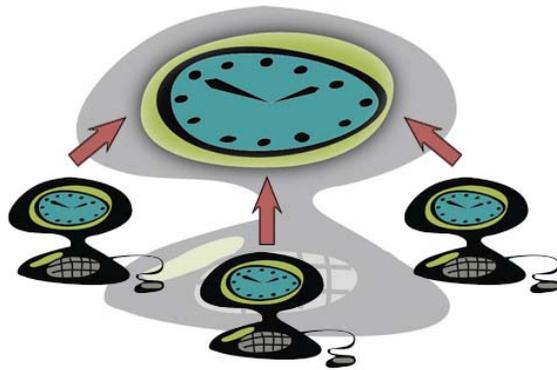


# ClockWatch<sup>®</sup> Client/Server

Network Time Synchronization

**User's Guide**  
Version 4.0.0



Spring 2007



**beagle software**  
[www.beaglesoft.com](http://www.beaglesoft.com)

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## 1.0 Introduction

Beagle Software's ClockWatch provides a fast and easy way to synchronize the computer system's clock to the Atomic Clock using the Internet or a modem.

ClockWatch queries a timeserver you specify, which returns the exact time. ClockWatch then converts the standard time to local time and compares it to the internal system time on the computer, adjusting the system clock if necessary. Settings can be made on demand, on a regularly scheduled basis or automatically based on the specific need of the local system. With ClockWatch you can set the level of accuracy you want to maintain and ClockWatch does the rest - making the settings when appropriate.

Results from clock settings are displayed on windows and charts showing the overall accuracy of your computer. Settings can also be logged to a file allowing you to save all activity in a text file for later review or archival.

This guide provides an introduction to the features and functions of ClockWatch in order to facilitate the installation, setup and operation of the application. Additional information on ClockWatch, timekeeping, standardized time and other Beagle Software products is updated on the World Wide Web at [www.beaglesoft.com](http://www.beaglesoft.com).

**Tip:** Help is available from any ClockWatch screen by pressing the **F1** key.

## 1.1 Software Installation

The installation procedure is the same for all editions of ClockWatch. Note that ClockWatch Client requires ClockWatch Server to be installed on the network.

### 1.1.1 Choose which machine will be the timeserver

- The computer should have Internet or modem access in order to sync time with the Atomic Clock.
- The computer must be running any Windows® operating system.
- The computer must be accessible on the LAN or WAN to all clients.
- The computer should normally be left running.
- The computer does not have to be a domain controller or an otherwise special computer on the network.

### **1.1.2 Install ClockWatch Server software on the timeserver**

- Install the ClockWatch Server program from CD-ROM or from the downloaded executable file. The CD-ROM should autostart from the CD tray. The downloaded file can be double-clicked to start the installation.
- Register the software by using the key code provided by Beagle Software (via email and/or on the back of the CD envelope).
- After installing ClockWatch Server, install the license upgrade utility provided by Beagle Software on the timeserver for the total number of client licenses purchased. Without the license utility, the server will reply to just a single client (except ServerMP).

### **1.1.3 Install the ClockWatch Client software on the clients**

- Install the ClockWatch Client program from CD-ROM or from the downloaded executable file. The CD-ROM should autostart from the CD tray. The downloaded file can be double-clicked to start the installation.
- Register the software by using the key code provided by Beagle Software (via email and/or on the back of the CD envelope).
- Specify the network name or IP address of the timeserver when asked by the installation (i.e., myserver or 209.198.91.1 ).

### **1.1.4 Test each client**

- The ClockWatch Server application or service must be running on the timeserver to respond to requests from ClockWatch clients
- Start both server and client ClockWatch program from: Start>Program Files>Beagle Software>ClockWatch.
- Press the "Set Time" button on the client.
- The connection will be made to the timeserver, the time retrieved and the time setting made. Results will be shown in the log window.

### **1.1.5 Adding Additional Users**

You can add new ClockWatch users for Windows NT/2000/XP/2003/Vista. Each user will have their own settings. There will be a single copy of ClockWatch application files installed on the computer.

#### **Steps to add a user:**

1. As an administrator, first install the full application on the workstation and confirm it works.

2. Grant "Change the system time" right to the intended user, in the User Rights Policy section.
3. Login to the workstation as the intended user.
4. Run the new user program, **AddNewUser**.
5. Use the same key code to register the software for the user.
6. Start ClockWatch.

**Notes:**

- There is no need to reinstall over the trial software—simply register using the keycode to engage full functionality.
- ClockWatch can be installed directly over a previously installed version or edition. Some options have changed, so you may need to reset some time setting or display options after starting the new software.

## 1.2 Software Removal

Removing ClockWatch from a system will remove all executables, help files, log files, registry settings and DLLs that are registered exclusively to ClockWatch. To remove ClockWatch you need to use the uninstall utility provided with the software:

1. Exit ClockWatch, stop all background instances of ClockWatch, including services.
2. Select the **Uninstall** program (uninstall.exe) from the **Programs>Beagle Software** directory.
3. Follow the uninstall wizard. Accept the defaults.
4. If asked if you want to remove shared DLLs, it is safest not to remove them in case they are in use by another program.

## 2.0 User Guide

Running ClockWatch is very simple if you are using an Internet connection. Follow these steps:

1. Connect to the Internet.
2. Start ClockWatch using the **Start>Programs>Beagle Software>ClockWatch** menu.
3. From the main ClockWatch screen press the **Set Time** button to check time and set clock.
4. Click **Exit** to close the program.

If no connection is made, it is likely that the default timeserver is not responding. Choose **Options>Timeserver** and select the **Directory** button. Choose another timeserver and try setting the time again. Also verify that your Internet connection has not been interrupted.

## 2.1 The Main Screen

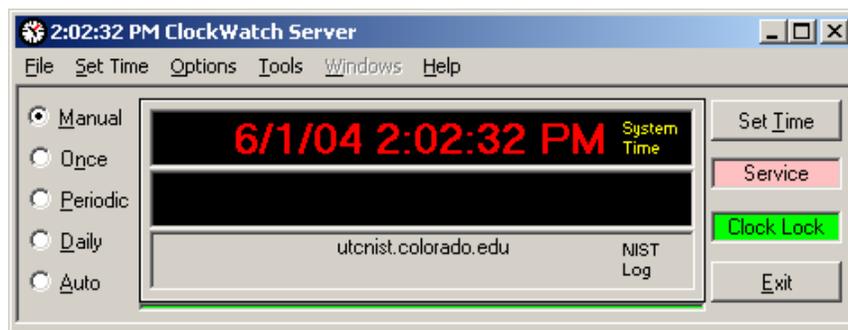
The main screen is the central point for displaying information and provides a base for running ClockWatch. Visible from the main screen are your computer's system time, the time of the next setting (if applicable), and results from previous settings. You also have options to display graphs and/or logs of setting activity (explained in section 3).

**Set Time:** Begins a time setting attempt immediately.

**Options:** Opens the Settings tab of the options screen.

**Help:** Opens a window to describe the components of the main screen.

**Exit:** Ends program after prompting to save any options changed for this session.



*The ClockWatch main screen*

### Display Windows

**Computer Time Window (top)** normally shows the:

- current local system time (red); or,
- after time setting, shows the NIST time the computer was set to (green); or,
- if the setting failed, shows the time of the failed attempt (yellow).

**Timeserver / Setting / World Time Window (middle)** normally shows the:

- time of the next scheduled setting (in purple); or
- after time settings shows the new time the computer was set to (in green); or
- when the World Clock is running, the local time in the time zone selected.

**Timeserver Log Window (bottom):**

- The first line of the log shows the information returned from the timeserver.
- After a time sync, the second line of the display shows a summary of

the last time setting including local time (24 hr format), setting status and time change, if any.

- If the setting was successful, then both the difference and drift of the last reading will be shown.

## 2.2 Guide to the Menus

### 2.2.1 File Menu

**Exit:** Exits ClockWatch. Closes log file. If options were changed, asks if changes should be saved.

### 2.2.2 Set Time Menu

**Internet/Timeserver:** Sets computer time to the selected timeserver.

**BIOS/ClockCard:** Sets the computer time to BIOS (hardware) system clock or, if installed, Beagle Software's ClockCard Real Time Clock on a PCI or ISA card.

### 2.2.3 Options Menu

Any selection from this menu opens a window with the customization options for ClockWatch. These options include Clock Setting, Display, Timeserver, Logging, Graphs, BIOS Clock and Service. See Section 3 for detailed descriptions of these options.

**OK:** Closes the screen. This button will save any changes you have made to this screen for use by the application. New options are not saved to the registry until you exit the application.

**Cancel:** Cancels the changes you are about to make. Any changes made to this screen will be gone after selecting this button.

### 2.2.4 Tools Menu

**Countdown Timer:** Countdown Timer lets you time events right on your desktop. Enter the expiration time or the interval to time, ranging from the next minute to the next year. The timer will show the time remaining in the format you choose. When the time expires, you'll be beeped. In the Stop Watch mode you can simply start the clock and see how much time has elapsed, as well as the time you started.

**Time Audit:** The Time Audit Utility lets you tell at a glance how close your Windows network is to being in sync. The utility communicates with the each of the clients to check their time. Does Remote time checks and lets to set custom monitoring levels. Client Test Detail gives a quick summary of how an individual client is doing.

## 2.2.5 Windows Menu

The options in this window are enabled only if:

- the “Show Graphs” button is selected in Options>Graphs, or
- the “Show Action Log” button is selected in Options>Logging.

**Cascade:** Displays all open charts as overlapping.

**Tile Horizontally:** Displays open charts stacked one atop another.

**Tile Vertically:** Displays open charts side by side.

**<Open Graphs List>:** Lists charts that are opened, checks the one currently in focus.

## 2.2.6 Help Menu

**Help Topics:** Displays a list of help topics.

**Search:** Search the help system for a key word or topic

**Using Help:** How to use help.

**Tips:** Opens the tip of the day Tip Screen

**Beagle Software Web Site:** Opens a Web browser (if available) which opens Beagle Software's home page, [www.beaglesoft.com](http://www.beaglesoft.com).

**Register (Trial version):** Opens the main Registration Screen which explains the different ways you can register your software.

**Software Updates:** Opens a Web browser (if available) which opens the ClockWatch software update page. This page contains information about the most current version of ClockWatch and upgrade options.

**About:** Displays version, system and program copyright information.

## 3.0 Customizing ClockWatch

ClockWatch is immediately functional for Internet settings. You can also customize several options to meet your specific needs. This section offers a comprehensive review of the options.

**Clock Setting:** Frequency of synchronization.

**Display:** Options for viewing time formats on ClockWatch screen.

**Timeserver:** Timeserver selection and connection set-up.

**Logging:** Options for tracking synchronization history.

**Graphs:** Options for viewing synchronization results.

**Clients:** Options for establishing contact with ClockWatch clients.

**BIOS Clock :** Options to configure ClockWatch to update the Windows operating system clock from the BIOS (hardware) clock. This option converts to “ClockCard” if Beagle Software’s ClockCard is installed.

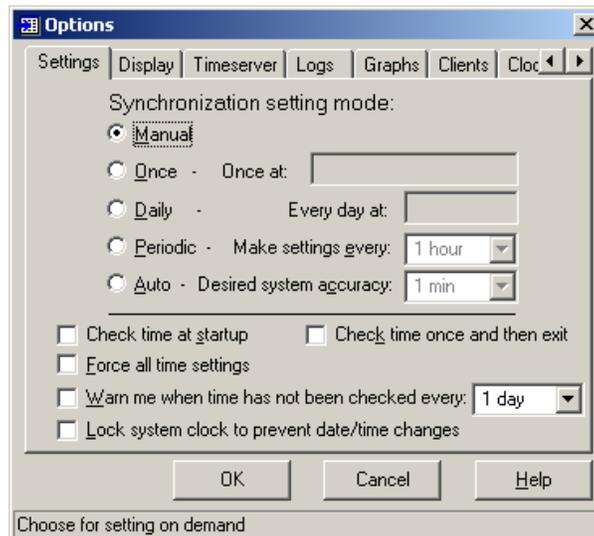
**System:** Start and stop the background service process.

### General Usage Notes

- For a setting to be attempted, ClockWatch must be running and the computer must be connected to the Internet or set to dial by modem.
- If ClockWatch is not running at the specified time, then the setting will be made as soon as the program is started.
- If ClockWatch is not connected to the Internet at the specified time and direct modem connection is not used, then the setting will not be made nor will it be rescheduled.
- Time loss can be due to factors relating to computer hardware or software. Experience will show which combination of factors result in significant time loss. This information is useful to the user in determining when the next setting will likely be required.
- Pressing the **Set Time** button repeatedly over a short duration will cause the NIST to suspend communication for a period of time.
- Some NIST timeservers tend to experience heavy traffic and may not respond. ClockWatch Server can be set to try another timeserver: choose **Options>Timeserver**, then choose **Directory**. Select another timeserver and try setting time again.

## 3.1 Settings

Use this window to establish how you want to sync time.



### **Manual**

Use Manual when you want to make a setting quickly, providing for on-demand settings only. Use the **Set Time** button on the main screen to make a time setting at any time.

### **Once**

Use Once when you want to set the clock at a given time in the future, for example, to synchronize with another computer or system. The date and time of this scheduled setting is shown in the Timeserver/Time setting display window (middle window on the main screen). **Once at...** shows the date and time of next setting.

When the **Once** option is selected, the **Enter Time Form** will appear, allowing you to set the time and date to perform a time check. This is the time that the next setting will be made. The form allows a variety of time/date formats.

**Time Input Field:** Used to enter the time for the next setting. If the setting mode is Once, then input is expected in the <date> <time> formats.

**Date formats:** Enter the date using a format that is valid for your region. For users in the US include month/day/year (i.e., 1/18/02) or in full month word format (i.e., January 18, 2002).

**Time formats:** Enter the time using a format that is valid for your region. US users can use either 12 hour AM/PM format (i.e., 1:15 PM) or 24 hour clock basis (i.e., 13:15).

**Note:** Invalid date or time strings, including dates in the past, will not be accepted by the form.

**Tip:** If the date is omitted, ClockWatch will select the following day.

### **Daily**

Use the Daily option to sync at the same time every day. Once the time is specified, ClockWatch will attempt to make a setting each day at that time, assuming the program is running. **Every day at...** shows the time that settings will be made each day.

When the **Daily** option is selected, the **Enter Time Form** will appear. See the explanation for this in the **Once** setting section, above. Note that **Daily** does not require a date setting.

### **Periodic**

**Periodic** is appropriate for the most demanding environments when the clock must be kept within several seconds of standard time. This option will schedule settings with specific, fixed timed intervals between settings (once every hour, 8 hours, 2 days, etc). **Make settings every...** (pull-down menu) will select the interval of time desired between settings.

**Auto**

**Auto** is best when the desired level of accuracy is known and the time drift is relatively constant. The program determines when to make the next setting based on the accuracy of previous settings and the accuracy level desired. Using information from the last setting where the clock was changed, ClockWatch determines when the next setting needs to occur to maintain the accuracy you've selected.

For example, if your computer loses time at the rate of 2 minutes per day and the desired accuracy is one minute per day, then ClockWatch will make a setting at least every 12 hours (note: since the rate of loss is not constant for most computers, an uncertainty factor is used in making the scheduled time calculation).

**Desired System Accuracy...** (pull-down menu) allows you to choose the level of accuracy you want ClockWatch to maintain.

If you are uncertain whether to use **Periodic** or **Auto**, try running ClockWatch in the **Periodic** mode for several days with an interval of 8 hours. If the time difference between readings is relatively constant, then the **Auto** setting will probably be the best choice. If readings differ widely then **Periodic** should be chosen at a rate to handle the worst (largest time difference) case.

**Check time at startup**

When enabled, ClockWatch will automatically start and run a time setting upon startup.

**Check time once and then exit**

When enabled, ClockWatch will check the time once and then exit. If ClockWatch fails to contact a timeserver, then the program will remain active until a time check is successful.

**Force all time settings**

When enabled, ClockWatch will make a time setting every time the clock is checked.

**Warn me when time has not been checked every...**

When enabled, ClockWatch will monitor the last time a time check was made. If the last check exceeds the interval limit selected, then a warning will be shown in the Log Window and in the system tray icon. If Event Logging is enabled, then ClockWatch will write the warning message to the event log (see Section 3.4 for information on event logs). ClockWatch will also check the last time a check was made when you start the program, alerting you if a time check is overdue.

**Send Email Warning**

Enables email notification for clock check warnings (see above). When first checked opens up Email notification setup.

## **Lock system clock to prevent unauthorized date/time changes**

Clock Locking prevents unauthorized users or programs from changing the system time. When Clock Locking is activated, the user will still be able to view the Windows date/time function and attempt to make a change. However, ClockWatch will force the setting back to unchanged, then log the user's attempt to change it.

### **Engage Clock Locking**

1. Start the ClockWatch application. Choose the **Options** menu, then select **Settings**.
2. Check the "**Lock system clock to prevent time/date changes**" option.
3. A window will pop up to allow you to choose an administrative password. You may retain the default password or choose your own.
4. Choose the **Display** option and select the box for **Startup Automatically**. This will start ClockWatch in the lock-down mode whenever the user is logged in.
5. Save the options (press "OK").
6. **To enable Clock Locking for the first time you must exit then restart the ClockWatch application.** After restarting ClockWatch, notice the green "Clock Lock" light. This indicates that the clock is locked.
7. Minimize the application to hide it in the system tray and enter the lock-down mode. You can also run ClockWatch as a service, but the service should be registered after setting Clock Locking.

### **Clock Locking Administration**

#### **Bring ClockWatch out of the hidden lock-down mode**

Locate the **hidden icon** by slowly moving the mouse from left to right in the System Tray. When you see the "**OK**" box, right-click the mouse to open the password field. Enter the administrative password, followed by your Enter key, to open ClockWatch.

#### **Turning locking on and off**

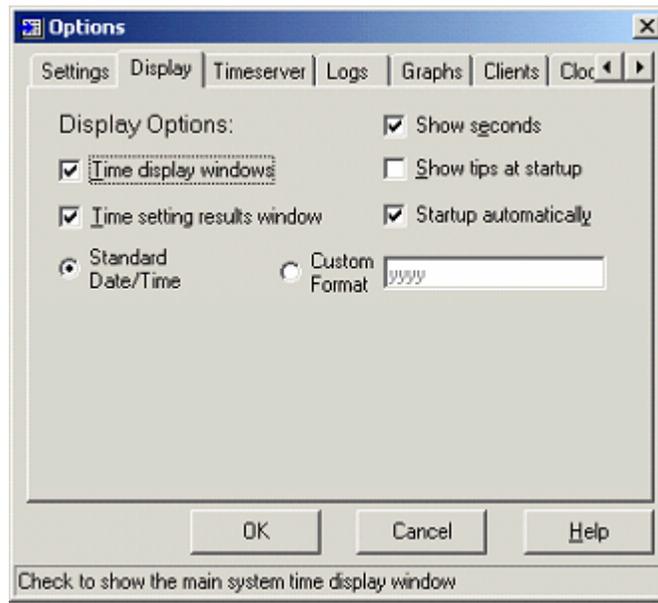
You can turn Clock Locking on or off from the Settings options tab within ClockWatch (**Options>Settings**). Deselect the last option on that window, "Lock system to prevent date/time changes". You can also unlock the clock by stopping ClockWatch.

#### **Changing the administrative password**

Open the Setting options tab within ClockWatch (**Options>Settings**). Check the box for "Lock system to prevent date/time changes" (if the box is already checked, uncheck and recheck). The administrative password form will be displayed.

## 3.2 Display

The Display tab offers options to customize the Main Screen.



**Mode** (Win XP/Vista)

**XP/Vista:** Display screens using the XP/Vista style.

**Classic:** Display screens using the Windows classic (9x) style.

**Show seconds:** When checked, shows and updates seconds in the time windows.

**Time display windows:** Turns on and off the display for both of the time windows (the top 2 windows).

**Time setting results window:** Turns on and off the NIST log display (the bottom of the 3 windows).

**Show tips at startup:** Turns on and off Tip screen at application startup.

**Startup automatically:** When checked, installs ClockWatch to startup the application at computer startup. The application begins along with other background applications and is shown in the system tray. The ClockWatch clock icon indicates the stay resident program is loaded and running in the background. See “Configuring for Auto Startup” in Section 3.1.

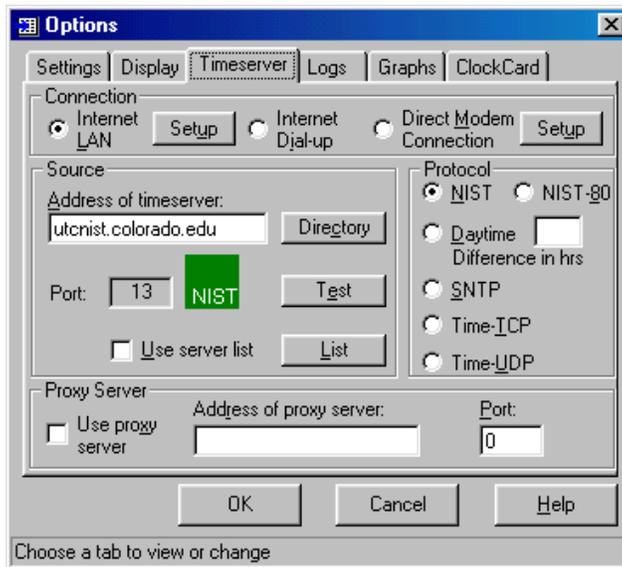
**Standard Date/Time** versus **Custom Format:** Choose the default format for displaying date and time, or choose custom format to suit your needs.

### 3.3 Timeserver

The Timeserver tab offers a choice for the timeserver used and type of connection to the timeserver you will be using. You can also connect directly to the server over the Internet or through a proxy server. If an Internet connection is unavailable then you can call the NIST directly on the phone using the computer's modem.

ClockWatch Server will access an external timeserver to obtain correct time, then act as the local timeserver for computers running ClockWatch Client. As such, the Options>Timeserver window is different for ClockWatch Server than for Client.

#### 3.3.1 ClockWatch Server Timeserver



*Timeserver option window for ClockWatch Server*

#### Connection Frame

**Internet/LAN:** When selected, communicates directly to the specified timeserver over the Internet, using the protocol and port specified.

**Internet/Dial up:** When selected, will first dial your ISP to make a connection to the Internet and then sync the clock using the timeserver specified. For configuration options click Setup.

#### Internet Connection Setup

Click the Setup button to configure how ClockWatch will make connection with the Internet; opens the Internet connection screen. ClockWatch offers two Internet connection options:

**Manual Connection:** If you establish the connection to the Internet

manually, or you normally are connected to the Internet over a LAN or on demand methods such as DSL or cable modems, you should choose the manual connection option.

**Have ClockWatch wait for Internet connection:** Use this option if you want ClockWatch to wait for the next time you make a connection to the Internet. When selected, ClockWatch will wait in the background until an Internet connection is established.

**Note:** Upon sensing an active Internet connection, ClockWatch will wait some time for the connection to be established before contacting the timeserver. The wait period is one half (50%) of the time specified in the **Max sec to wait for connection** field on this form.

**Have ClockWatch Automatically Dial my ISP:** You can have ClockWatch dial your ISP to make an Internet connection when needed. The Auto-Dial Internet service provider option instructs ClockWatch to establish an Internet connection when a clock synchronization needs to be made. This screen allows you choose the dial-up account and test the connection that ClockWatch will use to make a connection to the Internet.

When this option is checked, ClockWatch will dial the account specified and log in to the account. ClockWatch will use all the existing dial-up account information including phone number, user name and password. It is important that this information is current and accurate. If already connected to the Internet, ClockWatch will attempt to use the existing connection. Once logged in, ClockWatch will synchronize the system clock with the NIST and then take down the Internet connection.

**NOTE:** On Windows NT/2K/XP/2003/Vista systems RAS must be set up and available for use by the user running ClockWatch. Most likely, the Auto-dialing feature cannot be used by ClockWatch Service running in the system context.

#### Steps for using the Auto-Dial feature

1. Set up an Internet service account through Windows Dial-Up Networking (DUN). Test the account and the connection, making sure that the connection can be made without entering a password or username.
2. Open the Auto-Dial ISP screen in ClockWatch.
3. Select a DUN account from the pull down menu.
4. Test the DUN account by pressing the **Dial ISP** button.
5. Confirm that the account is dialed, answered, and the connection is established. You should see the same regular Windows network

connection icon (two networked computers) after the connection is established.

6. Drop the connection by pressing the **Disconnect** button.
7. Check the **Dial ISP first to connect to the Internet** option. Save the settings (press **OK**).
8. When ClockWatch is called to do time synchronization, it checks if an Internet connection is established. If it is not, then it will dial the DUN network account and then make the clock setting.

**Buttons:**

**Dial ISP:** Dial the ISP selected and establish an Internet connection. Used for testing the account.

**Disconnect:** Disconnect the current Internet connection. Will only disconnect connections established by ClockWatch.

**Get Status:** Get the current status of the connection.

**OK:** Save changes made and return.

**Cancel:** Cancel any changes made to options and return.

**Direct modem connection**

When selected, uses the modem to call the NIST directly and sync up time signals over the phone line. Other options in the Timeserver window are disabled when the direct modem connection is set.

**Setup:** Click to configure the modem used to make the direct modem connection with the NIST; opens the option screen for direct modem connection.

See Section 4 for detailed Modem Setup Information.

**Source Frame**

**Address of timeserver:** Enter the IP address or name of the timeserver (i.e., *time-a.nist.gov* or *167.166.116.1*). ClockWatch Client users should enter the IP of the ClockWatch Server. **Hint:** Check the Directory button for a list of timeservers.

**Port:** Shows the TCP or UDP port used to make the socket connection to the timeserver. ClockWatch uses TCP port 13 for NIST or Daytime, UDP port 123 for SNTP, and port 37 for the Time protocol. **Note:** If using a port different than the port specified, you must use the proxy server section on this form to specify the non-standard port. See the information on Proxy Server Frame, later in this section.

**Directory:** Opens a list of timeservers available for time synchronization.

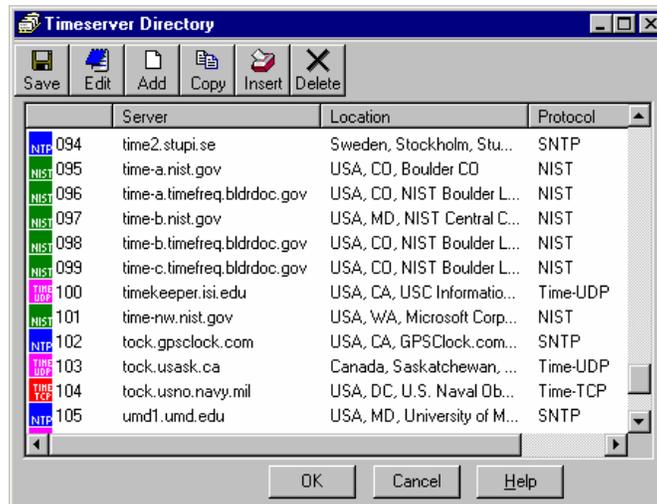
**Test:** Opens a test screen for testing the connection with the timeserver.

**List:** Opens the list of available timeservers to use as a backup.

**Use server list:** When enabled, this option will find the next available server if the current server is unavailable. ClockWatch will try this next server on the list on the next setting attempt. It will work through the list of servers list until one is found. The server will default to the server originally selected when restarting the application. You can view and edit the list of timeservers by pressing the List button.

### Timeserver Directory

The Timeserver Directory screen allows you choose a timeserver for use by ClockWatch for test or to add and edit individual timeservers. The directory includes a list of over 100 verified timeservers located throughout the world, with information on server location and primary protocol. The toolbar at the top of the screen allows you to add/edit/delete timeservers in the directory.



#### Editing Toolbar

The Editing toolbar contains the options for editing the timeservers in the directory:

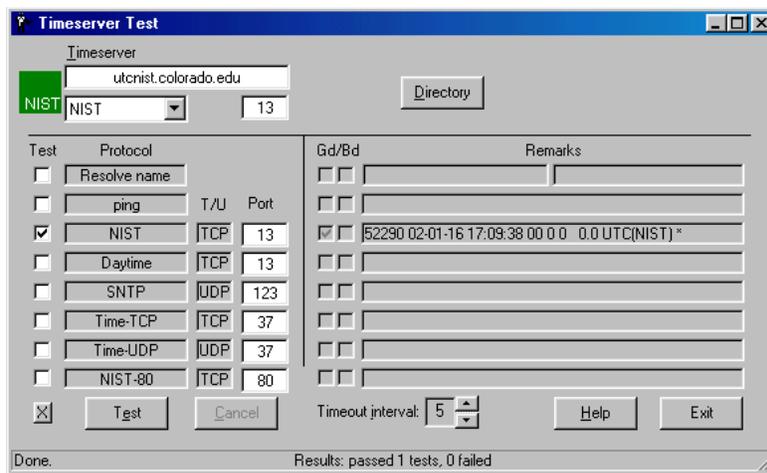
- Save:** Save the changes to the current server directory.
- Edit:** Edit the name, location or protocol of the timeserver.
- Add:** Adds a new timeserver at the end of the list.
- Copy:** Create a copy of the highlighted server below the existing server.
- Insert:** Inserts a new timeserver immediately below the current server.
- Delete:** Delete the timeserver from the directory.

### Timeserver Test Screen

This form is the main test screen for conducting timeserver communication tests.

#### Test Features

- Checks timeserver access and connection with 8 different tests.
- Shows the response of the individual timeserver to 5 standard time protocols.
- Includes name lookup test, and ping test to check for basic accessibility of the server.



The timeserver test lets you check both the connection and the capability of local or remote timeservers. Compatibility and connection problems can be diagnosed using the built-in 8 point connection test. The timeserver directory contains a list of over 100 timeservers located around the USA and throughout the world. When you are done, the utility can save the timeserver for use by ClockWatch for clock synchronization.

#### How to use Timeserver Test

Opening the Timeserver test form shows the current server settings in ClockWatch, including the server, protocol and port number used to communicate with the timeserver. The current settings are used to set the initial test conditions. Pressing the test button will verify that the communication can be established with the current settings.

#### Troubleshooting Connection Problems

If a problem occurs where time setting does not work with a certain timeserver, then the tests can be used to communicate with the timeserver in a variety of common ways, as well as diagnose problems with communicating over the LAN network or through a proxy server. See the Timeserver troubleshooter in Section 8.

### Testing New Timeserver connections

The server test utility lets you determine if a new timeserver is active and able to communicate using standard time protocols. A new site can undergo the full battery of tests to see that the address is valid and that the timeserver supports one of the ClockWatch supported time protocols.

### Test Settings

**Address:** Name of the timeserver. This is the name that will be used for testing.

**Protocol:** Time sync protocol used to communicate with this timeserver.

**Port:** Number of TCP or UDP port used to communicate with timeserver.

**Protocol:** Name of the test to run.

**Test:** Check to select the individual test.

**Resolve name:** Check that network name can be resolved to an IP address.

**Ping:** Common connection test to verify connection to a remote timeserver. The ping utility uses the ICMP echo request and echo reply packets to determine whether a particular IP system on a network is functional.

**NIST:** Time-sync protocol used to communicate with the National Institute of Standards & Technology.

**Daytime:** Common time-synchronization protocol.

**SNTP:** Simple Network Time Protocol supported on a number of timeservers throughout the world.

**Time-TCP:** Time protocol, TCP connection time.

**Time-UDP:** Time protocol, UDP connection type. Also called net date.

**NIST-80:** World Wide Web connection.

**T/U:** Whether the test uses a TCP or UDP type connection.

**Port:** Port number used to communicate with timeserver in test. Unless configuring behind a proxy server, accept the default.

**X:** Toggle all tests on or off.

**Test button:** Start to run the tests selected from top to bottom.

**Cancel button:** Cancel any remaining tests (will finish current test).

**Timeout Interval:** Interval, in seconds, to wait for the timeserver to respond for each test. If the timeserver does not respond within the interval then the test fails.

### Test Results

**Pass (Gd) Test Checkmark:** The timeserver has responded to the test with the appropriate response.

**Fail (Bd) Test Checkmark:** The timeserver has failed to respond to the test on the port specified, or the response was in an unexpected format.

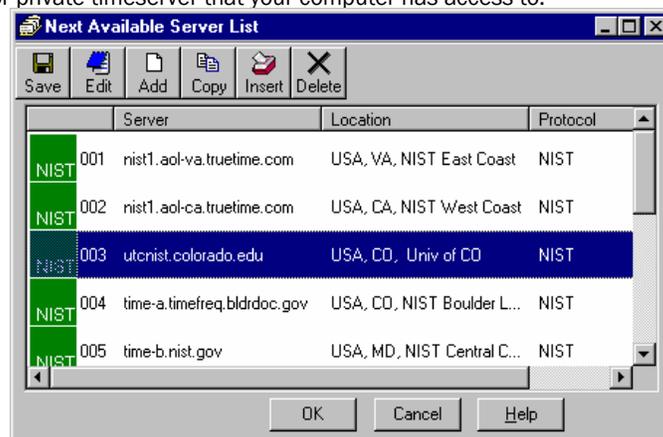
**Remarks/Data:** The string returned by the timeserver or the results of the test.

**Directory Button:** Open the timeserver directory list.

**Exit:** Exits the server test. If the current timeserver is in a protocol supported by ClockWatch; the utility will ask to save the timeserver settings in ClockWatch.

### Use Server List

The Use Server List button allows you to create an alternate list of timeservers to use when your primary timeserver is unavailable. This list provides backup capability whenever your primary timeserver is down. The list can contain any public or private timeserver that your computer has access to.



### How it works

The timeserver specified in **Options>Timeserver** is the primary timeserver. ClockWatch normally uses that timeserver to check the time. If for any reason the timeserver is unavailable and the **Use Server List** option is checked in the Timeserver option page, then ClockWatch will use a listed timeserver the next time it checks the time (starting from the top of the list). If that listed timeserver works, then ClockWatch will continue to use that timeserver during that session. Upon restarting ClockWatch, the original primary timeserver will be reset and the process repeated.

For adding and editing timeservers on the list see the **Timeserver Directory** screen, described earlier in this section.

**Tip:** Verify each timeserver before adding it to your backup server list.

### Protocol Frame

Specifies what kind of format the response from the timeserver will be in.

**NIST:** Specific format used by the National Institute of Standards and Technology. This string is always in standard UTC time. ClockWatch Client uses this format to communicate with ClockWatch Server.

**NIST-80:** based on NIST format, intended for use in secure environments when only Web communication is allowed. NIST-80 uses TCP port 80 instead of the port 13. This makes this protocol more suitable when used behind certain firewalls where communication is limited to web browsing.

**Daytime:** Protocol used by a wide variety of timeservers throughout the world. It is expected that the string returned be in the local time and in English.

**Difference in hours:** Specifies the difference in hours between the timeserver and your computer. ClockWatch will correct the time received from the timeserver this amount before comparing the computer's clock to standard time. This is the time in hours that the timeserver is ahead or behind your computer. For example, if in the same time zone, enter '0' for no difference; if the timeserver is an hour ahead, enter '1'; if an hour behind, enter '-1'. **Note:** The value in the Difference in Hours field is used in time comparisons any time the Daytime format is selected.

**SNTP:** Simple Network Time Protocol supported on a number of timeservers throughout the world.

**Time-TCP:** Time protocol, TCP connection time.

**Time-UDP:** Time protocol, UDP connection type. Also called net date.

**Tip:** If the format of a timeserver is unknown, try the more widely deployed SNTP format before trying the NIST, Time, or Daytime format.

### Proxy Server Frame

**Use proxy server:** When checked, communicates to a timeserver through the proxy server specified, expecting the formatted time string specified in reply. The proxy server serves as an intermediary, passing the request on to the timeserver and then relaying the response back to ClockWatch. For more information see Section 5.

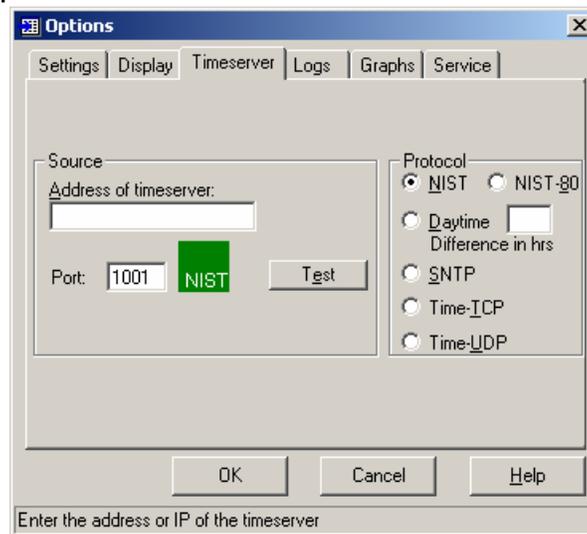
**Address of proxy server:** Enter the name or IP address of the local proxy server (i.e., *myfirewall* or *90.1.11.1*) that is set up to handle the time requests.

**Port:** Enter the TCP or UDP port number used to make the socket connection to the proxy server. In a straight pass-through mode ClockWatch uses TCP port 13 for NIST or Daytime, UDP port 123 for SNTP, and port 37 for the Time protocol. Specify the inbound port used on the proxy server for time requests. The network administrator must configure this port for time requests. This port will take the request from ClockWatch and relay it to the address and port mapped for time requests over the Internet.

**Note:** The protocol selected in ClockWatch must match the type of protocol used by the timeserver accessed through the proxy server.

### 3.3.2 ClockWatch Client Timeserver

The Client Timeserver tab allows you to set the address of your local timeserver.



*ClockWatch Client Timeserver option screen*

#### Source

Establish the time source by entering the IP address of the computer that has ClockWatch Server installed. The IP address of a Windows computer can be determined by choosing the “network connections” option from the control panel, double-click your LAN icon, then choose the “support” tab from the window that opens.

#### Protocol

See the Protocol frame information in section 3.3.1.

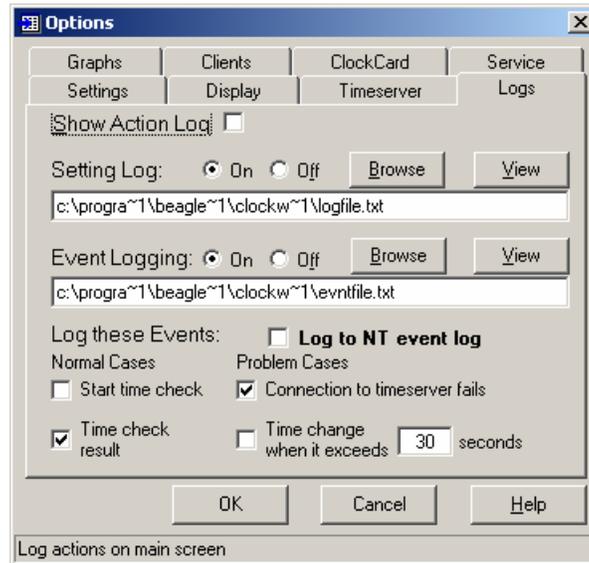
### 3.4 Logs

The log files show information about setting attempts made. You can choose to enable logging and specify the log file name and location.

The Clock Setting log provides a record of all the settings, made on the system. This can be useful in a variety of ways:

- To store previous setting attempts for use by the Previous Settings Graph.
- As a record of system performance.
- As a long term indicator of System Clock Drift over time.

- As a source of information on when Internet access is available.
- As an input to other programs such as a spreadsheet or database programs where further analysis would be done.



Once a log file is specified, ClockWatch will add data to the log file each time the program is activated and a setting is made. The log file will record every “0” setting where the clocks were in sync but will not record setting attempts when the connection failed. Old data from previous sessions will be preserved as the recent data is appended.

A log file must be specified for the Previous Settings Graph to show data.

### 3.4.1 Show Action Log

The Action Log is a summary view of all current time setting activity. Data is displayed in a list on the main screen and actions are added as they occur. Entries include the origination of the action and the result. Upon starting, the list shows the five most recent events (if available). After the program closes, the action detail can be found in the individual logs.

#### Columns:

**Date:** Identifying source icon and date and time in yy-mm-dd hh:nn:ss format.

**Source:** Internet time setting, ClockCard setting (Option), BIOS clock setting (Pro, Sentry, Server), GPS time setting (Star Sync), WWVB time setting (Radio Sync), client time requests (Client/Server) and clock locking activity are all included in the log.

*Note:* to show Client/Server activity the “Log as an event” option in the Client Options

section must be enabled.

**Status:** Result of the action.

**Time Difference** (seconds): If clock was changed shows the number of seconds time setting. For clock locking shows the attempted time change.

**Accuracy** (sec/day): For clock setting, shows the accuracy in terms of seconds/day.

**Tip:** You can resort by any column by clicking the column header.

### 3.4.2 Setting Log

**On/Off:** Turns logging on/off, which starts/stops writing to log file. Turning off logging does not remove any existing log file.

**Log File Name field:** Contains the full file name and path of the log file (i.e., c:\program piles\beagle software\clockwatch\logfile.txt). Select the default file name and location or choose your own. Use the Browse button to specify the location. This file must be specified for the Previous Settings Graph to show data.

**Browse button:** Presents the find file dialog to locate an existing file in the file system.

**View:** Opens up the log using Windows Notepad. *Note:* If there have been no setting attempts, there will be no file to view.

#### Interpreting the ClockWatch Setting Log

This section explains how to interpret the ClockWatch log. If logging is enabled in the **Options>Logs** tab, this log is updated each time a setting is made.

A sample of the log is shown below:

```

Synchronization Log          9/14/98 11:43:12 AM
Date      Time      Difference Accuracy  Status Server
-----
98-09-14 11:42:37    2           10.0      5     time-a.nist.gov
98-09-14 11:52:28    0            0.0      5     time-a.nist.gov
    
```

The first line is the title and includes the date and time the log was first used.

The second line contains the column header. These include:

**Date:** The date the setting was made.

**Time:** The local time the setting was made.

**Difference:** The difference (in seconds) in the local time from the adjusted timeserver time. May be a positive or negative number.

**Accuracy:** The rate of clock drift in time in terms of seconds per day.

**Status:** The results of the setting. See Status Result Codes, below.

**Server:** The name of the timeserver used to make the setting. Direct modem connections will show the phone number dialed.

### Setting Log Status Result Codes

The status result code, found in the Clock Setting log, shows the result of a time setting attempt.

<u>CodeResult</u>	<u>Description</u>
0 SETTING OK	Setting made.
1 DATE TIME ERROR	Date/time is invalid: date or time invalid.
2 TIME ZONE ERROR	Time zone is missing: Time Zone error.
3 DATE DIFFERENCE	dates don't match: date match error. ClockWatch will attempt to reset clocks that in two separate steps (date then time).
4 TIME DIFF TOO LARGE	time difference was too great, time difference exceeds maximum allowable to make a setting. ClockWatch will confirm before making setting.
5 TIME DIFF TOO SMALL	Time difference is too small; time difference was too small to make a setting. No need to set clock.
7 CANT CHANGE CLOCK	Lacks proper permission to change system clock. Try running as administrator.
9 TIME CONVERSION ERROR	Error occurred during time conversion. Verify that the timeserver format (NTP, Time, Daytime or NIST) is set correctly.
14 TIME CHANGE EXCEEDS AV	Time difference exceeded 3 sigma value, ClockWatch will confirm value before setting clock.
33 INCOMPATIBLE SERVER	Timeserver protocol setting was incompatible.
99 UNKNOWN_FORMAT	Unknown time server format
100 SERVER_ERROR	Timeserver not currently available: Internal timeserver error.
200 PARSE ERROR	Parsing return failed: format setting was wrong or time string was corrupt.

### 3.4.3 Event Logging

Event logging allows you to write selected action to a text file and/or the NT/2K/XP/2003/Vista event log. This log captures major time setting activities as well as warnings for when there may be a system or time setting problem. With the event log enabled, ClockWatch will include the events you specify as well as any operating errors.

**On/Off:** Turns all event logging on or off.

**Event File Name field:** Contains the full file name and path of the event file, (i.e., c:\program files\beagle software\clockwatch\

eventfile.txt). Select the default file name and location or choose your own. Use the Browse button to specify the location. This file must be specified for Event logging to work.

**Log to NT event log:** When checked, ClockWatch also writes events to the NT event log.

**Syslog (Client/ServerMP):** when checked, ClockWatch also writes events to a remote Syslog server. When option first checked, opens up Syslog Setup.

**Log these Events:** Specify the events you want included in the text or NT event log.

**Normal Cases:**

**Start time check:** logs the timeserver and when the time setting process is started

**Time check result:** logs the result of time setting activity

**Problem Cases:**

**Connection to timeserver fails:** logs when ClockWatch is unable to contact the timeserver (after all retries).

**Time change when it exceeds <interval> seconds:** You can specify for ClockWatch to log an event if the time change exceeds a threshold limit value. Insert the threshold time (in seconds) in the box. Whenever the difference between the system time and standard time exceeds this value an event entry will be made.

**Reading the Event Log**

**Text file:** Press the “View” button to view the current Event log text file. Events are listed chronologically.

**NT Event Log:** Open up the NT event reader and select ‘Application’. Entries will be listed under “ClockWatch” for the application and “CWSrvc” for events generated by ClockWatch Service.

**Interpreting the Event Lo**

A sample of the log is included below:

```

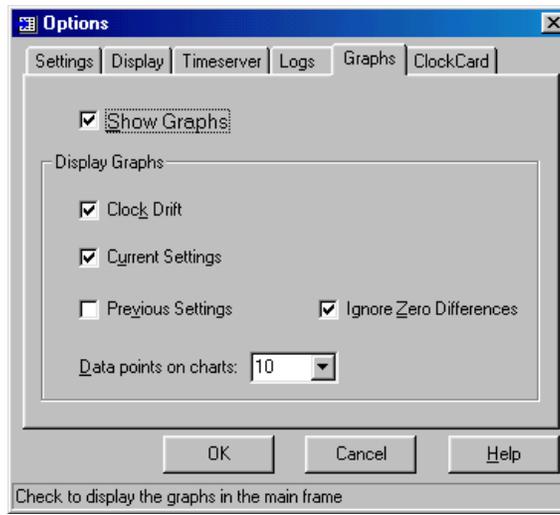
Event Log                               2/13/2001 10:23:49 AM
Date      Time      Type      Action
-----
01-02-13 10:23:49   Info      Start time setting with time-a.nist.gov
01-02-13 10:23:49   Info      Setting done - Time difference too small.
01-02-13 10:25:02   Info      Start time setting with time-a.nist.gov
01-02-13 10:25:02   Info      Setting done - Time difference too small.
01-03-15 16:12:00   Warning   Unable to check clock for the last 3 hours
01-03-15 16:13:59   Info      Start time setting with 192.168.2.239
01-03-16 11:28:42   Warning   Connection with time server failed.
01-03-15 16:25:18   Warning   Using next available server: time.nist.gov, with
protocol: NIST
Date                               The date the of event (yy-mm-dd).
Time                               The local time of the event (hh:mm:ss).
Type                               Severity of the event: Info, Warning or Error.
Action                             Event detail.

```

## 3.5 Graphs

The Graphs tab offers options for graph display and data charting of computer clock performance. ClockWatch has three graphs: Current Settings, Clock Drift, and Previous Settings.

Note: Data in graphs are hidden if display is turned off; no data are lost.



**Show Graphs:** Used to turn on or off all graphs. *Note:* Turning graphs off will also stop the Graphics Server from running. This server is used to display the graphs used by ClockWatch and other applications. It is stopped whenever all applications no longer have use for it.

**Clock Drift:** Used to turn Clock Drift graph on/off.

**Current Settings:** Used to turn Current Settings graph on/off.

**Previous Settings:** Used to turn Previous Settings graph on/off. This graph shows the settings made on previous ClockWatch sessions.

**Ignore Zero Differences:** If checked, displays only the settings when the internal clock was changed. If not selected, shows all settings, including those when the clock was not changed (zero difference), in the Previous Settings graph.

**Data points on chart:** Sets the number of readings from the current session that are displayed on the bottom axis of both charts. Use a small number if you want the most recent settings only. *Note:* Data points are shown for settings made since the application was started for the Clock Drift and Current Settings graph. The number of data points determines how many points to display in the Previous Settings graph.

## Interpreting the Graphs

**Current Settings Graph:** shows the time adjustment, in seconds, made between successive settings since starting the program. The vertical axis shows time difference, which is the amount of time the internal clock was off, in seconds, from standard time. The horizontal axis shows the readings for the time the settings were made.

**Clock Drift Graph:** shows the amount of drift between two successive settings where the internal system clock was changed. Drift is an indication of how accurate the system clock is over time. The vertical axis shows the clock drift (in seconds per day) which is calculated using successive settings where the internal clock was adjusted. Settings where there is no time change are ignored for the drift calculation. For these "0" settings the drift is shown as "0". The horizontal axis shows the time settings for the date or time of the actual setting.

**Previous Settings Graph:** Provides a quick way to view the local computer's clock accuracy over time. The chart shows the time adjustment, in seconds, made at each setting recorded in the log file. As with the Current Settings graph, the vertical axis shows the time difference, which is the amount of time, in seconds, the internal clock was off from standard time. The horizontal axis shows the time settings for the date or time of the actual setting.

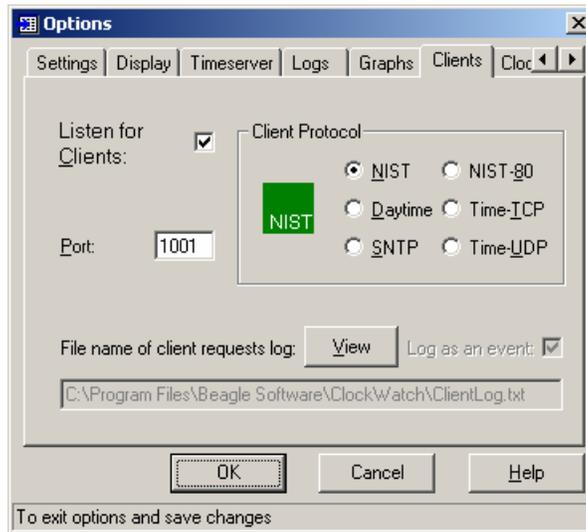
The Clock Drift and Previous Settings graphs rely on data from a log file, which ClockWatch establishes by default. The ignore zero settings option suppresses settings where the time was in sync and displays settings (in 3D) where a time change was made on the local computer. Data are displayed from the last setting made on the previous run of ClockWatch backward toward the first setting. Increasing the number of data points shows earlier data, if available.

### Notes on the Graphs

- The horizontal axis for charts shows the date and time the settings were attempted. Settings where the system clock was within 1 second of standard will show as setting with no time difference and no clock drift.
- The number of data points will show the most recent data only when the number of settings in the current session exceeds the number of data points.
- Graphs will display only if there is at least one new setting to display.
- When restarting the program, the first value on the chart will be the last setting where a time change was made.
- The previous settings graph shows data in 3D when the Ignore Zero option is used, in 2D when zero data is included.
- The vertical axis (y-axis) scales automatically depending on the maximum value to display.
- Clicking on a graph with the mouse will open the Graph Options tab. Upon redraw, the selected graph will then be in the leftmost position of the graph area of the main screen.

### 3.6 Clients (ClockWatch Server)

The **Clients** tab is shown only on ClockWatch Server. It is the main point of control for establishing communication with clients.



**Listen for Clients:** Check when you want ClockWatch Server to listen for clients. When enabled, ClockWatch listens for time requests on the port specified. When listening is enabled, ClockWatch server is available to respond to time requests from ClockWatch Clients. If client communication is expected then this check box should be checked. If there are no clients, leave this off (unchecked).

**Port Number:** ClockWatch Server listens for time requests from ClockWatch clients on this TCP or UDP port. Specify the port number used to communicate with ClockWatch Clients. The default value is 1001.

**Client Protocol:** Choose the protocol used to communicate with the time clients. This must be the same protocol and port used by the client in communicating with ClockWatch Server. Choose NIST, Daytime, SNTP, Time-TCP or Time UDP.

#### Client Logs

**There are two logs available to** report on client contacts with timeserver. These are the Client Detail Log and the Client Summary Log.

### Client Detail Log

The Client Detail Log shows the time requests from clients. When enabled the report will show every time a client asks the server for the time. the report shows the date for request (Y-M-D), the time of the request, the time zone used (UTC is GMT), the time on the client (if available), the difference in seconds between the client and the server, and the IP address of the client making the request.

```
Client Log 11/16/2006 2:24:20 PM
Date      Time      Lcl Client Time Difference Client
-----
06-11-16 20:24:20 UTC 20:24:25      5      192.168.0.101
06-11-16 20:51:13 UTC 20:51:16      3      192.168.0.102
06-11-16 21:01:24 UTC 21:01:27      0      192.168.0.102
06-11-16 21:11:24 UTC 21:11:29      0      192.168.0.101
```

### On/Off

Turn the Client Detail Log on or off.

### Log request as an event

When enabled, this option will log individual client requests in the event log showing the date, time and address of the requesting client. See more at Event Logging.

### File name of client detail log

*Contains the full file name and path of the client requests log file (i.e. C:\Program Files\Beagle Software\ClockWatch\ClientLog.txt). This log shows a list of all the clients requesting time from ClockWatch Server.*

### View

View the client detail log using Windows Notepad.

### Browse

Select a new filename or directory for the Client Detail Log

### Client Summary Log

Runs the Client Summary report and opens up the log using Windows Notepad. The summary report shows the total times each client has contacted the server and the time the last contact was made.

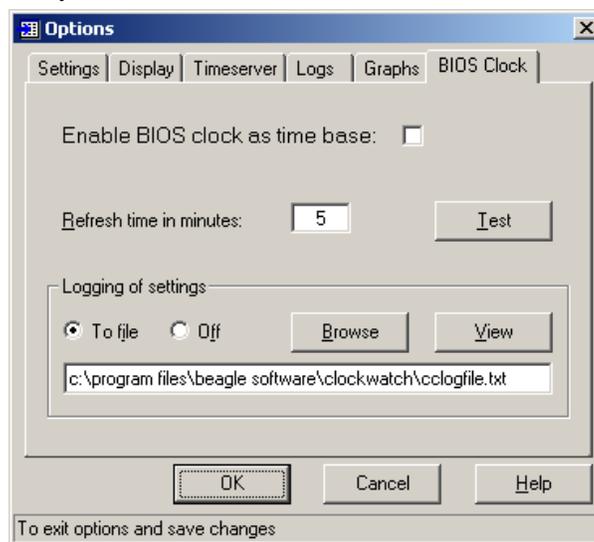
**Note:** To conserve resources the Client Summary Report is normally stored in memory, pressing the View button first writes the report out to the file.

### 3.7 BIOS (or ClockCard, if installed)

The BIOS Clock Options tab in ClockWatch allows the user to set how often the Computer's clock is updated from the BIOS clock. This option changes to ClockCard if Beagle Software's ClockCard is installed (see section 3.7.1).

The BIOS clock is the native PC clock located on the computer's motherboard that keeps time when the computer is off. Windows gets its time from the BIOS clock at boot time. While not a precise timekeeper, the clock on the motherboard is generally more stable than the operating system clock.

ClockWatch allows you synchronize the operating system clock with the BIOS clock. Computers experiencing significant daily time loss will find this an effective way to stabilize their clocks between external time settings.



#### Enable BIOS Clock as time base

When checked, ClockWatch will use the BIOS clock as a time source. This will cause ClockWatch to set the operating system time to the BIOS clock time at the specified interval. Note that, when enabled, ClockWatch will access the BIOS clock at the interval specified independent of the timeserver settings selected (Manual, Periodic, Auto, etc.)

#### Refresh time in minutes

Number of minutes between time settings.

**Test**

Opens a window to manually read BIOS clock time and set the operating system clock to that time.

**Logging of settings**

Logging allows you to create a permanent record of all time settings made through the BIOS clock.

**To file / Off options:** To turn on/off logging. When selected, the logging of time settings is to the named file. The log shows the results of each reading, regardless if the clock is changed or not. When logging is enabled, the status of each attempt is also shown in the timeserver log window (bottom of 3 windows) on the main ClockWatch screen.

**Browse :** To find an existing log file on your computer.

**View:** To view the time setting log file using Windows Notepad.

**Log File Name:** Enter the file name (with path) for the settings log. This is the text file where all re-settings of the operating system clock will be logged. Default value: C:\Program Files\Beagle Software\ClockWatch\CClogfile.txt

**Sample Log file**

Synchronization Log		9/6/2001 4:01:06 PM			
Date	Time	Difference	Accuracy	Status	Server
-----	-----	-----	-----	-----	-----
01-09-06	10:01:06	0	0.0	12	BIOS
01-09-06	10:29:03	0.42	0.0	5	BIOS
01-09-06	10:30:02	0.47	0.0	5	BIOS
01-09-06	10:31:03	0.65	0.0	0	BIOS

### 3.7.1 ClockCard

Beagle Software's ClockCard is an optional PC card (available in ISA or PCI format) with its own built-in-clock and battery. When installed in your PC, ClockCard replaces the real time clock (RTC) with its own. The ClockCard screen in ClockWatch allows the user to set how often the Operating System time clock is updated from the ClockCard RTC.

Updating the O/S clock from the ClockCard RTC is a good way to stabilize a system with erratic time keeping. It is useful to keep time between settings with external timeservers or where external timeservers are unavailable.

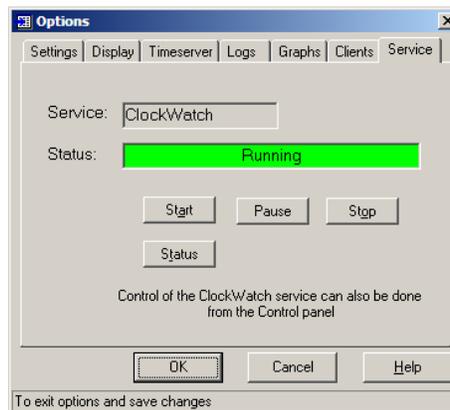
ClockCard functions independently of other ClockWatch time setting functions. When used alone, ClockCard can be the primary time source. When used in conjunction with external timeservers, it can serve as a secondary time source.

**Tip:** Settings from ClockCard update the operating system clock from the hardware (BIOS) clock. Settings made from external timeservers update both the O/S and hardware clocks.

The settings on this window are the same as described for BIOS Clock.

## 3.8 System

The System option shows status of the ClockWatch Service and allows you to stop and start the service. In Windows, a service is a separate process that runs independently of any application and that is normally active whenever the computer is running. When enabled, the ClockWatch Service runs when ever the computer is running. ClockWatch does all the clock synchronization activities without intervention, running from the parameters specified by the user using the normal ClockWatch application.



### Installing the ClockWatch Service

- Install and configure ClockWatch on the system. The service uses the ClockWatch parameters you specify in the regular ClockWatch interface—there is no direct user interface available to the service.
- Register the service module by choosing **re-register** under the **Service** options. This will register the service with the operating system.
- Start and run the service like any other service by using the Windows administrative interface.

**Note:** You can also view the status, start and stop the service from the Services applet in the Windows Control Panel. To start the ClockWatch service automatically every time Windows starts, set the service startup type to 'Automatic' in the properties for ClockWatch.

### Running the ClockWatch Service

To start the ClockWatch Service, choose **Options>Service** from the main screen. You can also start or stop the ClockWatch Service from the Control Panel Services applet. Either method lets you start, stop, pause or continue the execution of the service. The Control applet lets you specify if you want ClockWatch to be started at boot time, and if you want a simple user interface to be visible. The control buttons in the Services Applet include:

**Start:** Starts the ClockWatch service that is not currently running. The ClockWatch service accepts one optional startup parameter, *debug*, which gives a detailed trace of the ClockWatch service in the Debug.txt file in the ClockWatch application directory.

**Stop:** Stops a version of ClockWatch that is currently running.

**Pause and Continue:** suspends and resumes the clock synchronization activity of the ClockWatch service.

**Startup:** Specify the start-up characteristics of the ClockWatch service. You can specify if ClockWatch will startup automatically each time the system is rebooted and whether the ClockWatch service interface will be visible. Set to 'Automatic' if you want ClockWatch to start every time Windows starts.

**Note:** ClockWatch service must be run in the system context.

### Application Privilege Level (Windows XP/2003/Vista)

This option shows if you are running ClockWatch as an administrator or as a regular user. If the application is running with administrative privileges then the application has complete functionality. Regular users are often not able to set the clock directly. However then can indirectly set the time by sending the time setting request to the ClockWatch service, if it is running.

## 4.0 Modem Connection Settings

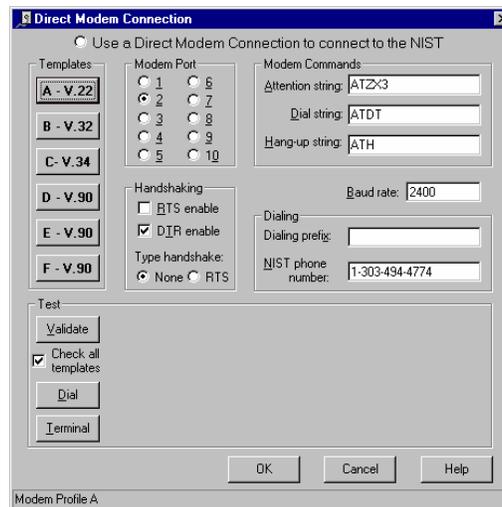
ClockWatch offers several connection options, as described in Section 3.1. This section offers more detail on establishing connections.

### Setting a Direct Modem Connection

ClockWatch can call the NIST directly. You can use the direct modem connection option for contacting the NIST with a phone call via a modem connected to a serial port on the computer. Instead of connecting to a timeserver over the Internet, the NIST is dialed directly with a modem, the time signal is synchronized, and the time reading is made. This option is available under the **Options>Timeserver** menu of the main screen and is not available in ClockWatch Client.

### Steps to use the direct modem connection

1. Have a modem (internal or external) connected to a serial port. The modem must be first installed under Windows.
2. From the main screen choose **Options>Timeserver**. Select the “direct modem connection” option and choose **Setup**.
3. Modify the phone number or dialing prefix if you can't dial long distance numbers directly (or you happen to be in the same area code as the NIST).
4. Test the connection by pressing the **Set Time** button on the main screen.
5. If the modem has a speaker, listen for the modem to go off hook, get a dial tone and dial the number. Then listen for the NIST modem to answer the call and establish a connection between the two modems.
6. If the call goes through but the exchange fails, check to see that both flow control and data compression are disabled in the modem. If these features are still active, then disable them permanently or disable them for each call to the NIST by modifying the modem attention string, documented in the “Modem Commands” section to follow.
7. If the log window shows “Modem/Port timed out,” then the first step of handshaking, the Attention step, failed and the modem did not respond with the **OK** required to continue. Some settings may need to be modified.



### Templates

The template buttons are a quick way to set the connection to the common types of modems in use. Pressing one of the template buttons changes the Attention string and handshaking settings on the form. The templates provide a quick way to configure the direct modem connection for a generic class of modem.

- A - V.22** for use with older 2400 baud or 4800 and 9600 baud modems.
- B - V.32** for 14.4k baud modems.
- C - V.34** for 33.6k baud modems. Sets the maximum link speed to 2400 baud.
- D - V.90** for 56k modems, simple attention string.
- E - V.90** for 56k baud modems. Turns off software flow control and MNP data compression.
- F - V.90** for 56k baud modems, forces the modem into V22bis compatible mode.

### Modem Port

Select the number of COM port (COM1-COM5) for the modem you are dialing out on. This is the number of the serial port where the internal or external modem is attached.

### Handshaking

Handshaking refers to the internal communications protocol implemented in the computer hardware by which data is transferred from the modem to the communications port.

**RTS Enable:** Determines whether to enable the Request To Send (RTS) line. Typically, the Request To Send signal that requests permission to transmit data is sent from the computer to the attached modem.

**DTR Enable:** Determines whether to enable the Data Terminal Ready (DTR) line during communications. Typically, the Data Terminal Ready signal is sent by a computer to its modem to indicate that the computer is ready to accept incoming transmission.

**Handshaking Type:** A handshaking protocol is used so data is not lost when data arrives at the communications port.

**None:** No handshaking.

**RTS:** RTS/CTS (Request To Send/Clear To Send) handshaking.

### Modem Commands

**Attention string:** Enter the modem command string for initializing the modem. This string is used to prepare the modem to call out and precedes the dialing of the phone number. The direct connection procedure in ClockWatch expects that the modem respond with OK after each modem command is issued. It is important that both flow control and data compression be disabled to allow the modem to read the string output by the timeserver. The extended Hayes command code to turn off flow control is commonly `&K0` and/or `\Q0` and to disable MNP data compression `%C0`, check your modem documentation for the actual codes.

A value for the field is optional. The default value for the attention string is `ATZX3`

**Dial string:** Enter the modem command string to dial out. The default value is `ATDT`. *Hint:* To use pulse dialing change the dial string to `ATDP`.

**Hang-up string:** Enter the modem command string to hang-up the modem after communication is finished. The default value is `ATH`

**Hint:** You can use a terminal program such as HyperTerminal (a standard Windows accessory) to verify the modem is installed properly and the commands sent to the modem are correct. Configure HyperTerminal to open the same COM port the modem is using (but not the modem itself) and type in the same command strings that are used to see if the modem responds.

### Baud Rate

Enter the baud rate as a number. The modems at the NIST handle normal modem speeds from 300 to 9600 baud.

## Dialing

**Dial Prefix:** Enter the dialing prefix (if any) required to dial out. This digit is dialed before the NIST phone number is dialed. If you include commas ',' in the string then the dialing will pause a period of time for each comma in the string. There is no default value.

**NIST Phone Number:** Enter the phone number of the NIST ACTS modem. The default value is the NIST in Boulder, Colorado, USA at 1-303-494-4774.

## Test

The test frame contains controls to test if the settings work with the modem. When running tests, the dialog between the program and the modem are shown in the test frame.

**Validate:** Runs a preliminary test of the settings by sending them to the modem and monitoring the reply. At the end of test, gives an indication if the modem has replied properly to the commands sent to it.

**Check all templates:** When checked, checks each of the standard setting templates when the **Validate** button is pressed. If a suitable template is found then the validation will stop with that template's settings.

**Dial:** Test the settings by running an actual direct dial time check sequence. Dials the NIST, syncs with the modem, and waits for a time string from the NIST in response. When successful, the actual time string returned from the NIST will be displayed.

**Terminal:** Opens the Modem Test Screen to test the settings.

## Modem Test Screen

The Modem Test is a simple terminal applet that opens the communications port allowing direct communication with the modem. This screen allows you to test the commands and handshaking used for direct modem connection. This screen will attempt to open a connection to the modem with the settings taken from the Direct Modem Connection options screen. Once opened, the user can send commands directly to the modem and wait for a response. This screen is available from 'Test' button in the Direct Modem Connection options screen.

### Steps to use the Modem Test

- From the main screen choose **Options>Timeserver**. Select **Direct Modem Connection** and click **Setup**. the settings in Direct Modem Connection form.
- Press the **Terminal** button on that form.
- The Modem Test Screen will open and the connection between

the modem and the communications port will be opened.

- Type a command in the Input box (i.e., **AT**).
- Press the **Send** button; the command will be sent to the modem.
- The response from the modem will be shown in the large box. Typically the modem will respond by echoing the command you sent, and an 'OK' acknowledging the command.
- If nothing is returned (no 'OK') then the connection settings are likely wrong.

**If there is no response from the modem:**

- The communications port (com port) number may be wrong in the Direct Modem connection form.
  - Verify the connection to the modem in the Modem>Diagnostics tab in the Windows Control Panel.
- A modem has not been installed or is not turned on.
- The handshaking settings are wrong in the Direct Modem Connection form; try turning toggling **RTS** and **DTR** enable on/off.

## 5.0 Using ClockWatch Behind Firewalls

Firewalls are common in networks to separate the LAN users from the World Wide Web. A firewall is a server or application that serves as an intermediary between the LAN users and the Internet. Applications needing access to the Internet must talk to the firewall for access to the outside.

ClockWatch normally uses the Internet to connect to the timeservers of the National Institute of Standards and Technology (NIST) or other timeservers. ClockWatch can be configured to work behind a firewall or proxy server.

There are several approaches that can be used to connect ClockWatch to the Internet through a firewall. In general, these approaches involve configuring the application to work with the server. In some cases, configuration of the server is also necessary.

**Note:** If it is impractical to reconfigure the firewall, then users can try the NIST-80 protocol that communicates over port 80, the same port used for Web communication. Beagle Software maintains a timeserver that communicates using the NIST-80 protocol (clockwatch-nist.com). It can be selected by choosing **Options>Timeserver**, then choosing the **Directory** button, then scroll down the list.

### **Steps to configure ClockWatch behind a firewall**

1. Check if reconfiguration is necessary behind the firewall by installing ClockWatch to see if it works.
2. If ClockWatch can't communicate directly over the Internet, find out the type of firewall is in use from the network administrator:
  - If the firewall is a proxy server, one option is to use port mapping.
  - If it is a SOCKS (Socket Secure) Server, then one option is to use SOCKScap application wrapping.

Both options are described below.

### **Port Mapping & TCP Bridging**

Port mapping and TCP bridging allows for an unused port on the proxy server to be configured to contact the timeserver on behalf of ClockWatch. ClockWatch sends the request to the proxy server using the specified port. When the proxy server receives a request on that port it "maps" or "bridges" the request to the address and port configured on the proxy server over the Internet. The response from the timeserver is then relayed back to ClockWatch.

Below is a brief discussion on how to set some of the key parameters for the port on the proxy server.

#### **To configure the proxy server:**

1. Define a new port to map on the proxy server.
2. Choose an unused port, for example, port 14.
3. Name it something like "ClockWatch Daytime Proxy".
4. Map the port to port 13 (the Daytime port).
5. Enter the domain name of an NIST server, for example, "time-nist.gov".

#### **On the ClockWatch options panel:**

- Set the local host to the IP or Name of the proxy server, i.e., *proxy.beaglesoft.com*.
- Set the local port to the port you selected above, i.e., 14.

#### **How It Works:**

1. ClockWatch is first started on the client and the "Set Time" button is pressed.
2. To connect to the NIST, ClockWatch sends the request to the local host on the local port, in this case the proxy server, *proxy.beaglesoft.com*, on port 14.

3. The proxy server translates the request to make a request to *time-a.nist.gov* on port 13.
4. The time string is passed back to ClockWatch running on the client.

## SocksCap Application Wrapping

Application wrapping is an application which 'wraps' itself around ClockWatch to intercept and handle communication requests.

- **SocksCap** is an application wrapper developed by NEC. It allows Windows users to enable their Winsock applications to traverse a SOCKS server.
- **Proxy Client** is an application wrapper developed by Microsoft. It allows Windows users to traverse a Microsoft Proxy server.

### How do Application Wrappers Work?

SocksCap is a Microsoft Windows DLL that extends the functionality of the Windows Socket (Winsock) stack, allowing it to work successfully in the SOCKS5 environment. SocksCap intercepts calls from Winsock applications to the Windows Socket (Winsock) stack and converts them to calls that support SOCKS protocols.

SocksCap resides between non-SOCKS converted Winsock applications and a non-converted SOCKS Winsock stack. It converts socket calls to communicate through a SOCKS v4 or SOCKS v5 server. You can configure SocksCap to connect directly (not through the SOCKS server) to some addresses and to use proxy connections (through the SOCKS server) to all others.

SocksCap does not require modifications to the Winsock applications or the Winsock stacks. On a SOCKS-enabled firewall SocksCap offers a client-only solution.

### Who Can Use Wrappers?

- Users behind corporate proxy firewalls that are SOCKS-capable.
- Users running SOCKS servers or SOCKS daemons that serve as firewalls.

However, due to the multitude of available Winsock stacks, SocksCap may not work in every situation.

## 6.0 ClockWatch in a Client/Server Environment

ClockWatch can be used in a client/server environment whereby **ClockWatch Server** is both servicing the time requests from workstations running **ClockWatch Client**, and keeping the server it is running on set to the correct time by connecting to timeservers over the public network.

### Client/Server Architecture

- Client-Server is a type of distributed application architecture that connects a computer workstation (client) to one host computer (server).
- A Server normally runs continuously, waiting for client queries.
- Clients may run ad hoc, requesting time synchronization services from the server at any time.

### Why Use Client/Server?

Simply put, Client/Server means that there is an intelligent workstation client accessing a central timeserver. The ClockWatch Server software handles the application processing on the server, while another edition of software, ClockWatch Client, handles the end-user interface processing on the client.

The ClockWatch workstation client's job is to accept input from the user, send requests to the ClockWatch host, format and display responses from the host. The ClockWatch host server's job is to keep the time accurate on the host and to process requests and send appropriate responses. All interaction with external timeservers is done by the host server. The communication link with the clients must be a network (e.g., Ethernet) connection.

The advantages of this approach are:

- Your ClockWatch workstation clients handle the task of interacting with the user, so the load on your ClockWatch host server is reduced.
- Since clients don't need to talk to timeservers on the Internet, Internet traffic is reduced and the integrity of corporate firewalls is maintained.
- Your ClockWatch workstation clients can be easily tailored for different options. For example, a traveling laptop can be set up differently from a permanent desktop computer.
- The application architecture is very scalable—one host server can handle 1 to 2000 different clients.

There are two timeserver options for implementing ClockWatch Client/Server:

1. You can use ClockWatch for both your host server and workstation clients. Your time synchronization processing is done on one computer, while your ClockWatch workstation clients are separate PCs running ClockWatch Client on Windows.
2. You can run your ClockWatch workstation clients and your regular Daytime host server.

**Connecting ClockWatch Server to ClockWatch Client**

1. Server is installed as an application or an NT service on the computer to serve as the enterprise-wide timeserver.
2. Server is listening on the LAN/WAN for client requests.
3. Server makes periodic calls to external timeserver to keep time accurate on the computer it is running on. To make the connection it uses the native Internet connection or dials the timeserver directly over the phone line.
4. Independently, a workstation running ClockWatch Client requests time from Server over the LAN or WAN using the sockets protocol.
5. Server responds to each client with correct time, logging client request.
6. Client adjusts time for time zone and sets internal clock to correct time.

**Connecting Beagle Software Clients Over a Network**

Using the Transmission Control Protocol/Internet Protocol (TCP/IP) network communications software you can connect your networked ClockWatch workstation clients to your host server in any way that allows a socket type connection between client and host.

**Configuring ClockWatch Server**

1. Install ClockWatch Server on the computer intended to access the external timeserver.
2. Set and test the time setting options to confirm that ClockWatch is communicating over Internet or modem to the external timeserver.
3. If installed on Windows NT/2K/XP/2003/Vista and your preference is to run ClockWatch as a service, do so now.
4. Set the server to listen for Clients by enabling choosing Options>Clients and selection "listen for clients".
5. The Server is now ready to listen for client requests while maintaining the correct time on the server.

Note: If the server is to reply to client requests, it must remain running.

**Configuring ClockWatch Client**

1. Install ClockWatch Client on the workstation networked to the time server.
2. In the Server options tab, set the address of the timeserver running ClockWatch Server.
3. Select the **NIST** time format to communicate with ClockWatch Server. If not using ClockWatch server then the timeserver must use the **Daytime** time string format.
4. Set and test the time setting options to confirm that the workstation is communicating over the network to the timeserver.
5. The Client is now ready to make ad hoc requests to the time server.

**Note:** Client can also be installed as an Service on the client workstation. See following section on running as an Service.

**Note:** The port used for Client Server communication is 1001. If this port is in use by another process it may not function correctly. Contact Beagle Software for more information about server port address options.

## 6.1 Email Notification Setup

ClockWatch can notify you via email when the computer's clock is overdue for a time check. Notification alerts you or an affiliate to a potential problem via email when the clock has not been checked for a period of time.

### Sender's Email

**Name / ID:** Enter the identification for the computer sending the message. This will appear in the "from" column of receiving email client (optional).

**Email Address:** Enter the email address of the sender.

### Mail Server

**SMTP Server:** Enter the name of the outgoing SMTP mail server you will be sending the email through.

**Proxy:** Check if using a email proxy server.

**Proxy Server:** Enter the name or IP address of the proxy server used to send outbound email.

### Recipient's Email

**Email Address:** Enter the email address of the intended recipient. Multiple recipients must be separated with a semicolon (;).

### Test

**Subject:** Enter a subject for the test message (optional).

**Test Message:** Text of the test message (optional).

**Test button:** Press the Test button to send the test message to the current options.

### Usage Notes:

Warning Notification must be enabled in ClockWatch for email notification function. Email notification is based on the warning settings in ClockWatch. The warning message from ClockWatch includes the computer's name and IP address, the time and date the warning was generated, and the amount of time elapsed since the last successful clock check. The SMTP server used must allow sending mail without logging in or first checking incoming mail. ClockWatch uses the default port (25) to send mail. Some virus programs inhibit the sending of multiple similarly titled email messages.

## 6.2 Syslog Setup (Client/ServerMP)

ClockWatch can send events to a remote syslog server. Syslog servers, common in UNIX and Linux networks, gather messages from a variety of sources such as routers, switches, and any other syslog enabled application or device. The syslog server filters, stores, displays and forwards messages gathered locally and from the network.

**Server tab** – specify the syslog server.

**Syslog Server:** Enter the name or IP address of the remote syslog server. Note that the server must have remote syslog messaging enabled and must be accessible over the TCP/IP connection.

**Test tab** - allows you to send a test message to syslog to confirm the settings and connection.

**Level:** Choose the urgency level you want the test message to be sent at..

**Test Message:** Text of the test message.

**Test button:** Press the Test button to send the test message to the current options.

**Usage Notes:**

Remote syslog logging must be enabled on the receiving computer. This allows the Syslog server to receive messages from the network using an Internet domain socket with the *syslogd* daemon in UNIX/Linux.

Syslog uses UDP port 514 for communication. This port must be open on both the sending and receiving computers.

ClockWatch sends messages at either the information, warning or error level priorities. Messages are sent to the NTP subsystem of Syslog.

Event logging must be enabled in ClockWatch to generate messages for remote Syslog logging. You can choose the type of events to log on the Logging and Clients tab in ClockWatch.

## 7.0 Technical Information

### 7.1 Configuring for Auto Startup

ClockWatch can be operated in an unattended mode from the System Tray. To enable auto startup, choose **Options>Display>Startup Automatically**. When this option is checked, ClockWatch automatically loads and operates in whichever mode it was last configured and then runs in the background. The ClockWatch Pro icon will be available in the System Tray after ClockWatch is loaded.

Once ClockWatch has been installed in the System Tray:

- Restore user screen by clicking the left mouse button on the ClockWatch icon.
- Set the clock by double clicking the right mouse button on the ClockWatch icon.
- The ClockWatch icon in the System Tray will show setting progress by changing the color of the outer ring:

**Usage Notes:**

- On Windows 95/98/Me machines ClockWatch Pro starts on system boot-up.
- On Windows NT/2K/XP machines ClockWatch Pro is started when the local user logs in to Windows.
- Windows NT/2K/XP users should consider using the ClockWatch Service, available as part of ClockWatch Server.

**Using Batch Mode**

ClockWatch can be operated in an unattended mode from the Windows or MS-DOS command line. This allows unattended or batch operation for:

- Execution from other programs.
- Starting from remote computers.
- Starting from scheduling programs such as Windows 98 Task Scheduler or Microsoft Plus+.
- Inclusion in batch files.

### Synchronizing Another Computer to a Computer Running ClockWatch

A remote computer can synchronize with the computer running ClockWatch using the Net Time command available in Windows. The syntax for this to be run from a remote computer not running ClockWatch is:

```
net time \\<clockwatch> /set /yes
```

Where :

- net time** is the network command
- \\<clockwatch>** is the name of the computer with the correct time. (i.e., \\SERVER\_MAIN)
- /set** synchronizes the clock on computer you are executing the command from, with the computer specified.
- /yes** runs the command without verification.

**Note:** ClockWatch Client working with ClockWatch Server offers more flexibility and control over time setting than using the **net time** command.

### Running ClockWatch Automatically Using the 'at' Command

ClockWatch Server and Client can be run as a service under Windows NT/2K/XP. Other editions of ClockWatch can run automatically in the background on a Windows NT/2K/XP network by using the **at** command.

The **at** service must first be started from the Net Start command or by using the service applet in the Control Panel. Syntax for the **at** command is:

```
at \\anyconnectedcomputer time /every day command
option
```

Where:

- at** is the command.
- Anyconnectedcomputer** is the computer where ClockWatch is installed.
- time** is the time to run the command.
- /every day** is an option to run the command every day at the time specified.
- command** is the name of the executable to run.
- option** is the command line argument for the executable.

For example:

```
at \\beaglent 01:30 /every:Th,S
c:\Program Files\Beagle Software\ClockWatch\ClockWatch.exe
once
```

Runs ClockWatch with the **once** option every Thursday and Saturday at 01:30 AM on the computer named *beaglent*.

## 7.2 Command Line Mode

ClockWatch can be started from the command line using the Windows **Run** command or from the MS-DOS prompt. When called from the command line, without argument, ClockWatch will start and wait for user input.

If you launch ClockWatch from the command line and want the program to run once and exit without user intervention, use the **once** command argument

Users of ClockWatch Server should use the following command:

```
<program_path> CWSrvc.exe once
```

Using the CWSrvc executable has the added advantage of using the specific ClockWatch settings instead of the system defaults.

## 7.3 System Demands of ClockWatch

The demands of ClockWatch, when used in most modes, are minimal. Testing has shown that most users experience approximately a 1% increase in system utilization when viewed by the NT System Monitor when in the sleep mode, with a less than 5% increase when actually making a setting.

Sequence of Events when making a setting

- ClockWatch requests a Windows socket (Winsock) type connection to the NIST timeserver.
- ClockWatch receives the time string from the NIST.
- ClockWatch converts and compares the NIST time to local time.
- A setting is made if there is a difference in times.

### **Internet Traffic**

Since the communication over the Internet is minimal, ClockWatch should not have any significant impact on Internet communications traffic since only one packet is received for each setting request.

### **System Resources**

ClockWatch spends most of its time in the sleep mode, waiting for a scheduled setting to occur or waiting for user input. ClockWatch uses one of the native operating system timers, which are finite in number.

## 7.4 ClockWatch Specifications

### System Requirements

- Windows 95/98/Me, NT 4 (SP3+), 2000, XP, 2003 or Vista.
- Correct time zone must be set in the Windows Time/Date control panel.
- Internet connection (Dial-up or direct connect)
  - A browser does not need to be active for ClockWatch to function.
- Valid Winsock installation.
  - This is included as part of the Internet networking installation.
  - ClockWatch may need to be configured to work behind a proxy server.
- Modem with direct dial out capability (for direct-modem connection option).

### Accuracy

- Sets clocks within +/-1.0 second of UTC (NIST,Time)
- Sets clocks within +/- 0.5 second of UTC (NTP or direct modem connection)

### Network Connection

Uses a WinSock connection for communication.

#### Connection:

**NIST, Daytime** connection is made to public timeservers over the Internet with TCP port address 13. This is commonly called the 'Daytime' port.

**NTP** Connection is made on UDP port 123.

**Time** Connection is made on TCP or UDP port 37.

The local TCP port used for the connection to a proxy server is user-selectable.

ClockWatch Server and ClockWatch Client normally use port 1001 to communicate (user-selectable).

### Modem Connection

Hayes-compatible dial-up modem with dial-out long distance capability required for direct-modem connection option.

## 8.0 Troubleshooting

Some more common trouble issues are discussed in this section. You may also refer to troubleshooting page on the Beagle Software Web site ([www.beaglesoft.com/clwatroubleshooter.htm](http://www.beaglesoft.com/clwatroubleshooter.htm)) for help.

### Troubleshooting Table of Contents

- 8.1 Installation Problems
- 8.2 Time Setting Problems
- 8.3 Client/Server Communication Problems
- 8.4 Problems with Graph or Log Options
- 8.5 Connection Problems
  - 8.5.1 Timeserver Connection Problems
  - 8.5.2 Internet Connection Problems
  - 8.5.3 Direct Modem Connection Problems
- 8.6 Testing a Timeserver Connection
- 8.7 Running the Trace Diagnostic Routine

## 8.1 Installation Problems

**The registration window appears at software startup and shows the message, "This software must be registered".**

- Be sure to type the keycode exactly as shown on your confirmation email and/or CD envelope. All letters are capitalized.
- Check that you have installed the ClockWatch Edition (i.e., Server, Client) that you purchased. The Software Registration window shows installed edition (just beneath "Beagle Software). If you have installed the wrong edition, simply reinstall ClockWatch (no need to uninstall the existing edition).
- Check that the software version (i.e., 2.4, 2.5) matches the version you purchased. If you have redownloaded the application from [www.beaglesoft.com](http://www.beaglesoft.com), the version may be more recent than your purchased software. Contact Beagle Software, [support@beaglesoft.com](mailto:support@beaglesoft.com) or 612-370-1091 for assistance.
- The Windows System Registry has been altered or corrupted: Re-enter the keycode to re-register the software.

**After installing ClockWatch you get a runtime error when starting ClockWatch such as:**

Run time error "372" - failed to load control CommonDialog from **COMDLG32.OCX** - your version of COMDLG32.OCX may be outdated.

Or...

Run-time error "372" Failed to load control "MS Comm" from **MSCOMM32.OCX**. Your version of MSCOMM32.OCX may be outdated. Make sure you are using the version of the control that was

provided with your application.

Or...

`OLEAUT32.dll` is out of date. A newer version is required for this program.

This indicates that the common control that ClockWatch uses was not installed during installation and needs to be updated. To update the file, follow these steps:

1. Identify and write down the name of the control by reading the error message. Controls have file names that end in "OCX" or "DLL".
2. Open a Windows Command window by clicking **Start**, select **Run**, type "command" (do not type the quotation marks) and press **OK**. This will open the Command window. You should see a **C:\WINDOWS>** prompt.
3. Type "cd C:\Windows\system" (do not type the quotation marks) and press <Enter.> This will change the prompt to **C:\WINDOWS\SYSTEM>** on Windows NT/2k/XP/2003/Vista systems type "cd C:\Windows\system32" (do not type quotation marks).
4. Rename the older version of the control identified in step 1 by typing "**ren control control.old**" for example "**ren comdlg32.ocx comdlg32.old**" (do not type quotation marks) and press <Enter.>. This will rename the file and return the prompt to **C:\WINDOWS\SYSTEM>**.
5. Close the command window by clicking the X button in the top right corner, or type "exit".
6. Reinstall ClockWatch over the existing installation, updating the control.

If you are still experiencing problems, please contact Beagle Software support ([support@beaglesoft.com](mailto:support@beaglesoft.com) or 612-370-1091) with the exact text of error message you are seeing.

## 8.2 Time Setting Problems

### **ClockWatch is not making a time setting**

- The system clock may be accurately synchronized to the Atomic Clock. Setting attempts made too quickly together do not show a discernable difference and no adjustment is needed. You will see a message: "Time difference too small. No setting made."
- Your computer may not have an active Internet connection. Verify that the computer has an active Internet connection. This is most easily done by opening a web browser, then hit the F5 key on your keyboard to reload the page. If the page does not reload, you do not have a connection.
- The time setting function is in the Manual mode and no settings have been made. Click the "Set Time" button to attempt a time sync. Results will be displayed in the main window.
- Be sure ClockWatch is running when you expect the setting to be

made. ClockWatch must be running in either the desktop, in the taskbar, the system tray or as a Service.

- The default timeserver selected may be busy. Select **Options>Timeserver**; select the Directory button, then select another timeserver. Some of the NIST servers get busy at times. If you are using clockwatch-nist.com on Port 80 and cannot make a connection, contact Beagle Software support for assistance.
- There may be too many requests made to the NIST over a short period of time. Change the NIST server used under the Options menu or wait 15 minutes before retrying.
- If you are running in Automatic mode, the clock setting option is based on the level of accuracy you are trying to maintain and the specific accuracy of the computer you are running. To establish a baseline, run ClockWatch in the periodic mode with settings every 4 hours for several days to check the accuracy of your system.
- Your computer has an Internet connection, but there is no connection to the selected timeserver. Verify the connection to the timeserver by using Telnet. Information on how to do this is in ClockWatch's help file, as well as Section 9.6 of this guide. Search the index for "Telnet". Look for errors in the NIST log window that indicate a setting can't be made due to the NIST server being down or other causes. You may be able to resolve the problem by choosing another timeserver.

#### **ClockWatch makes the wrong time setting**

- ClockWatch uses the Windows internal time zone setting to determine if daylight savings time is both used and is currently in effect. Check the time zone setting under the Date/Time icon in the Windows Control panel to verify that the setting is set to your local time zone. This applies for timeservers utilizing NIST, NTP or TIME protocol.
- If a Daytime type timeserver is used, then check that the **hours difference** field is set correctly.

#### **There is no time difference shown after a setting**

- The difference in time with the measurements have been too small (1 second or less) to make a clock setting.

#### **ClockWatch Is Installed behind a firewall**

- ClockWatch needs to be properly configured to work behind a proxy server. As a test, check to see if your Web browser is configured to work with a proxy server. If so, see the section in the ClockWatch User Guide, or visit <http://www.beaglesoft.com/clwafirewalls.htm> about configuring ClockWatch to work behind firewalls.

## 8.3 Client/Server Communication Problems

### **'Address In Use' or 'Can't Reset Server' Error Messages**

- This is usually due to the TCP port that the Client Server communication normally uses being used by another application. ClockWatch uses port 1001 for Client Server communication. If another application is using this port, then ClockWatch is unable open it and complains. The address can be changed on both the Client and the Server—please contact Beagle Software support for instructions.

### **Clients get "Exceeds license" message**

- ClockWatch Server must be licensed for each ClockWatch Client in use. Contact Beagle Software to purchase additional licenses or to obtain an evaluation license for multiple clients.

### **Clients Fail to Contact Server**

- Check the address specified on the timeserver tab of the Client (run **ipconfig** from the DOS command line on the Server to determine the Server's IP address). Check that the port and the protocol are the same on both the Server and Client.
- Check the communication (**ping** from the Client to the Server using the address).
- Check that the port is available for use (run **netstat -a** from the DOS command line on both client and server for a listing of TCP and UDP ports currently in use).

### **Non ClockWatch Clients fail to connect to ClockWatch Server**

- Check the license of the Server.
- Check that the port and protocol are the same on both the client and server. Note that ClockWatch uses the nonstandard TCP port number **1001** as a default port to communicate with its clients. You normally change the port number in the "Timeserver" option tab on the ClockWatch Client and the "Clients" option tab on ClockWatch Server.

### **Clients fail to Connect when I press the "Set Time" button**

- The socket connection used to communicate with the Server and a specific client remains open for approximately 2 minutes after the client makes a time request. This is a Windows operational setting and individual clients must wait at least 2 minutes between successive time setting requests.

## 8.4 Problems with Graph or Log Options

### Graphs don't show anything

- No clock settings were needed: difference and accuracy are both "0".
- No reading has been made since startup.
- The log file has not been specified or is turned off (Previous Settings Graph only).

### Clock drift numbers vary widely

- There is a process or hardware that is causing the clock to lose or gain (generally lose) time at a faster rate than at other times.
- The system is very busy and the clock is losing time at a faster rate than normal.

## 8.5 Connection Problems

**Options>Timeserver** will allow you to customize the type of connection the computer will make to the timeserver, as well as specify the timeserver used. Some connection problems may be resolved by customizing the settings on this option.

### 8.5.1 Timeserver Connection Problems

The timeserver list contains a list of timeservers to be used by ClockWatch. While they have all been verified, not all timeservers are available to all users at all times.

#### A timeserver or no timeservers reply

- Use the timeserver test (see Section 9.6) to determine if communication is available over the Internet at all. If you find only certain protocols reply (such as ping) then you may be behind a firewall that prevents communication of the ports that timeservers commonly use. See section on using ClockWatch behind Firewalls.

#### The timeserver I want to use isn't on the list

- You can add a new timeserver using the "Add" button at the top of the timeserver list.

### 8.5.2 Internet Connection Problems

#### ClockWatch doesn't dial my ISP

- Choose the **Setup** option next to the "Internet Dial-up" button. In the window that opens, verify that the Windows Dial-up Networking account is currently active and works when you select it from Windows.

#### **ClockWatch dials my ISP but doesn't connect to a timeserver**

- It's possible that, even though you are connected to your ISP, you're either not logged into your account or Internet access is unavailable. Establish the connection manually from Windows, verify that connection to the Internet is active, and then press the "Set Time" button from the ClockWatch main screen.

### **8.5.3 Direct Modem Connection Problems**

The direct-modem connection requires that the communication between the communications port and the modem work smoothly. Given the wide variety of modems and computers installed, getting the settings correct may at times require some extra attention. This section includes points to look at if the Direct Modem connection fails to dial and synchronize with the NIST timeserver.

#### **Modem Falls to Dial**

- The phone line is not configured for outbound dialing. Check to see that:
- No prefix or account code is required to dial an outside line.
- The phone line or extension in use is restricted from dialing a long distance number. **Tip:** Test the line by taking the phone line from the modem, plug it into a regular telephone and dial the NIST at 1-303-494-4774. The NIST modem should answer the call.
- Turn handshaking on or off on the Direct Modem Connection screen. Some modems require that handshaking be set to allow the modem to dial. Settings can be tested by using the Modem Test Screen. Try turning the **RTS** and **DTR** enable on or off, adjust both the **Type Handshake** to **None** or **RTS**.
- Try a different Attention string. If the Attention string is invalid for the modem in use, then the modem will not be able to continue. Try the different Attention strings available in the Templates on the Direct Modem Connection form.

#### **Modem Dials NIST but Doesn't Synchronize**

- Try turning **RTS** handshaking off (if it is on). The modem might be waiting for a change in state from the communication port that never comes.
- Try turning off Flow Control and/or MNP data compression in the modem. An Attention string of **AT&K0%CO** will often do both on many modems. Try the different Attention strings available in the Templates on the Direct Modem Connection form.
- Force the modem to transmit with a maximum link speed of 2400 baud. Some modems accept a command that limits the maximum

speed the modem will converse in (V.34 modems sometimes use **AT&N3**). Some V.90 modems allow you to force the modem into the Bell V.22, 2400 baud mode (try **AT+MS=V22B,0,2400**).

#### **Modem 'Hangs' after Call**

- If the call is successful but the modem is 'stuck' after calling the NIST, try turning off **DTR**. Sometimes DTR will cause the modem to hang-up prematurely not allowing the port to reset.

#### **Test>Terminal results in "Unable to open port" message**

- The com port selected is not the one used by the modem. To find the com port used by modems installed on your computer, open the Modem applet in the Windows Control Panel. Press the "Diagnostics" tab to see a listing of the com port/modem assignments.

#### **Modem Won't Reply to String**

- Try changing the string you are sending or modify the handshaking used with the modem.

## **8.6 Testing a Timeserver Connection**

### **Testing a Timeserver Connection**

You can verify a specific computer's connection to a timeserver over the Internet using Telnet. Telnet, included as a utility with Windows, allows a user to specify both the address and port to test an Internet connection.

#### **To test a connection:**

1. Open an MS-DOS Window.
2. Type both the address followed by the port to connect to. Most timeservers use port 13 (the daytime port) for time queries.
3. The result of the time string should be visible in the telnet window. Check the format of the string with the supported Daytime time format to verify the type of timeserver.
4. Telnet will report the connection to the host is lost even though the time string has arrived. This is normal.
5. If the server does not respond, it is possible that either:
  - The timeserver is not currently in operation. Try another address.
  - The server does not accept time requests from unregistered IP addresses. Some servers require that you register your IP address before servicing your time request.
  - The server does not use port 13.

- You are sitting behind a proxy server that restricts communication over the Internet. You must talk to the proxy server, which can then relay the request to the timeserver. See section 5.0.
- Your connection to the Internet is not working.

#### **A typical Telnet session:**

Command Prompt:

```
C:\WINDOWS>telnet time-a.nist.gov 13
```

Telnet responds:

```
49010 93-01-23 22:01:22 00 0 0 50.0 UTC(NIST) *
```

(Telnet will then report connection to host is lost)

#### **Interpreting Timeserver Test**

To interpret the meaning of failing individual tests, check the failed test below:

##### **Resolve name**

- Unable to resolve name into IP address. Check spelling of address.
- Check if Internet connection is active. Name lookup is active by checking a known public site (i.e., www.yahoo.com).
- Domain name server is down or otherwise unavailable.

**Note:** Generally if you cannot resolve the address, all the subsequent tests will fail.

##### **Ping**

- Timeserver does not echo back a ping. Many timeservers do not support ping. Verify by pinging a known public site (i.e., www.yahoo.com).

##### **NIST or Daytime**

- Timeserver does not reply to the test utility with the protocol and port specified—Timeserver down or not available. Try another NIST timeserver (i.e., time-a.nist.gov).
- Timeserver does not support connection with the NIST or Daytime protocol. Test with other protocols.
- A proxy server is blocking communication over port 13. Try another NIST timeserver (i.e., time-a.nist.gov).

##### **SNTP**

- Timeserver does not reply to the test utility with the SNTP protocol and port specified. Timeserver down or not available. Try another SNTP timeserver

- Timeserver does not support connection with the SNTP protocol. Test with other protocols.
- A proxy server is blocking communication over port 123. Try a timeserver that uses a different protocol.

#### Time-TCP or Time-UDP

- Timeserver does not reply to the test utility with the Time protocol and port specified.
- Timeserver down or not available. Try another Time timeserver
- Timeserver does not support connection with the time protocol. Test with other protocols.
- A proxy server is blocking communication over port 37. Try a timeserver that uses a different protocol.

## 8.7 Running the Trace Diagnostic Routine

ClockWatch includes a detailed trace mode that gives detailed information about connection and communication information useful in debugging communication problems. You can run ClockWatch in the trace mode which provides a detailed log to pinpoint problems by simply adding the **debug** option to the command line when starting ClockWatch.

The following steps will run ClockWatch in the trace mode and allow you to view the trace log file, DebugFile.txt.

1. Run ClockWatch in diagnostic mode by running ClockWatch with the **debug** option. Usually: "C:\Program Files\Beagle Software\ClockWatch\ClockWatch.exe" debug
2. Run the problem till the connection fails or problem occurs. Exit ClockWatch.
3. View the diagnostic trace, DebugFile.txt, usually in the main ClockWatch directory: C:\Program Files\Beagle Software\ClockWatch\DebugFile.txt
4. Check for "ERRORS" or connection problems in the trace. You can email the DebugFile.txt file to [support@beaglesoft.com](mailto:support@beaglesoft.com) for assistance. Please include some background information on the situation.

## 9.0 Obtaining Technical Support

**Web site:** [www.beaglesoft.com](http://www.beaglesoft.com)

Consult our web site for the latest updates, technical information and documentation.

**E-mail:** [support@beaglesoft.com](mailto:support@beaglesoft.com)

Please be as specific as possible including the program version and the steps to recreate the problem, if possible.

**Phone:** +1 612-370-1091

**Fax:** +1 612-605-7138

### **Refund Policy**

In order to receive a refund on a product for the purchase price, the product must not have been damaged by the customer or by the courier chosen by the customer to return the goods. The product must be returned in complete condition, meaning that all cables, manuals, software, etc., are included. The product must be in as-new or re-saleable condition to qualify for refund. Refunds are not issued for shipping charges.

### **Restocking Charges**

Product items returned within 30 days qualify for a full purchase price refund, assuming all qualifications listed above in Refund Policy are met. Items returned after 30 days and before 60 days of purchase will be subject to a minimum 20% restocking charge. Additional charges may apply for damaged or missing parts. Products returned after 60 from the date of purchase, or products that are not returned in as-new or re-saleable condition, do not qualify for refund or credit and will be returned to the customer.

### **Registered Version**

One registered copy of ClockWatch can be installed on a single workstation and used by one or more people.

### **Limited Warranty**

Beagle Software warrants that this product will perform in accordance with the included documentation for a period of 180 days from the date of receipt and that Beagle Software will, at its own discretion, make commercially reasonable efforts to solve any problem issues. This Limited Warranty is void if failure of the software product has resulted from accident, abuse or misapplication.

### **Governing Law**

This agreement shall be governed by the laws of the State of Minnesota, USA.

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Please refer to the online help for the complete Software License Agreement.

## **10.0 Beagle Software Information**

Beagle Software, founded in May 1997, supplies innovative and useful Internet enabled Windows programs that bring the power of the Internet to the desktop of the user.

Beagle Software is located in Minneapolis, Minnesota, just slightly West of the Mississippi River.

### **Ordering Information**

**Web:** <http://www.beaglesoft.com/OrderForm.htm>

**Email:** [sales@beaglesoft.com](mailto:sales@beaglesoft.com)

**Mail:** Beagle Software  
126 N 3rd St, Ste 407  
Minneapolis, MN 55401 USA

**Fax:** +1 612-605-7138

**Phone:** +1 612 370-1091, 1-877-845-2549

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[www.beaglesoft.com](http://www.beaglesoft.com)

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