



Contents

Introduction	5
Conventions used in this manual:	5
Getting Started	6
Setting System Time Zone	6
Understanding Time and Time Zones	6
What is Time	6
Time in History	6
UTC	7
Configuring your Local Clock	7
.....	7
The Main Window	8
The Main Toolbar	8
Configuring clocks	9
Time Zone Manager	10
Modifying Existing Clocks	10
The Clock's Location	11
Clock Format	11
Clock Attributes	12
Adding New Clocks	12
Deleting Clocks	12
Moving Clocks	12
Managing Locations	13
Updating your Location List:	13
Merging or Replacing Location Data	13
Adding New Locations	13
Updating Existing Locations	14
Setting Lat/Long Using the Map	14

Setting the UTC Offset using the Map	14
Deleting Locations	15
Searching	15
Multiple results	15
Menu and Shortcuts	16
Daylight Saving Time Manager	17
The Structure of DST Rules	17
Configuring WorldTime DST rules	18
Rule Details	18
Adding New Rules	18
Editing Existing Rules	18
Configuring System Time Zones	19
WARNING	19
System Time Zone Details	20
Copying Rules	20
Copying from WorldTime into the Windows System	20
Copying from the Windows System into WorldTime	20
Astronomical Data	21
The Map	22
Options	23
View Options	23
Measurement Options	23
Layers	23
Preferences	24
General Preferences	24
Chimes	24
Selecting the Chime Clock	24
Restricting Chime Times	24
Chime Types:	25
About Ship's Bells	25
Application Options	26
Clock Objects	27
Clock Borders	27
Analog Clock Size	27
Clock Formats	27
Display Clocks Preferences	28
The Titlebar Clock	28
Display Clock Formats	28

Sound Preferences	29
Chimes	29
Alarm Sounds	30
Synchronization Sounds	30
Synchronization Preferences	31
NTP: Network Time Protocol	31
NTP Preferences	32
AutoSync Settings	32
Network Preferences	33
Connection Type:	33
Dial-up Preferences	33
Proxy Server Settings	34
Advanced Preferences	35
Alarms	36
The Alarm Manager Window	36
Creating New Alarms	36
Editing Alarms	36
Deleting Alarms	36
The Add/Edit Alarm Window	37
Alarm Types	37
Alarm Details	38
Alarm Payload	38
Calendar	39
TRAqDATE	40
Creating Events	40
Displaying Details	40
Notes:	40
Time Calculator	41
When Where	41
Difference	41
What Zone	42
DateTime when	42
System Time Information	43
The Stopwatch	44
Stopwatch Operation:	44
Countdown Timer Operation	44

NTP Server	45
Protocols:	45
Command Line Options	45
GUI Options	45
How Do I ... ?	46
Synchronize my clock	46
Appendix A	47
Standard Time Formats	47
Examples:	47
Standard Date Formats	48
Examples	48
Appendix B	49
wtZones.wtd	49
wtDST.wtd (DST rule format)	49
wtClocks.wtd	50
Font Encoding Format	50
wtServers.wtd	51
wtAlarms.wtd	51
wtSyncLog.wtd	51
Custom Map Layer Data	52
File Formats	52
Troubleshooting	53
Network Connections	53
The Dial-Now button seems to have no effect	53
Chimes	53
The chimes sound the incorrect number of times	53
Synchronization	53
WorldTime's sync feature seems to be "out" by 1 or 2 seconds	53
All Synchronization Attempts Fail	54
Synchronization Sets the Clock Grossly Incorrect.	54
FAQ	55
Why is WorldTime free?	55
Why are some "major" locations not in the list?	55
What programming language is used to create WorldTime	55

Introduction

The main window of WorldTime is a world clock capable of displaying an unlimited number of user configurable clocks, each with it's own time zone, daylight savings time rule, description, city, region, country, location code, and display format - all updated in real time (well almost ~ 1/ second) Choose from a list of numerous locations that can be updated from the web or add your own.

This module is small and was designed to stay on your desktop and display the current date, day of week and time from any defined zone in its title bar or the title bar or any other window. You can even choose to have WorldTime stay on top and/or always start minimized.

Conventions used in this manual:

The following conventions have been used in this guide in an attempt to maintain consistency and clarity.

Italic Text Used for screen names or field labels

Bold Avant-garde Used to indicate exact values as they would appear as data.

Getting Started

Setting System Time Zone

WorldTime requires that the local time and time zone be set using the Date/Time control panel applet before other locations in the world can be tracked (a message indicating this is displayed the first time WorldTime is started) There is a short-cut to this control panel applet in that welcome message. You can also access the control panel applet at any time from the WorldTime context menu (right click) under *Tools*.

Set your local time, date, and (most important) time zone and click OK. WorldTime will now be able to correctly compute the time anywhere in the world.

Understanding Time and Time Zones

Although this guide deals mainly with the operation of the WorldTime application, it is probably appropriate to include some background information about time and its uses world wide.

What is Time

One second is currently correctly defined as "the duration of 9,192,631,770 periods of the radiation corresponding to the transition between two hyper-fine levels of the ground state of the caesium-133 atom."

Time in History

Originally based on the Earth's rotation this has been found to be irregular and has in more recent times been replaced by atomic time.

The overhead sun at noon can arrive 16 minutes 18 seconds early or up to 14 minutes 28 seconds late. In fact only 4 days per year have 24 hours in them. These days occur on, or about 25 December, 15 April, 14 June and 31 August. The rest are longer or shorter as measured from the overhead midday sun. A more precise measure of time was required. So there have been many definitions of the second throughout time:

1884 - International Meridian Conference (Washington DC): based on a mean solar day at Greenwich, England.

1956 - Ephemeris Time: Based on lunar observations

1958 - Atomic Time: Based on clock data from numerous countries

1967 - Atomic Time: based on radiation patterns of the caesium element.

1972 - Co-ordinated Universal Time (UTC) introduced.

1984 - Dynamical time - based on motion of celestial bodies

1986 - UTC replaced GMT.

Despite time being measured highly accurately by atomic means the earth time stills rules. Should earth time and atomic time get out of step scientists adjust time by subtracting or adding "leap seconds" on the last day of June or December

UTC

In 1970 the Coordinated Universal Time system was devised by an international advisory group of technical experts within the International Telecommunication Union (ITU). The ITU felt it was best to designate a single abbreviation for use in all languages in order to minimize confusion. Since unanimous agreement could not be achieved on using either the English word order, CUT, or the French word order, TUC, the acronym UTC was chosen as a compromise.

Greenwich Mean Time (GMT) is a 24 hour astronomical time system based on the local time at Greenwich, England. GMT can be considered equivalent to Coordinated Universal Time (UTC) when fractions of a second are not important. However, by international agreement, the term UTC is recommended for all general timekeeping applications, and use of the term GMT is discouraged.

Configuring your Local Clock

Although it is not required, most users will want to display their local time amongst other locations in the main WorldTime window.

When first installed WorldTime will automatically create a clock titled **Your Local Time**. The easiest way to display your local time is to edit this clock. If this clock no longer exists you can create a new clock first by clicking the **New Clock** button or by selecting **Clocks | Add New Clock** from the context menu (right click menu)

- 1) Click on the **Your Local Time** clock's or the new clock's title to open the *Time Zone Manager* window.
- 2) Select your location from the list or enter it's details, note: the Latitude and Longitude are required for WorldTime to display astronomical data and display a location on the map.
- 3) Modify the location's name to the desired value.

In the *Clock Manager* section of the window

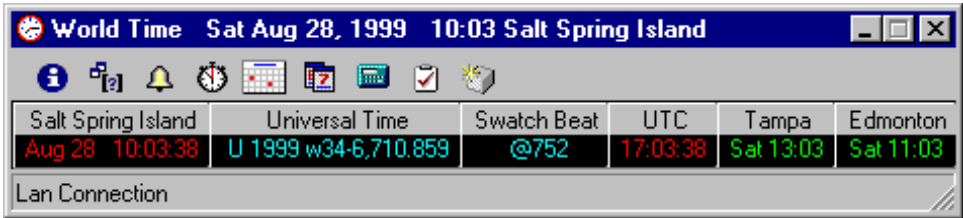
- 4) Modify the *Time Format* or *Date Format* if necessary (this will be expanded upon later)
- 5) Ensure that the *Clock Type* is set to **Local** you may receive a warning message if more than one clock has been set as a **Local** type clock. If you see such a message choose to make the new clock the **Local** clock and allow WorldTime to convert any others to **Location** type clocks.
- 5) You may also wish to have this clock displayed when the mouse is over the WorldTime icon that resides in the system tray (notification area) if so, check the *Use For Title & Tray pop-up* check-box.
- 6) When finished click the *Set Clock* button.

The Main Window

When first installed WorldTime will display its main window with several example clocks, a toolbar, status line, and title. You may customize the look of this window as desired.

The Main Toolbar

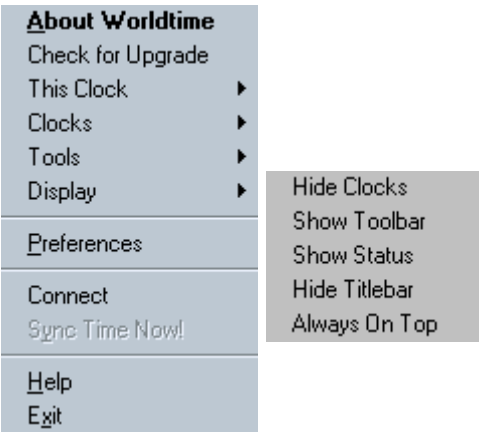
The WorldTime main window's toolbar consists of icons for all the primary WorldTime tools.



From left to right these are:

- | | |
|-------------------------|--|
| About | Opens the WorldTime about box |
| Preferences | Opens the Preferences screen |
| Alarms | Opens the Alarm Manager |
| Timer | Starts a new Timer (Stopwatch) |
| TraQdate | Opens the TraQdate module |
| Calendar | Opens the pop-up calendar |
| Time Calculator | Opens the Time calculator |
| System Time Information | Displays system information pertaining to current time settings. |

The rightmost icon allows a new clock to be created. The toolbar, titlebar, and status line can all be hidden (if desired) using the menu accessible either from the WorldTime system tray icon or by right clicking anywhere within the main window.



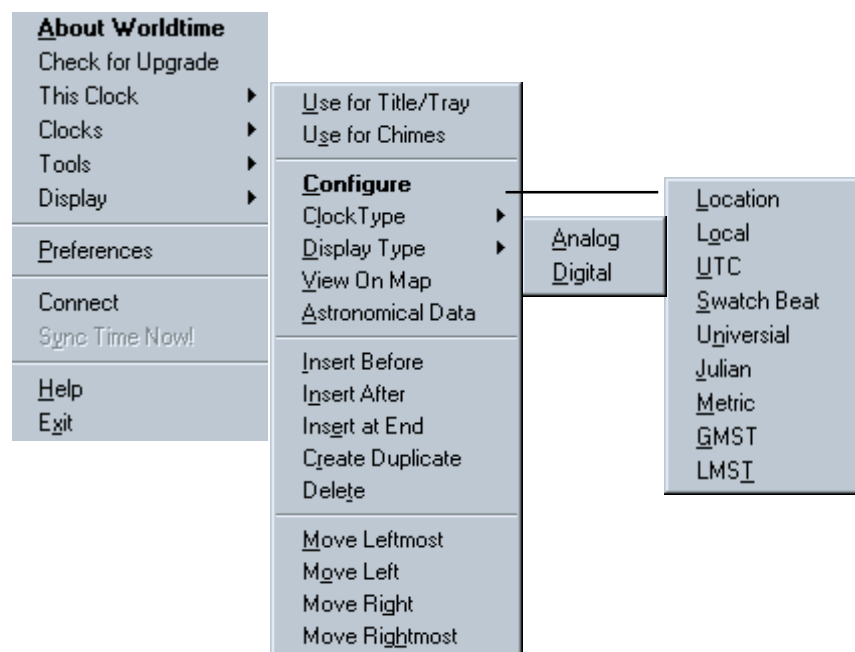
The main window with status line and toolbar hidden is shown below. Note: the window can not be moved while the titlebar is hidden.



Configuring clocks

The majority of WorldTime's features centre on the clock objects displayed in the main window. Each clock can be configured to display the time in any number of formats from virtually any location. The location and settings for each clock are configured using the **Time Zone Manager** (see the next chapter)

Some clock options, like the **Display Type** and **Clock Type** can also be controlled directly from the main context menu by right clicking on a clock.



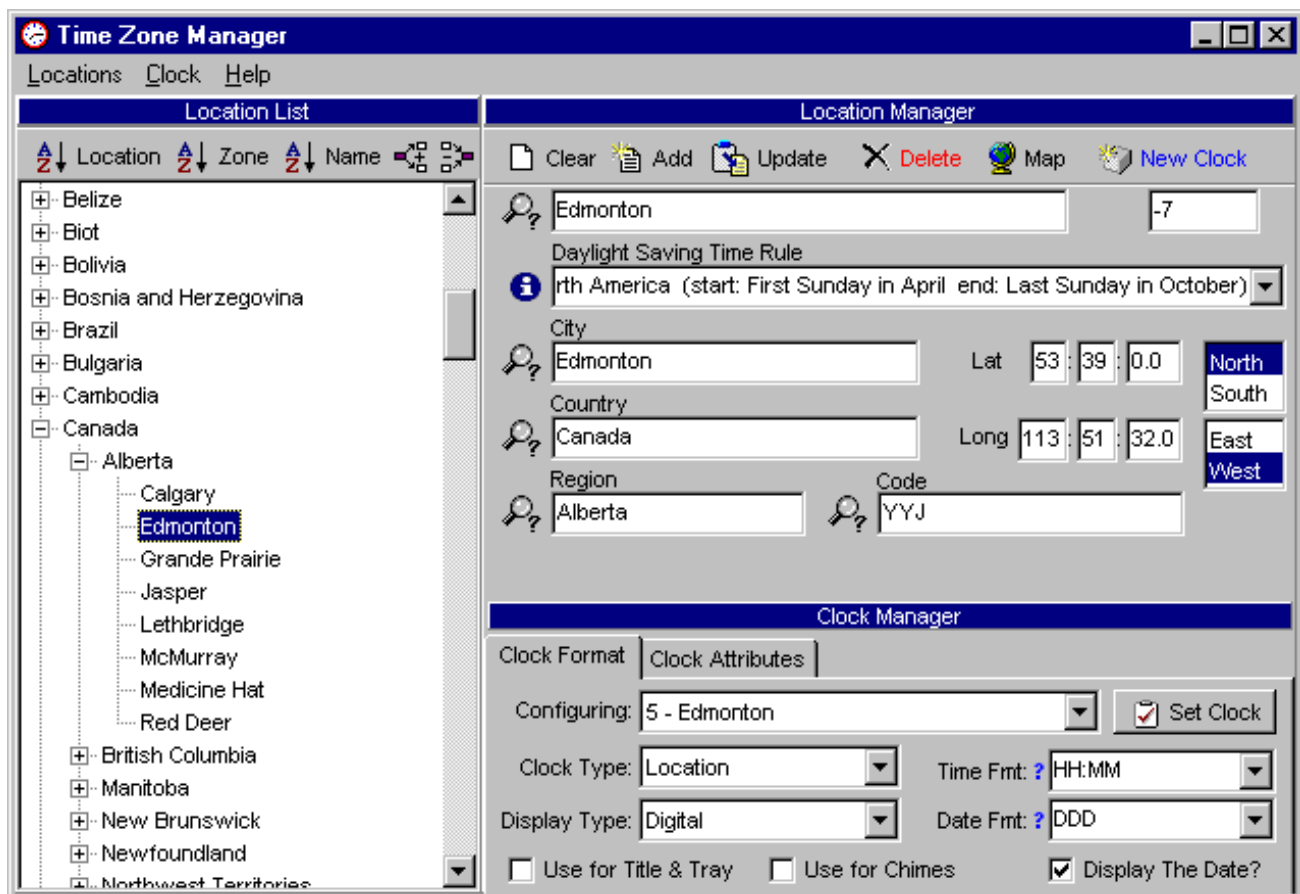
Time Zone Manager

Modifying Existing Clocks

Changing the location and/or format of an existing clock is simple, assume for now that the desired location already exists in the *WorldTime Location List*. Most of the options for each clock can be controlled by the *Time Zone Manager* window. There are two ways to access this window, either click the clock's title on the main window or right click on the clock and select **This Clock | Configure** from the main context menu.



The *Time Zone Manager* window will then open and allow you to modify location and/or clock details and attributes.



The Clock's Location

WorldTime includes an every growing, database of locations from around the world. Clock locations can be selected from this list or entered manually (more on locations later) To set the location for the clock either select or enter the desired location details and click the *Set Clock* button to apply the change.

Clock Format

The clock format tab controls what information will be displayed on the clock and how that information that will be displayed.

The majority of the formatting information is merely cosmetic but it is important to pay special note to the *Clock Type*

Configuring Type

Indicates which clock is being edited

Allows the type of information to be selected. These Include:

Local - The Local date/time, no control over UTC offset or DST Rule

Location - The date/time at the specified location (typical)

UTC - displays UTC date/time

Swatch beat - displays Internet time (see <http://www.swatch.com>)

Universal - displays universal time (see <http://www.universl-time.org>)

Julian - displays the Julian Date

Metric - displays Metric Time

GMST - Greenwich Mean Sidereal Time (used in astronomy)

LMST - Local Mean Sidereal Time (used in astronomy)

Display Type

Analog - Displays the time using an analog clock

Digital - Displays the time using a digital clock

Time Format

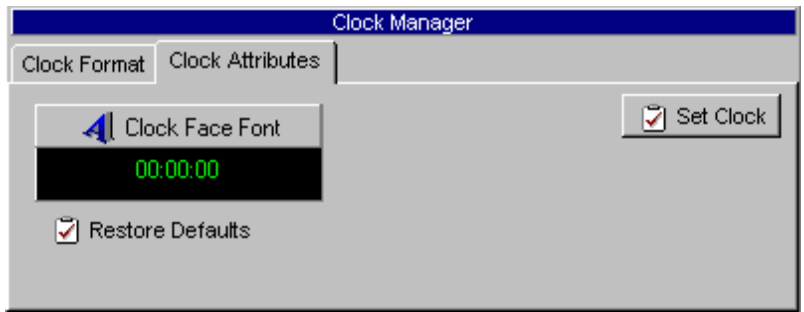
see Appendix A: Time Formats

Date Format

see Appendix A: Date Formats. Only applies if *Display the Date* is checked.

No changes to the clock's attributes or location are applied to the selected clock unless the *Set Clock* button is clicked.

To have the currently selected clock used for display in the titlebar or as the hint for the system tray icon, check the box marked *Use for Title & Tray pop-up*.



Clock Attributes

The clock attributes allows the colours and fonts used for each clock to be adjusted to suit individual preference.

To bring up a dialog box that allows any of the settings to be altered, click on the appropriate part of the sample clock shown. Remember to click the *Set Clock* button when finished.

Adding New Clocks

There are several ways to add a clock:

From the *Time Zone Manager* window: click *New Clock* in the toolbar to create a new clock with the settings and location currently displayed. This clock will be added at the right of any existing clocks in the main window.

From the main window: click the *new clock* button on the toolbar. This will add a “blank” clock at the right of any existing clocks and automatically open the *Time Zone Manager* screen

From the system tray menu select **Clocks|Add New Clock** this is the same as clicking on the *new clock* button in the main toolbar.

Right click on any existing clock and select either

This Clock|Insert Before - inserts a new ‘blank’ clock to the left of the selected clock

This Clock|Insert After - inserts a new ‘blank’ clock to the right of the selected clock

This Clock|Insert At End - same as clicking *new clock* in the tool bar

This Clock|Create Duplicate - duplicates the current clock and adds the duplicate clock to the right of all existing clocks.

Deleting Clocks

To permanently remove a clock from the main display right click on the clock and select **This Clock|Delete**

Moving Clocks

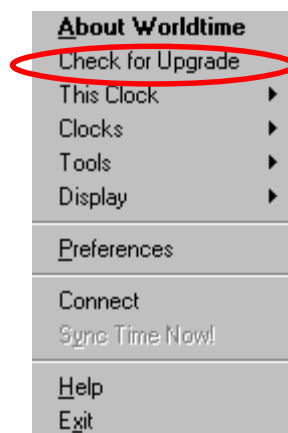
To re-order the clocks that appear in the main window right click on any clock and select **This Clock |Move...** you may also sort clock by selecting **Clocks|Sort by Name** or **Clocks|Sort By Zone** drag and drop movement of clocks is currently under development.

Managing Locations

The location list that is included with WorldTime contains all the locations that have been submitted by the world wide user community - it is by no means a complete list. You may modify any of the locations on the list or add your own. You may also update the list using the location update data files that are posted periodically to the WorldTime Web site.

Updating your Location List:

To update the WorldTime location list automatically via the Internet select *Check for Upgrades* via the system tray or right-click pop-up menu. If an update is available for the WorldTime application you will be prompted to upgrade WorldTime first. If a location data upgrade is available you will be given the option to automatically download and merge new location data with your existing data.



Merging or Replacing Location Data

There are two options when installing a location data update.

Replace:

This replaces the location data on the local machine with the data that was downloaded from the WorldTime web site. It will ensure that the local data exactly matches the master list, but will erase any custom locations that were created on the local machine and are not included in the master list.

Merge:

WorldTime also provides a *Merge* process with the following rules:

- 1) Locations from the master list are added to the local list if no other location with that name exists.
- 2) Locations that exist in both lists are replaced in the local list with the data from the master list.
- 3) Locations that only exist in the local list are left untouched.

This option will keep existing locations synchronized with the master list but will not alter custom locations that you have created yourself.

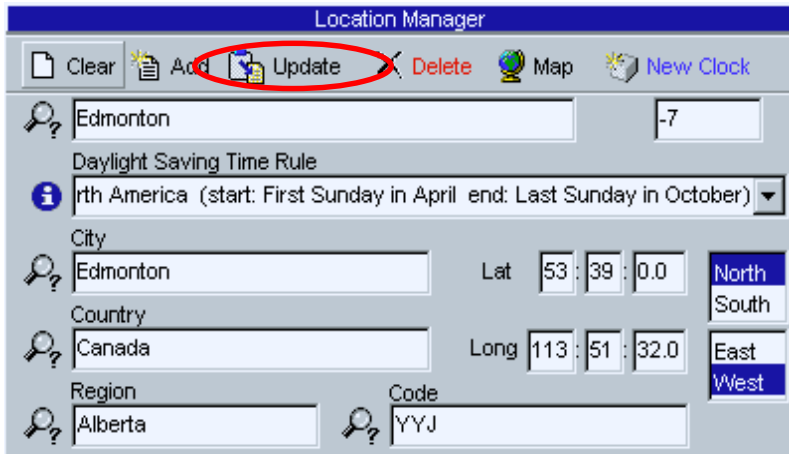
Adding New Locations

To add a new location to the list simply: fill in the new information into the fields of the *Time Zone Manager* window's location section. Once finished click the *Add* button in the location section's toolbar. If you do not have all the information for your location you need only enter the *Name*, *UTC Offset*, and *Daylight Saving Time Rule* as a minimum. The remaining information can be added later. Please note, however, that without *Latitude* and *Longitude*, locations will not display correctly on the map and the *Astronomical Data* will not be correct.

Updating Existing Locations

To change the information about a location that already exists in the list:

- 1) Select the location
- 2) Modify the data as appropriate
- 3) Click *Update* in the location area's toolbar.

The screenshot shows the 'Location Manager' window. At the top is a toolbar with buttons: 'Clear', 'Add', 'Update' (circled in red), 'Delete', 'Map', and 'New Clock'. Below the toolbar, there are several input fields: a search field with 'Edmonton' and a time zone dropdown set to '-7'. A section for 'Daylight Saving Time Rule' shows 'North America (start: First Sunday in April end: Last Sunday in October)'. Below this are fields for 'City' (Edmonton), 'Country' (Canada), 'Region' (Alberta), 'Lat' (53:39:0.0), 'Long' (113:51:32.0), and 'Code' (YYJ). To the right of the latitude and longitude fields are buttons for 'North', 'South', 'East', and 'West'.

Keep in mind that your changes will be lost if the location name is on the WorldTime standard location list and you *Merge* or *Replace* your local list with data from the WorldTime master Location List.

To prevent this, you can either change the location's name or, better yet, if the change is to correct an error - post an update to the WorldTime web site by submitting the updated information. To send a location update:

- 1) Ensure all the displayed location details are correct and that the *ClockType* is not set to **Local**
- 2) from the Location menu select Web|Submit This Location.

You can manually submit locations by using the Location form at:

<http://www.felinefuture.com/pawprint/wt/wtlocform.html>

Setting Lat/Long Using the Map

You may choose to use the WorldTime map to select the Lat/Long for your location. For this feature to be available you must have both the map and the Time Zone Manager open. Then, simply click anywhere on the map to set the Latitude and Longitude for that point.

Setting the UTC Offset using the Map

When properly configured, WorldTime can also set the correct UTC offset using the data from the map. To make use of this feature you must have selected which map 'layer' contains the time zone information (see the section about the map for more information). Once configured, the correct UTC offset will be automatically entered in the Time Zone Manager window whenever the mouse is clicked on the map.

Deleting Locations

To remove a location from the list select the location and click *Delete*. Remember, again, that the location may be automatically re-added if you update your location list with the master data from the WorldTime web site.

Searching

WorldTime provides several ways to find locations in the list. Location searches may be based on any of the following criteria:

Location Name

City

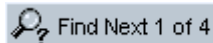
Region

Country

Location Code

To perform a search enter as much of the location name as necessary and click the search button associated with that field or select from the *Location Menu Search* By ____ Searches are 'partial match' therefore a city search for **Van** will find all entries that contain the characters '**Van**' anywhere in the *City* field for example: **Vancouver** and **North Vancouver** would both be valid results.

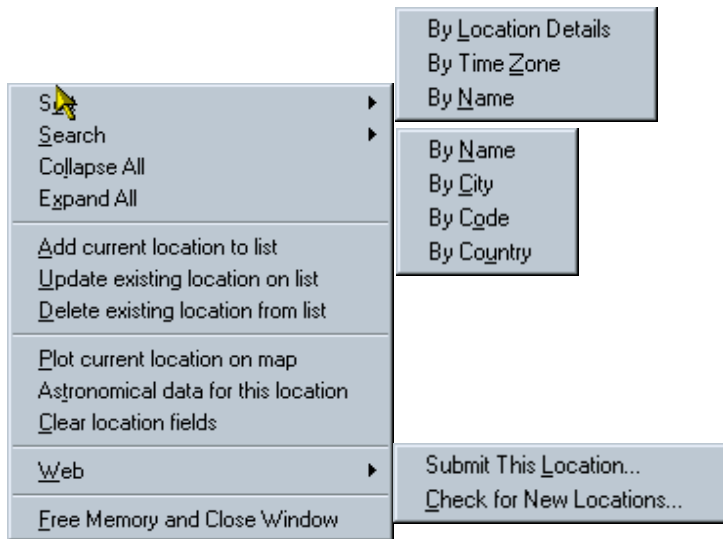
Multiple results



Some searches will generate more than one possible match. If this happens a button *Find Next x of x* will appear near the bottom of the window. The screen will display the first location in the result set. You may then step through the locations in the result set by clicking the *Find Next* button. If this button does not appear after a search then only one possible match was found.

Menu and Shortcuts

The *Time Zone Manager* provides several shortcuts via menus and buttons that are worthy of note. Many of these have already been discussed in the Clock and Location sections.



Sort By ...	Sorts the Location List
Search By...	Searches for a location using the specified criteria.
Collapse All	Hides any details displayed in the location list (i.e. shows country only if in Location mode)
Expand All	Shows all available detail in the location list.
Add...	Same as the Add button
Update...	Same as the Update button
Delete...	Same as the Delete button

Plot Current Location on map

Plots the selected location on the Map. Same as the Map button on the toolbar.

Astronomical data for this location

Displays the astronomical data window for this location. The location does not need to be defined as a clock to view the astronomical data in this manner.

Clear Location Fields

Clears all the fields on the window.

Web|Submit This Location

Suggest a new or updated location for inclusion in the WorldTime master location list.

Web|Check for New Locations

Checks the WorldTime web site to see if any location updates are available.

Free Memory and Close Window

Clears the location list from memory and frees any resources associated with the Time Zone Manager window - this can be used whenever the window and/or location list will not be needed for some time.

Daylight Saving Time Manager

The WorldTime daylight saving time manager allows the list of DST rules used in WorldTime and the list of time zones contained in the Windows system to be configured. It is accessible from the WorldTime program group, the WorldTime tools menu, and from the TimeZone Manager window by clicking the icon to the left of the DST rule drop down list.

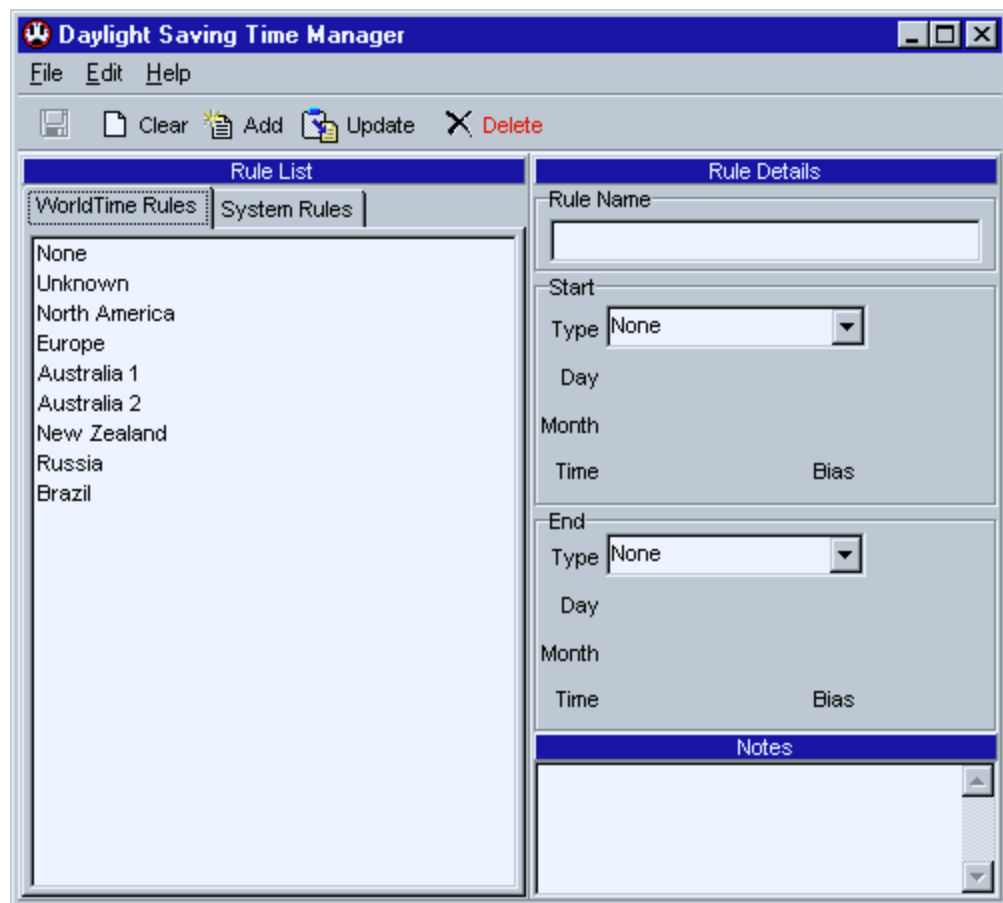
The Structure of DST Rules

Both WorldTime and the Windows system structure Daylight Saving Time rules in the same manner. Each rule has a start and end date and time, and each date has an associated bias (offset in minutes) The Start and End date can be provided in two different formats:

Specific: The date is a certain day of a certain month in any given year: e.g. March 15

Day Ref.: The date is specified as a certain occurrence of a particular day of the week in a specified month: e.g. Second Tuesday in March

The latter format is far more common and thus the drop-down lists in DST manager are designed to conform to that standard. Dates requiring the specific date format are still supported but the date must be entered manually.



Configuring WorldTime DST rules

The DST rules for *WorldTime* are automatically loaded from the *wtdst.wtd* file when the *Daylight Saving Time Manager* is started and are listed under the *WorldTime Rules* tab.

Rule Details

The following example outlines the DST rule definition used by most of North America

Rule Name: The name of this rule.

Start: Details about the start of DST

Type: The type of rule date:

None No DST applies

Specific Date specified by a specific date

First First occurrence of the day of week

Second Second occurrence of the day of week

Third Third occurrence of the day of week

Fourth Fourth occurrence of the day of week

Last Last occurrence of the day of week

Day: The day of week or, if type is **Specific**, the date

Month: The month of this date

Time: The time at which DST comes into effect.

Bias: The offset (in mins) that is added during DST

The fields in the *End* date are identical to those of the *Start*. The bias in the *End* area of the rule is in effect whenever DST is **not** in effect, and is therefore usually 0 but some locations actually have a negative bias during non-DST periods. The notes can contain any additional information about the rule and are usually used to give examples of locations where this rule is used.

Adding New Rules

To add a new rule simply fill in the requisite fields and click the  **Add** button.

Editing Existing Rules

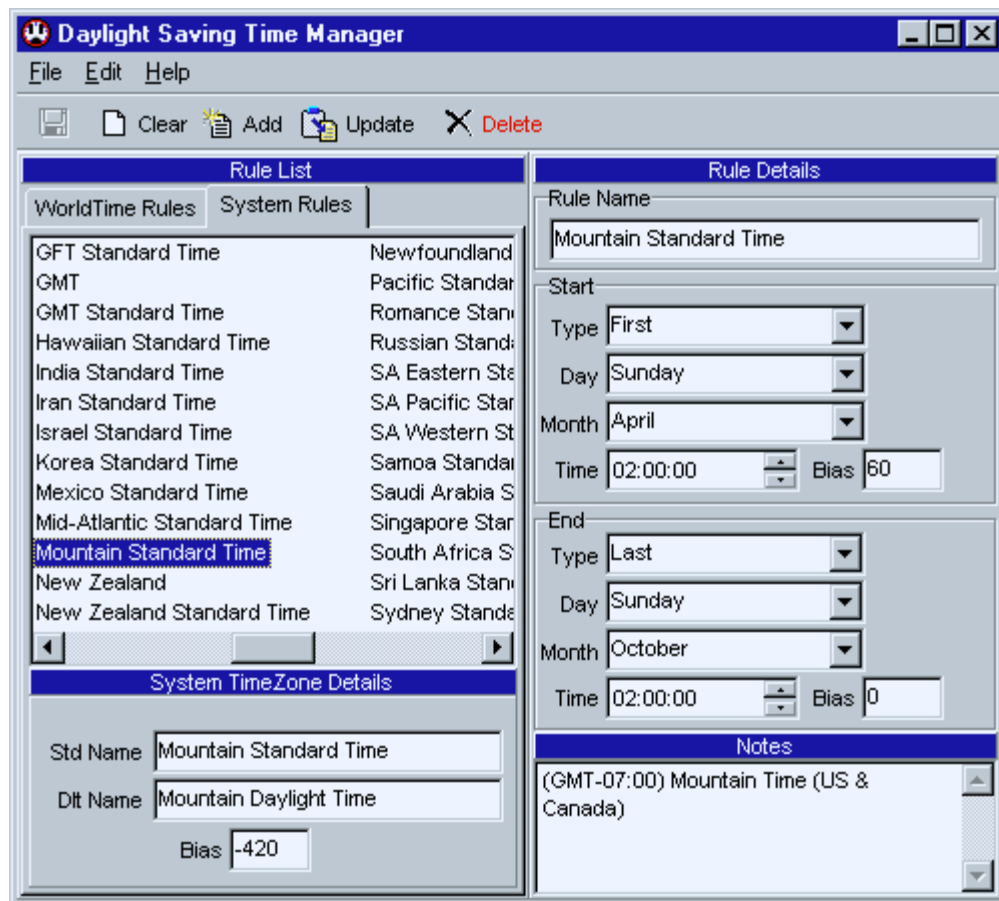
In most cases it is not advisable to edit existing rules - these rules have been confirmed as valid and should not be changed. If you are aware of a different rule please suggest it for inclusion in the WorldTime standard DST data. To edit rules that you have created select the rule, modify any required data and click the  **Update** button.

Configuring System Time Zones

Many WorldTime users have commented that the time zone and DST information provided with the *Windows* operating system is not always accurate. The *Daylight Saving Time Manager* allows these time zone records from the registry to be modified and then be used when selecting your local time zone in the control panel's *Date/Time* applet.

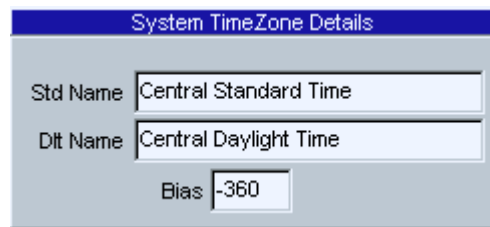
WARNING

Any changes made to the system time zone entries are permanent and can not be undone. Please do not edit these time zones unless you are certain of the changes that are being made.



System Time Zone Details

The DST manager behaves exactly the same for system time zone rules as it does for WorldTime rules except that the system rules are designed to define the time zone rather than just the DST rule. As such, the system time zone details area of the window contains the additional fields necessary to define a time *Windows* time zone.



The screenshot shows a dialog box titled "System TimeZone Details". It has three input fields: "Std Name" containing "Central Standard Time", "Dlt Name" containing "Central Daylight Time", and "Bias" containing "-360".

Std Name:	The name of this time zone when DST is not in effect
Dlt Name:	The name of this time zone when DST is in effect.
Bias:	The offset (in minutes) from UTC of this time zone when DST is not in effect (this is similar to the UTC offset in WorldTime)

Copying Rules

Sometimes it will be required to use the definitions from the system timezone list in WorldTime or vice versa. The DST manager provides a easy facility to accomplish this.

Copying from WorldTime into the Windows System

Select the rule from the *WorldTime Rules* tab, switch to the *System Rules* tab and enter the remaining information (specifically time zone names and bias) then click the  Add button.

Copying from the Windows System into WorldTime

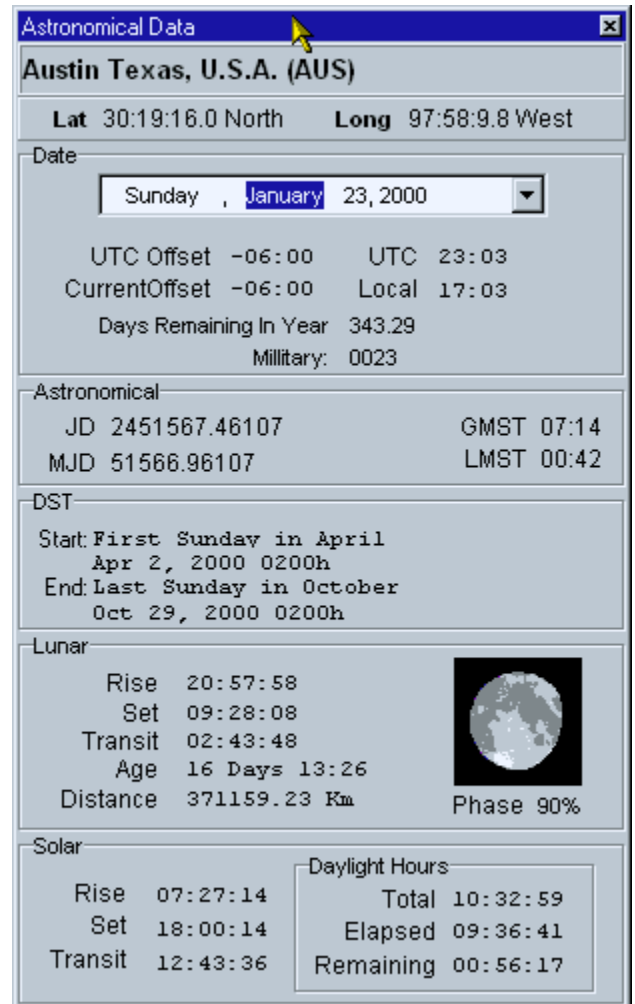
Select the desired time zone from the list in the *System Rules* tab, switch to the *WorldTime Rules* tab, make any desired changes and click the  Add button. Note: this only copies the DST definition and not the time zone itself.

Astronomical Data

The astronomical data window is available for any location in the WorldTime database. It can be accessed from the *Time Zone Manager* window's menu.

To access this window for a location that is currently being tracked as a clock in the main window this Astronomical Data is available from the main context menu (rich click on the clock) by selecting *This Clock|Astro Data* or by holding down the Shift key while clicking on a clock display.

When first activated this window with display the astronomical data in reference to the current date and time for the selected location. This data is automatically updated every 10 seconds. If a new date is selected from the pulldown then the automatic update is suspended.



Astronomical Data

Austin Texas, U.S.A. (AUS)

Lat 30:19:16.0 North **Long** 97:58:9.8 West

Date
Sunday , January 23, 2000

UTC Offset -06:00 UTC 23:03
CurrentOffset -06:00 Local 17:03
Days Remaining In Year 343.29
Military: 0023

Astronomical
JD 2451567.46107 GMST 07:14
MJD 51566.96107 LMST 00:42

DST
Start: First Sunday in April
Apr 2, 2000 0200h
End: Last Sunday in October
Oct 29, 2000 0200h

Lunar
Rise 20:57:58
Set 09:28:08
Transit 02:43:48
Age 16 Days 13:26
Distance 371159.23 Km
Phase 90%

Solar
Rise 07:27:14
Set 18:00:14
Transit 12:43:36

Daylight Hours
Total 10:32:59
Elapsed 09:36:41
Remaining 00:56:17

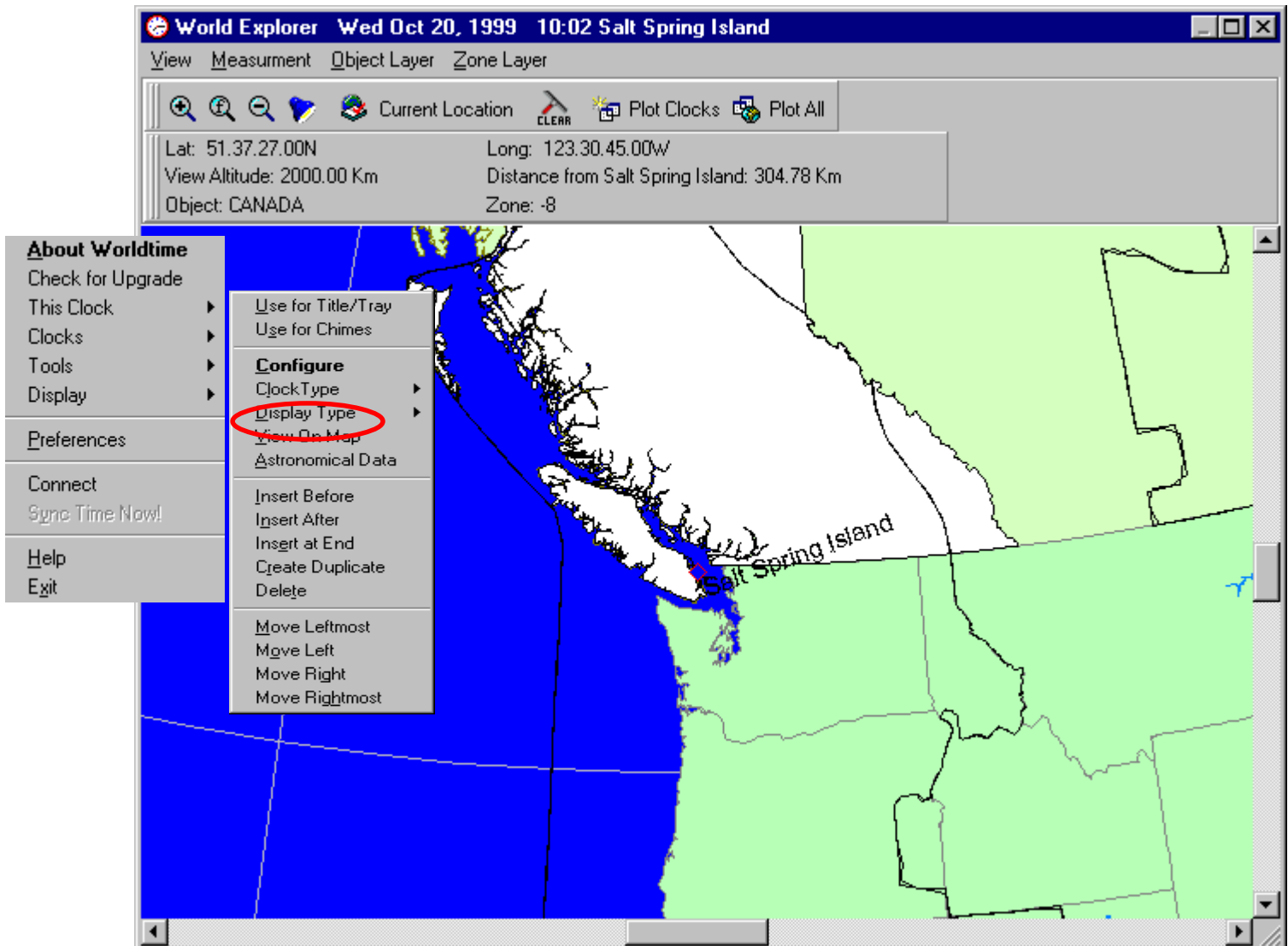
The Map

The WorldTime map allows any/all of the locations in the location list to be plotted based on their Latitude and Longitude. The map can be activated in several ways:

- 1) Click on the time portion of any of the clock objects

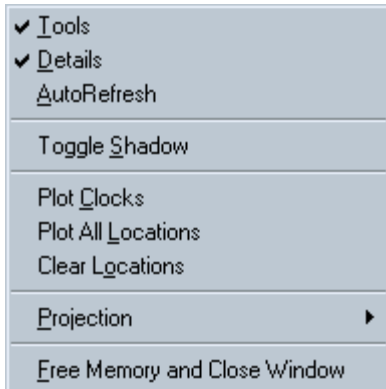


- 2) Right click on any clock and select *This Clock|View On Map*
- 3) Click on the Map button in the *Time Zone Manager* screen.



Options

The map provides several options that control the layout and the data that is displayed.



View Options

Choose to toggle the display of either the toolbar and/or detail display to conserve screen landscape if necessary.

Tools: Display or hide the toolbar

Details: Display or hide the data detail display

Toggle Shadow: Turns the simulated day/night shadow on or off.

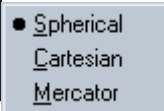
Plot Clocks: Plot (by lat/long) the location of all current clocks

Plot Locations: Plot (by Lat/Long) the location of all known locations - this can be memory intensive if many thousands of locations are in the current locatio list.

Clear Locations: clear any plotted locations from the map.

Projection: Choose the type of map projection.

Free Memory and Close Window: Frees any resources associated with the Map window - this can be used whenever the window will not be needed for some time.

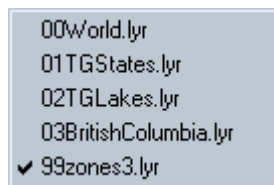


Measurement Options

The measurements drop down allows the unit of measure displayed for Altitude and Distance to be selected from a list of standard units.

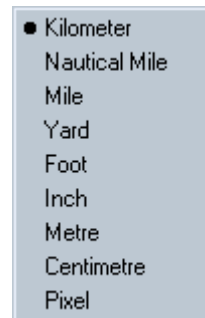
Layers

Each set of data displayed on the map is contained within a "layer" WorldTime allows any number of map layers to be displayed simultaneously, and some of these layers can contain data used to further the functionality of the system.



Layers containing pertinent data can be selected using the *Object Layer* and *Zone Layer* menus.

Data from the layer selected in the *Object Layer* menu will be displayed in the map details panel. Data from the layer selected in the *Zone Layer* menu can be used to set the UTC offset of locations (see the *Time Zone Manager*) and is also displayed in the details panel. A layer file containing accurate time zone data is included with the standard WorldTime instillation. See the Appendix for details about custom Layer files and other GIS applications.



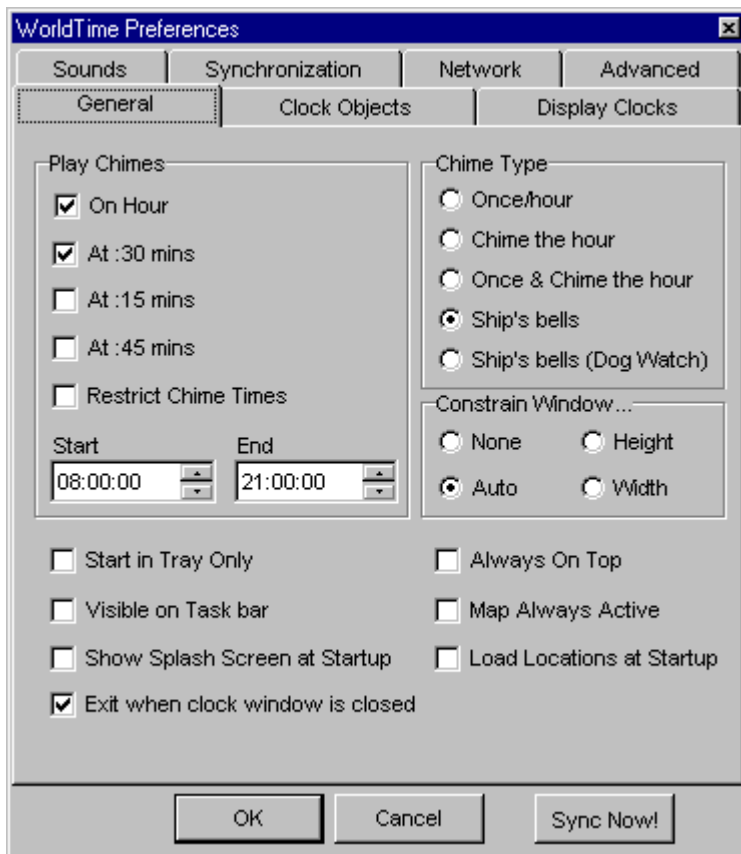
Preferences

General Preferences

The General Preferences provides user control for the behaviour of the WorldTime application and the clock chimes.

Chimes

WorldTime provides several types of chimes that can be triggered on the hour, at 15, 30: and 45 minutes past the hour. This is controlled by checking off only those times at which chimes should be triggered. The sound that will play can be selected from the *Sounds* tab.



Selecting the Chime Clock

By default chimes sound based on the local time but any clock that is currently being displayed can be used as the time source for chimes. This clock can be selected from the *Time Zone Manager* window or by using the main context menu (right click) and selecting *This Clock|Use for Chimes*

Restricting Chime Times

For those who sleep near their computer, and do not turn it off at night, the chimes may become annoying. You can therefore restrict them to only sound during a specified time range. To activate this feature enter the desired *Start* and *End* times and also check the box marked *Restrict Chime Times*. These restrict times are assumed to reference the local time of the clock that is being used for chimes.

Chime Types:

On Hour: plays the *On Hour* .wav file once only.

Chime the Hour: Plays the Hour Toll file the number of times as the current hour (local time 12 hour clock) eg 7pm plays 7 chimes

Once & Chime the Hour: does both of the above with the On Hour first. This is used to simulate “Big Ben” type chimes - the system default.

Ship's Bells: plays the *On Hour* sound the number of times as appropriate to the current ship's watch.

About Ship's Bells

0000 - 0400h Night

0400 - 0800h Early morning

0800 - 1200h Morning

1200 - 1600h Mid day

1600 - 1800h First dog

1800 - 2000h Second or last dog

2000 - 0000h Evening

Each watch covers a 4 hour period except the “Dog: watches which are 2 hours. The number of bells is always 2 at the end of the first hour, 4 the end of the second, 6 the third, and 8 at the change of the watch. Bells on the hour are sounded in groups of 2 in quick secession 1 additional bell is sounded on the half hour. As is the case with many naval traditions there are some “differences of opinion” regarding the dog watches.

By some traditions 6 and 8 bells never sound during the dog watches and the bells reset to 0 at the start of the second or last dog watch, where in other traditions the bells simply continue as usual. WorldTime allows for either of these traditions

Examples of bells that would sound throughout the day:

Ships Bells option

0000 = 8 bells

1300 = 2 bells

1900 = 6 bells

2000 = 8 bells

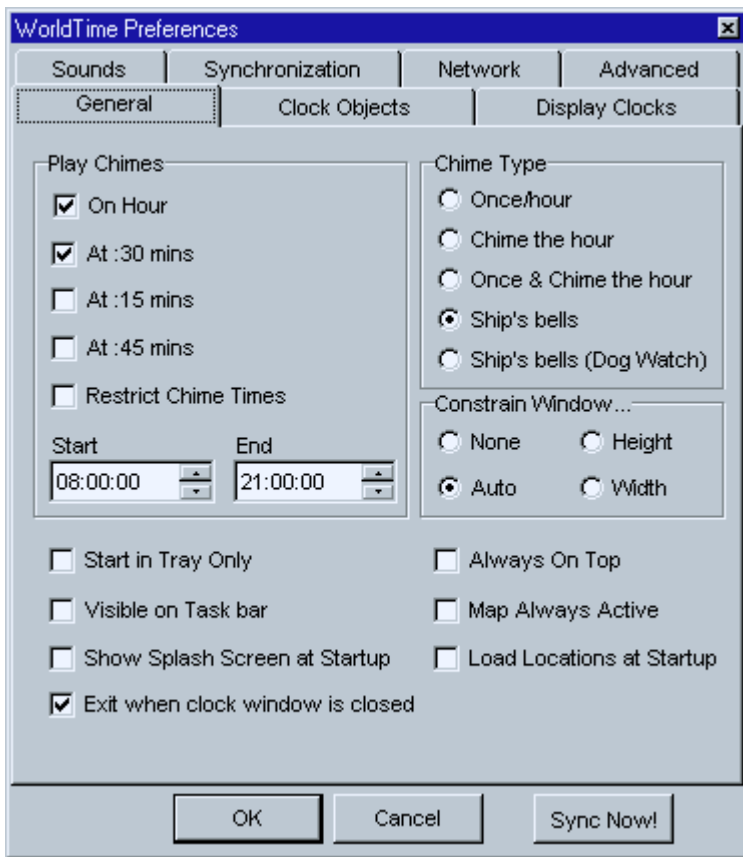
Ships Bells (Dog Watch) option

0000 = 8 bells

1300 = 2 bells

1900 = 2 bells

2000 = 4 bells



Application Options

The following options control the behaviour of the WorldTime application:

Start in Tray Only: if selected the application window containing the clock will not be visible when WorldTime starts - only the icon in the System Tray will appear.

Visible on Task Bar: if selected a button in the Windows Task Bar will be created for the WorldTime application. If left unchecked only the System Tray icon will be created.

Show Splash Screen at Startup: Un-check this option to disable the splash screen

Exit when clock window is closed: if checked the application will close when the main window is closed, otherwise the application will only minimize when its close button is clicked.

Always On Top: When checked the WorldTime main window can not be sent behind other windows and should always remain visible unless minimized.

ConstrainWindow...

<i>None</i>	The main window is not automatically resized
<i>Auto</i>	Both the height and width of the main window are set to create one row of clocks - this is the typical setting for most users.
<i>Height</i>	The height is set automatically but the width is left as set by the user
<i>Width</i>	The width is set automatically but the height is left as set by the user

Map Always Active: Helps save system resources by not loading the World Map unless specifically requested. If this box is checked the map will load at startup and stay resident. This will make accessing the map faster.

Load Locations at Startup: Leave un-checked to further save resources and speed the time it take for WorldTime to start. If checked the location data and *Time Zone Manager* are loaded at startup. This option is left off by default.

Clock Objects

This preferences tab allows the format of all the clocks currently tracked in the WorldTime main window to be set to the same formats. This is a global override of each clock's individual settings. To change the format of individual clocks use the *Time Zone Manager* screen, which is accessible by clicking on any clock's title or by right clicking on the desired clock and selecting *This Clock|Configure*.

Clock Borders

This option allows the clocks to be displayed without borders, simulating the look of WorldTime versions < 5.

Analog Clock Size

This controls the size (in pixels) of the diameter of all analog clock faces (size values between 25 and 400 pixels are allowed).

The screenshot shows the 'Clock Objects' tab in the WorldTime preferences window. At the top are tabs for 'Sounds', 'Synchronization', 'Network', and 'Advanced'. Below these are sub-tabs: 'General', 'Clock Objects' (which is selected), and 'Display Clocks'. In the 'Clock Objects' section, there is a checkbox for 'Show Clock Borders' and a spinner box for 'Analog Clock Size' set to 50. Below this is a 'Clock Formats' section with four checkboxes: 'Adj. Type', 'Adj. Time Fmt.', 'Adj. Display Type', and 'Adj. Date Fmt.'. Each checked checkbox has a corresponding dropdown menu. There are also checkboxes for 'Adj. Date Display' and 'Display The Date?'. At the bottom left is a 'Clock Attributes' section with a checkbox for 'Adj. Clock Attributes', a 'Click to set' button, a 'Clock Face Font' button, a digital clock display showing '00:00:00', and a 'Restore Defaults' button. On the right side of the window, there is text stating 'Checked settings on this page update ALL clocks' and a large red button labeled 'Override ALL Clocks'.

Clock Formats

These fields provide control over how the clock are displayed in the main WorldTime window. Only those items where the Adj box is checked will be updated: This way you can update only the date format for all clocks and leave all the other individual clocks' settings unchanged. The settings on this screen match those in the *Time Zone Manager*. For further information about these options please refer to that section of the user guide. For a description of Time and Date Formats see Appendix

To apply any desired global adjustments click the *Override All Clocks* button.

Display Clocks Preferences

These options control the information displayed when the mouse pointer is held over the system tray icon and, optionally, in the title bar of the topmost window.

The Titlebar Clock

The titlebar clock is used to display the time in the title of whichever is currently the topmost window. This will work in most all applications save those that update their own title in real or near-real time. WorldTime will display the clock selected whenever the box marked *Activate Titlebar Clock* is checked. The clock to use can be selected by either right clicking on the clock and selecting *This Clock|use for Title/Tray* or from within the *Time Zone Manager*.

Display Clock Formats

The information displayed on both the Titlebar and Tray icon clocks can be independently controlled here. The options for both function in the same manner: Enter the desired Time and Date formats (see Appendix A) and choose if the *Clock Name* and *Location Details* should also be included.

The screenshot shows the 'Display Clocks' tab of a preferences window. At the top, there are four tabs: 'Sounds', 'Synchronization', 'Network', and 'Advanced'. Below these are three sub-tabs: 'General', 'Clock Objects', and 'Display Clocks'. The 'Display Clocks' tab is active. It contains a checked checkbox for 'Activate Title bar clock'. Below this is a section titled 'Title Display Format' which includes a 'Date Format' dropdown set to 'DDD MMM d, YYYY', a 'Time Format' dropdown set to 'HH:MM', and two checkboxes: 'Include Clock Name' (checked) and 'Include Location Details' (unchecked). A similar section titled 'Tray Clock Format' is located below, with 'Date Format' set to 'DDD, d/mmm', 'Time Format' set to 'HH:MM', and 'Include Clock Name' (checked) and 'Include Location Details' (unchecked) checkboxes.

Sound Preferences

The sound preferences allow the user to control which sound files are used for various events throughout WorldTime and it's various modules. You can browse for files using the *Open* button or listen to the displayed file by clicking the Speaker button.

Chimes

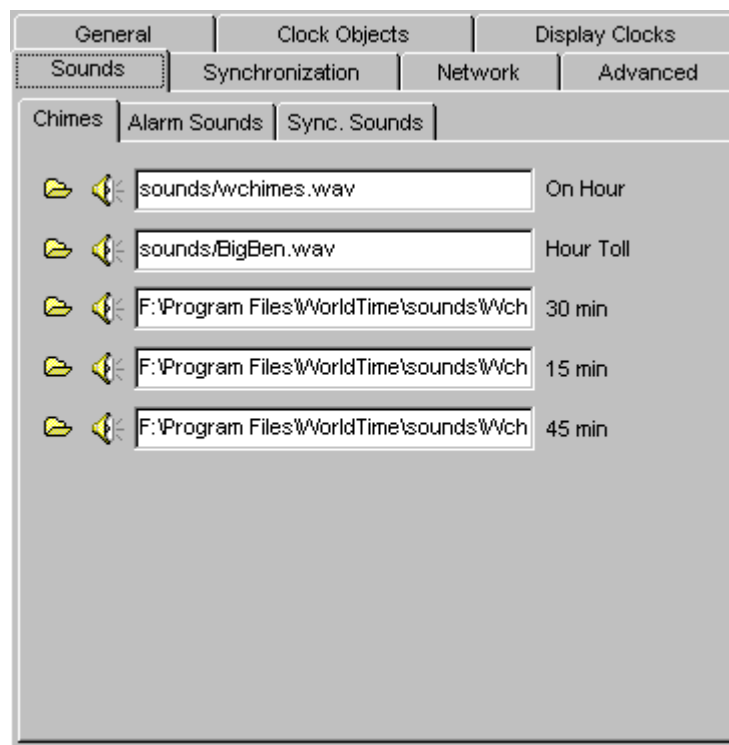
On Hour: the sound file for either *On Hour* or *Once & Chime the Hour* type chimes

Hour Toll: the sound used to chime the hour and for *Ships' Bells* type chimes

30 min: The sound played on the Half Hour (if selected) for all but *Ships Bells* type chimes

15 min: The sound played at :15 past (if selected) for all but *Ships Bells* type chimes

45 min: The sound played at :45 past (if selected) for all but *Ships Bells* type chimes



Alarm Sounds

Major: the sound file for *Major* type alarms

Normal: the sound file for *Normal* type alarms

Minor: the sound file for *Minor* type alarms

Stopwatch: the sound file for when the Stopwatch count down timer reaches zero

Synchronization Sounds

Connect: the sound file played when WorldTime attempts to sync the time

Synchronize: the sound file played when WorldTime successfully synchronizes the time

Synchronization Preferences

This panel controls how and when, if at all, WorldTime will attempt to synchronize your system clock using NTP (Network time protocol)

NTP: Network Time Protocol

The NTP suite actually consists of three separate protocols for the transmission of time and date information:

DayTime:

(accuracy in perfect conditions ~ +/- 2sec)

Transmits the Date and Time as a string e.g. "Tuesday, February 22, 1982 17:37:43-PST"

SimpleTime:

(accuracy in perfect conditions ~ +/- 1sec)

Transmits the Date and Time via TCP or UDP as the **integer** number of seconds since;
00:00 (midnight) 1 January 1900 GMT network delay is not taken into account

NTP:

(accuracy in perfect conditions ~ 200ms)

Transmits the Date and Time via TCP or UDP as the **fractional** number of seconds since;
00:00 (midnight) 1 January 1900 GMT network delay can be taken into account

WorldTime currently supports either the DayTime or SimpleTime protocol for time synchronization and includes custom code that attempts to compensate for network delay. The WorldTime synchronization feature is an additional module and should not be used for mission critical time synchronization where accuracy is of key importance. WorldTime is, after all, first and foremost a world clock.

For more information about NTP please consult IETF RFC1305, 868,869, and 1361 which (at the time of printing) can be found at <http://sunsite.auc.dk/RFC/rfc/>

Additional resources for Time Synchronization and information:

The NIST Time and Frequency Division <http://www.nist.gov>

For accurate NTP based Synchronization: <http://www.dillobits.com/yats32/index.html>

NTP Preferences

Server UTC Offset: Although most NTP servers will return their time stamp referenced to UTC, some have been known to return the time based on other time zones. This field specifies the UTC offset for the server listed - 0 for UTC based servers

NTP Server: The DNS or IP address of the NTP server with which to synchronize. WorldTime comes with a list of over 70 public NTP servers contained in the file `wtservers.txt` (see Appendix B: File Formats for information)

NTP Type: controls which NTP protocol is used for time synchronization. SimpleTime is more accurate but some servers do not support it.

AutoSync Settings

These options control if and when WorldTime synchronizes the time automatically. As an alternative to these types of auto-sync you may also set an alarm to synchronize the time.

The screenshot shows the 'NTP Preferences' dialog box with the 'Synchronization' tab active. The 'Offset from UTC' is set to 0. The 'NTP Server' is set to 172.25.35.1. Under 'NTP Type', 'Simple Time' is selected. In the 'Auto-Sync' section, 'Set Time Automatically' is checked, and the interval is set to 0:59:58. Other options include 'Set Date as well as time' (unchecked), 'Warn if sync differential is > 45 mins' (checked), 'Cycle Time Servers' (unchecked), and 'Log Sync Events' (checked). At the bottom, there are 'View Log' and 'Clear Log' buttons.

Set Time at Startup: If checked WorldTime will attempt to set the time when it is first started. WorldTime will only attempt automatic synchronization if a valid network connection exists (see Network Preferences)

Warn if Sync adjustment > 45 mins: if checked WorldTime will post a warning message before adjusting the clock after NTP synchronization if it would cause the system time to change by more than 45 mins.

Set Time Automatically: Attempts to synchronize the time repeatedly based on the time interval entered, starting when WorldTime is opened and continuing until it is closed.

Set Date as well as Time: Attempts to set the computer's date in addition to updating the time. Since most computer's clocks are not "off" by more than a few minutes this is rarely necessary.

Cycle Time Servers: If a synchronization attempt fails, WorldTime will proceed to the next server in the list and attempt to synchronize the time again. This will continue until the attempt is successful or all servers in the list have failed.

Log Sync Events: If selected WorldTime will maintain a log of all sync events in the file `wtsynclog.wtd` (see Appendix B: File Formats for information)

Network Preferences

These options control how/if WorldTime connects to TCP/IP based networks (the Internet) for time synchronization and updates.

Connection Type:

Select the type of network connection (if any) that WorldTime should use.

No Connection: If your computer is not configured for network connectivity or if you will not use WorldTime for time synchronization or to check for updates via the Internet.

Modem Connection: If your computer uses a modem to connect to the Internet via Windows RAS (Remote Access Service) also known as Dial-up Networking.

Network Connection: If your computer is configured with virtually any type of dedicated (always on) connection for TCP/IP networking.

Email Address: Add or edit the email address used when making automatic submissions to the WorldTime web site.

Dial-up Preferences

If you selected a *Modem Connection* as the connection type then WorldTime provides further options to maximize performance with dial-up connections.

The screenshot shows the 'Network' tab of the WorldTime preferences window. The 'Connection' sub-tab is active. Under 'Connection Type', 'Dial-Up (modem)' is selected. The 'Email Address' field contains 'Scott@FelineFuture.com'. In the 'Dial-up Preferences' section, the 'Phonebook Entry' is 'GTE', 'User name' is 'GTE/swbaker', and 'Password' is masked with asterisks. The 'Connect if required' checkbox is unchecked, 'Sync each connect' is checked, and 'Reset tray icon on Disc.' is unchecked. A 'Dial Now' button is next to the Phonebook Entry field. A 'Check For Upgrades Now' button is at the bottom of the dialog.

Phonebook Entry: The RAS server name as defined in your RAS phone book (select this from the drop-down list whenever possible).

User Name: The username (provided by your ISP) that is used when authenticating your Internet connection: This is NOT your email address.

Password: The Password (provided by your ISP) that is used when authenticating your Internet connection.

Connect If Required: When checked WorldTime will automatically initiate a dial-up connection whenever it is required for time synchronization.

Sync each Connect: when checked WorldTime will attempt to synchronize the system clock whenever a new dial-up connection is detected.

Reset tray icon on Disc.: Reverts the WorldTime icon in the system tray to its original state when disconnecting from the internet.

Dial Now: click this button to initiate a new dial-up connection.

Check For Updates: click this button to check if a more recent WorldTime or WorldTime Location data file exists.

Proxy Server Settings

WorldTime currently can not use a proxy server for time synchronization. These settings are only used for WorldTime location updates and WorldTime application update checks.

The Proxy settings are only used if the *Use Proxy Settings* box is checked, otherwise the contents of the other fields are ignored.

Proxy Server: The DNS or IP address of your proxy server

HTTP Proxy Port: the port to use for HTTP proxy requests (usually 80)

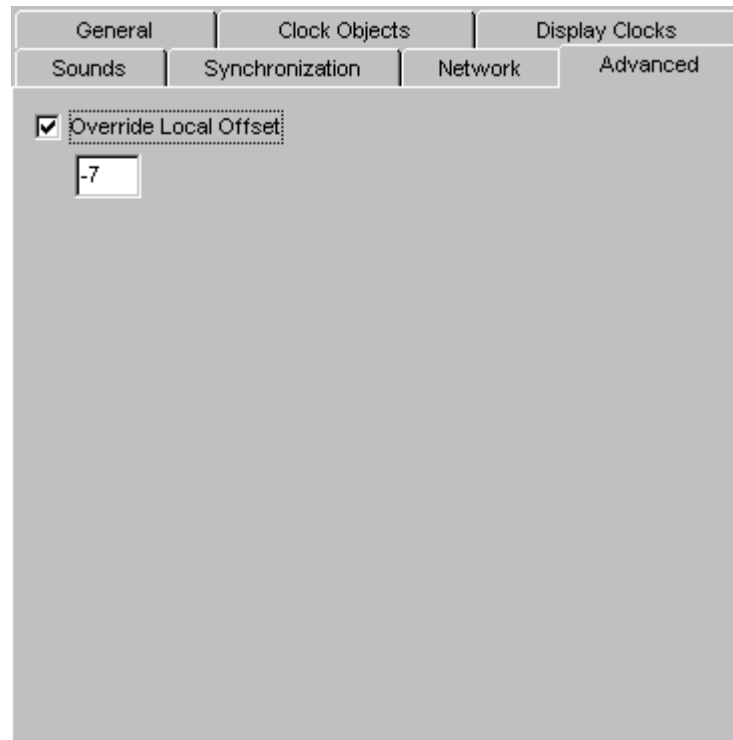


The screenshot shows a settings window with a tabbed interface. The tabs at the top are 'General', 'Clock Objects', 'Display Clocks', 'Sounds', 'Synchronization', 'Network', and 'Advanced'. The 'Network' tab is selected. Within the 'Network' tab, there are two sub-tabs: 'Connection' and 'Proxy Settings'. The 'Proxy Settings' sub-tab is active. It contains a checked checkbox labeled 'Use Proxy Settings'. Below this, there is a text field labeled 'Proxy Server' containing the value '172.25.35.1'. To the right of this field is another text field labeled '80' with the text 'HTTP Proxy port (usually 80) used for updates' next to it.

Advanced Preferences

Currently the only option on the Advanced tab is the Local offset override. This can be used to allow WorldTime to accurately calculate times when the computer's system time zone can not be set to the local time zone. This is seldom necessary but was added by user request when an office machine was set to the UTC time zone by an automated process whereas the machine clock was set to the actual local time by the user.

When active the text field should contain the number of hours offset from UTC. The contents of the text box are ignored when the option is not checked.



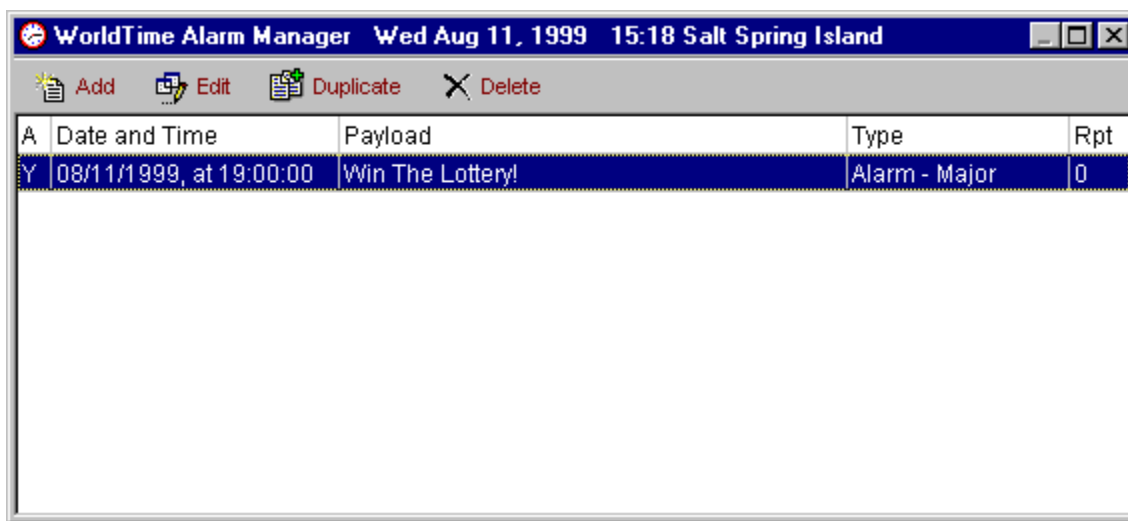
The image shows a screenshot of the 'Advanced' tab in the WorldTime preferences window. The window has a tabbed interface with the following tabs: General, Clock Objects, Display Clocks, Sounds, Synchronization, Network, and Advanced. The 'Advanced' tab is currently selected. Inside this tab, there is a checked checkbox labeled 'Override Local Offset'. Below this checkbox is a text input field containing the value '-7'.

Alarms

WorldTime includes a complete location aware alarm module. Alarms can be used to alert the user, connect/disconnect from a dial-up network, run an application, or synchronize the clock. There is no limit to the number of alarms that WorldTime can track, and alarms can repeat based on a specified number of days.

The Alarm Manager Window

The Alarm Manager window provides a list of all alarms in WorldTime. The list includes pending as well as acknowledged alarms.



Creating New Alarms

New alarms can be created in one of two ways. From scratch by clicking the  **Add** button or by using another existing alarm as a starting point by clicking the  **Duplicate** button. In any case the Add/Edit alarm window (see the following discussion) will appear and allow the requisite details to be entered.

Editing Alarms

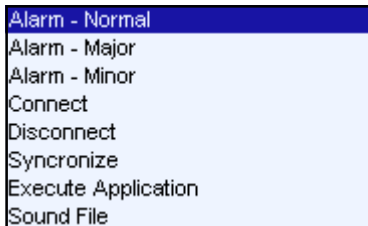
To edit an alarm either select the alarm and click the Edit button or double click on the alarm.

Deleting Alarms

to remove an alarm from the list, select the alarm and click the delete button.

The Add/Edit Alarm Window

The same window is used to add new or edit existing alarms. The window will change appearance slightly depending on which alarm type has been selected and if the current alarm is pending or acknowledged.



Alarm Types

Each alarm is defined by one of several alarm types that control its behaviour:

Visual Alarms (Major, Minor and Normal) : Visual alarms play a sound and pop-up a window on the screen when they come due.

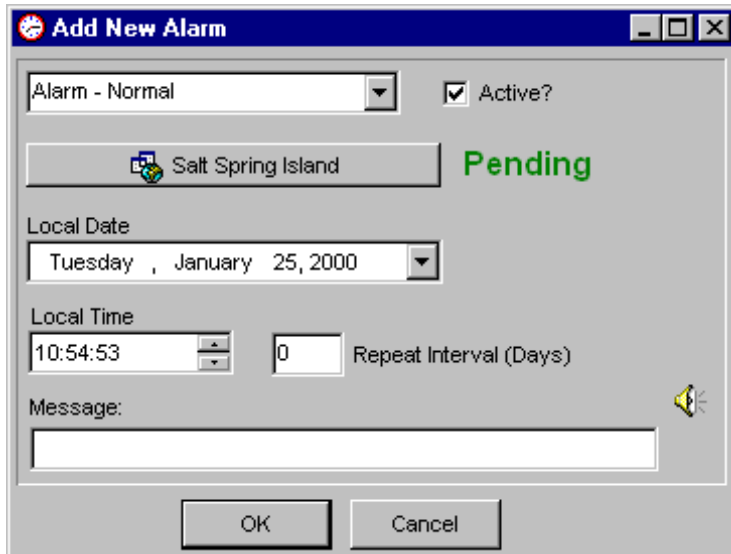
- | | |
|--------|--|
| Normal | Plays the Normal Alarm Sound (defined in the Sounds Preferences) once and displays a message. This alarm will automatically snooze without user-intervention after 30 seconds. |
| Major | Plays the Major Alarm Sound every 10 seconds and waits for user intervention. |
| Minor | Plays the Minor Alarm Sound (defined in the Sounds Preferences) once and displays a message. This alarm will automatically snooze without user-intervention after 30 seconds. |

The remaining alarm types are classified as *Action* alarms, and are used to perform a certain action at a specified time. There is no visual or audible notification of these alarm types.

- | | |
|---------------------|--|
| Connect | Attempts to establish a dial-up network connection based on the <i>Network</i> settings in the <i>Preferences</i> . This is the same as selecting <i>Connect</i> from the main context menu. |
| Disconnect | Attempts to disconnect any existing dial-up network connection. This is the same as selecting <i>Disconnect</i> from the main context menu. |
| Synchronize | Attempts to synchronize the system clock (this is the same as selecting <i>Sync Now</i> from the main context menu) |
| Execute Application | Attempts to execute the application defined in the Alarm's <i>Payload</i> (see the next section) |
| Sound File | Plays the sound (.wav) file defined in the alarm's <i>Payload</i> . |

Alarm Details

The remaining details of each alarm are fairly straightforward with the possible exception of the alarm *Payload* (discussed below)



Active	Indicates if the alarm is active. Alarms with not sound unless this flag is checked.
Location	Specifies the location (time zone) to which the alarm's date and time are referenced.
Local Date	The date when the alarm should sound (at the specified location)
Local Time	The time when the alarm should sound (at the specified location)
Repeat Interval	The number of days after which the alarm should be automatically reset once it has been acknowledged. e.g. Set to 1 to have an alarm that repeats every day.

Alarm Payload

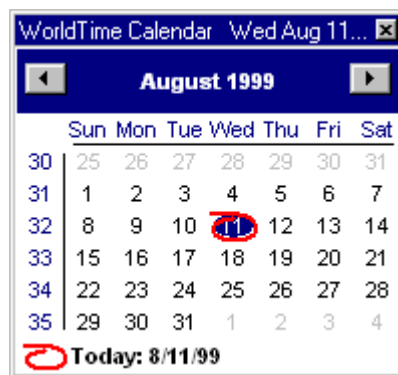
The *Payload* or an alarm can contain various things depending on the *Alarm Type* For visual alarms (*Major, Minor, Normal*) it contains a message to be displayed on the visual alarm notification window. If the message is a URL or file then the user has the option of manually launching that URL or file from the alarm notification window.

For the *Sound File* alarm type the *Payload* contains the .wav file to play. For the *Execute Application* type the *Payload* contains the file to be executed and for *Synchronize* it serves as an area to put notes. The *Payload* is not available for *Connect* and *Disconnect* type alarms.

Calendar

The WorldTime calendar is a simple tool that displays a calendar. It defaults to today's date when first opened and behaves as a standard *Windows* calendar pop-up. Display the calendar by clicking on the calendar icon in the main toolbar or **Tools | Calendar** from any WorldTime menu.

Click the Left or Right arrows to change the month. Click on the year to change the year directly. The calendar display can be returned to today's date at any time by clicking the *Today:<date>* listed at the bottom of the window.



TRAqDATE

TraQdate displays the exact time until or since any event at any location (historical changes in daylight savings time rules are not taken into account)

Creating Events

To add an event click the *Add* button and enter a date and time as well as a location.

The screenshot shows the TRAqDATE application window. At the top is a menu bar with 'Add', 'Edit', and 'Delete' buttons. Below is a 'Details' section for 'Until Millenium #2'. It shows a breakdown of time: 0 years, 11 months, 8 days, 21 hours, 4 minutes, and 26 seconds, totaling 'Monday, January 1, 2001, at 00:00:01'. A secondary breakdown shows 0.94 years, 11.26 months, 48.98 weeks, and 342.88 days. Below the details is an 'Event List' table with columns for Event, Date of Event, and Event Local.

Event	Date of Event	Event Local
Millenium #2	01/01/2001- 00:00:01	UTC
Gewn Born	11/04/1998- 16:58:43	Salt Spring Island
First Litter Of Kittens Born	08/05/1997- 15:00:00	Vancouver
Second litter of kittens born	11/25/1997- 16:35:00	Vancouver
Submitted FF site to Yahoo	10/13/1999- 11:45:00	Salt Spring Island
Helios Born	09/24/1999- 00:00:00	
Scott Cale's Birth	10/13/1973- 12:00:00	
Ra Born	09/25/1999- 21:32:00	

Displaying Details

Selecting any event listed will update the traQdate window with the results for that event. The event list can then be hidden using the up/down button on the left of the *Event List* header.

Notes:

The "days" algorithm uses a 365.25 day year - this is a good measure for calculating lengthy duration but for short duration around leap years may produce results that seem incorrect.

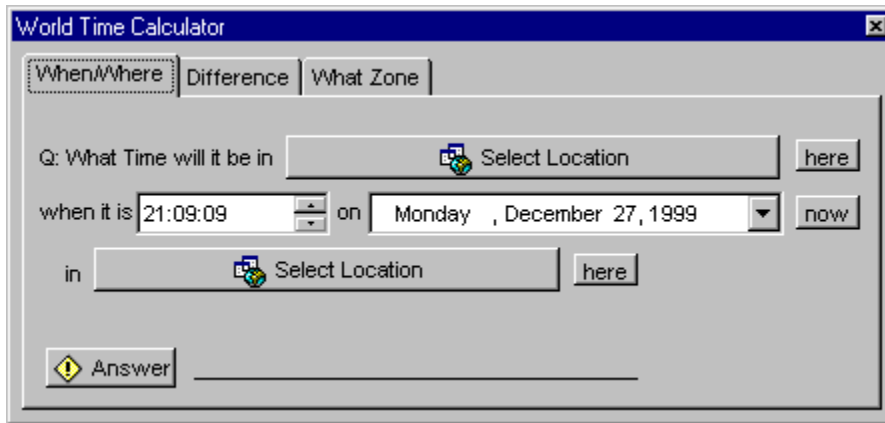
The screenshot shows a dialog box titled 'Add New Tracking Item'. It contains fields for 'Local Date' (Wednesday, November 04, 1998), 'Local Time' (16:58:43), and 'Repeat' (0). There is a location field showing 'Salt Spring Island' with a globe icon. A 'Description' field contains the text 'Gewn Born'. At the bottom are 'OK' and 'Cancel' buttons.

Time Calculator

The WorldTime time calculator provides a simplistic tool for calculating time related information. The following modes are supported:

When Where

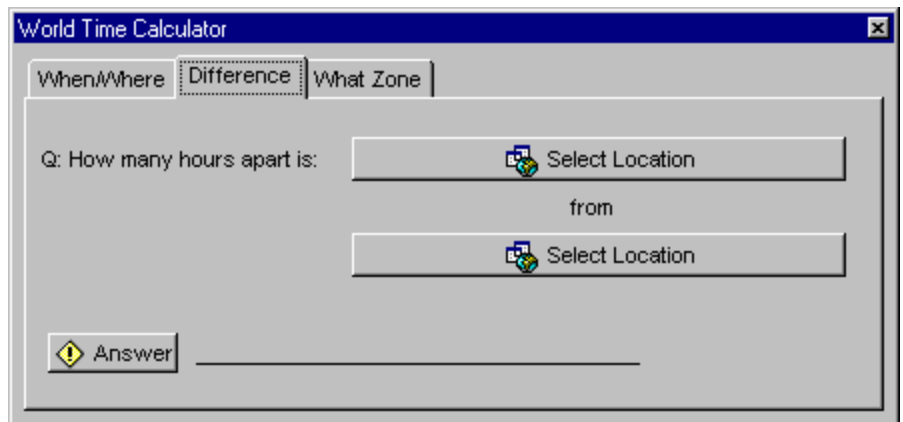
Allows the time in one zone to be calculated based on the time in some other zone. Enter the Location for which the time is required, and the date, time, and location for which the time is known - then click the *Answer* button



The screenshot shows the 'World Time Calculator' window with the 'When/Where' tab selected. The interface includes a question label 'Q: What Time will it be in', a text input field with a 'Select Location' button and a 'here' button, a time input field showing '21:09:09', a date input field showing 'Monday, December 27, 1999' with a dropdown arrow, and a 'now' button. Below these is another 'in' label, a second 'Select Location' button with a 'here' button, and an 'Answer' button with a yellow warning icon next to a text output field.

Difference

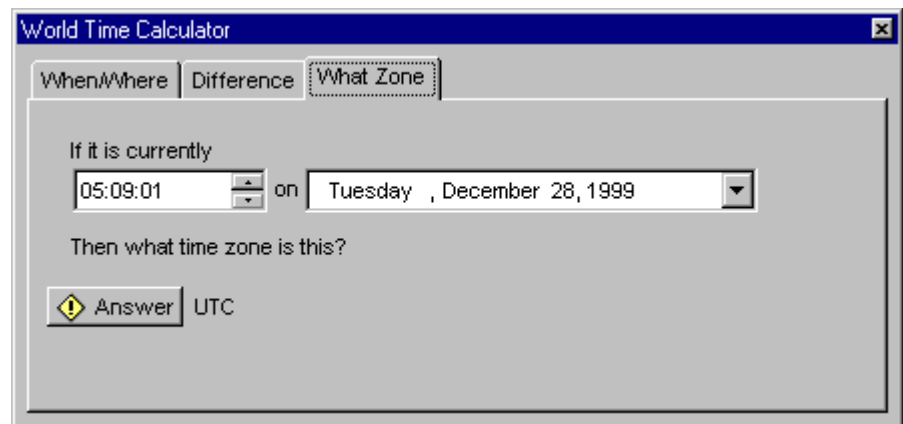
Returns the fractional number of hours difference between the two locations selected. Simply select the desired locations and click the *Answer* button



The screenshot shows the 'World Time Calculator' window with the 'Difference' tab selected. The interface includes a question label 'Q: How many hours apart is:', two text input fields each with a 'Select Location' button, and a 'from' label between them. At the bottom is an 'Answer' button with a yellow warning icon next to a text output field.

What Zone

In this mode the calculator attempts to calculate the UTC offset required if the current time at some unknown location is known: i.e. A business associate mentions that it is currently 1500h but you do not know where the person is located. Enter that time and today's date in the time and date fields then click Answer. If possible the UTC offset of the most likely time zone will be returned. If a time and date that is greater than 12 hours is entered then an error will be returned.

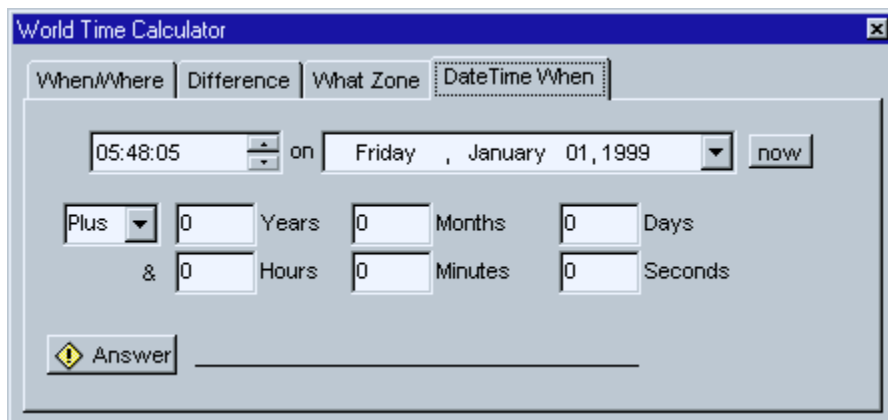


The screenshot shows the 'World Time Calculator' window with the 'What Zone' tab selected. The 'When/Where' tab is also visible. The 'Difference' tab is disabled. The 'What Zone' tab contains the following fields and controls:

- 'If it is currently' label.
- A time input field showing '05:09:01' with up/down arrows.
- An 'on' label.
- A date dropdown menu showing 'Tuesday , December 28, 1999'.
- A label 'Then what time zone is this?'.
- An 'Answer' button with a yellow warning icon.
- The text 'UTC' displayed next to the 'Answer' button.

DateTime when

In this mode the calculator can be used to add or subtract any combination of years, months, days, hours minutes, and seconds to any given time in order to calculate the resulting time and date.



The screenshot shows the 'World Time Calculator' window with the 'DateTime When' tab selected. The 'When/Where' tab is also visible. The 'Difference' tab is disabled. The 'DateTime When' tab contains the following fields and controls:

- 'When/Where' tab.
- 'Difference' tab.
- 'What Zone' tab.
- 'DateTime When' tab.
- A time input field showing '05:48:05' with up/down arrows.
- An 'on' label.
- A date dropdown menu showing 'Friday , January 01, 1999'.
- A 'now' button.
- A 'Plus' dropdown menu.
- Input fields for '0' Years, '0' Months, '0' Days, '0' Hours, '0' Minutes, and '0' Seconds.
- An 'Answer' button with a yellow warning icon.
- A blank line for the answer.

System Time Information

This window displays application information and system settings/data that relate to time. It also provides a shortcut to the time drift graph.



The following information is displayed:

Active Timer: The amount of time this WorldTime session has been active

Current Locations in List: The number of locations in the local WorldTime location list

Time Zone Information: the local system time zone settings as defined using the control panel DateTime applet.

System Time Adjustments: Applicable to *Windows NT* only: this system setting indicates a automatic time adjustment that is applied to the system clock along with each clock tic. In most cases it is disabled and can not be altered from within WorldTime. It is displayed here for information only.

The Stopwatch

WorldTime includes a full function stopwatch module in the form of a separate application "wttimer.exe". It can run independently of WorldTime and any number of instances can run simultaneously. The timer can be used as a normal stopwatch or a count down timer.



Stopwatch Operation:

To use the WorldTime timer as a stopwatch ensure that the *Up/Down* toggle is set to *Up* this is the default when the clock is first opened. The *Start/Stop* button is used to turn the time on and off while the *Lap* button is used to record lap times during timing.

With each successive lap time recorded the average lap time is also computed. There is no limit to the number of lap times that may be recorded. When stopped the *Clear* button will reset the stopwatch.



Countdown Timer Operation

For use as a count down timer click the *Up/Down* toggle to read *Down* then enter the desired count down duration in the blue field. Start or pause the countdown using the *Start/Stop* toggle. The stopwatch alarm sound as defined in the WorldTime preferences will sound when the time reaches zero.



NTP Server

The WorldTime mini NTP server provides a simple solution to keeping multiple computers on a LAN or WAN synchronized to you time-base of choice. When active on a system that is also synchronized to a primary or secondary stratum NTP server using WorldTime or any other NTP synchronizer the *WTServer* can be used to eliminate the need for workstations to synchronize through a proxy server or firewall individually.

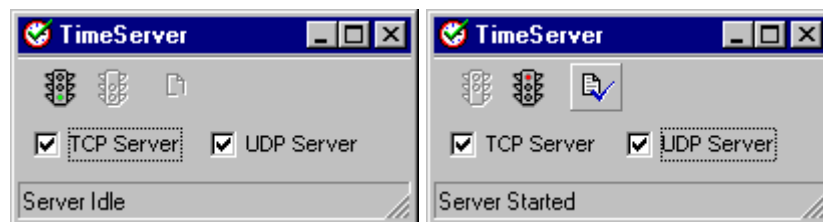
Protocols:

This server supports TCP and UDP implementations of both the RFC 867 and 868 NTP protocols for SimpleTime and DayTime.

Command Line Options

In most practical applications the mini NTP Server will be started automatically at system startup and will be left running at all times. Various parameters have been implemented to facilitate this (the parameter order is not important):

- start automatically starts the server in both TCP and UDP mode
- min automatically minimizes the server window to the system tray
- nolog inhibits logging of NTP requests to the wtserverlog.wtd log file.



Thus a standard startup command might be as follows:

wtserver.exe -start -min

GUI Options

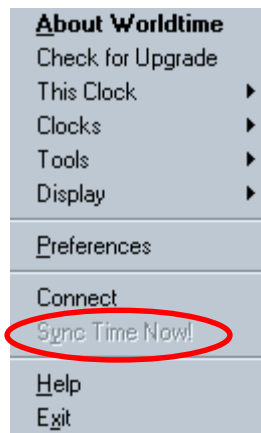
The mini NTP Server includes a simple GUI that provides control for all aspects of the application. The server may be started or stopped, protocols changed, and via the tray menu: the log file may be viewed. When running the server displays the current number of NTP requests served in its status line.

How Do I ... ?

This section provides step by step instructions for using some of WorldTime's more common features that have not already be covered elsewhere in this guide.

Synchronize my clock

WorldTime provides several options to automate clock synchronization but you may also manually synchronize the clock. (see the synchronization preferences section of this guide for more information about using automatic synchronization)



The most straightforward way to sync the clock is to select *Sync Time Now* from the main context menu (right click on the tray icon or main window)

If that option is grey (as shown here) that means that WorldTime does not believe that you are connected to the internet. If you are connected, the most likley reason is that the *Network Preferences* for WorldTime have not be correctly configured (see the preferences section of this guide for more information about configuring WorldTime for your network connection)

Appendix A

Standard Time Formats

There are several places in the WorldTime application that allow user control of the format used to display the time. Although in most cases several common formats are available by means of a drop-down list, however a custom format can always be entered directly. The time format notation is as follows, characters other than those listed or contained in double quotes are left unchanged:

H	a hour digit in 24 hour clock
h	a hour digit in 12 hour clock
M/m	a minute digit
S/s	a second digit
am/pm	display the full am or pm designation
a/p	display an 'a' for am or 'p' for pm

Examples:

The following list shows the time format string and what will be displayed at 2:45:30pm

HH:MM:SS	14:45:30
hh:mm	02:45
h:m:s a/p	2:45:30 p
HH.MM am/pm	14.45 pm
"The time is: " h:m	The time is: 2:45

Standard Date Formats

Date formats in WorldTime can be selected and controlled in much the same way as the time format. The following list describes the standard date format notation, characters other than those listed are left unchanged:

YY	2 digit year
YYYY	4 digit year
M	1 or 2 digit numeric month
MM	2 digit numeric month
MMM	3 character alpha month
MMMM	the month spelled out in full
D	1 or 2 digit day of month
DD	2 digit day of month
DDD	3 character weekday
DDDD	the weekday spelled out in full

Examples

The following list shows the date format string and what would be displayed on Monday, August 9th 1999

YYYY-MM-DD	1999-08-09 (ISO standard)
MMM d,YY	Aug 9, 99
DDDD "the" d "th of" MMMM YYYY	Monday the 9th of August 1999
YYYY-MM-DD (<i>ISO standard</i>)	1999-08-09

Appendix B

wtZones.wtd

wtZones.wtd is a comma delimited text file that contains the location data used within WorldTime. It consists of columns of the following format

Location Name	The name of this location (KEY - must be UNIQUE)
UTC Offset	The offset from UTC in hours
Local Offset	The local offset (Ignored - overwritten by the system)
Latitude	Degrees of Latitude (North is Positive)
Longitude	Degrees of Longitude (West is Positive)
DST Rule	The DST Rule (see description below)
City	The City name (usually the same as the Name except when duplicate city names force the name otherwise)
Region	The state/province/county
Country	The Country
Code	A Location code (typically the nearest airport code or codes)
“!”	this character appears at the end of each line.

Any line starting with the “#” character is treated as a comment.

wtDST.wtd (DST rule format)

DST rules are contained within a single string formatted as follows

<name>/<start>/<end>/<notes>

Where the <start> and <end> dates are in the following form delimited by the “.” character:

Type	Type Rule Type N=None, 1=First, 2=Second, 3=Third, 4=Fourth, L=Last, S=Specific
Day	The day of the week (sunday = 1, Saturday = 7) OR is the Type is S then the day in the month
Month	The numeric month
Bias	The offset to add to the standard UTC offset in minutes
Time	The exact time at which DST comes into effect.

For example the rule for North America that adds a 60 minute offset starting on the First Sunday in April at 0200h until the Last Sunday in October at 0200h would be coded as follows:

North America/1.1.4.60.02:00:00/L.1.10.0.02:00:00/Used throughout the USA...

wtClocks.wtd

All clocks used in WorldTime are stored in this tab delimited text file:

Version Tag	currently fixed at "WTClockData-1.0.0:"
Clock Type	Matches the clock type in the WorldTime application.
Date Format	See Appendix A
Time Format	See Appendix B
Display Type	"Digital" or "Analog"
Display Date?	"True" or "False" indicates if the date should be displayed
Bkg Color	Background colour (Decimal equivalent of the Hex RGB value eg FFFFFFFF for white)
<title font>	An encoded font record (see below)
<clock font>	An encoded font record (see below)
<Location>	Matches the format in the wtzones.wtd file.

Font Encoding Format

Any font records encoded in WorldTime data files follow the format below:

Name	The Font name (matches the font in the system)
Color	Colour (Decimal equivalent of a Hex RGB value eg FFFFFFFF for white)
Height	The negative height of the font in pixels.
Size	The size of the font in points.
Charset	Te Character set (Generally 0 or 1 for most Western ASCII)
<options>	Font options encoded as Y or N in the following order: Bold, Italic, Underline, Strikeout.

wtServers.wtd

This single column text file is a list of the addresses of IP addresses of NTP servers that can be used for synchronization.

wtAlarms.wtd

All alarms in WorldTime are stored in a tab delimited text file of the following format:

Alarm DateTime	The date and time of the alarm specified as the fractional number of days since 12/30/1899
Alarm Type	Matches the alarm type within WorldTime
Repeat Interval	The number of days after which the alarm should be automatically re-set after it has been acknowledged.
Active?	Y or N indicating if the alarm is active
Pending	Y or N indicates if the alarm is pending (yet to be acknowledged)
Payload	The alarm's payload
<location>	Matches the format in the wtzones.wtd file.

wtSyncLog.wtd

When selected all sync events are logged in a tabbed delimited text file in the following format:

Tag	"SYNC-ATTEMPT" fixed element
Host	The NTP server where the sync was attempted.
UTC Date stamp	Indicates the Time (after sync) of the sync attempt
Status	"SUCCESS" or "FAIL - <descripiton>" indicates the ststua of the sync attempt.
DateTime Before	The DateTime before the sync specified as the fractional number of days since 12/30/1899
DateTime After	The DateTime after the sync specified as the fractional number of days since 12/30/1899
Differential	The change in the system time as a result of the sync specified as a fractional number of days

Custom Map Layer Data

The map portion of WorldTime is actually based on a very powerful GIS tool (TGlobe: www.tglobe.com), of which, only a few features are used in this application. This section should help if you wish to have more accurate map details, display more or less data, or simply display custom data on the map.

Inside the WorldTime directory there is a directory called "map" WorldTime will attempt to load and display any layer (.lyr) files that are present in this directory. The standard install package includes several low resolution layer files suitable for most users. These files are lacking some of the finer details of Earth's geography and users with sufficient system resources may wish to substitute high resolution data for the included files.

File Formats

Currently, WorldTime can only read the TGlobe native .lyr format files. A converter is available to convert many other standard GIS formats. If you have GIS data in any standard formats that you would like to convert for use with WorldTime please send an email to mapdata@pawprint.net for more information.

In the near future, Additional map data, and higher resolution data will become available for download from the WorldTime web site.

Troubleshooting

Advice concerning some common problems that have been reported by the WorldTime users community.

Network Connections

The Dial-Now button seems to have no effect

WorldTime uses the Windows Dial-up Networking `rasdial.exe` command to connect to the Internet. If you use a dialler other than `rasdial` WorldTime can not automatically connect to the Internet. I plan to make this configurable in future versions.

To test if your computer is configured for `rasdial` go to a command prompt and type “`rasdial`” If the command exists the system will report any existing dial-up connections, you will otherwise receive an error.

Chimes

The chimes sound the incorrect number of times

WorldTime uses one of its internal clocks to determine how many chimes are required. If this clock is set incorrectly, the chimes will also sound incorrectly. Here are some things to check

- 1) Ensure that the correct clock is set as the *Chime Clock*.
- 2) Ensure your computer's system time is set correctly
- 3) Ensure your computers time zone is set correctly (this is fairly obvious as WorldTime basically can not function if it is not)
- 4) Endure that the WorldTime clock displaying your local time (if you have one) is set to have its *Clock Type* = 'Local'

Synchronization

WorldTime's sync feature seems to be “out” by 1 or 2 seconds

WorldTime uses either the NTP DayTime or SimpleTime protocols for synchronization. These protocols are only accurate to, at best, +/- 1 sec. The Full NTP protocol is accurate to 200ms and can take network delay into account. Thus, if you compare a clock synchronized using WorldTime with one maintained using the full NTP protocol you may notice a small discrepancy. WorldTime is not intended for use when synchronizing clocks that must be kept more accurate than this.

All Synchronization Attempts Fail

WorldTime uses a component that is included with the Delphi programming language for time synchronization. There are some limitations: namely that it can not synchronize through a firewall. Also there appears to be some problems with this component. Tests have indicated that some users who have had trouble synchronizing their clock can workaround the problem but replacing the server's DNS address with the actual IP address. You can either edit the file wtservers.wtd to add IP address information add an IP address directly in the NTP Server field on the preferences screen. If this does not solve the problem then, unfortunately, there are no others recommendations at this time.

Synchronization Sets the Clock Grossly Incorrect.

There are several things that can cause the Synchronization process to set the clock incorrectly:

- 1) The NTP server selected is not returning UTC: Although all standard stratum 2 servers are supposed to return UTC some of the servers in the WorldTime list return their local time instead - If you suspect this is the problem try the National Institute of Standards and Technology server (time.nist.gov) from the U.S.A as they certainly return UTC are usually reachable.
- 2) DateTime String protocol has been selected: This NTP protocol is not only inaccurate but risky. Rather than returning the date and time as a number it returns text stating the date and time in ASCII. There is no specified format for the returned string: thus forcing WorldTime to "Guess" its format. If the synchronization attempts are not setting the clock correctly - and/or, as a general rule it is best to choose the Simple Time protocol - it is also far more accurate.
- 3) The local machine's Time Zone is not set correctly: The synchronization process sets the local machine's "System Time" which is always UTC. Windows systems translate this system time into the local time (for display to the user) based on the Time Zone selected. To check which time zone is currently in use on the local system open the WorldTime System Time Information tool - the standard and daylight savings Bias (UTC offset in minutes) will be listed.
- 4) The *Server UTC Offset* is not set correctly: This value should be 0 to allow synchronization with any NTP server that is returning UTC.

In any case if the *Warn if Sync Differential is > 45 mins* box is checked in the *Synchronization Preferences*, WorldTime will present a confirmation message prior to setting the clock whenever the change would exceed that amount as a result of a NTP sync.

FAQ

In an attempt to answer some of the most common questions regarding WorldTime here comes the old Q and A...

Why is WorldTime free?

WorldTime is free because I want it to be! I started writing it because I didn't want to pay the (sometimes outrageous) prices for other world clock software that was available at the time. Now that I have got a viable application I see no reason to charge others for it. Regardless, WorldTime does benefit me in several ways: I learn better programming, I meet tons of interesting people via email, and my web page is completely paid for by the advertizing revenue WorldTime generates. Last but not least... when I started out on the internet using NCSA Moasic as a browser (Netscape didn't even exist yet!) everything was free - that was the whole point. Now, in my small way, I'm attempting to preserve the original goal of the internet - free, easy, mutual collaboration and development.

Why are some “major” locations not in the list?

The WorldTime location list is primarily created from user submissions via the AddLocation form on the WorldTime web site. I don't have time to search through data and find all the information but rely on the many users of WorldTime to help out in this area. Thus, if a location is “missing” it just means that no one else has submitted it yet and that since you need it it may be high time for someone (hint hint) to do so.

What programming language is used to create WorldTime

The entire WorldTime application was coded using the Borland Delphi programming environment (see www.borland.com) I started using Delphi 3 and have been using Delphi4 since WorldTime version 3.0. Now since version 5.3 I have converted to Delphi version 5