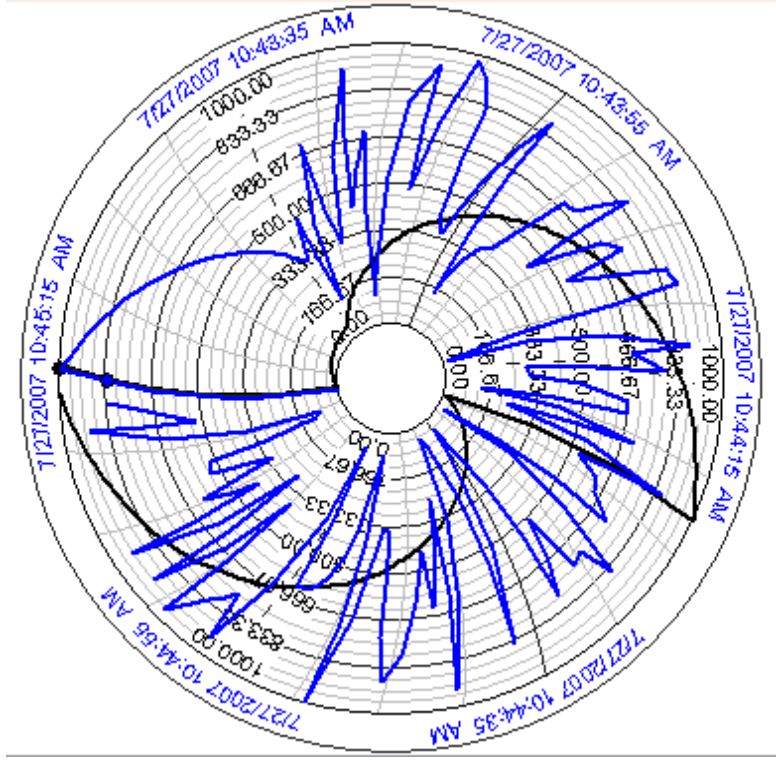




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Getting Started

The TrendWorX32 Viewer ActiveX component that can be used in any application that is capable of displaying ActiveX objects. You add the Viewer by selecting that component from within the design environment of an application such as GraphWorX32, other GENESIS32 components, or by embedding this component into HTML or other display files. TrendWorX32 Viewer is an OPC client application that provides both real-time trending as well as historical data trending. The Viewer can work with a variety of data sources, including third party OPC servers and certain database applications.

There is no menu command for the TrendWorX32 Viewer on the Start menu, the command for TrendWorX32 opens an application that is called the TrendWorX32 Container which typically opens showing the TrendWorX32 Viewer in the Container window.

With TrendWorX32 Viewer you can do the following things:

- Display real-time data from one or more sources.
- Display historical data from one or more data sources.

TrendWorX32 Viewer is interfaced to display memory-based historical data from the GENESIS32 Persistent Trending memory-based data-logging OLE Automation server, as well as historical servers supporting the OPC HDA (Historical Data Access) Interface, such as the TrendWorX32 SQL Server.

- Work with and modify trending data to provide statistics and other functions.
- Collect verified trending data into a multithreaded buffer at a rate you choose.

The TrendWorX32 Viewer ActiveX supports VBA Scripting as well as language aliasing, local aliasing, and global aliasing. The Viewer is capable of displaying three types of trends:

- Real Time
- Persistent
- Historical.

The viewer ActiveX also allows for personalization.

TrendWorX32 Viewer allows the data to be collected at a different rate and graphically drawn at a multiple of the data-collection rate in order to minimize overall system load. Currently the minimum scan rate is set to be 10 milliseconds, and it is required that all data-collection rates that you set be an integer multiple of 10 milliseconds.

You can configure the desired number of samples to view on the screen (up to a maximum of 7200) and the desired window time period. All objects exposed by the TrendWorX32 Viewer ActiveX can be accessed directly through OLE Automation, and their associated properties can be manipulated directly through C++ clients (which support OLE containment) or Visual Basic applications. The fastest display refresh (redraw) rate is 50 milliseconds.

Internal Architecture of ActiveX

The internal architecture of the TrendWorX32 Viewer ActiveX is composed of three individual object managers:

- A **Point** manager (used to store point name information)

- A **Variable** manager (used to store data buffers and server updates for each point)
- A **Pen** manager (used to represent the visual aspect of the collected data points)

In addition, TrendWorX32 Viewer has the following threading mechanisms:

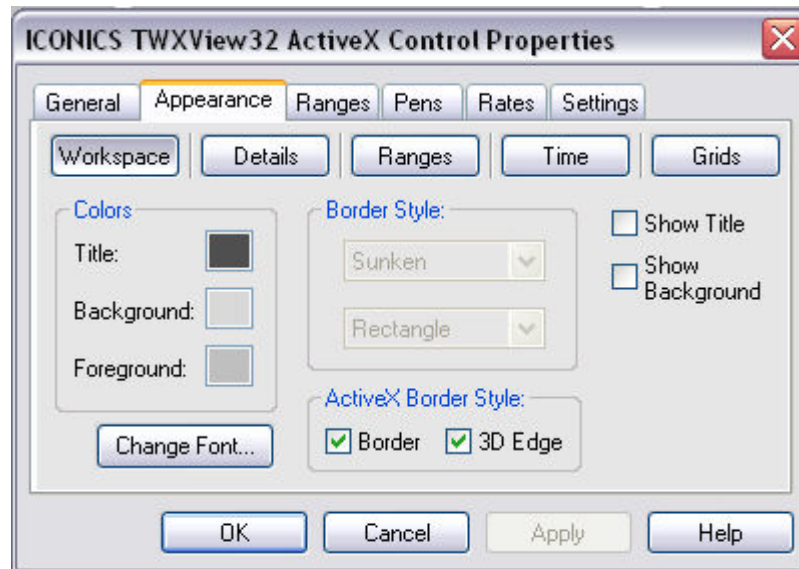
- A **Main** (primary) thread
- A **Worker** thread used for data updates and buffer management

Configuration Mode

As an example of how the TrendWorX32 Viewer is used in GraphWorX32, consider the following:

1. Click **Start**, Programs, **ICONICS GENESIS32, GraphWorX32**, and then select the **GraphWorX32** command
2. Click on the **TWXView32 ActiveX Control**  button to insert a TrendWorX32 Viewer onto the GraphWorX32 design surface.
3. **Double-click** on the ActiveX control to bring up the **Properties** window.
4. Click on the **Appearances** tab, select desired options such as the background and foreground colors, text font, size, and color, as well as how the grid and detail section of the viewer should look as desired.
5. To add a background to the Trend Viewer in the Workspace, check the **Show Background** check box and browse for a image file.

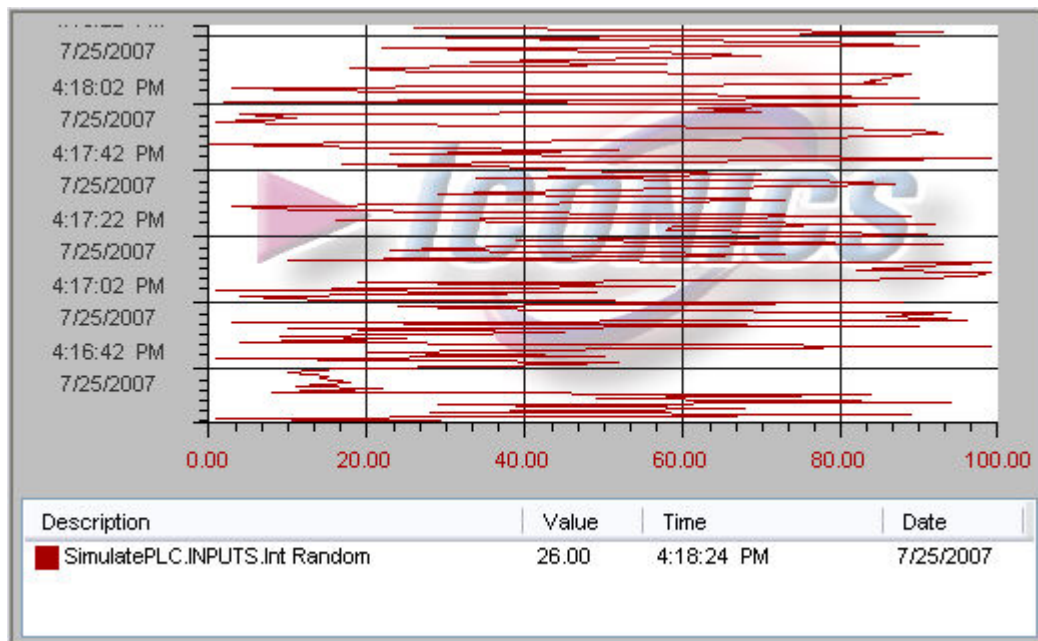
Trend Viewer Properties



6. **Select** the file, and the **position** option (center or stretch to fit).
7. Click the **OK** button.

In GraphWorX32 click the Runtime menu to go into runtime; you should see your trend viewer displaying the background image you have chosen as shown below.

Trend Viewer with a Background Image



Runtime Mode

In runtime you can do the following:

- Double click on the graph to display the TrendWorX32 toolbar (shown below); the toolbar lets you freeze the display, edit pens, edit trends, show statistics, and more.

Double click on the graph to view the Trend Viewer toolbar and modify runtime options.



In runtime, you can edit all properties except the options on the Appearances tab of the Properties dialog box.

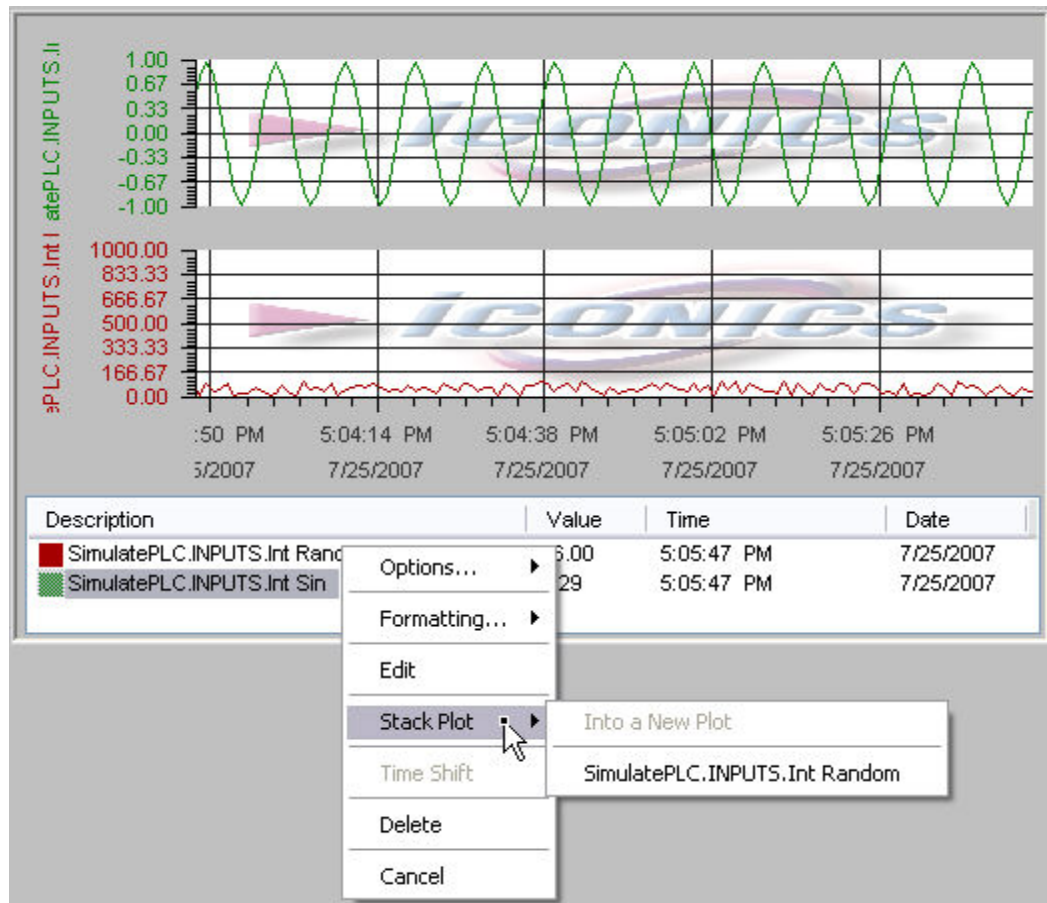
In runtime, you can create stacked plots by right clicking on a pen in the Details windows and selecting the Stacked Plots command from the context menu. This option is not available in configuration mode.

To stack plots:

1. **Highlight** the pen you want to stack into a different plot in the **Detail** window.
2. **Right click** on the pen and select **Stack Plot** Into a New Plot.

You will now have two plots in the same trend window.

You can use the Stacked Plots command to put split up your pens.



With the three elements you've seen: the Properties dialog box in the Configuration mode; the Toolbar and pen and graph context menus in Runtime mode you can control most of the important features contained in the TrendWorX32 Viewer ActiveX.

What's New

Version 9.10 offers several new features that were not part of previous versions of TrendWorX32 Viewer 9.01 and before. These settings allow you to better control aspects of the Runtime mode

- A new setting for the Main Toolbar dialog box can set the docking characteristics of the toolbar so that it docks to either the top, middle, or bottom of the ActiveX control. The setting is found in the Settings tab of the TWXViewer32 ActiveX Control Properties.
- The Cursor can be set in Runtime in V. 9.10, whereas in previous versions you could only apply the cursor in Freeze mode. This setting called Cursor always on can be enabled in the Settings tab of the TWXViewer32 ActiveX Control Properties dialog box.
- Upon registration of the ActiveX the ICOSSETUP.INI file now contains all applicable global configuration options along with their default values. Most of the options are then be in the TwxViewer GUI on a per instance basis.
- TrendWorX32 now has a feature that lets you alter the scale of your trend Changing Range Values for both in the X- and Y-axes on the fly. This allows you to zoom in or out changing the ranges. You can double click on the

minimum and maximum values on both axes and enter your desired starting value and ending value for the range. You can set scales separately in Runtime mode, Freeze mode, and Zoom.

- The Zoom Ruler feature is another way of determining how much you have zoomed into your image. New in V. 9.10 enabling the Zoom Ruler setting puts a percentage axis at the right hand side of your graph.
- In the past when a plot ended before filling up the graph a line indicating where the last value of the plot would end would be drawn. This feature, now called Draw Line into Future is an Options Settings that can be turned on and off, as desired.
- In previous versions of TrendWorX32 Viewer date and time values were shown together. When you turn off the Time setting for a display, the Date setting would become disabled as well. Version 9.10 allows you to modify Time Date Settings turn off Time while still showing the Dates on your display.

Trending Quick Start

TrendWorX32 Viewer is used to view real time, historical, or persistent trending data, as follows:

- **Real time trending** data refers to data collected at the same time it is displayed.
- **Historical trending** data is data that has already been collected and is stored on disk in a database or some other type of file structure.
Historical data runs the trends over a time period that you choose, the data changes with time but the data isn't what's currently being collected.
- **Persistent trending** data is data that is currently held in RAM, and is volatile. When you restart your computer persistent trending data is lost unless the contents of memory are saved out to disk.

Persistent data runs the trends over a time period that you choose, the data changes with time but the data isn't what's currently being collected

Configuration

In the steps that follow the TrendView32 ActiveX is opened in the TrendView32 Container. The container allows you to build TrendWorX32 only displays. Most GENESIS32 applications use the ActiveX component within other applications. In some instances you may want to have a TrendWorX32 Container application; for example, when you want to publish a display to a Windows Mobile device.

Note: The data collection rate and history refresh rate should match your history trend configuration's data collection rate and data logging rate

To create a trend display inside the TrendWorX32 Container:

1. Start the TrendWorX32 Container by clicking on **Start, Programs, ICONICS GENESIS32, TrendWorX32**, and then selecting the **TrendWorX32** command.
2. Click on the **Trend Viewer ActiveX** icon to add a Trend Viewer ActiveX to the container.
3. Double-click the **Trend Viewer ActiveX** to bring up the **Property** inspector

dialog box.

4. Click on the **General** tab and specify the **type** of chart desired and a **configuration file** for the Trend Viewer.
5. Click on the **Rates** tab, and specify the **data collection rate** and **history refresh** rate.
6. Select the **Pens** tab to add pens for trending.

At this point in the configuration you will need to set your data source, which controls which type of trend you will display in your graph. The sections that follow describe the setup for the three different types of trends.

Real Time Trending

To view data as it is being collected (real-time):

1. Click the **OPC Tags** button to add real time OPC pens for trending.
2. The Unified Data Browser will open.
3. Select the **OPC Server** and the **tags** to display that data.
4. Click **OK** to close the Trend Viewer Properties dialog box.
5. Click **Runtime** to see your real time trends.

Persistent Trending

To view data stored in RAM (persistent):

1. Click on the **Tags Menu** button in and select **Persistent Trends**.
2. A window will come up and you should see your group name in the upper half of the window.
3. Double click on the **group name** and the tags in that group should then be visible in the lower half of the window.
4. Choose the **tags** to be displayed from the list
5. Click **OK** and close the **Properties** inspector.
6. Click **Runtime** to see your persistent trends.

Historical Trends

To view data stored on disk (historical), do the following:

1. Click the **Tags Menu** button and select **History Tags** from the drop down menu.

The Unified Data Browser will open for you to choose the HDA server and select the tags to view historical data from.

2. Select the **starting and ending date and time**.
3. Select your **tags** and click OK to close the Properties dialog box.
4. Click **Runtime** to see your historical trends displayed.

Note: Data collection doesn't stop when you switch to the Historical display

TrendWorX32 Viewer ActiveX Features

With TrendWorX32 Viewer you can create the following charts:

- Time plots
- XY-plots
- Bar plots
- Logarithmic plots
- Strip charts
- Circular charts
- Custom data displaying

TrendWorX32 Viewer ActiveX includes the following operational features:

- Highly customizable component
- Fast data replay
- Independent data collection / screen refresh mechanism
- Full exposure through OLE Automation objects
- Extensive runtime configuration
- Integration with the ICONICS Security Server
- Easy Visual Basic integration
- Drag-and-drop support during runtime
- Extensive real-time signal information (including signal quality)
- Expression handling
- User-configured alarm levels for signals
- User-defined global or relative signal ranges
- Global aliasing with browsing support
- Language aliasing with browsing support
- Support for VCRWorX32 data replay
- TraceWorX debug tracing support
- Enhanced expression support

TrendWorX32 Viewer works with the following data sources:

- Interface to OPC Real-Time servers
- Built-in buffering system
- Support for custom imported data
- Latest HDA compliance support
- Enhanced daylight savings time support for historical replay

You have control in the interface over:

- Title

- X-grids
- Y-grids
- Ranges/x-axis ranges (for XY plots)
- Details
- Time settings
- Statistics
- Pens
- Multilingual support
- Real-time statistical information with .csv file support
- Fixed location or scrolling grids
- Embedded signal simulator
- Support for multiple plot types, including:
- Reordering on Trend pens
- Progress indicator dialogs for potentially time consuming pen connections or historical updates
- Support for stacking of multiple trend plots
- Support for background images
- Customizable background printing option
- Improves the X/Y axes auto-size feature
- Tick mark interval support on X/Y axes
- Customizable time stamp spacing in trend display
- Plot title support on Y-axis
- Font-sensitive auto-size support on chart title
- Improved grid animation control for the new plot style
- Improves the user-friendliness and readability of configuration panel and trend displays
- Fully backward compatible with the previous plot style

Note. TrendWorX32 up to and including Version 6.1x uses the Windows-based APIs for converting a time from local time to UTC or from UTC to local time. The Windows APIs do not correctly adjust the conversion for the daylight savings time if the timestamp to be converted was obtained from a different time period (i.e. it was obtained in "summer" time but now we have "winter" time). TrendWorX32 Version 7.x or later has time conversion utilities that account for this discrepancy

When considering the time conversion, consider:

- These functions are used by default (no user enabling is required).
- This is what they do in order to convert each time stamp:

They check Windows for the PC Time Zone Settings and to see if automatic daylight savings is enabled.

They also obtain from Windows the times/dates for switching over. (These dates do not change are in the form of, e.g., the first Sunday of April.)

Depending on the previous information, the new functions properly adjust the conversion times compensate for daylight savings time.

Working with Trends

A trend is the measurement of data characteristics of a data source over time. Trend settings allow you to control the following characteristics:

- The data source that is selected
- The data collection period (how often a data point is measured and stored)
- The range of data that is displayed.
- The settings for the display grid.

Other aspects of the trend display are controlled independently of trend settings, such as the pen characteristics.

Edit Trend

To edit trends:

Click on the **Edit Trend** button on the Trend Viewer toolbar to open the Edit Trend dialog box, shown below.

Edit Trend dialog box



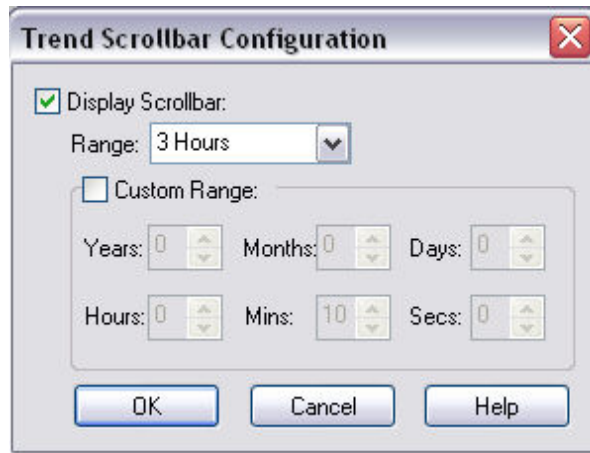
The Global High/Low Ranges fields show the ranges that were assigned in the Ranges tab of the Properties dialog box. If the Global Ranges box was not checked on that tab, then this section of the Edit Trend dialog box will be unavailable.

The Grids section of the Edit Trend dialog box determines how many lines along the X-axis and Y-axis make up the grid displayed in the Trend window.

Trend Scrollbar Configuration

The **Scroll Bar** button opens the **Trend Scrollbar Configuration** dialog box sets the time range for how far back you will be able to scroll while in freeze mode. This dialog box is shown below.

Trend Scroll Bar Configuration dialog box



Zoom Settings

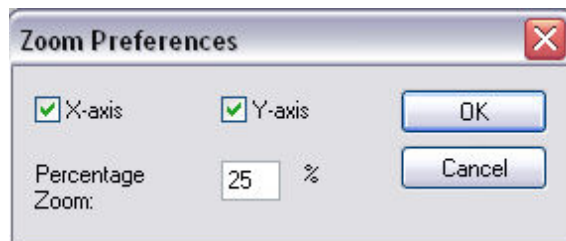
Zoom settings control the ranges displayed in the X-axis and Y-axis of a trend. The settings you select control the measure of granularity with which you can zoom in or out on your data using the Zoom Trend button on the Trend Viewer toolbar.

To select the settings for the Zoom Trend button:

1. Click the **Zooming** button in the **Edit Trend** dialog box.
This opens the **Zoom Preferences** dialog box, shown below.
2. Select which **axis** will be used as the basis for the zoom feature.
3. Enter a **percentage** into the **Percentage Zoom** text box.

A percentage of 50% will apply a zoom in factor of X2; while a percentage of 25% zoom in by a factor of X4. That is, for 25% a scale that went from 0 to 1000 will be scaled down to 250 units. The actual range of the zoomed graph you see depends on where your cursor was when the zoom was applied. For a 4X zoom if the value was 0, then the range would be 0 - 250. For a value of 450 the range displayed would be 325 to 575.

Zoom Preferences Dialog Box



Note: If you use the "rubber band" zooming feature, these options will be ignored. In addition, these options apply globally for all the TrendWorX32 Viewers. That is, they are not saved on a per-individual Viewer ActiveX basis.

To **zoom in by a factor** on a trend in Freeze mode:

1. Click **Zoom Trend** button  icon on the toolbar.

2. **Move the cursor** to the location you wish to zoom in on.
3. Click the **left mouse** button to **zoom in** at your current location.

To zoom out by a factor on a trend in Freeze mode:

Right click on the trending area.

Or, hold the **Shift key** and click on the **Zoom Trend** at your current location.

The setting you selected for the zoom feature apply to the amount of zoom that is applied.

In addition to the point-and-click zoom function, the TrendWorX32 Viewer ActiveX also supports a **rubber band** or **box zoom** approach to zooming.

To **zoom into a specific area** of your trend:

1. Click the Zoom Trend button to enable the point and click zoom function.
2. Hold the **Shift** key, then click the **Left Mouse** button and drag to **select the area** of the trend graph that you wish to zoom in on.

Zoom Ruler

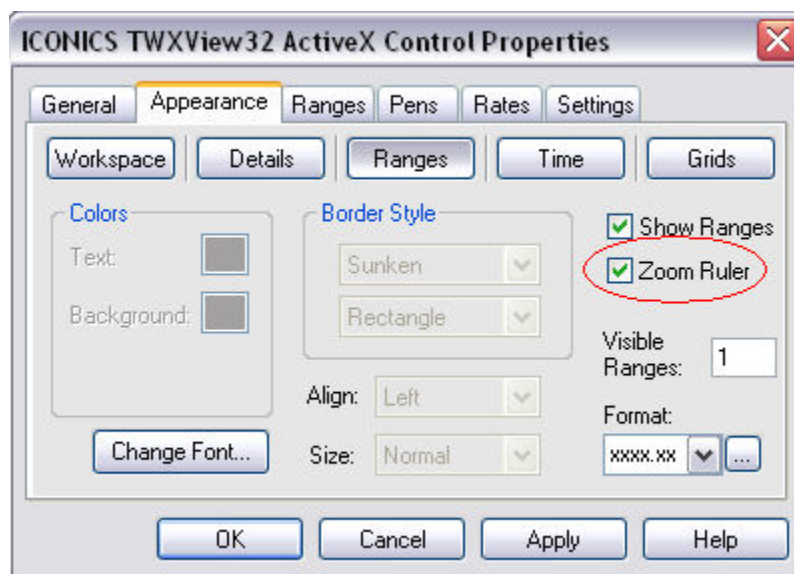
If you wish to see the percentage that you have zoomed into your graph a new feature in version 9.10 called Zoom Ruler displays this information. When the setting is enabled your graph will contain a percentage scale on the right hand side of the display. The figure in the next section has this feature enabled.

To place a Zoom Ruler on your display:

1. Double click on the ActiveX to display the ActiveX Control Properties dialog box.
2. Click the Appearance tab, then the Ranges button.
3. Click the Zoom Ruler check box to select it and enable the feature.

Or, click to deselect the check box and disable the feature.

The Zoom Ruler setting.



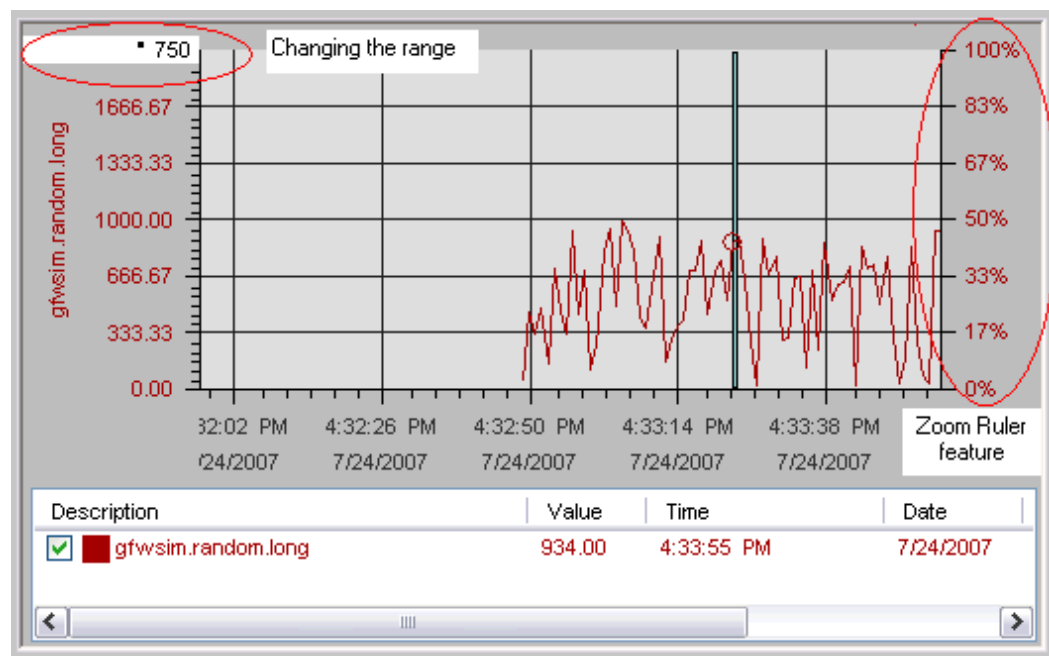
Changing Range Values

The TrendWorX32 Viewer is a feature that allows you to zoom in and out on a trend by altering the starting and ending value of a range. You can set the minimum and maximum values of the X-axis (abscissa) and the Y-axis (ordinate) - but not the time range - in Runtime mode, Freeze mode, and Zoom mode.

To change a scale value:

1. Double click on either: the minimum value of the X- or Y-axis
Or the maximum value of the X- or Y-axis
2. In the text box that appears into enter the new value for that end of your range as shown below for the minimum ordinate value.

To reset the range values on the fly, double click on the range point desired.

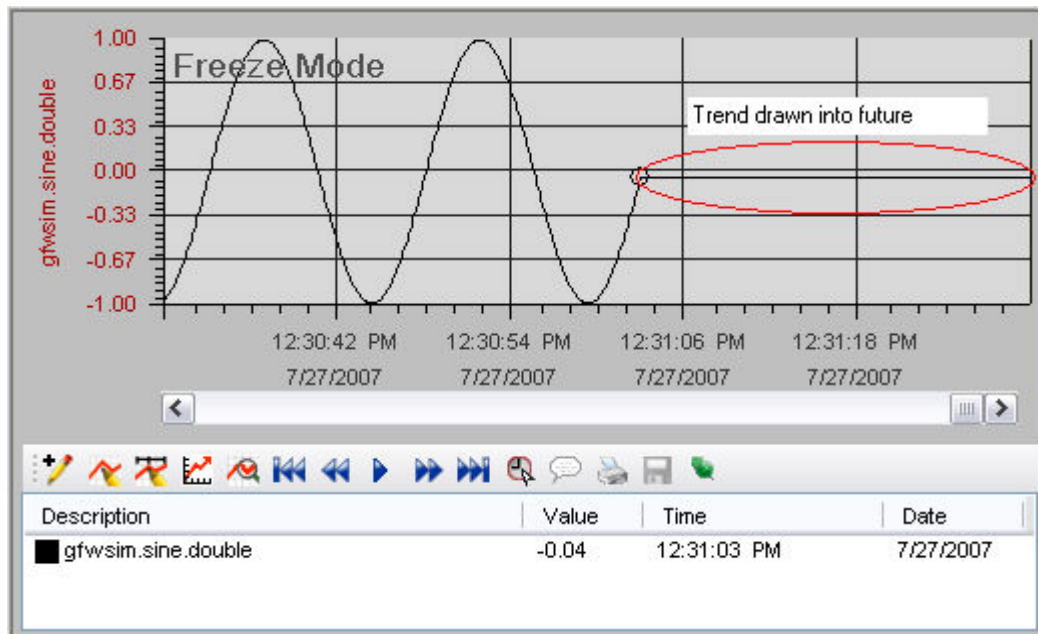


Change the Zoom Ruler value that lets you alter the scale of your trend, both in the X- and Y-axes on the fly allowing you to zoom in or out by changing the ranges. You can click on the minimum and maximum values on both axes and enter your desired starting value and ending value for the range. You can set scales separately. When you leave the current mode the scale or range settings return to the default specified in your properties. Modified ranges that are set in Runtime mode are saved when you perform a Save Configuration command.

Draw Line into Future

When a trend doesn't completely fill up the display either because the period data was collected or displayed was too small or if the trend was stopped for analysis, there is a gap between where the plot ends and the end of the chart in Freeze mode. In versions prior to 9.1 a line was drawn from the last value of the plot to that same value at the end of the plot. The figure below shows an example of this Draw Line into Future feature turned on.

The Draw Line into Future shown in Freeze mode.



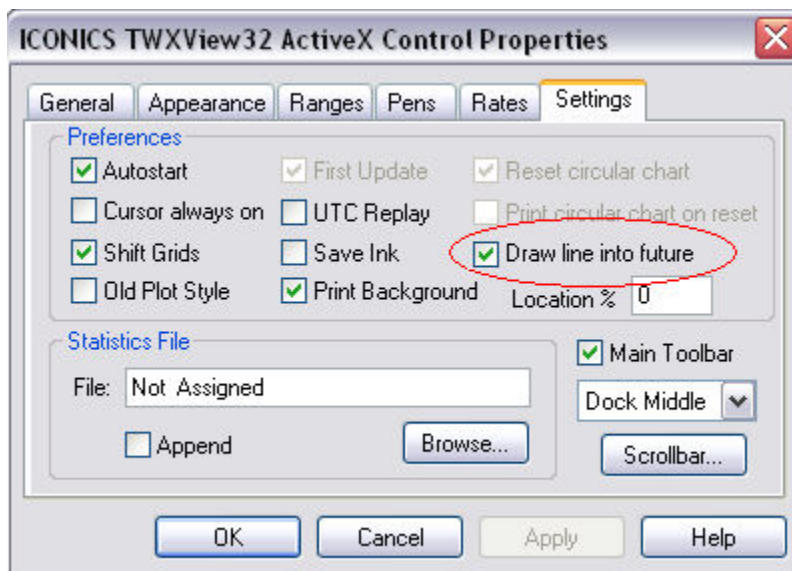
New in version 9.10 is the option to turn the Draw Line into Future off, so it will draw the line only to the current time.

To turn the Draw line into Future on or off:

1. In Configuration Mode double click on the ActiveX to display the ActiveX Control Properties dialog box below.
2. Click on the Settings tab.
3. Click the Draw line into future check box to select it and enable or turn it on the Draw Line into Future setting, as shown below.

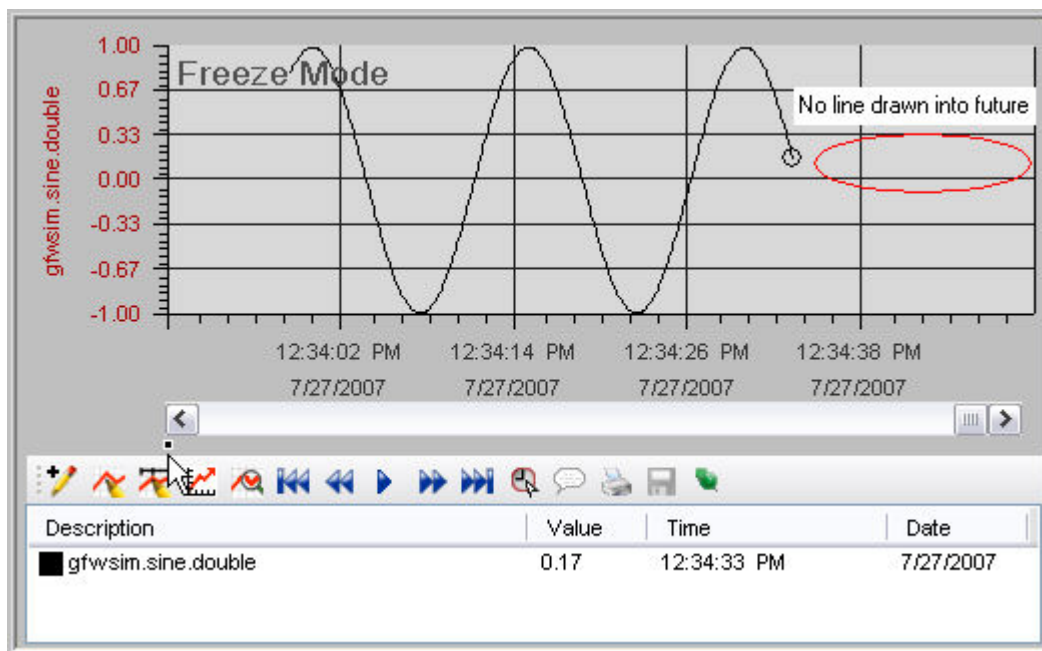
Or, deselect the check box to turn the feature off.

The Draw Line into Future setting.



The figure below shows how a graph would look without this line drawn.

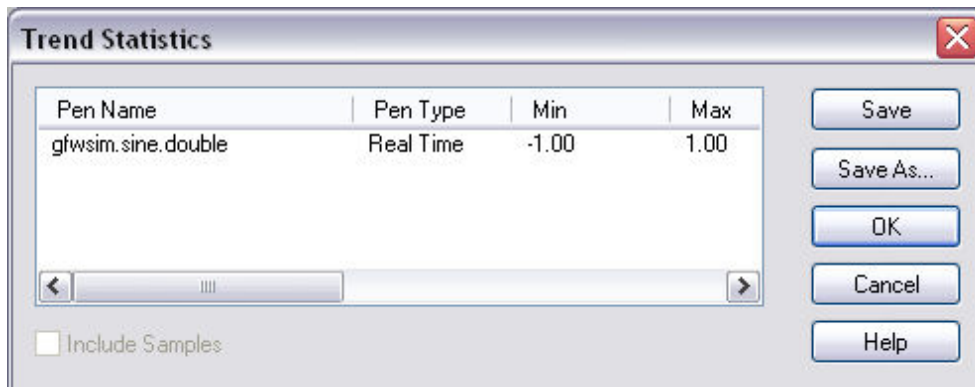
No Line Drawn into Future.



Statistics

Clicking the **Statistics** button on the **Trend Viewer** toolbar opens the **Trend Statistics** dialog box, shown below.

Trend Statistics Dialog Box



The **Trend Statistics** dialog box shows relative statistics for all pens in a trend. In the case of bar plots, the statistics window shows the statistics profile of all signals combined. When the **Save** or **Save As** buttons are clicked, the **Save As** dialog box opens, and you are prompted to enter a file name for the statistics. The statistics will be saved in a .csv file. Checking **Include Samples** includes each pen's samples in the saved statistics file, along with any historical comments for the history pens (if available).

Print Trend

You can print your trend in either Runtime or Freeze mode.



Note: The icon for the Print command is always enabled (although it is a light gray color).

to print a trend:

1. Click on the Print Trend button  on the Trend Viewer toolbar.
2. In the Windows **Print** dialog box make your selections.

The printout includes a header that provides some information about the trend, such as the settings and the name of the computer in which the trend originated.



Note: If you have background images in your trend, you have the option of printing the background. To print the background enable the **Print Background** check box. This option is on the **Settings** tab of the **Trend Viewer Properties** dialog box.

Save Trend

If the TrendWorX32 Viewer is configured to save its configuration into a .V32 file, independently of the container, WebHMI users will have the option in runtime mode to save current settings into the preconfigured file.



Note: The **Save Trend** function on the Trend Viewer toolbar is integrated into the Security Server and is ONLY available to WebHMI users. It is not supported in displays that use global aliases.

To save TrendWorX32 Viewer settings in WebHMI:

Click the **Save Trend** button  on the **Trend Viewer** toolbar.

In the a WebHMI application, this file will also be the configuration file that is loaded whenever the HTML page is refreshed.

Connections

The TrendWorX32 Viewer can display data from:

- Real-time signals connected to OPC servers
- calculated variables (using expressions)
- ICONICS simulated data and custom (user-fed) data through OLE Automation
- Historical data connected to OPC HDA servers (such as ICONICS TrendWorX32 SQL Server).
- Signal connections can be established in various ways:
- In **Configuration mode**, through the **Pens** tab of the **TWXView32 ActiveX Properties** dialog box

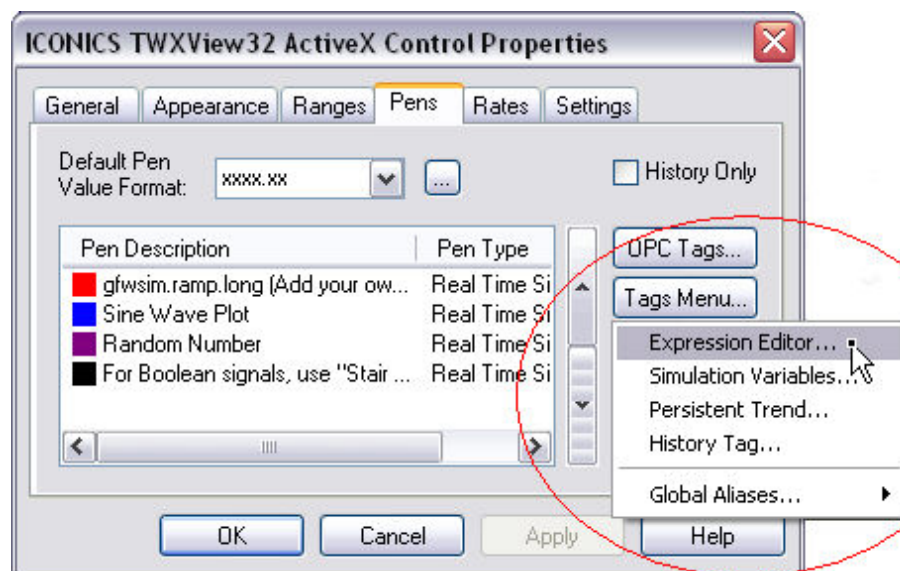
- In **Runtime mode**, through the **Edit Pens** button on the **Trend Viewer** toolbar
 - Using **OLE Automation** methods (such as "AddRealTimePen" and "AddHistoryPen") and VB Script/VBA
 - Using **drag-and-drop** (text format), in **Runtime** mode only
- To connect a real-time pen to a signal using drag-and-drop, the TrendWorX32 Viewer must be activated and in runtime mode. The drag-and-drop object should be of text type.

Once a signal is connected to a TrendWorX32 Viewer pen, the TrendWorX32 Viewer adds the pen to its buffering system manipulation and starts data collection and data display.

To configure a pen to display a calculated variable:

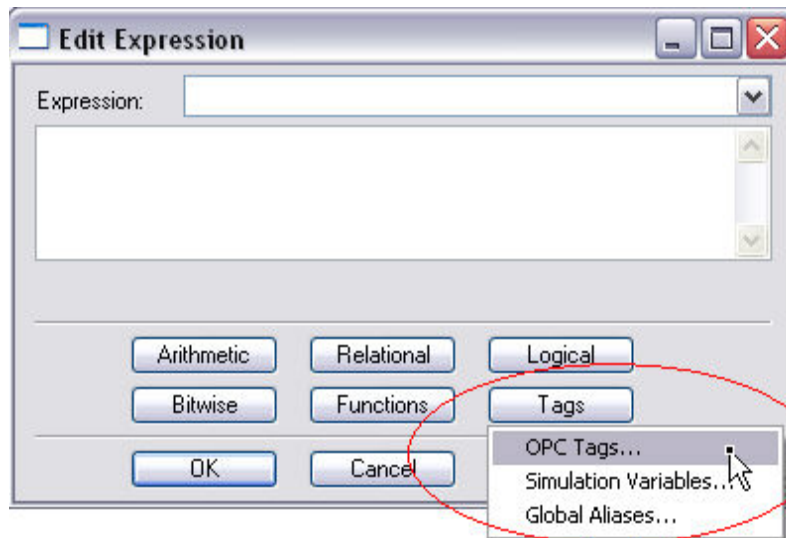
1. Double click on the **TrendViewer32 ActiveX** to open the **ActiveX Control** Properties dialog box.
2. Click on the Pens tab.
3. Click on the **Tags Menu** button and select the Expression Editor as shown below.

The Expression Editor command on the Tags Menu.

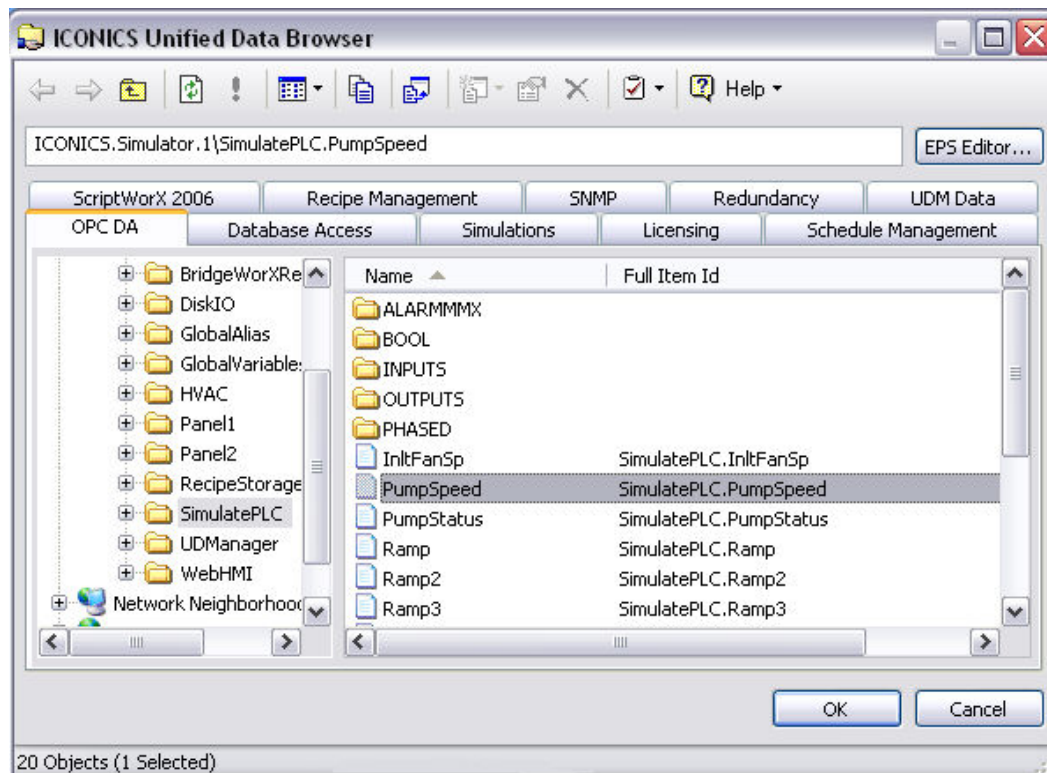


4. Select the **Expression Editor** command.
5. Click on the **Tags** button, and then on the **OPC Tags** command to connect pens to real-time OPC server signals as shown below.

The OPC Tags command opens the ICONICS Unified Browser.



6. In the **Unified Browser** select the **OPC tag** you wish to capture trend data for.



The TrendWorX32 Viewer ActiveX utilizes the ICONICS thin wrapper OLEexpress to communicate to OPC servers, therefore providing a very fast and efficient mechanism for real-time data acquisition and display.

In addition to the **OPC Tags** options, the following global alias options allow for global aliasing connections:

- **OPC Tag Alias.** OPC Tag Alias opens the Global Alias Browser, where you can select from a list of configured global aliases.

- **Persistent Trend Alias.** Persistent Trend Alias, requires you to edit the pen after the alias connection is made, and create the alias for the Persistent Trend group for proper operation.
- **History Tag Alias.** If you select a History Tag Alias pen, you will be prompted to first pick a historical tag from an OPC HDA server and then select the alias to use. After the connection is made, you will be asked to edit the pen and select the remaining aliases.

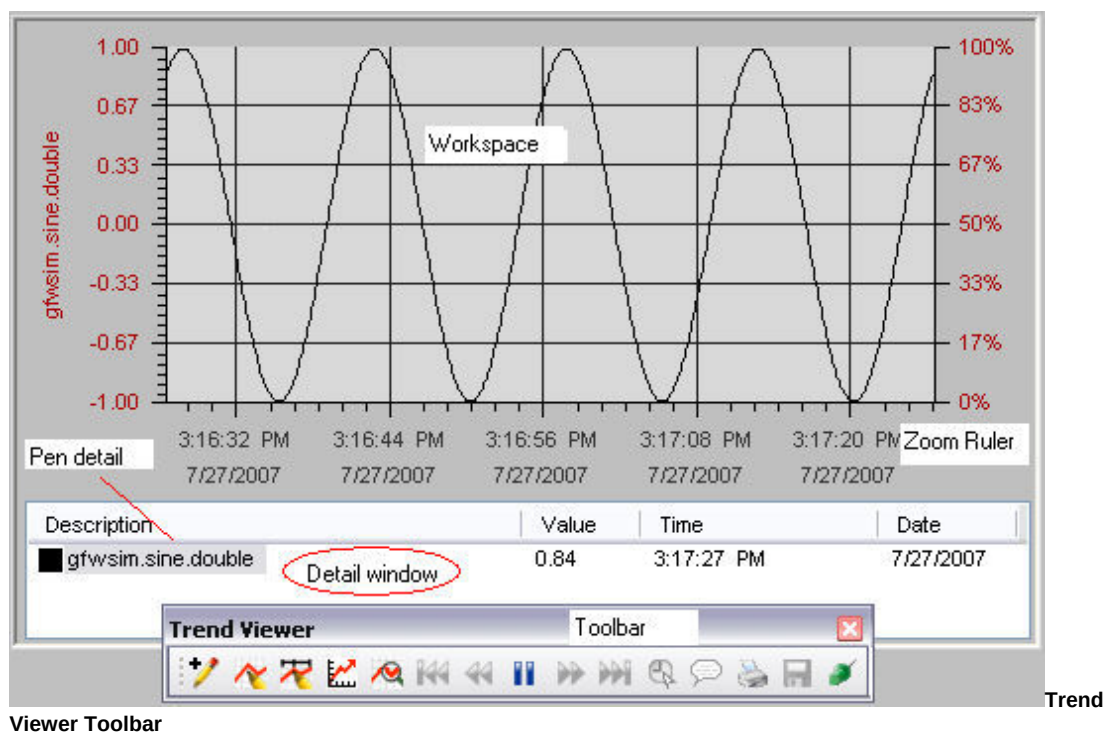
Refer to the next topic on Historical Replay for information about how to set your trend display to view data stored on disk. In addition to real-time and historical data, the TrendWorX32Viewer also supports the custom pen type through OLE Automation. This pen can be fed with user data using OLE Automation methods.

User Interface

User Interface

The different areas of the TrendWorX32 Viewer are shown in the figure below.

Trend Viewer32 Interface in Runtime mode



The **Trend Viewer** toolbar is the runtime user interface for the ActiveX. The toolbar provides access to various runtime TrendWorX32 Viewer ActiveX functions and operations. To view or hide the toolbar, double-click the TrendWorX32 Viewer data surface during runtime.



Note: You cannot view the toolbar in configuration mode.

Trend Viewer Toolbar, as viewed in Freeze mode.



The **Trend Viewer** toolbar contains the following buttons, whose functions are described in the sections below:

 **Edit Pens** button. When you click on this button the **Trend Pen Configuration** dialog box appears allowing you to modify a pen's display and data representation.

 **Edit Trends** button. This button opens the **Edit Trends** dialog box which allows you to change the range of the data displayed as well as the granularity of the grid.

 **Edit Periods** button. Click on this button to open the **Trend Edit Period** dialog box. Use this dialog box to set the data collection rate as well as the how long (the period) trend data is collected.

 **Statistics** button. Click on this button to open the **Statistics** dialog box which displays various statistical measures of your trends. You can find minimums, maximums, start and stop times, averages, and standard deviation, and more.

 **Zoom Trends** button. Click on this button to change the scale of your display (the Y axis or ordinate). Each click zooms in further and further. To reset your original scale, hold down the Shift key and click on the Zoom Trends button.

 **Page Back** button. This button shifts the trend display back from the cursor line by one trend period. This function is available only when the trend display is in freeze mode. The TrendWorX32 Viewer retrieves and displays historical and persistent trend data from the TrendWorX32 Persistent Trending memory buffers.

 **Cursor Back** button. Click the **Cursor Back** buttons in freeze mode to move the cursor line back from its current position. The Cursor is available in version 9.1 in both Runtime and Freeze modes (provided the appropriate mode is on); in previous versions it was available in Freeze mode only. Hold the **Shift** key and click the **Cursor Back** buttons to moves the cursor left 10 samples (by default).



Freeze Mode button. Click the enter Freeze mode. The Runtime button then appears in place of the Freeze mode button.



Runtime button. Click the button to return to runtime from Freeze mode. This button then changes to the Freeze mode button above.



Cursor Forward button. Click the **Cursor Back** buttons in freeze mode to move the cursor line forward from its current position. The Cursor is available in version 9.1 in both Runtime and Freeze modes (provided that the appropriate option is on); in previous versions it was available in Freeze mode only. Hold the **Shift** key and click the **Cursor Freeze** buttons to moves the cursor right 10 samples (by default).



Page Forward button. This button shifts the trend display forward from the cursor line by one trend period. This function is available only when the trend display is in freeze mode. The TrendWorX32 Viewer retrieves and displays historical and persistent trend data from the TrendWorX32 Persistent Trending memory buffers.



Set Right Time button. Click the button to open the **Set Trend Top/Right Time** dialog box. This dialog box enables you view a specific historical trend period. In freeze mode, this causes the TrendWorX32 Viewer to retrieve and display the selected historical and persistent trend data from the TrendWorX32 Persistent Trending memory buffers.



Show Comments button. Click to place the Viewer into freeze mode and retrieve all historical operator comments and batch information that is available.



Print Trends button. Click this button to opens the **Print** dialog box. The print output includes a header that describes the trend, such as the settings and the name of the computer in which the trend originated.



Save button. If the Viewer is configured to save its configuration into a .V32 file, independently of the container, WebHMI users will have the option in runtime mode to save current settings into the preconfigured file with this button. This function is integrated into the Security Server and is *ONLY* available to WebHMI users. It is not supported in displays that use global aliases.



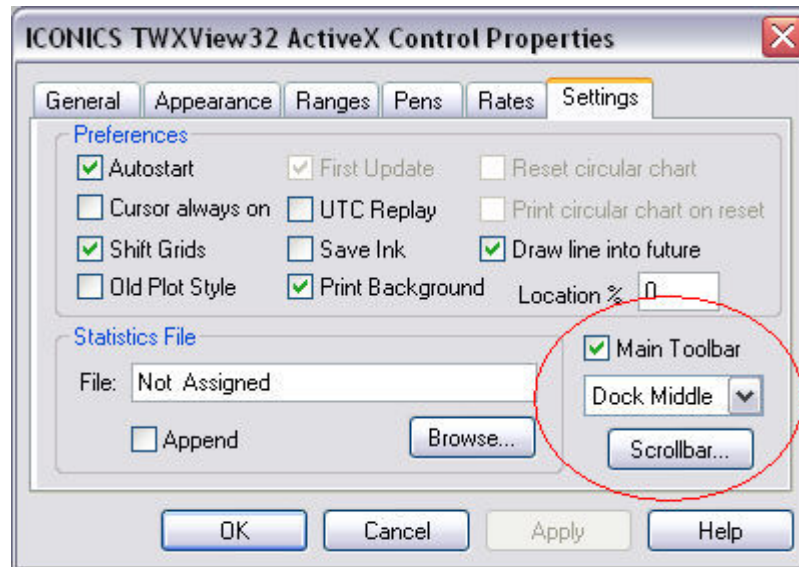
Dock Toolbar button. Click this button to dock the toolbar to the Top, Middle or Bottom of the Trend Viewer32 ActiveX. Click the button again to have the toolbar float.

Dock Toolbar

The toolbar can be docked either at the top of the Viewer ActiveX, the middle, or the bottom. To set the docking position:

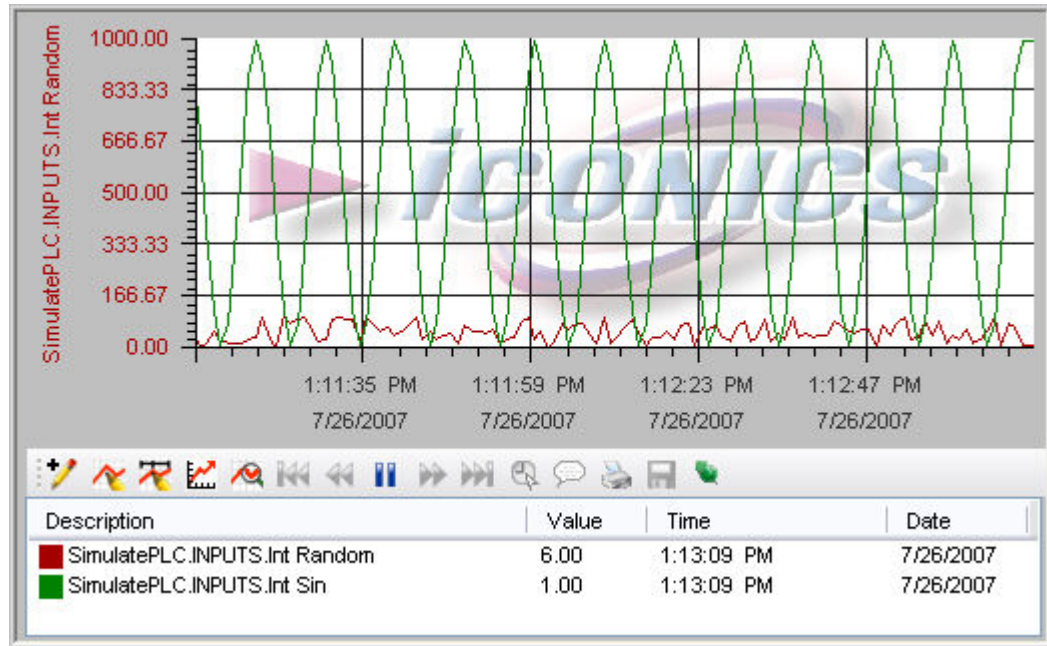
1. **Double click** on the ActiveX in Configuration mode
2. Click on the **Setting** tab in the **TWXView32 ActiveX Control** Properties.
3. Set the **docking characteristics** you desire in the section circled in the figure below.

The Docking section settings for the Trend Viewer Toolbar.



The figure below shows the Toolbar docked in the middle position.

The Toolbar shown docked in the Middle position.



To show the toolbar:

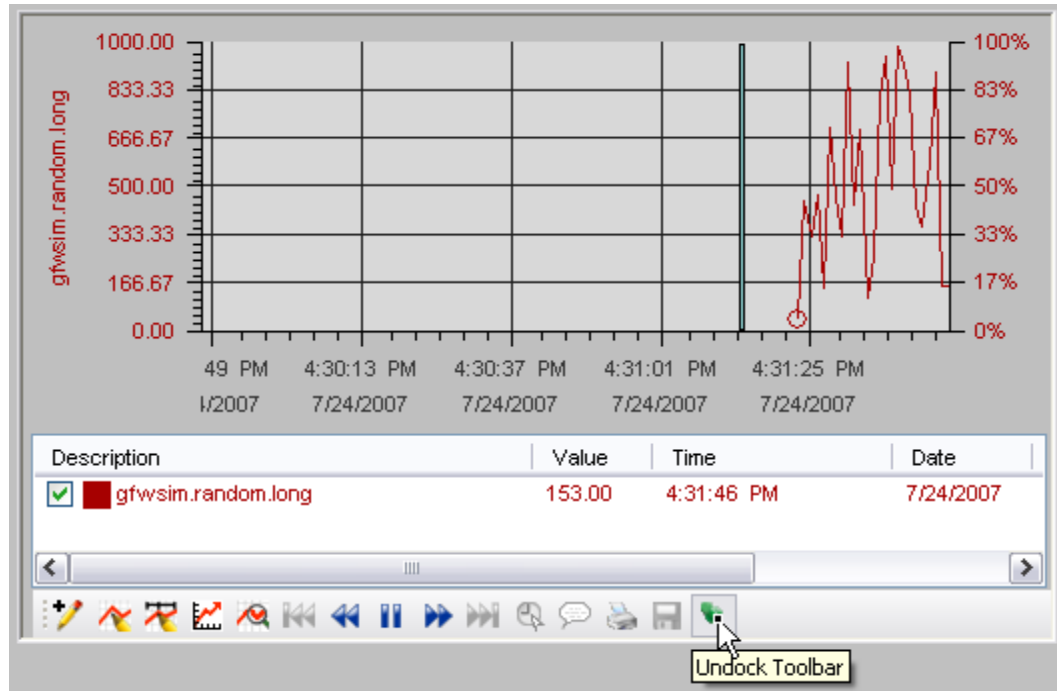
Open the **Setting** tab of the **Properties dialog** box as was described above, then click to **enable** the Main toolbar check box.

To hide the toolbar:

Click to **disable** the **Main toolbar** check box.

The figure below shows the toolbar docked in the bottom position, as well as indicating the Dock (and Undock) button.

The Toolbar docked at the Bottom.



The Cursor

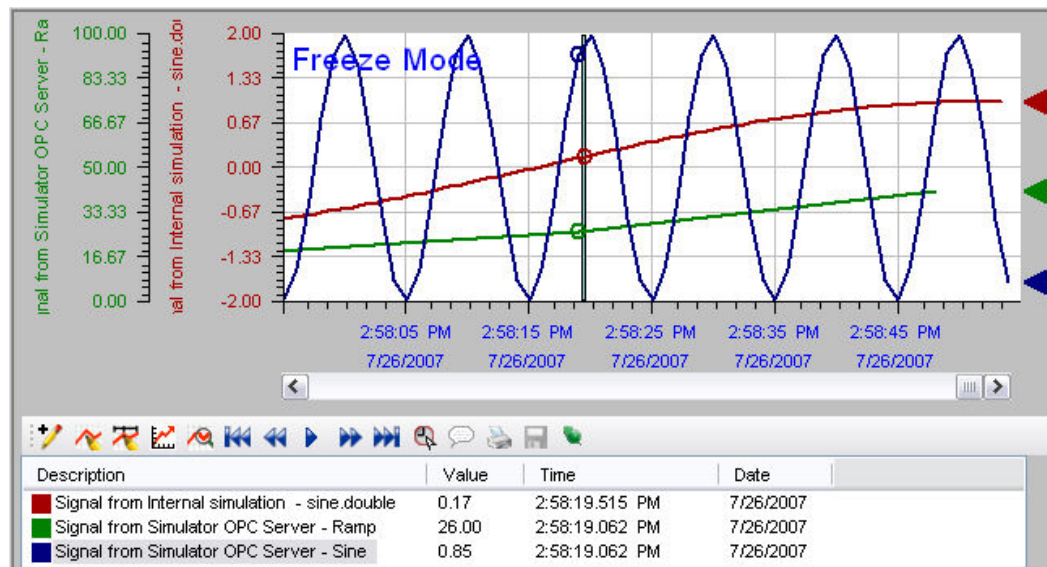
The cursor is an indicator of the currently selected position of your trend. The cursor is a black vertical line with circles in the color of the each pen where the line intersects the closest sample of the plot for that pen, as shown below.

The Cursor in Freeze mode

To **set the cursor** in Freeze mode:

Left click on the display in Freeze mode to set the cursor at that position.

The Cursor line shown in Freeze mode.



By holding the left mouse button down, you can move the cursor line and view the sample values, time stamps, and other parameters in the **Details** window. In freeze mode the trending function paging, is available.

The Cursor in Runtime Mode

There is a setting that lets you set the Cursor in Runtime mode called Show Cursor

To turn on the cursor in runtime:

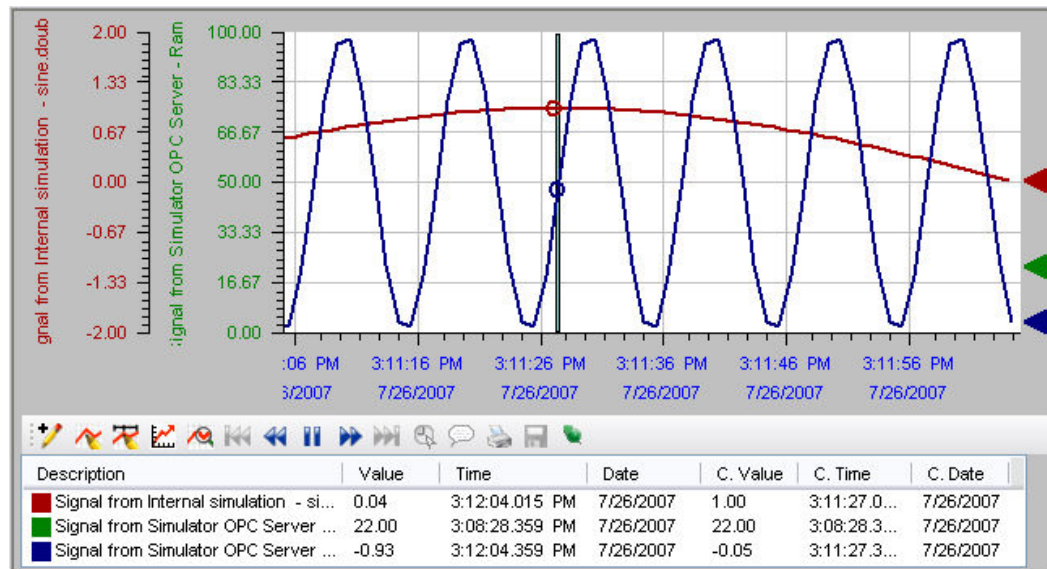
1. **Double click** on the ActiveX in **Configuration** mode.
2. Click on the Settings tab, then click to enable the Cursor always on check box, as shown below.

The Cursor always on setting allows you to set the cursor in Runtime mode.



The figure below shows a cursor set during runtime. The three pen markers (colored triangles) shown at the right of the graph are an option you can set during runtime from each pen's context menu. Notice that in the plot above in Freeze mode you don't see details beyond the Value, Time, and Date displayed; but in Runtime mode here at the right of the Details window you see the C. Value, C. Time, and C. Date or Cursor Value, Date, and Time for the cursor..

The Cursor line shown in Runtime mode.



Paging

The Paging function moves the display one trend period away from the cursor's position. Paging is available only when the trend display is in freeze mode. The TrendWorX32 Viewer retrieves and displays historical and persistent trend data from the TrendWorX32 Persistent Trending memory buffers.

To page:

- Click the **Page Back** button  on the **Trend Viewer** toolbar to shift the trend display back from the cursor line by one trend period.
- Click the **Page Forward** button  on the **Trend Viewer** toolbar to shift the trend display forward from the cursor line by one trend period.

INI Settings

The ICONIC .INI file contains stored settings retained from the previous or current session with GENESIS32 applications. To view the .INI file, go to the following location:

C:\DOCUMENTS AND SETTINGS\ALL USERS\APPLICATION DATA\ICONICS

After GENESIS32 version 9.1 is installed and the .OCX file is registered the TrendWorX32 section will have the following list of settings:

```
[TWXVIEW32\SETTINGS]
VCRSPEED=ICONICS.VCRWORX\SPEED
VCRTIME=ICONICS.VCRWORX\TIME
DRAWLINEINTOFUTURE=1
TOOLBARDOCKINGPOSITION=MIDDLE (TOP OR BOTTOM)
CURSORWHILEUNFREEZE=0 (1 IS ON ALL THE 0s ARE BOOLEANS)
DETAILSCOLORPERPEN=0 (MAKES THE DESCRIPTION THE SAME COLOR AS PEN IN SAME LOCATION AS CHECK BOX FEATURE)
```

```

DETAILSCHECKBOXES=0
RANGESPERCENTAGE=0
[TWXVIEW32\ZOOM OPTIONS]
X-AXIS=1
Y-AXIS=1
PERCENTAGE=25
[TWXVIEW32\DATA PROPERTIES]
OPC SAMPLE FILL RATE=0
MAX PEN SAMPLES=7200
SHOW RUNTIME TEXT=0
BUFFER DATA=1
[TWXVIEW32\PRINT PROPERTIES]
HEIGHT SCALE FACTOR=5
WIDTH SCALE FACTOR=5
PRINT HEADER=1

```

Most of the settings are exposed in the user interface, but not all

Your .INI file may contain different values depending upon selections that you make in the TrendWorX32 GUI. Settings with values of 0 or 1 are typically Boolean values, that is 0 for False and 1 for True. Some settings such as TOOLBARDOCKINGPOSITION can take settings such as TOP, BOTTOM, or MIDDLE

Runtime Mode Operations

The **Trend Viewer** toolbar, shown below, enables you to modify the trend display during runtime mode.

Trend Viewer Toolbar



During runtime mode, the TrendWorX32 Viewer provides support for the following functions:

- Adding, deleting, and editing a pen.
- Freezing or unfreezing the Trend display (does not halt data collection).
- Editing trend options, such as grids, ranges, cursor step, and language resources.
- Editing the trend period or data-collection rates. Note that by changing data period, TrendWorX32 Viewer may modify the data- collection rate in order not to exceed the configured number of samples.
- Displaying statistical information for all the pens regarding the displayed values. This statistical information can be stored in a .csv file. You first need to provide a valid file name for the function to work.
- Zooming on a specific region of a trend when the trend is in **Freeze Mode**. You can zoom by pressing the left mouse button while holding down the **SHIFT** key and selecting the area you on which you would like to zoom.

Clicking the left mouse button on the trend display undoes the zoom. In addition, there is Point and Click support for zooming by clicking the Zoom Trend button on the **Trend Viewer** toolbar.

- Scanning the range of a trend by using the cursor to view specific sample values.
- Selecting the focus pen, which is the pen whose details and (if desired) range information will be displayed first in the TrendWorX32 Viewer.
- Retrieving and replaying from the TrendWorX32 Persistent Trending server.
- Paging forward and backward in time.
- Time shifting for comparison of pens.
- Docking the toolbar in the Trend Viewer (available only with the new plot style; "old plot style" must be unchecked).

Functions Not Supported in Runtime Mode

The following functions are not supported in runtime mode:

- Replacing point names (You should use delete/add, or within the VBA environment, use the "FormLoad" event for replacing point names.)
- Changing the trend plot type
- Getting to the Time Settings object through the OLE interface
- Modifying the x-axis of XY plots
- Modifying file name for saving statistics
- Modifying preference for global ranges
- Modifying preference for shifting grids
- Modifying preference for startup value
- Modifying preference for restoring range values

Operations

Historical Replay

The TrendWorX32 Viewer is interfaced through the OPC Historical Data Access specification to the GENESIS32 TrendWorX32 SQL Server, as well as to other third-party historical servers supporting the specification.

The TrendWorX32 Viewer ActiveX is compliant with the latest OPC HDA release specification 1.2. In general, the OPC HDA specification is an extended OPC specification, which includes an increased number of interfaces and methods, not all of them being mandatory. On the other hand, the TrendWorX32 Viewer ActiveX trend client requires an advanced HDA server implementation to support its rich user interface.

Since not all OPC HDA servers will support the TrendWorX32 Viewer's required advanced interface set, and since there is currently no available way to classify OPC HDA server functionality (or equivalently, compliance levels), the TrendWorX32 Viewer ActiveX has integrated minimal OPC HDA server capability information, which will either modify its user interface or warn the user if the third-party OPC HDA server does not support the required interfaces. However, the TrendWorX32 Viewer ActiveX will not compensate for the lack of implementation of used OPC HDA

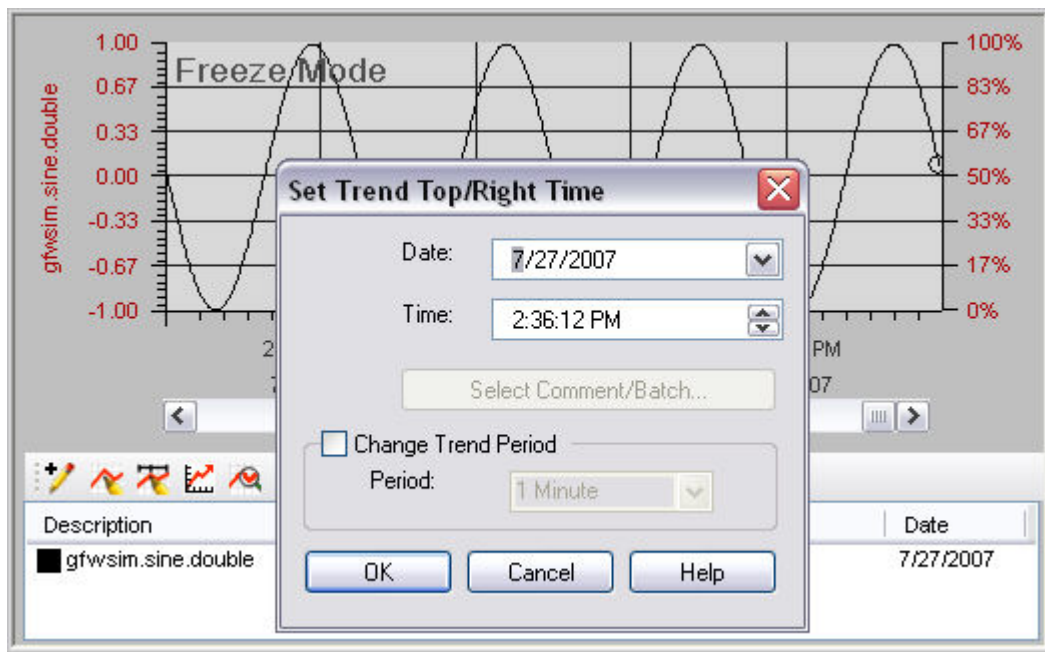
interfaces or methods by combining supported method calls to produce the same end result. The following additional OPC HDA compliance development effort has been done:

- **Detection of Connection Point Support:** The TrendWorX32 Viewer ActiveX supports two methods of historical replay. In Auto Updating mode (default), mixed real time and historical signals can be configured and updated in real time via asynchronous methods calls. In History Only mode, only historical signals can be configured and they are updated via user interface requests (or VBA automation) and no asynchronous requests will be processed. If the OPC HDA server does not support connection points, then the second historical replay mode should be used.
- **Detection of OPC HDA Aggregates:** Each historical pen can utilize a historical data retrieval filter (called "aggregate"). The TrendWorX32 Viewer will retrieve the OPC HDA server supported aggregates and allow editing of the historical pen to select the desired aggregate. If the OPC HDA server does not support any aggregates, the only historical data retrieval filter supported will be the **Raw Data** filter.
- **Detection of OPC HDA Server Annotation Support:** The TrendWorX32 Viewer ActiveX trend client will detect if OPC HDA servers support annotations, and it will modify its user interface accordingly.

Set Right Time

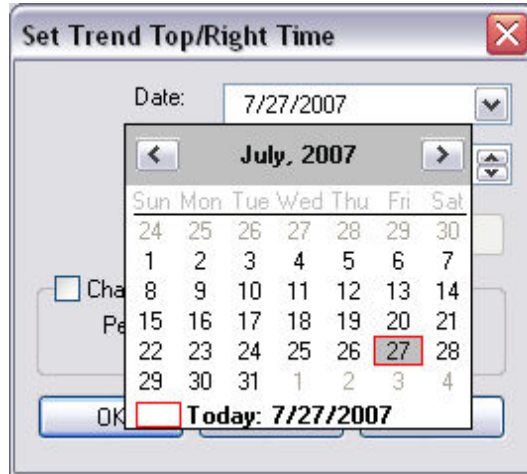
Clicking the **Set Right Time** button on the **Trend Viewer** toolbar opens the **Set Trend Top/Right Time** dialog box, shown below. This dialog box enables you view a specific historical trend period. In freeze mode, this causes the TrendWorX32 Viewer to retrieve and display the selected historical and persistent trend data from the TrendWorX32 Persistent Trending memory buffers.

Set Trend Top/Right Time Dialog Box



To select a desired date for the trend period you want to view, click the down arrow in the **Date** field, and then choose a date from the calendar, as shown in the figure below. To select a desired time, highlight the hours, minutes, or seconds in the **Time** field. You can either type the desired hours, minutes, and seconds or click the arrows to scan the highlighted time field.

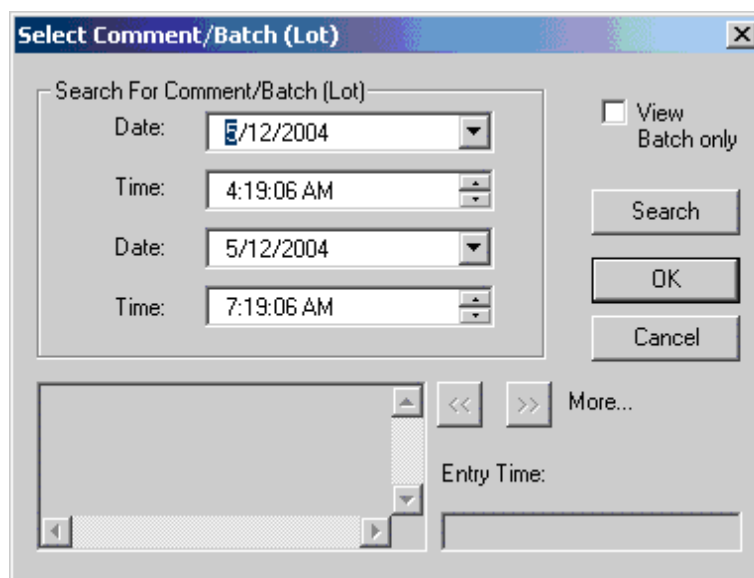
Choosing a Date From the Calendar



The **Set Trend Top/Right Time** dialog box has time and date pick controls as well as an interface to the historical operator comments and batch information. To use this feature:

1. Select a history pen from the details window.
2. Click the **Set Right Time** button on the **Trend Viewer** toolbar to open the **Set Trend Top/Right Time** dialog box. Click the **Select Comment/Batch** button.
3. This opens the **Select Comment/Batch (Lot)** dialog box, shown below, which allows you to search for a specific batch entry or operator comment within a time range.

Select Comment/Batch (Lot) Dialog Box



In the **Select Comment /Batch (Lot)** dialog box:

1. Select a start time and date. To select the date, click the down arrow in the **Date** field, and then choose a date from the calendar.
2. Select an end time and date.
3. Click **Search** to initiate the search.
4. Once the search is completed, use the << and >> buttons to scroll through multiple operator comments and batch entries.
5. When you locate the desired one, click **OK**.



Note: Selecting the **View Batch Only** option filters out the historical operator comments so that only the related batch (lot) entries are displayed.

Show Comments

If historical pens are configured in the TrendWorX32 Viewer, clicking the **Show Comments** button on the **Trend Viewer** toolbar places the Viewer in freeze mode and retrieves all historical operator comments and batch information available. You can then select a historical pen from the **Details** window or double-click the comment icon to display the following the **Comment(s) Entry** dialog box, shown below.

Comment(s) Entry Dialog Box

If more than one comment exists in the same area, the << and >> buttons will be enabled. These buttons allow you to scroll through all available comments.



Note: Historical comments are not supported for XY plots and bar plots. Historical comments are integrated into the ToolTip support as well as the historical replay and ideal pen functionality.

Features Added in Version 9.01

In terms of historical replay and reporting, the following key changes have been made:

- Data filter selection other than Raw will result in data time stamped at the beginning of each subinterval.
- When retrieving data using data filters other than Raw, subintervals for which there are no data because of no data-logging activity will be marked as "empty" slots at the corresponding time with an empty (VT_EMPTY) value. You can check the returned qualities for further processing.
- The historical qualities supported are as follows:
 - o OPCHDA_EXTRADATA 0x0001
- More data may exist
 - o OPCHDA_INTERPOLATED 0x0002
- Interpolated data value
 - o OPCHDA_RAW 0x0004
- Raw data value
 - o OPCHDA_CALCULATED 0x0008
- Calculated data value
 - o OPCHDA_NOBOUND 0x0010
- No data found to provide upper or lower bound
 - o OPCHDA_NODATA 0x0020
- No data collected. Archiving not active
 - o OPCHDA_DATA_LOST 0x0040
- Calculation started/stopped/lost
 - o OPCHDA_CONVERSION 0x0080
- Scaling / conversion error
 - o OPCHDA_PARTIAL 0x0100
- Aggregate value is for an incomplete interval

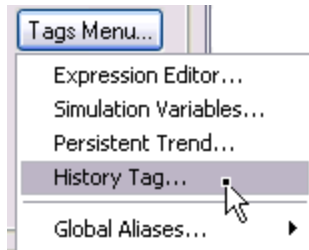


Caution: Because of the new compliance changes in historical replay and reporting, a version 7.x or later historical replay or reporting may not produce identical results to existing 6.1x version reports and or historical replay screen captures for the same signals and time periods.

To display only historical data:

1. Select **History Only** in the **Pens** tab of the **TWXView32 ActiveX Properties** dialog box.
2. Selecting **History Tag** command from the **Tags Menu** to view all of the available OPC HDA servers as shown below.

The History Tag command.



Replay Modes

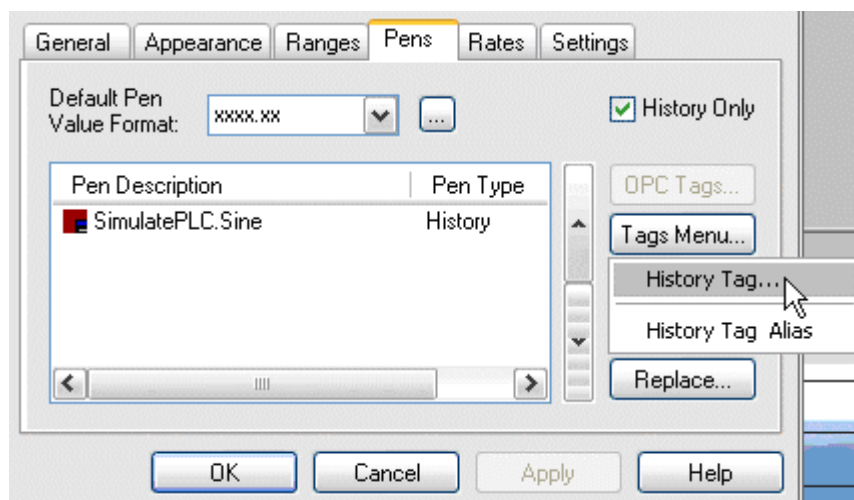
Two modes of historical replay are supported:

1. Mixed replay of signals
2. History only replay (in freeze mode)

In **mixed replay**, which is the default mode, you can connect real-time OPC signals, persistent trending signals, and historical signals. All the signals will auto update, and the historical signals will be refreshed with new historical data as they become available. You can control the frequency of historical data updates by modifying the **History Refresh Rate** option in the **Rates** tab of the **Properties** dialog box of the TrendWorX32 Viewer. This should be set close to the data-logging frequency (i.e. the **Log to Disk** option in the TrendWorX32 Configurator).

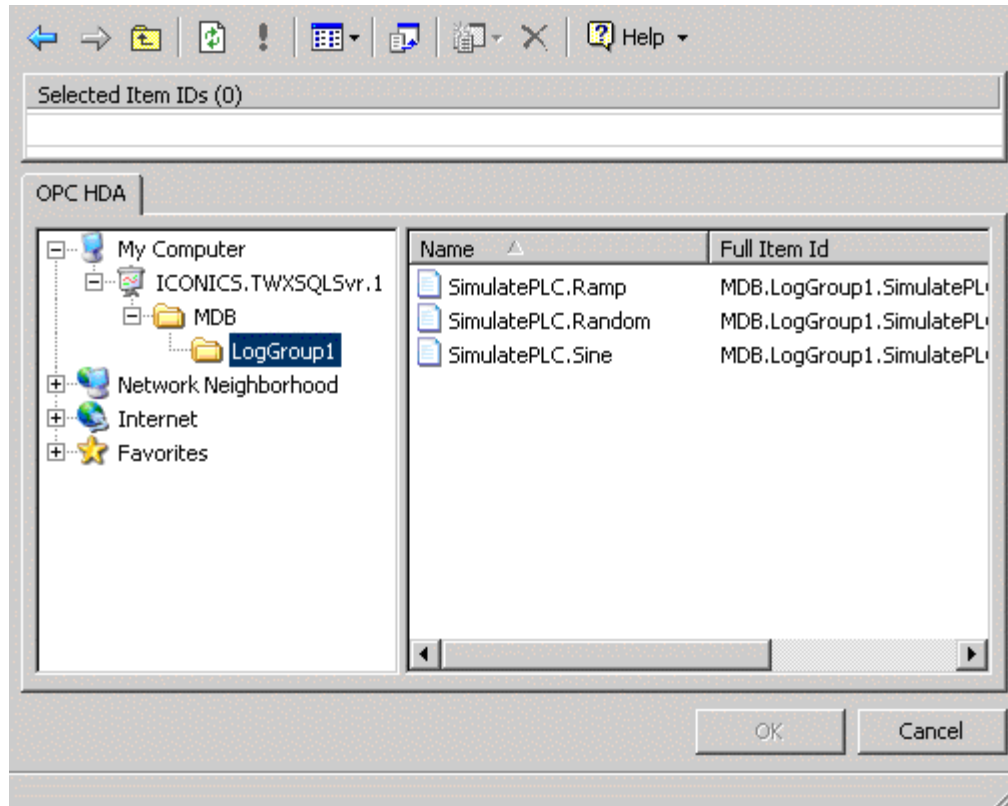
of the **Properties** dialog box, as shown in the figure below, prior to making any signal connections. In this mode, you can only connect to historical data. Once the Viewer is committed to animation (runtime) mode, it will populate the screen with the historical data and automatically set the Viewer into freeze mode. You can then retrieve historical data by scrolling back using the scroll bar. In addition, for finer control over historical replay, you can double-click the time window or click the **Set Right Time** button on the **Trend Viewer** toolbar to set the Viewer's right historical time of reference.

Historical Signal Connections



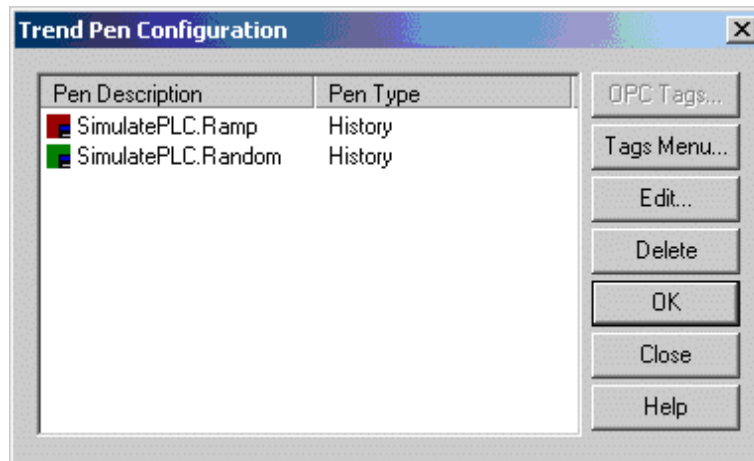
Adding historical pens. To add historical pens, click **Tags Menu** and select **History Tags** to open the **Unified Browser**, which allows you to browse all of the installed historical servers locally or remotely, as shown in the figure below.

Browsing for Historical Tags



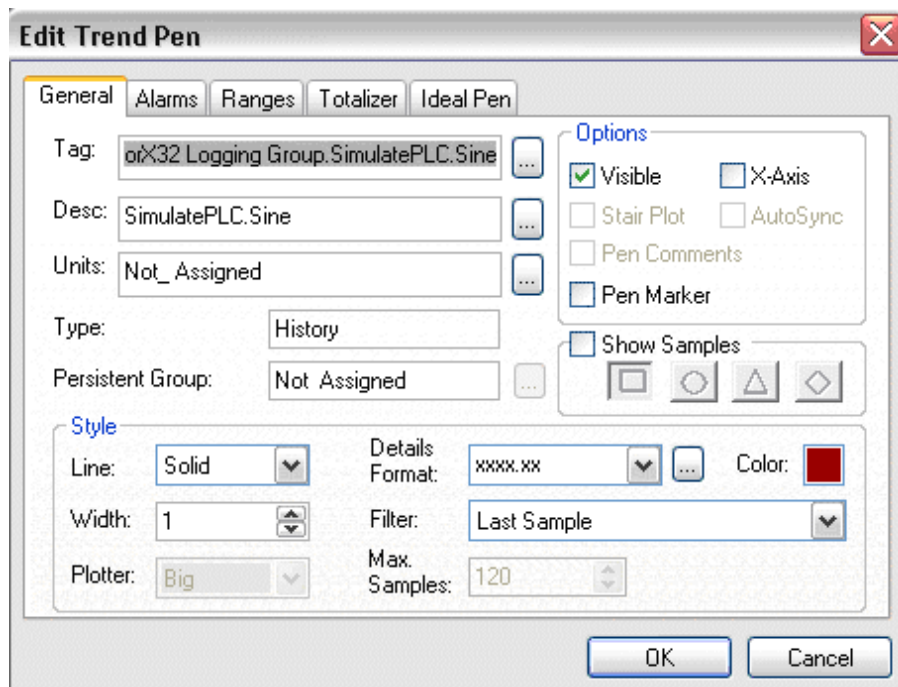
If the TrendWorX32 Viewer is in runtime mode, click the **Edit Pens** button on the **Trend Viewer** toolbar to open the **Trend Pen Configuration** dialog box for historical pens, as shown below.

Configuring Historical Pens



Editing historical pens. To edit historical pens, select a pen and then click **Edit** in the **Trend Pen Configuration** dialog box. This opens the **Edit Trend Pen** dialog box, as shown below. When editing a historical pen, you can configure the averaging mechanism used in retrieving historical data. You can always change this option within runtime mode, either through the user interface or OLE Automation, to focus on various aspects of the historical replay.

Editing Historical Pens



Pen Filters

The various choices of the pen filter determine how historical data will be retrieved. For example, if the Viewer is configured to replay data for one hour, with a data resolution of 1 min., the historical data retrieval mechanism will divide one hour's worth of data into bins of 1 min. each, and then it will average the data according to the desired filter. If **Filter** is set to **Average**, it will compute the average of all samples per bin to yield a single pen sample to be drawn on the screen. If **Filter** is set to **Last Sample**, the last sample that falls within each bin will be plotted on the screen.

In addition to the standard data filters, the TrendWorX32 Viewer supports the **Raw Data** filter for historical replay as follows:

1. Select the **Raw Data** filter for a historical pen.
2. Specify the **Max. Samples** to retrieve.

As a result, the TrendWorX32 Viewer will ask the TrendWorX32 SQL Server to retrieve the Max. Samples number of raw samples (no interpolated/extrapolated) from the historical data. If more data exist for the time interval for which the data were requested, an X mark will appear at the ends of the curve to indicate that not all samples were retrieved for the time interval of the request. This feature does require some configuration in order to prevent usage of large amounts of memory. A typical way to estimate the maximum number of samples data-logged for a period of time is to divide the time period by the data-collection rate of the signal configured in the data logger. If no dead band is configured, and the data-logged signal changes frequently, the result indicates an upper limit of samples data-logged for that period.

In the case of bar plots, the historical replay results in a time-averaged sample across the preconfigured trend period in configuration mode. That is, if the period is set to one hour, the bar plot type will display the averaged sample over the last hour.

Setting Periods

Clicking the **Edit Period** button on the **Trend Viewer** toolbar opens the **Trend Edit Period** dialog box, shown below.

Trend Edit Period Dialog Box

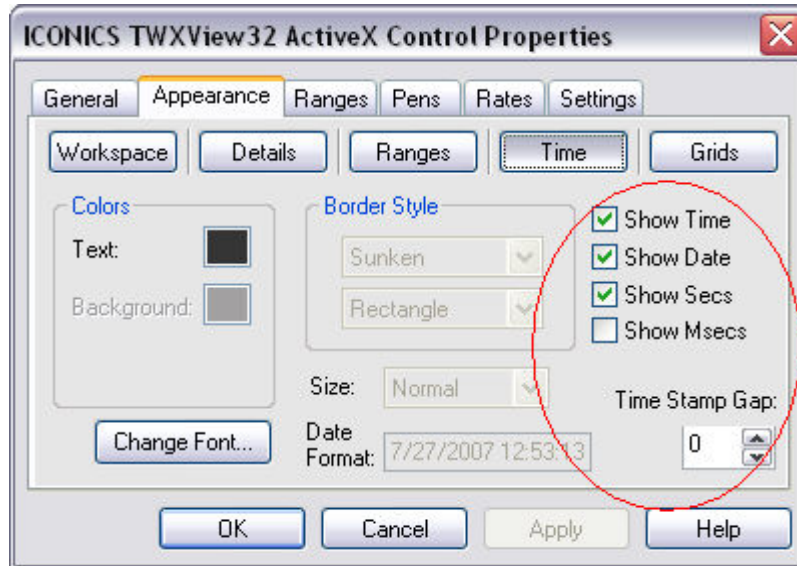
The **Data-Collection Rate**, **Display Refresh Rate**, and **Samples** fields are set according to the settings made on the **Rates** can set the trend period and/or the data-collection rate using the **Trend Edit Period** dialog box. If you want to select a custom period, the **Custom Trend Period** option should be checked first. Otherwise, the **Period** field will be activated, and by default this field is set at 2 minutes. But the options of 10 seconds, 30 seconds, 1 minute, 10 minutes, 30 minutes, 1 hour, 3 hours, 8 hours, 1 day, 5 days, 1 week, 1 month, 3 months, 6 months, and 1 year are also available from this list.

During the **Period Change** operation, the TrendWorX32 Viewer ActiveX increases the number of samples on a per-pen basis to produce a higher trend time period frame for viewing data. If upon doing so it exceeds its maximum number of samples per pen, which is currently set to 7200, it will try to adjust the data resolution (data-collection rate) to produce the desired trend period.

Time Date Settings

You can set options that control how dates and times are indicated on your trends. These settings are found in the **Appearance** tab of the ActiveX Control Panel dialog box. Click on the **Time** button to see the settings indicated in the figure below. Time date settings do not affect your data collection rate or period. What these settings control is the way your graph looks. These settings show up as tick marks on the time axis of a time plot.

Time Date settings.



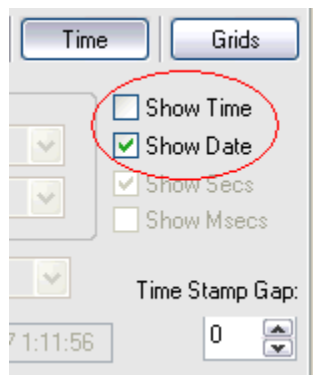
You can select the border and size parameters, as well as the text and fill colors. You can also choose to show or not to show the date, seconds, and milliseconds during runtime mode, as follows:

- To display time information in the trend display...check the **Show Time** check box.
- To display the date in the trend display...check the **Show Date** check box.
- To display seconds in the trend display...check the **Show Seconds** check box.
- To display milliseconds information in the trend display...check the **Show Millisecs** check box.

With the time disabled the date is still available, as shown below.

Note: Version 9.10 allows you to turn off the time setting while still leaving the date enabled

Show Date is no longer coupled to Show Time.



VCRWorX32 Data Replay

The TrendWorX32 Viewer ActiveX includes support for VCRWorX32, which is a powerful tool in GENESIS32 that enables the replay and reanimation of graphical,

historical and alarm data. VCRWorX32 replays trend pen data that have been logged to a trend logger database. If you are using a trend viewer display to view replayed data in VCRWorX32, only pens that have been data-logged will be viewable in VCRWorX32 playback mode. If multiple pens are shown in the trend display and only some of those pens have been logged to a trend logger database, in playback mode you will see only those pens that have been data-logged. Any pens that have not been data-logged will not be displayed.

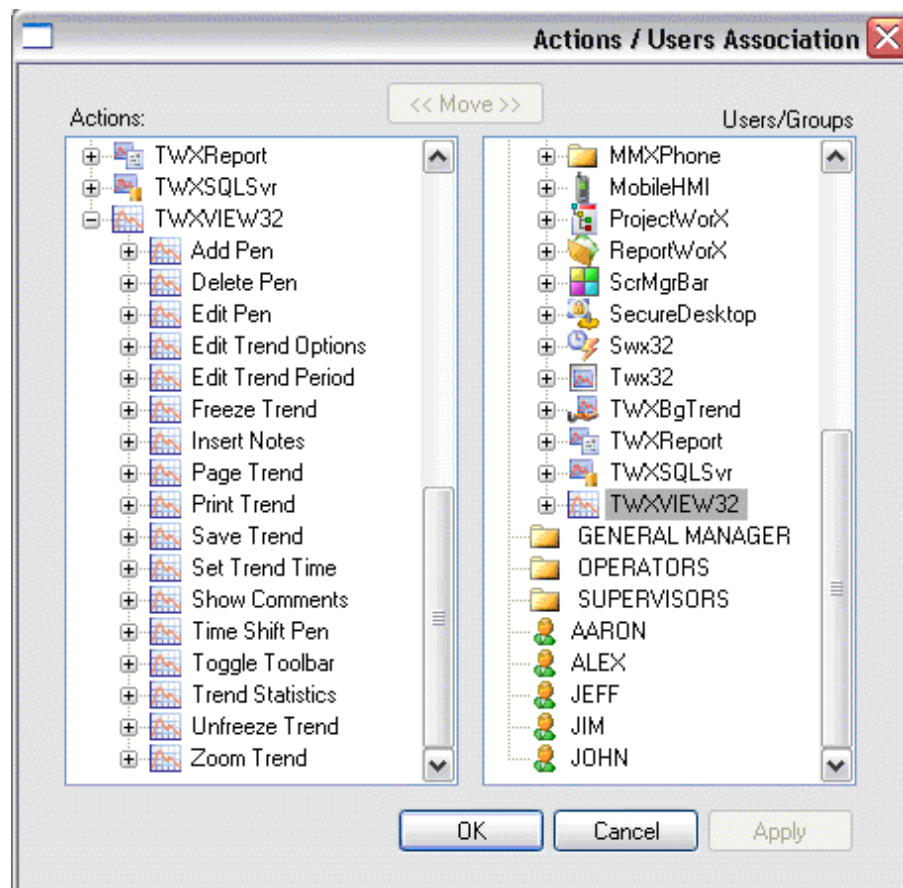
For complete information about configuring VCRWorX32, please see the VCRWorX32 Help documentation.

Security

The TrendWorX32 Viewer ActiveX is interfaced to the GENESIS32 Security Server through OLEExpress. The security system is enabled within runtime mode to provide a very flexible security mechanism. The TrendWorX32 Viewer supports the security actions shown in the dialog box below.

If you do not have the appropriate security actions for the functions you want to perform, an error message box will appear indicating that you do not have the security level required by the action.

GENESIS32 Security Server



Language Aliasing Support

The TrendWorX32 Viewer ActiveX component has all of its strings saved in the resource file, which can be modified to provide custom versions. In addition, it provides real-time support for loading a resource-only .dll to support international languages. This .dll file is compiled as a standard Win32 .dll, and it is made to contain all the resources and the .odl file of the TrendWorX32 Viewer module. Any time the GENESIS32 application settings are switched to a different language, TrendWorX32 Viewer will load the corresponding resource-only .dll.

The resource-only .dll file name uses the TrendWorX32 Viewer component, followed by the three characters used in Windows NT as the abbreviation for a language name (e.g., the abbreviation "deu" stands for German, and the .dll should be named "TWXViewer_deu.dll"). In addition, using the OLE automation property language ID, you can control this functionality through OLE automation.

In addition, the Unicode version of the TrendWorX32 Viewer ActiveX supports language aliasing with automatic range and value scaling, as well as unit conversions, formatting, and font selection. For more information about configuring Unicode version language-aliasing support, please refer to the GENESIS32 Language Configurator documentation. The TrendWorX32 Viewer ActiveX supports the following language-aliased strings:

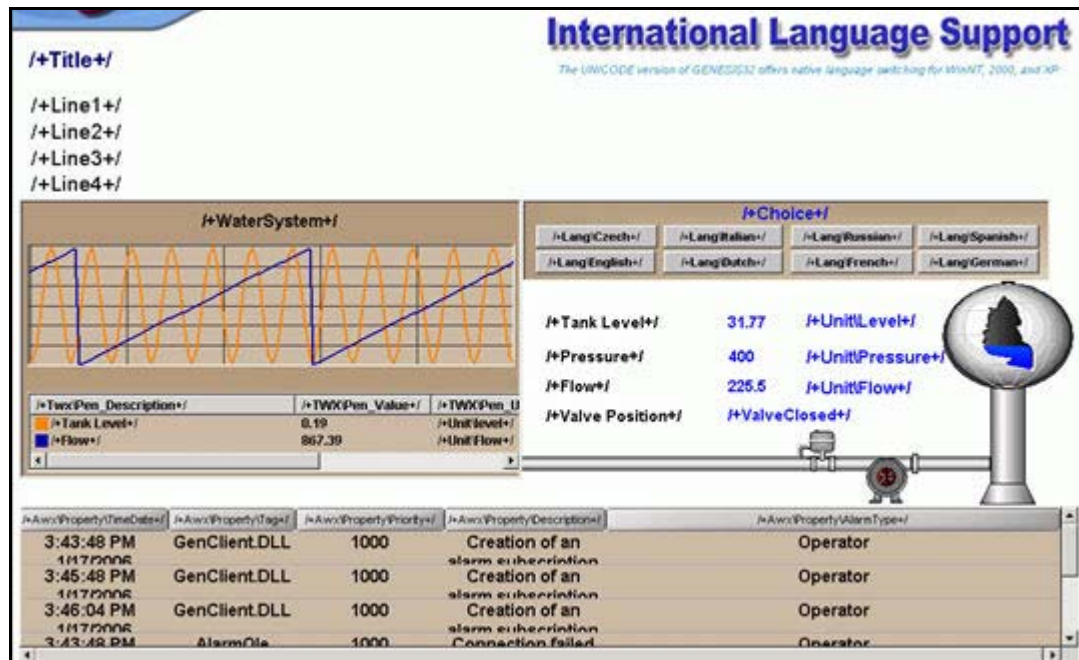
- Pen description
- Pen engineering units (with scaling support)
- Pen details format
- Title string of viewer
- Format strings of details
- Detail window column names

Note: The TrendWorX32 Viewer requires the following additional language-aliasing configuration work. If any expression is to be used for range, alarm limits, or unit scaling, you need to define a "Read Expression" and a "Write Expression" in the Language Configurator. By doing so, the Viewer will be able to function properly between language switches.

Sample Language Configuration

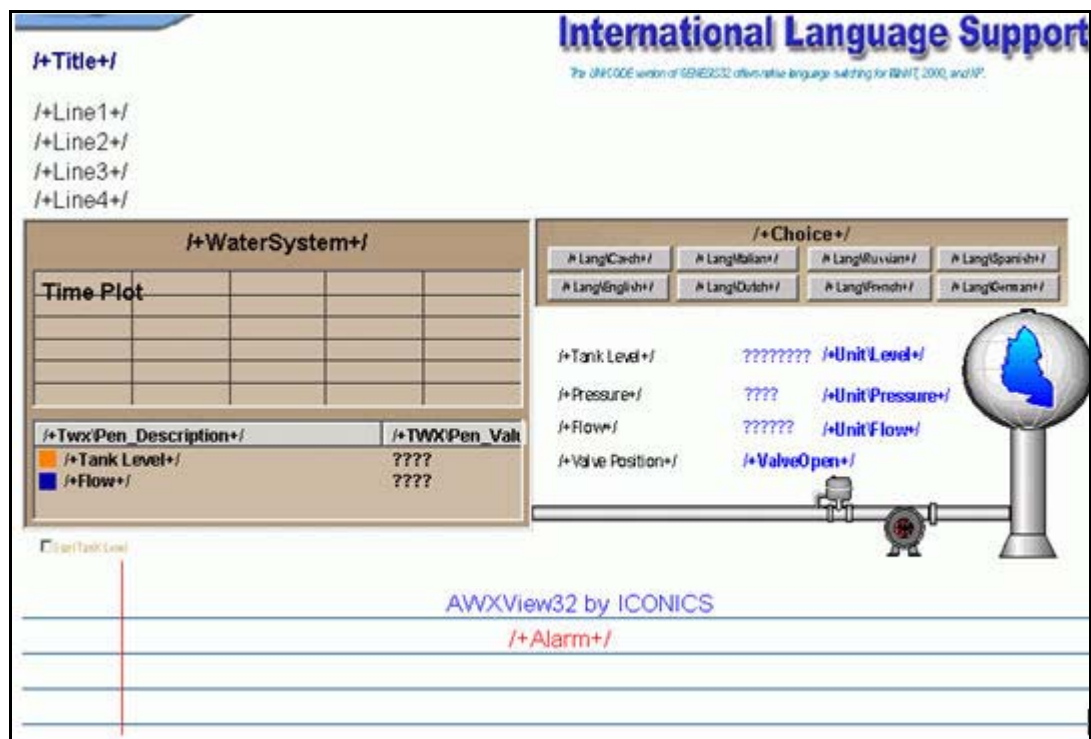
The Unicode version of GENESIS32 installs a sample Language Server configuration, called LanguageAliasingConfig.mdb, under the \Documents and Settings\All Users\ICONICS\Examples32 product installation "tree." In addition, the Gen32 Demo includes a sample GraphWorX display, called LanguagesUnicodeDemo.gdf, which includes a sample Viewer configuration. The figure below shows this sample display during runtime mode. Notice that you can switch between languages in this display by clicking the buttons.

Language-Aliasing Demo in Runtime Mode



The figure below shows this same language-aliasing demo in configuration mode. This display incorporates ActiveX objects from GraphWorX32, TrendWorX32, and AlarmWorX32.

Language-Aliasing Demo in Configuration Mode



For example, if you click on the "Water System" time plot trend in the language-aliasing configuration screen above, you can view the properties of the trend in the TrendWorX32 Viewer Active X. The **Edit Trend Properties** dialog box, shown below, displays the language-aliasing configuration of the "Tank Level" pen in the time plot.

plot trend for the water-monitoring system.

Language Aliasing Pen Configuration

Edit Trend Pen

General Alarms Ranges Totalizer

Tag: x=50*(1+{{ICONICS.Simulator.1\Simulat

Desc: /+Tank Level+/-

Units: /+Unit\level+/-

Type: Real Time

Persistent Group: Not Assigned

Style

Line: Solid

Width: 2

Plotter: Big

Details Format: xxxxx.xx

Filter: Raw Data

Max. Samples: 120

Color: Orange

Options

☒ Visible ☐ X-Axis

☐ Stair Plot ☒ AutoSync

☐ Pen Comments

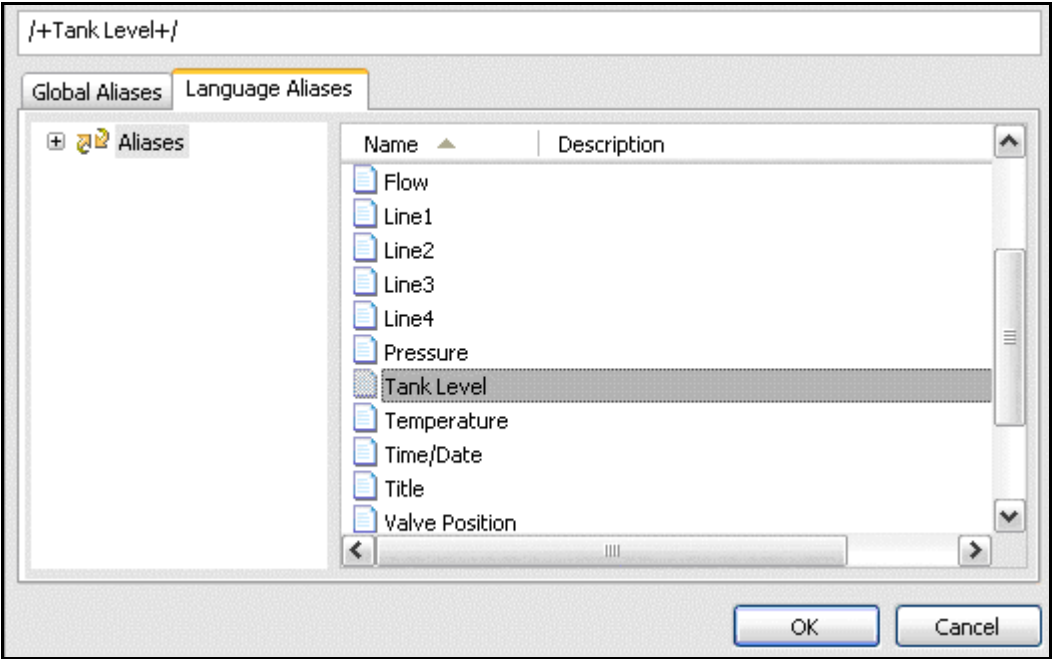
☐ Pen Marker

☐ Show Samples

OK Cancel

When specifying a language alias, you can also select a language alias from the Language Alias Browser, which includes all language aliases in the language database. This eliminates the need to manually type the alias name. Clicking the ... button opens the **Language Aliases** tab of the **Unified Browser**, which includes all language aliases in the language database. This eliminates the need to manually type in the name. Clicking the ... button opens the language alias browser. The browser includes all languages alias the language configuration database. All language aliases that are configured in the Language Configuration are conveniently available to choose from inside the browser. The tree control of the Language Configuration is mimicked in the tree control of the language alias browser. Select a language alias by double-clicking alias name. The alias name appears at the top of the browser, which automatically adds the /+ and +/ delimiters to the alias name, as shown in the figure below. Click the OK button.

Selecting a Language Alias From the Unified Browser



/+WaterSystem+/ <th data-kind="ghost"></th> <th data-kind="ghost"></th> <th data-kind="ghost"></th> <th data-kind="ghost"></th>									
Time Plot									
/+Twx\Pen Description+/ <th data-kind="parent" data-rs="2">/+Tank Level+/<th data-kind="parent" data-rs="2">/+Flow+/<th data-kind="parent" data-rs="2">????<th data-kind="parent" data-rs="2">????<th data-kind="parent" data-rs="2">/+Unit\level+/<th data-kind="parent" data-rs="2">/+Unit\Flow+/<th data-kind="parent" data-rs="2">###:###:###.###<th data-kind="parent" data-rs="2">###:###:###.###</th></th></th></th></th></th></th></th>		/+Tank Level+/ <th data-kind="parent" data-rs="2">/+Flow+/<th data-kind="parent" data-rs="2">????<th data-kind="parent" data-rs="2">????<th data-kind="parent" data-rs="2">/+Unit\level+/<th data-kind="parent" data-rs="2">/+Unit\Flow+/<th data-kind="parent" data-rs="2">###:###:###.###<th data-kind="parent" data-rs="2">###:###:###.###</th></th></th></th></th></th></th>	/+Flow+/ <th data-kind="parent" data-rs="2">????<th data-kind="parent" data-rs="2">????<th data-kind="parent" data-rs="2">/+Unit\level+/<th data-kind="parent" data-rs="2">/+Unit\Flow+/<th data-kind="parent" data-rs="2">###:###:###.###<th data-kind="parent" data-rs="2">###:###:###.###</th></th></th></th></th></th>	???? <th data-kind="parent" data-rs="2">????<th data-kind="parent" data-rs="2">/+Unit\level+/<th data-kind="parent" data-rs="2">/+Unit\Flow+/<th data-kind="parent" data-rs="2">###:###:###.###<th data-kind="parent" data-rs="2">###:###:###.###</th></th></th></th></th>	???? <th data-kind="parent" data-rs="2">/+Unit\level+/<th data-kind="parent" data-rs="2">/+Unit\Flow+/<th data-kind="parent" data-rs="2">###:###:###.###<th data-kind="parent" data-rs="2">###:###:###.###</th></th></th></th>	/+Unit\level+/ <th data-kind="parent" data-rs="2">/+Unit\Flow+/<th data-kind="parent" data-rs="2">###:###:###.###<th data-kind="parent" data-rs="2">###:###:###.###</th></th></th>	/+Unit\Flow+/ <th data-kind="parent" data-rs="2">###:###:###.###<th data-kind="parent" data-rs="2">###:###:###.###</th></th>	###:###:###.### <th data-kind="parent" data-rs="2">###:###:###.###</th>	###:###:###.###

Global Aliasing Support

The TrendWorX32 Viewer supports Global Aliasing by interfacing to the Global Aliasing Server. The following strings can be aliased:

- **Viewer Title**
 - o Title
- **Ranges**
 - o Hi Tag, Lo Tag, Format, Format XY
- **Details**
 - o Format
- **Pen**
 - o Point Name, Hi Tag, Low Tag, Description, Units, Details Format, Ranges Format, Persistent Group Name
- **URL Path**
 - o Configured in the **General** tab of the **TrendWorX32 Viewer ActiveX Properties** dialog box.
- **Expressions**
 - o In the **Expression Editor**, click the **Tags** button and select **Global Aliases** from the pop-up menu to open the **Global Alias Browser**.

Currently the TrendWorX32 Viewer supports machine-level and process-level aliasing. All fields, which support aliasing, have been interfaced to the Global Alias Browser dialog, which is evoked by clicking on the ... button.

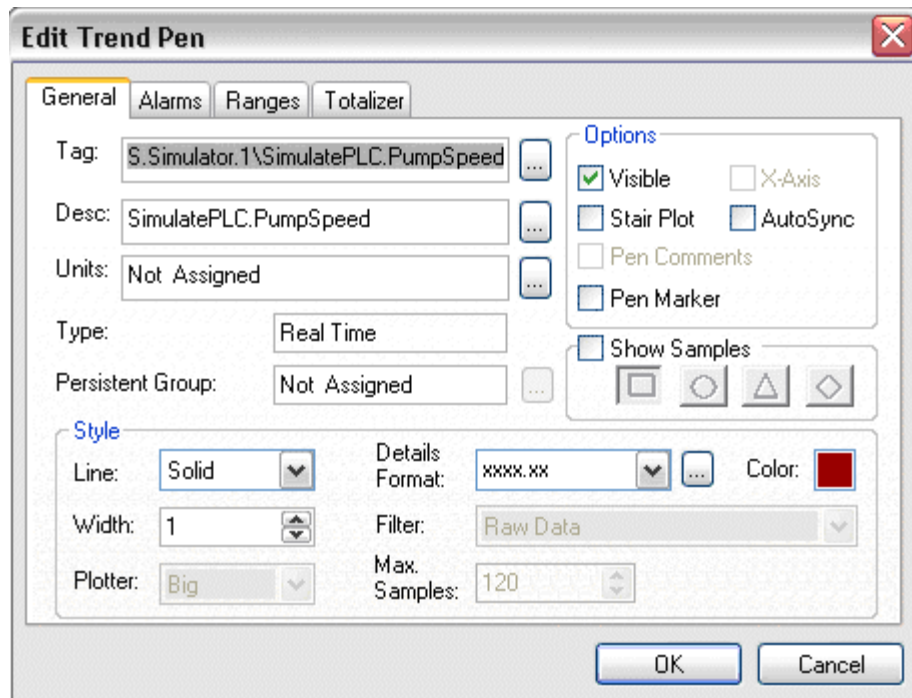
In addition, the TrendWorX32 Viewer has integrated Language Aliasing and Global Aliasing browsers.

The user first connects a real time, persistent, or historical tag and then has the option to alias the entire pen string or part of it. Global aliasing is also supported also for drag-and-drop operations as well as related OLE automation methods.

What is NOT supported:

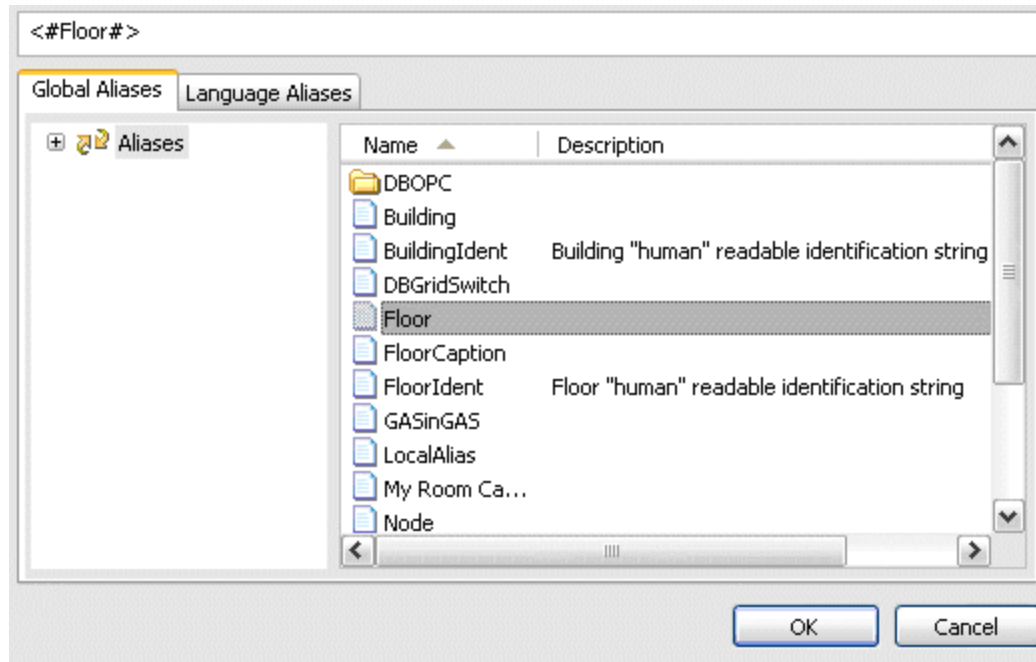
- Runtime editing of aliased fields
- Aliases resulting in new global aliases (ie a resolved alias is also an alias)
- Local settings saving if Global Aliases are used.

Global Aliasing Pen Configuration



Clicking the ... button opens the Global Alias Browser, as shown in the figure below. Select a global alias from the Unified Browser, which includes all global aliases in the global alias database. This eliminates the need to manually type in the alias name. All global aliases that are configured in the Global Alias Engine Configurator are conveniently available to choose from inside the browser. The tree control of the Global Alias Engine Configurator is mimicked in the tree control of the Global Alias Browser. Select a global alias by double-clicking the alias name (e.g. "Floor" in the figure below). The alias name appears at the top of the browser, which automatically adds the <# and #> delimiters to the alias name. Click the **OK** button.

Selecting a Global Alias From the Unified Browser



TrendWorX32 Object Capability

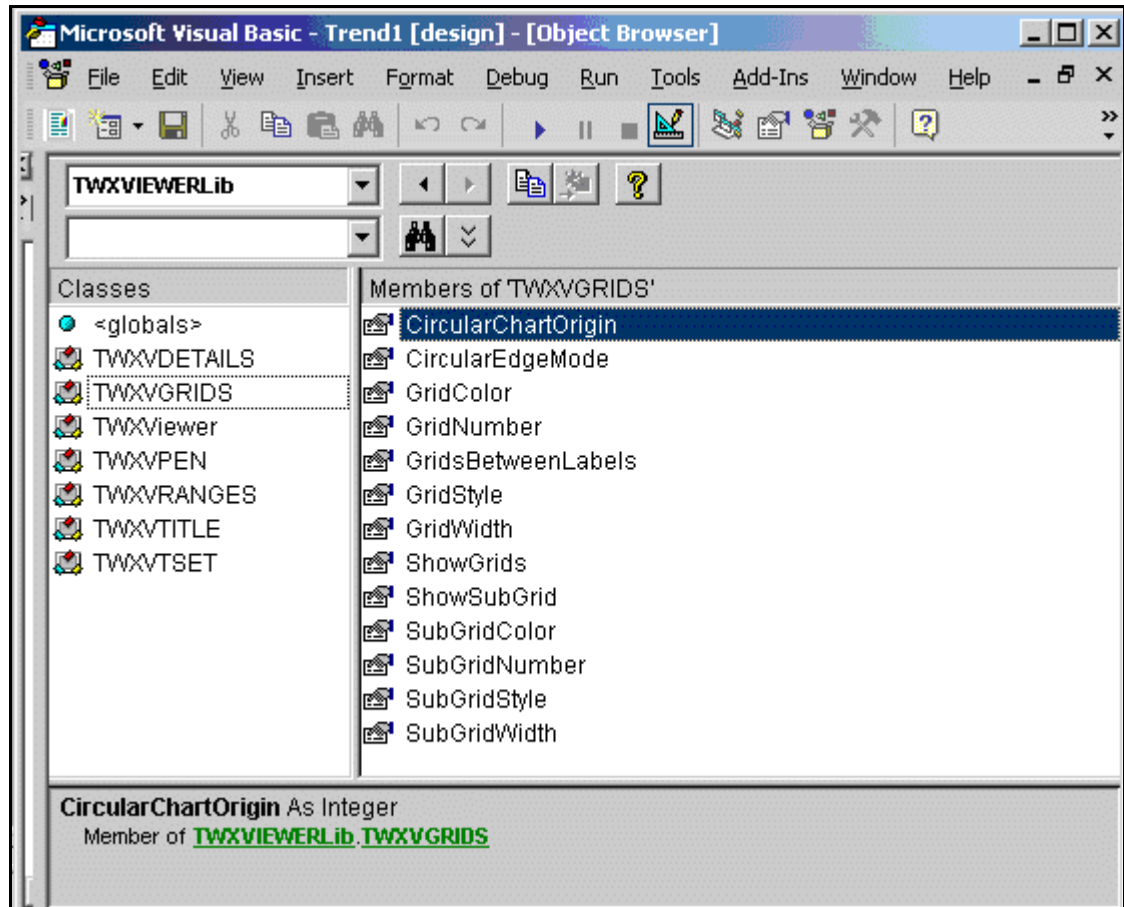
The TrendWorX32 Viewer ActiveX component integrates easily into Visual C++ or Visual Basic container applications. The GENESIS32 containers, such as GraphWorX32, provide Toolbar support for inserting the TrendWorX32 Viewer ActiveX. Once inserted into a document or a form, the TrendWorX32 Viewer ActiveX can be resized and configured.

Within the GENESIS32 containers and in Visual Basic forms, the component is initially placed in design mode. In design mode, you can configure the TrendWorX32 Viewer ActiveX using the **TWXView32 ActiveX Properties** dialog box. Once the application is committed to runtime mode, the **Trend Viewer** toolbar, it becomes a drop target for text and therefore can establish signal connections through drag-and-drop.

The TrendWorX32 Viewer ActiveX configuration data are saved directly in the container form or within its own streamed file format with the file extension .v32. You must provide a valid file name before the data are serialized and saved. TrendWorX32 Viewer uses the concept of a "working directory," defined in the GENESIS32 containers (such as GraphWorX32). This represents the working directory where project files and configuration files will be stored. TrendWorX32 Viewer will use this directory as a starting point for saving and loading its configuration files.

This section describes the objects exposed through OLE Automation used in TrendWorX32 Viewer ActiveX. These can be easily viewed in the Visual Basic **Object Browser**, shown below.

Visual Basic Object Browser



Using Visual Basic you can do the following things:

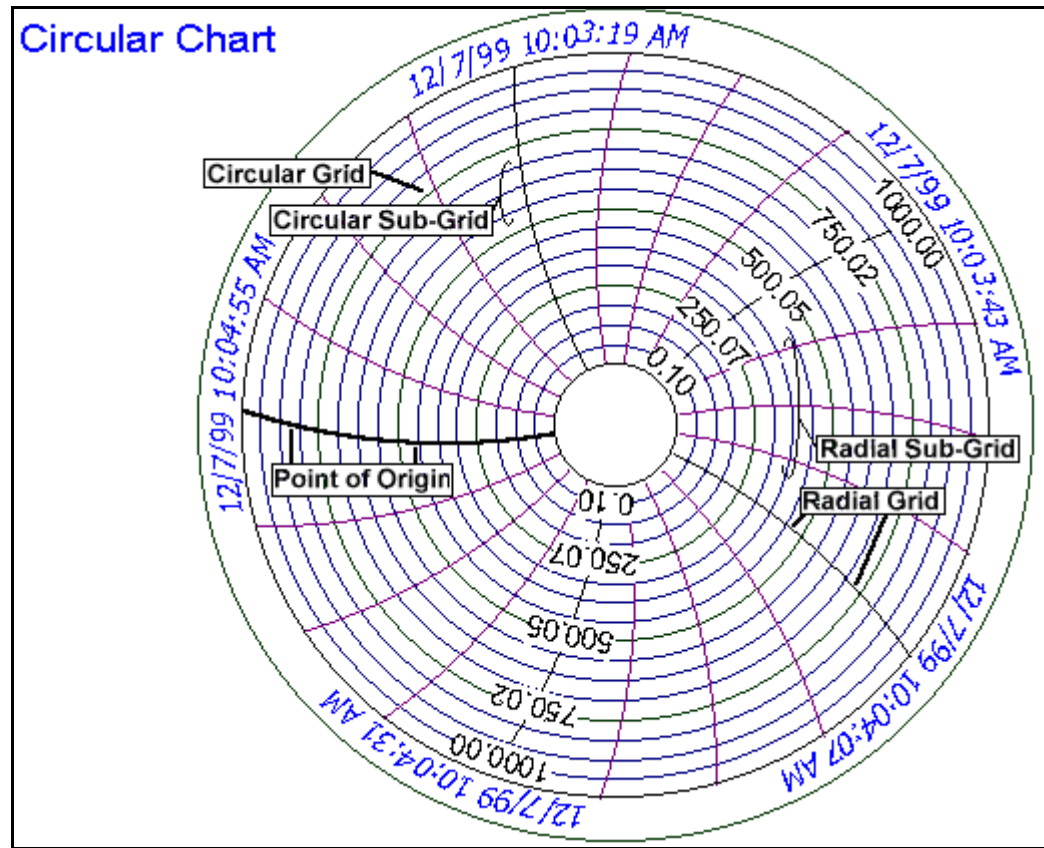
- **Set titles.** Title manages title information, such as the title name, font options, and drawing of the title. The Title Object serializes all title-specific information.
- **View Grid Objects.** Grid manages grid options and drawing of the grid. The Grids Object serializes all grid-specific information. There are individual objects for X-grids and Y-grids.
- **View Ranges Objects.** Ranges manages range information, such as border options, and drawing of the ranges according to plot type. The Ranges Object serializes all range-specific information.
- **View Time Settings Objects.** Time Settings manages time information, such as border options, font options, and drawing of the time field. The Time Settings Object serializes all time field-specific information.

Circular Charts

A **circular chart** is a trend type that plots signal values in a circular field. The **signal value** is represented by the distance from the center of the chart. The angular position of the points on the line represents time.

To create a circular chart ActiveX, select **Circular Chart** from the **Add Trend** submenu of the **Edit** menu, or press the shortcut keys **CTRL + 6**. This will display the circular chart ActiveX in the TrendWorX32 Container as shown below.

Circular Chart



Open the **TWXView32 ActiveX Properties** dialog box by double-clicking the circular chart ActiveX, or by selecting **Properties** from the container **Edit** menu. This will enable you to set the properties for the circular chart.

Set the trend period and the data-collection rate using the Rates tab in the TWXView32 ActiveX Properties dialog box, shown in the figure below. The thickest line on the circular chart, prominent because of its bold appearance, represents the point of origin for the trend period. Notice that the time labels go counter-clockwise in conformity to the industry standards.

Properties dialog box Rates Tab

The screenshot shows the 'Rates' tab of the GENESIS32 TrendWorX32 Viewer. The tab is divided into several sections:

- Data Collection Rate:** Hours: 0, Min: 0, Secs: 1, Msec: 0.
- Display Refresh Rate:** 1 x Collection Rate.
- Trend Period:** Years: 0, Months: 0, Days: 0, Hours: 0, Min: 2, Secs: 0.
- History Refresh Rate:** 60 Sec.
- Samples:** 120.

At the bottom of the dialog are buttons for OK, Cancel, Apply, and Help.

Once all the data points are plotted within the trend period during runtime mode, one of the following will occur:

- All data points will disappear, and a new trend period will begin.
- All data points will remain and continuously scroll as old data points are replaced by new data points.

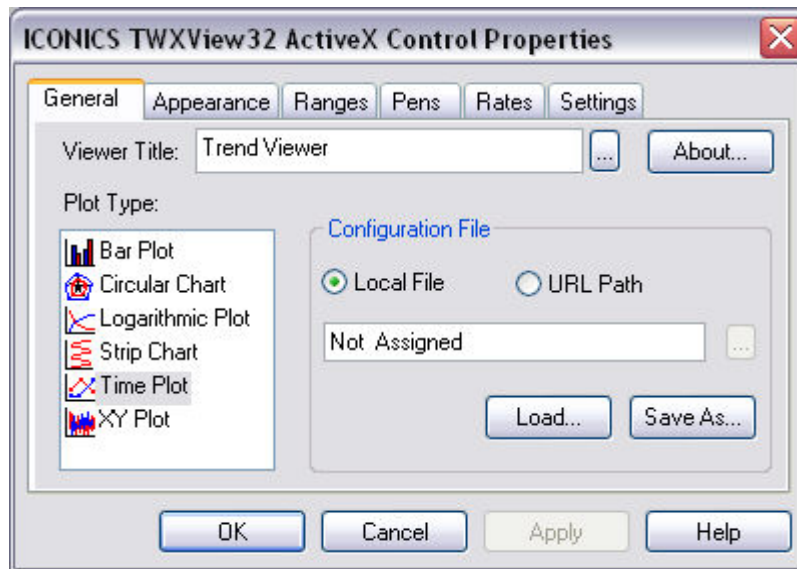
You can control these conditions using the **Settings** tab of the **TWXView32 ActiveX Properties** dialog. When **Reset Circular Chart** is checked in the **Settings** tab, all data points will disappear at the beginning of each new trend period. In addition, you can choose to have the circular chart auto print upon resetting a full trend period has elapsed.

You can change the appearance of a circular chart using the tabs in the TWXView32 ActiveX Properties box. Particularly relevant to the appearance of the circular charts are the Appearance tab and, to a lesser extent, the Ranges tab. For more information on how to use these tabs, please see the appropriate sections.

ActiveX Properties

TwxView32 ActiveX Properties dialog box (also called the **Properties** dialog box), shown below, is the configuration user interface for the ActiveX. Double-clicking the ActiveX during configuration mode opens the **Properties** dialog box, which as you can see contains the following tabs:

TWXView32 ActiveX Properties Dialog Box

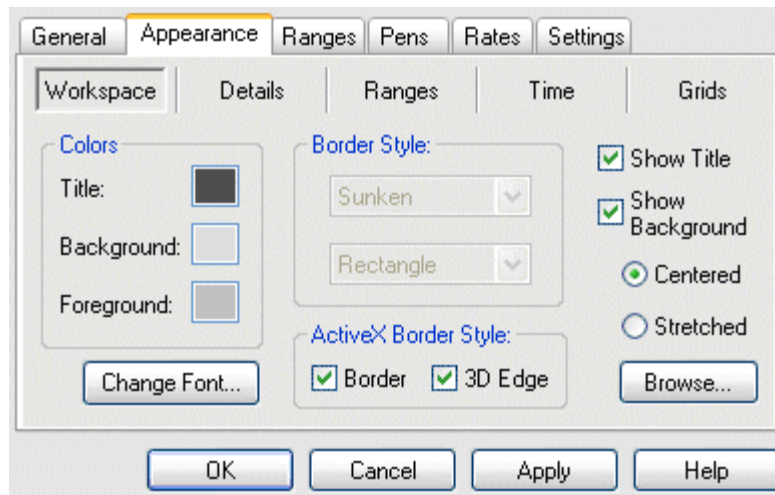


Appearance Tab

The **Appearance** tab of the **Properties** dialog box, shown below, sets the appearance properties for the following items:

- Workspace
- Details
- Ranges
- Time
- Grids

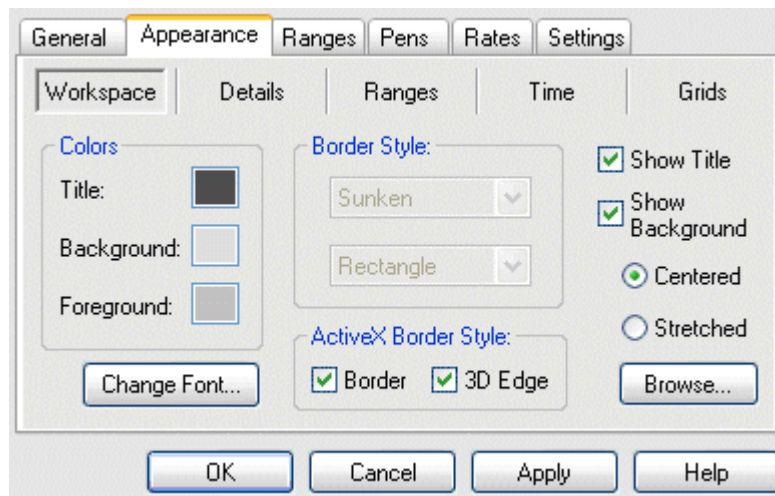
Properties Dialog Box: Appearance Tab



Workspace

The **Workspace** section of the **Appearance** tab, shown below, configures various cosmetic aspects of the trend display, such as colors, background, and borders. To display the viewer title in the trend display, check the **Show Title** check box.

Appearance Tab: Workspace Settings



Change Font

The **Appearance** tab sets the font type for the **Workspace**, **Details**, **Ranges**, and **Time Settings** sections of the **Trend** window. Click the **Change Font** button to choose a font. The standard Windows **Font** dialog box appears, and you can select the font type, size, and style.

Backgrounds

The TrendWorX Viewer ActiveX supports the use of background images in trend displays. To enable the background, check the Show Background check box, as shown in the figure above. Click the Browse button to select an image file to use as your background. The GENESIS32 installation provides several background images that you can use in your displays. Or you can create and use your own images. Once

you have selected your image, click the **Apply** button, and the image will appear in the trend background.

Choosing the **Centered** option centers the background image in the trend display and preserves the aspect ratio of the original image. Choosing the **Stretched** option stretches the background image across the entire area of the trend display. Stretching may cause some images to become distorted.

Colors

In the **Colors** section of the **Workspace** settings, you can choose the colors for the **Background**, **Title** (the title and text displaying the type of trend), and **Foreground** (the actual chart). To change the color, simply click the box corresponding to the area that you want to change. This opens a **Color** dialog box, which enables you to select a predetermined color. You may also select the **Define Custom Colors** button to create a color.



Note: Border Style (available only with the old plot style).

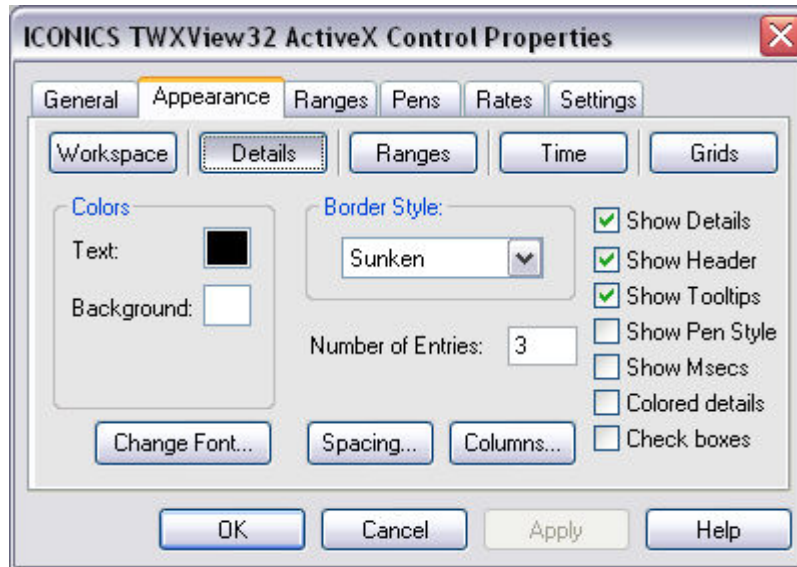
The **Border Style** section of the **Workspace** settings defines the type of border and placement the display will have. There are four options for the **Trend Border Style**: Bumped, Etched, Raised, and Sunken. In the bumped style, only the border looks raised, while the etched style is mostly flat. In the raised style, the border looks as if it is coming out of the window. In the sunken style, the border looks as if it is going into the window. The **Trend Border Options** list enables you to select where you want the border to be placed: Bottom, Bottom Left, Bottom Right, Left, Rectangle, Right, Top, Top Left, or Top Right.

You can select which components of the trend you want to appear on the display. Additionally, you can select **Trend Border Style** and the **Trend Border Options**. To enable the trend border, check the **Border** check box. To give the border a three-dimensional appearance, check the **3D Edge** check box.

Details

The **Details** section of the **Appearance** tab, shown below, manages the detail display information area, and the enabled choices closely match the selected plotting type.

Appearance Tab: Details Settings



Colors

In the **Colors** section of the **Details** settings, you can choose the colors for the **Text** and **Background**. To change the color, simply click the box corresponding to the area that you want to change. This opens a **Color** dialog box, which enables you to select a predetermined color. You may also select the **Define Custom Colors** button to create a color.

Border Style

The **Border Style** section of the **Details** settings defines the border attributes for the Details window. There are four options for the **Border Style**: Bumped, Etched, Raised, and Sunken. In the bumped style, only the border looks raised, while the etched style is mostly flat. In the raised style, the border looks as if it is coming out of the window. In the sunken style, the border looks as if it is going into the window.

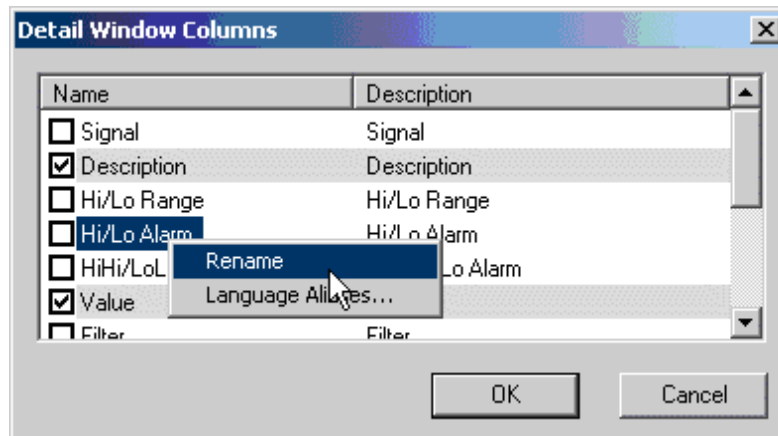
Columns

Clicking the **Columns** button on the **Details** tab opens the **Detail Window Columns** dialog box, as shown in the figure below. This dialog specifies the column names for the details section of the Trend Viewer, and also enables you to choose which columns to display in the Details window. Both the column names and descriptions are listed, but you can only modify column names. To change a column name, right-click on the name and select **Rename** from the pop-up menu, as shown in the figure below. Your changes are reflected in the Viewer.



Note: When you right-click on a column name, you can also select a language alias (Unicode version only) from the Language Alias Browser.

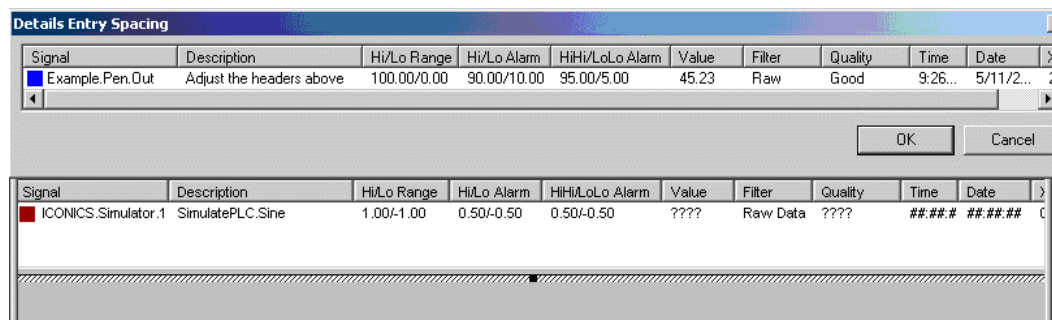
Setting the Column Names for the Viewer



Spacing

Clicking the **Spacing** button allows you to configure a default column spacing for the Details window to be recalled during runtime mode. This opens the **Details Entry Spacing** dialog box, as shown in the figure below. As you can see, the column spacing corresponds to the spacing the trend viewer display. Adjust the spacing according to the number of columns that are displayed.

Details Window Spacing



Other Options

The **Number of Entries** field displays the number of pens in the Details window of the Viewer. If more pens exist, the Details window will show a scroll bar for scrolling up or down. If **Show Header** is checked, the Details window header will be displayed. If **Show Tool Tips** is checked, tool tips indicating the sample values will be displayed as the cursor moves across the display area in freeze mode.

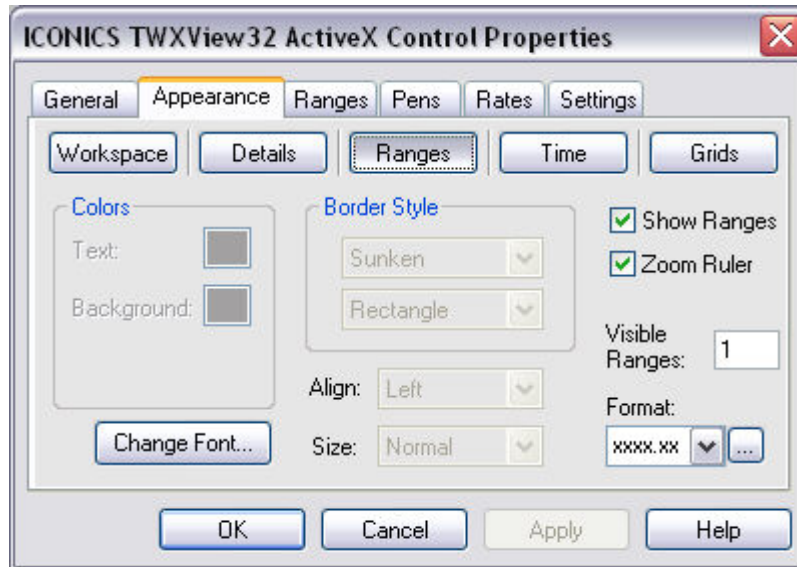
If **Show Msecs** is checked, the Details window will append the milliseconds value to each time stamp displayed. If **Show Pen Style** is checked, the Details window will draw a line in front of the pen description text in the same style, width, and color as the pen curve. This way, signals drawn with different pen styles can be easily identified in monochrome printouts.

Ranges

The **Ranges** section of the **Appearance** tab, shown below, manages the Ranges Configuration for the trend display. Depending on the selected plot type, some options may or may not be available. To display ranges in the trend display, check the **Show Ranges** check box.

The **Size** field indicates the size of the entire ranges field in the trend display. The **Align** field determines where the ranges field will be placed in the trend window (right or left), with the exception of the Strip Chart, in which the only range values are x-ranges that cannot be moved from left to right. The **Visible Ranges** sets how many range scales will be visible in the trend display.

Ranges Settings



Colors

In the **Colors** section of the **Ranges** settings, you can choose the colors for the **Text** of global ranges and **Background** of the range box when the "old plot style" option is checked. To change the color, simply click the box corresponding to the area that you want to change. This opens a **Color** dialog box, which enables you to select a predetermined color. You may also select the **Define Custom Colors** button to create a color.

Border Style (available only with the old plot style)

The **Border Style** section of the **Ranges** settings defines the border attributes for the Details window. There are four options for the **Border Style**: Bumped, Etched, Raised, and Sunken. In the bumped style, only the border looks raised, while the etched style is mostly flat. In the raised style, the border looks as if it is coming out of the window. In the sunken style, the border looks as if it is going into the window. The **Border Options** list enables you to select where you want the border to be placed: Bottom, Bottom Left, Bottom Right, Left, Rectangle, Right, Top, Top Left, or Top Right.

Format

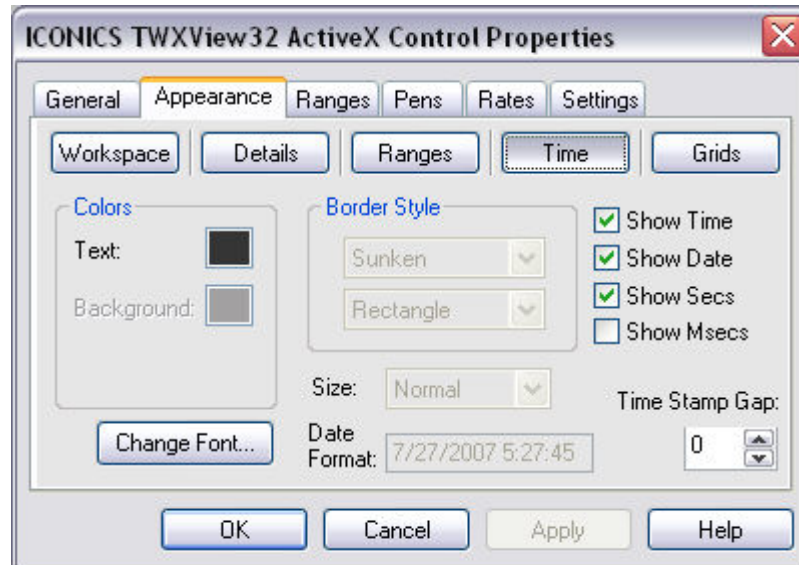
The **Format** field determines how the numbers representing the ranges will appear (decimals or integers). To select an alias to use for the **Format**, click the ... button to the right of the drop-down list. This opens the respective alias browsers, allowing you to choose from a list of available aliases.

Time

The Time section of the Appearance tab, shown below, configures the style of the time display inside the trend (e.g. the x-axis labels on a time plot). You can select the border and size parameters, as well as the text and fill colors. You can also choose to show or not to show the date, seconds, and milliseconds during runtime mode.

To display time information in the trend display, check the Show Time check box. To display the date in the trend display, check the Show Date check box. To display seconds in the trend display, check the Show Seconds check box. To display milliseconds information in the trend display, check the Show Millisecs check box.

Time Settings

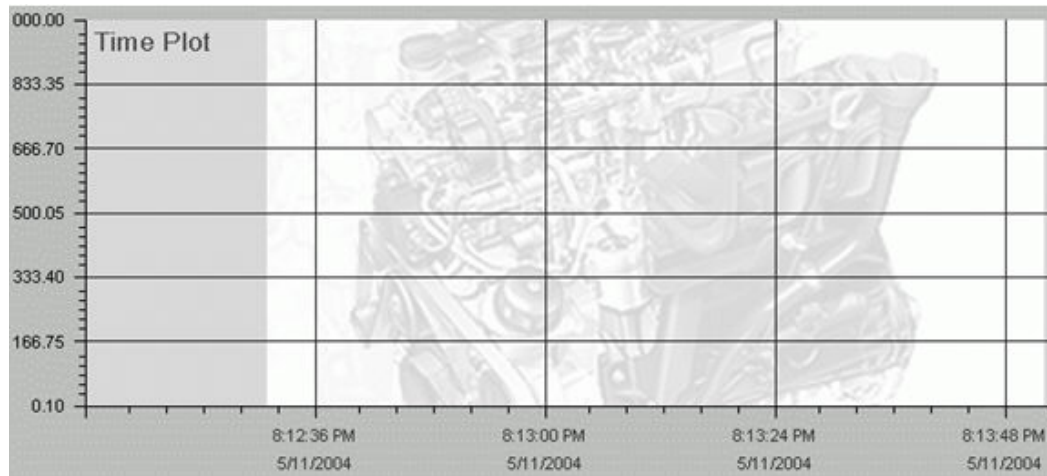


The **Time Stamp Gap** determines how many time stamps to remove between time labels in a trend plot. In the time plot shown in the figure below, the time stamp labels appear at fixed intervals along the x-axis. If you resized the trend window to make it smaller, the time labels would collide and overlap, making the time stamps impossible to read. However, if you remove some of the time stamp labels on the plot, the labels will not collide and will still be readable. Click the arrow buttons to change the spacing between time stamps as needed.



Note: The **Time Stamp Gap** setting does not affect the actual time data of the trend; it only affects how much space appears between the time labels.

Spacing Between Time Stamps



Colors

In the **Colors** section of the **Time** settings, you can choose the colors for the **Background** of the time box when the "old plot style" option is checked and **Text** (the title and text displaying the type of trend). To change the color, simply click the box corresponding to the area that you want to change. This opens a **Color** dialog box, which enables you to select a predetermined color. You may also select the **Define Custom Colors** button to create a color.

Border Style

The **Border Style** section of the **Time** settings defines the type of border and placement the display will have. There are four options for the **Border Style**: Bumped, Etched, Raised, and Sunken. In the bumped style, only the border looks raised, while the etched style is mostly flat. In the raised style, the border looks as if it is coming out of the window. In the sunken style, the border looks as if it is going into the window. The **Border Options** list enables you to select where you want the border to be placed: Bottom, Bottom Left, Bottom Right, Left, Rectangle, Right, Top, Top Left, or Top Right.

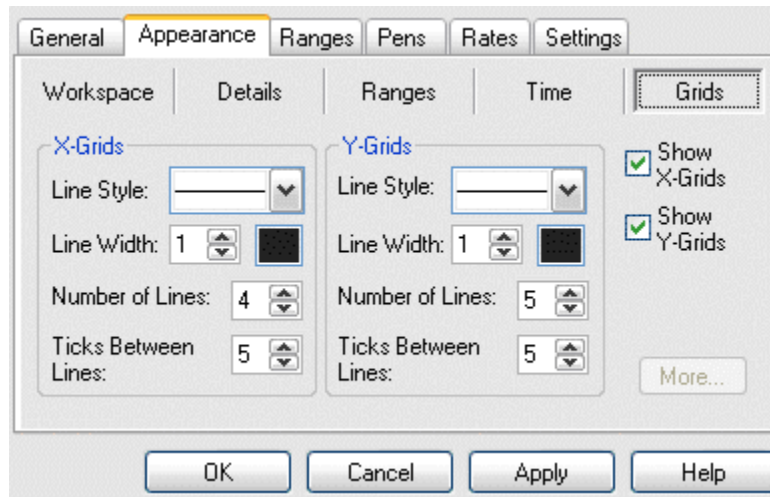


Note: Border Style are only available only with the old plot style.

Grids

The **Grids** section of the **Appearance** tab, shown below, configures the appearance of the grid on the display. If the **Show** boxes are checked, the respective X-axis and Y-axis grid lines are displayed in the trend display.

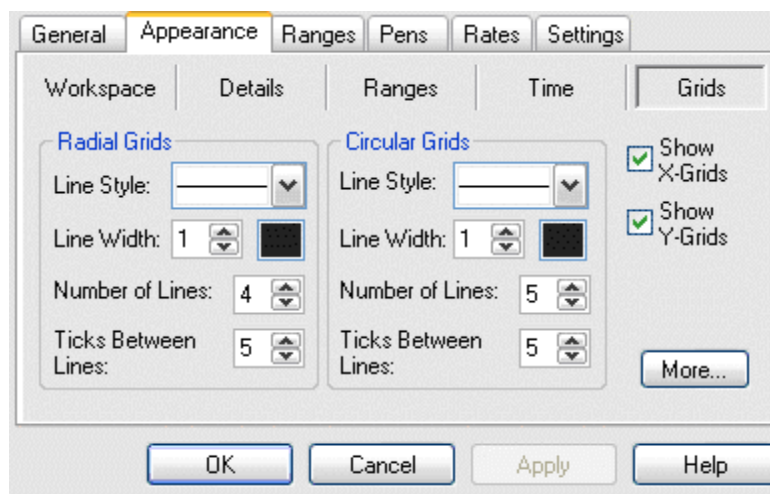
Grids Settings



TrendWorX32 conveniently provides for separate configuration for the X-axis and Y-axis, with the exception of the bar plot, which does not support x-axis grids. You can select a **Line Style** for the line from the following options: **Dashed, Dotted, Dotted Dash, or Solid**. The **Line Width** field specifies how wide the grid lines are for each axis. You can select a color for the grid by clicking the color box and choosing a color. The **Number of Lines** field specifies the number of grid lines you want to appear for each axis. The **Ticks Between Lines** field specifies the number of ticks (i.e. intervals) between any two grid lines.

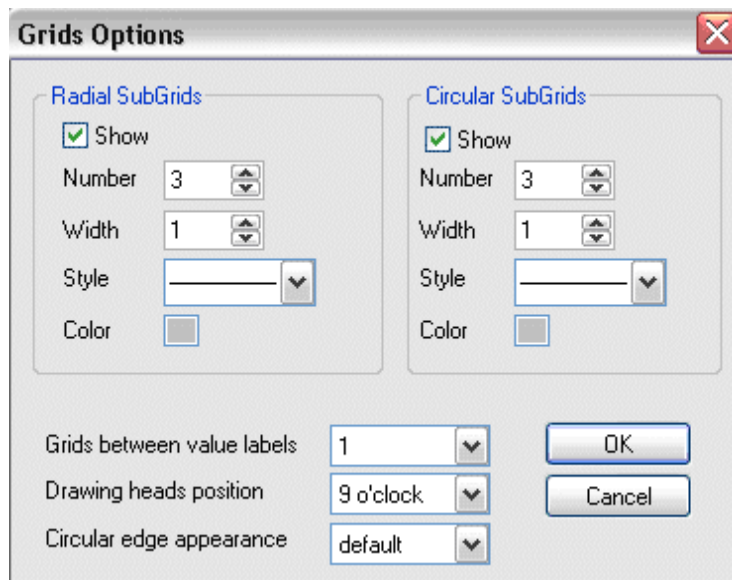
If you are using a circular chart, the following dialog box appears. Select the **Grids** tab to modify the color and style of the radial grids and circular grids.

Grids Tab for Circular Charts



Click **More** to open the **Grids Options** dialog box, shown below, which enables you to change the number, width, style, and color of the radial and circular subgrids. You can elect to show or not to show (enable or disable) the radial and circular subgrids. You can choose the number, width, style and color of the radial and circular subgrids. You can also set the number of grids to be shown between value labels, whether they are grids or subgrids. You can set the position of the drawing heads by selecting one of the options from the **Drawing Heads Position** drop-down list. You can also select the edge thickness of the circle.

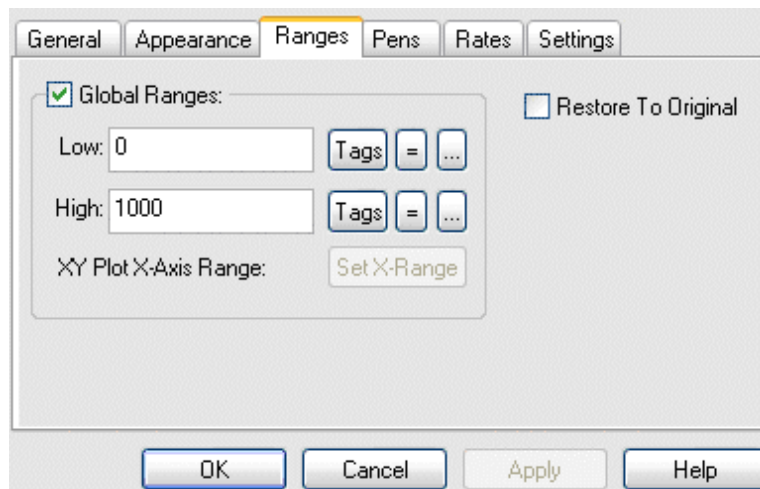
Grids Options Dialog Box for Circular Charts



Ranges Tab

The **Ranges** tab of the **Properties** dialog box, shown below, manages the global ranges configuration for the trend display. Depending on the selected plot type, some options may or may not be available.

Ranges Tab



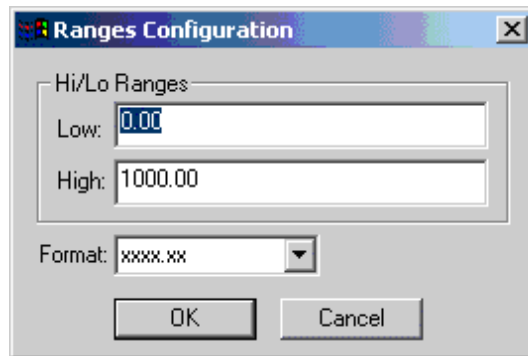
The **Global Ranges** section of the **Ranges** tab sets the ranges for the trend display. If **Global Ranges** is checked, all pens will be drawn using the same set of ranges. These can be constants, expressions, OPC tags, or global aliases. To select an OPC tag for the low or high ranges, click the **Tags** button. To select an expression, click the **=** button to open the Expression Editor. To select a global alias, click the **...** button and select **Global Aliases** from the pop-up menu. This opens the Global Alias Browser, allowing you to choose from a list of available aliases.

In the Unicode version of the TrendWorX32 Viewer, if **Global Ranges** are enabled, the **Format** field can be language-aliased to produce the desired number formatting, font, and scaling (if a scaling expression is available in the Language Configurator).

If you are using an XY plot, the **Set X-Range** button will be available. Clicking this button opens the **Ranges Configuration** dialog box, which specifies the **High** and

Low ranges, as well as the **Format**, for the x-axis.

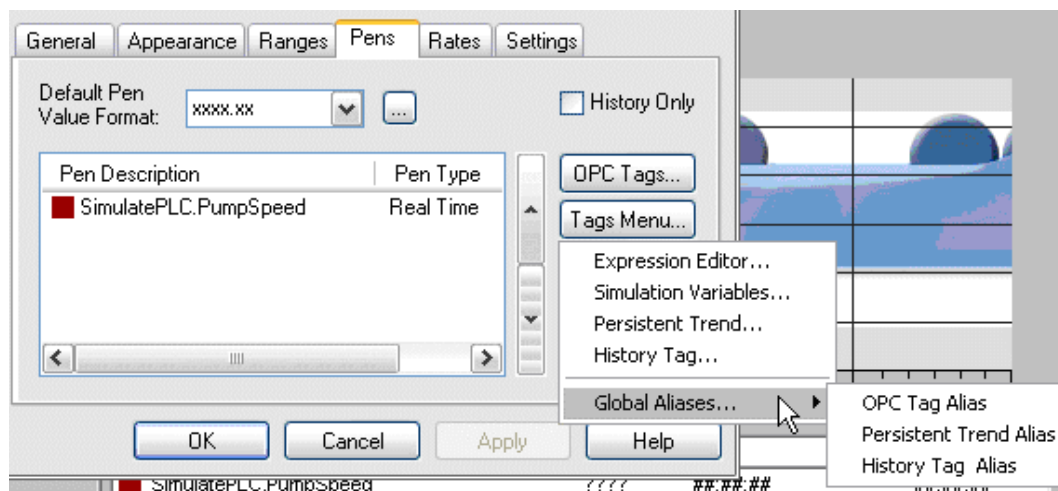
Ranges Configuration for XY Plots



Pens Tab

The **Pens** tab of the **Properties** dialog box, shown below, handles the signal connection, editing, and configuration for the data displayed in the trend. Clicking **OPC Tags** opens the **Unified Browser**.

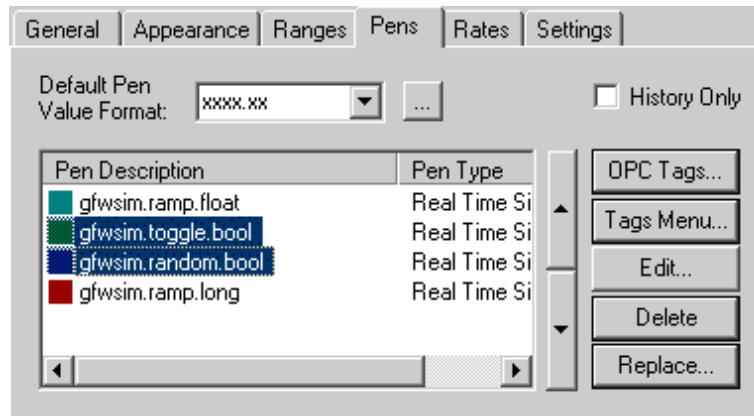
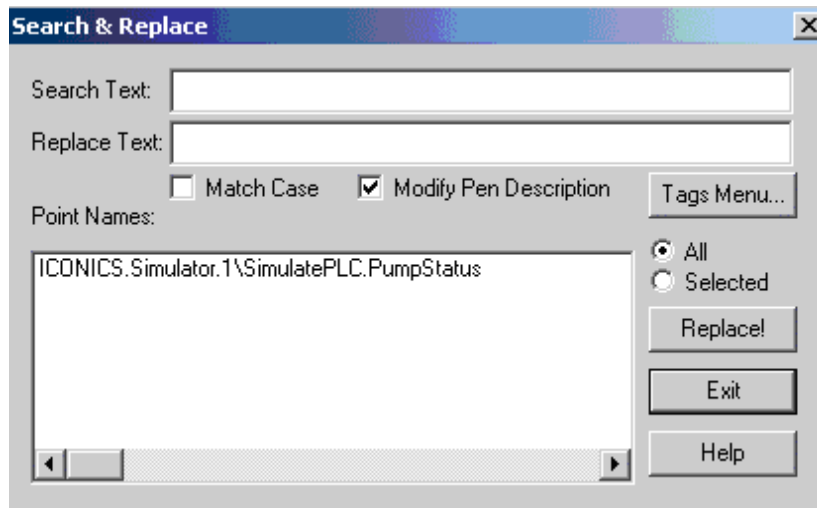
Pens Tab

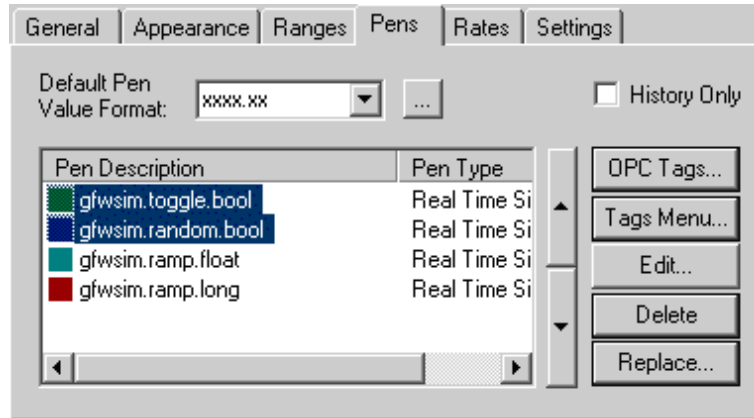


To display only historical data, in freeze mode you must check **History Only**. Then you can make connections to OPC HDA servers. If this option is not set, you can make both real-time and historical tag connections on the same TrendWorX32 ActiveX Viewer. You can connect signals to pens, which are coming from an OPC server or are the result of a calculated expression to show the real-time data. This is illustrated in the following sections:

- OPC Tags
- Tags Menu
- Edit Button

You can also delete, modify, and replace pens. To delete one or more pens, select the pen and then click **Delete** on the **Pens** tab. Then click **Yes** to delete the pen. To replace or modify the pen, click **Replace** on the **Pens** tab. This opens the **Search and Replace** dialog box, shown below. You can search for and replace text as needed to modify the pen.

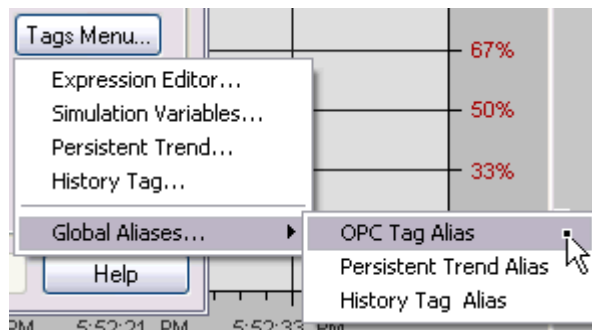




Tags Menu

Clicking **Tags Menu** in the **Pens** tab of the **Properties** dialog box opens the following menu, as shown in the figure below.

Tags Menu



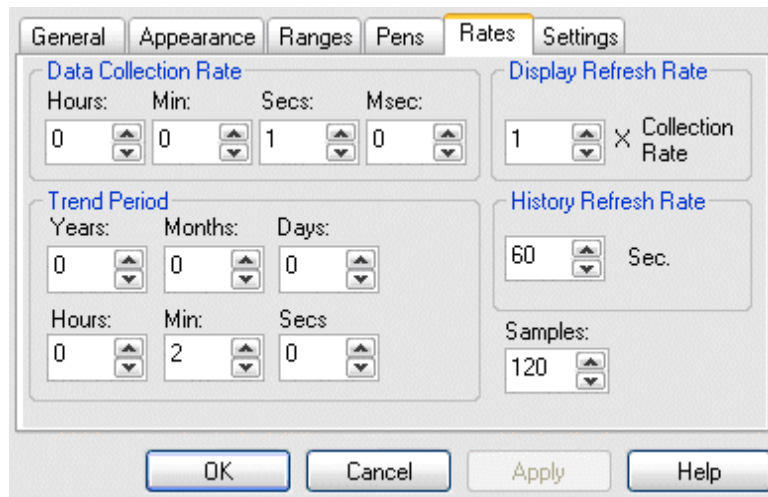
The **Tags** menu contains the following basic options:

- [Expression editor](#)
- [Simulation variables](#)
- [Persistent trend](#)
- [History tag](#)

Rates Tab

In the **Rates** tab of the **Properties** dialog box, shown below, you can select the desired **Data-Collection Rate** and the number of **Samples**, among other variables. Currently the fastest data-collection rate is 10 milliseconds (ms). The update rate is calculated by inserting the variables on the **Rates** tab into an equation. Therefore, if you change one of these variables, all other variables will be updated automatically. Notice also that the data-collection rate is configured independently of the drawing action. The fastest display update rate is 50 ms, with the exception of bar plots, in which the display rate matches the data-collection period.

Rates Tab



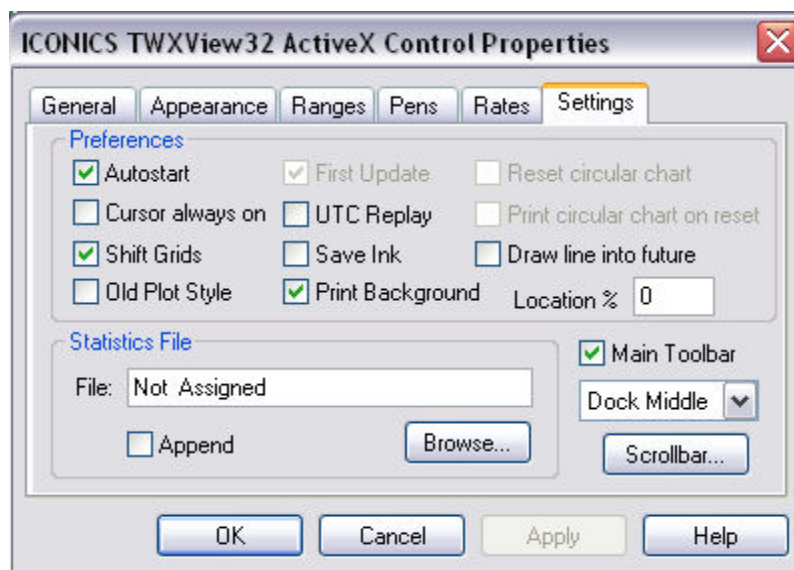
The **Display Refresh Rate** controls the speed at which the signal curves will be drawn. If, for example, the data-collection rate is set to 250 ms and the **Display Refresh Rate** is set to 4, the samples will be collected at 250 ms, but the signal curve will be updated every second without loss of data. This is a great option to minimize system-resource usage.

The **History Refresh Rate** controls the frequency at which the historical pens will be refreshed with new historical data from the TrendWorX32 Historical Database. This can be used as an optimization and load-balancing tool. For example, if the TrendWorX32 SQL Server is configured to log to the database every 1 min., then the History Refresh Rate should be set to a maximum of 1 min.

Settings Tab

The **Settings** tab of the **Properties** dialog box, shown below, manages various aspects of the trend configuration.

Settings Tab



If **Autostart** is checked, the TrendWorX32 Viewer ActiveX will automatically enter animation mode when the container application switches from design mode to use mode. Note that in the TrendWorX32 and AlarmWorX32 containers, this option is

disabled, and both applications will start the ActiveX Viewers through OLE Automation.

If **Main Toolbar** is checked, you can access the **Trend Viewer** toolbar during runtime mode.

When **Shift Grids** is checked, the relative location of the grids on the axis is time-scale based. You can also enable the restoration of range information that may have been changed during runtime mode. Choosing startup determines a relative plot of each signal on the display based on the **Location %** value. The default value is 0, and the pen curve will begin plotting from the far right side of the trend display.

Under the **Statistics File** section, you can click the **Browse** button and select a .csv file for saving statistical information during runtime. Check **Append** if you want to append the statistical information to the .csv file or overwrite the existing one.

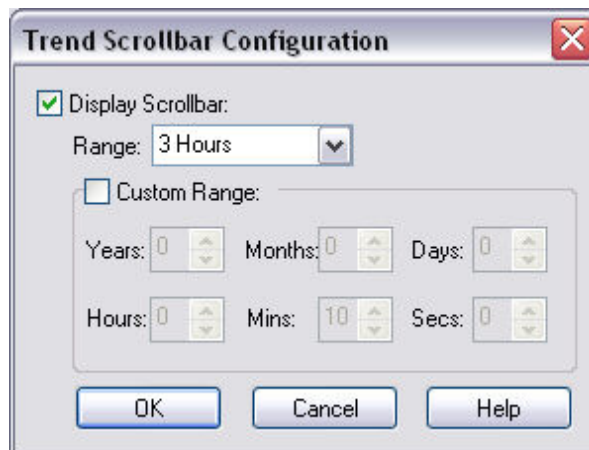
Selecting **Save Ink** will conserve ink while printing by not using the configured background color fill of the individual areas within the trend display. The curves and text, however, will be printed in the configured colors. Also, if you select **Print Circular Chart on Reset**, and the **Reset Circular Chart** after full period option is enabled, the TrendWorX32 Viewer will automatically print the circular chart display.

TrendWorX Version 8.0 introduced a new look and feel to the trend viewer display. To revert to the style TrendWorX versions prior to Version 8.0, check the **Old Plot Style** check box.

If you have inserted background images into your trend display, you have the option of printing the background when printing trend displays. If you do not want to print the background image with trend display in order to conserve ink, uncheck the **Print Background** check box.

Click the **Scroll Bar** button to set the time range for how far back you will be able to scroll while in freeze mode. This opens the **Trend Scroll Bar Configuration** dialog box, as shown below. If **Display Scrollbar** is checked, you must select a range for how far back you can scroll. By default, the scroll range is set at 3 hours, but the options of 10 seconds, 30 seconds, 1 minute, 2 minutes, 10 minutes, 30 minutes, 1 hour, 8 hours, 1 day, 5 days, 1 week, 1 month, 3 months, 6 months and 1 year are also available from this list. If you wish to enter a more-specific range you can check **Custom Range** and select the range in years, months, days, hours, minutes, and seconds.

Trend Scroll Bar Configuration dialog box



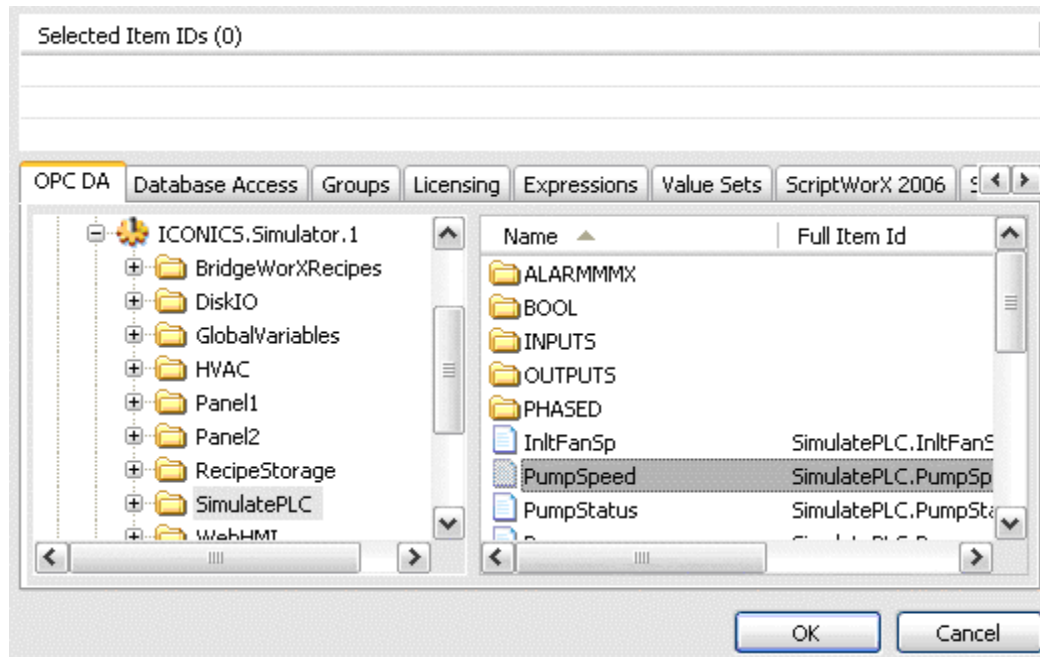
Data Sources

OPC Tags

To make real-time connections from the **Pens** tab of the **Properties** dialog box, click the **OPC Tags** button. This opens the **Unified Browser**, which enables you to browse all available OPC servers and their signals, as shown below.

You can make multiple tag connections through the Unified Browser. To do so, first expand the server "tree" and then double-click the tags you wish to connect from the expanded tree view. Once all selections are made, click **OK** to establish the connections.

Unified Browser

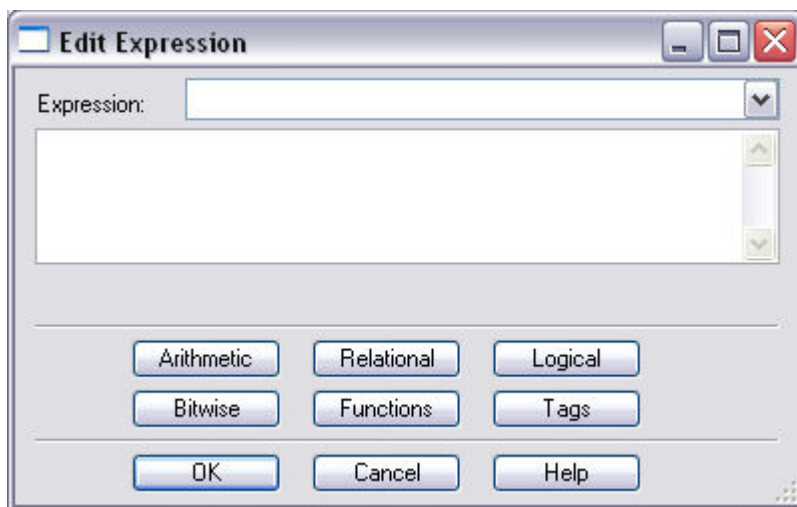


Expression Editor

Selecting **Expression Editor** from the **Tags Menu** in the **Pens** tab of the **Properties** dialog box launches the **Edit Expression** dialog box, shown in the figure below. The **Expression Editor**, shown below, is available to assist you in creating expressions for your GENESIS32 applications. The window is resizable and can be stretched as well as maximized or minimized. The drop-down list at the top of the **Edit Expression** dialog keeps track of the last 50 expressions you have entered. The expression entered most recently is the first in the drop-down list.

Note: For more information about the Expression Editor, please see the Expression Editor help documentation.

Expression Editor

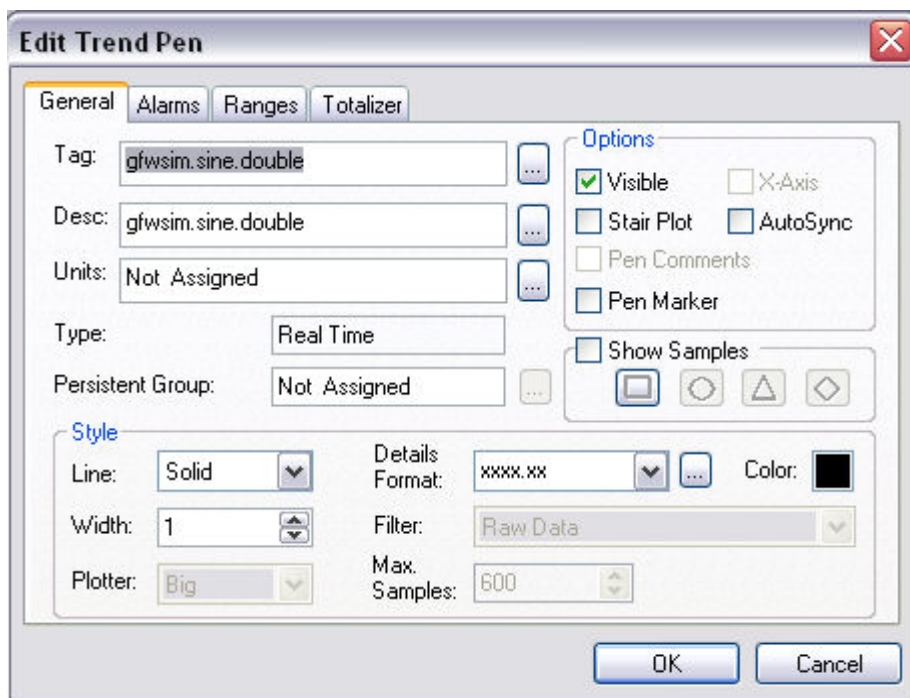


To edit the Trend Pen:

Double-click the pen in the **Pens** tab list, as shown below.

This opens the dialog box, which allows you to edit many options specific to that pen.

Selecting Pens To Edit



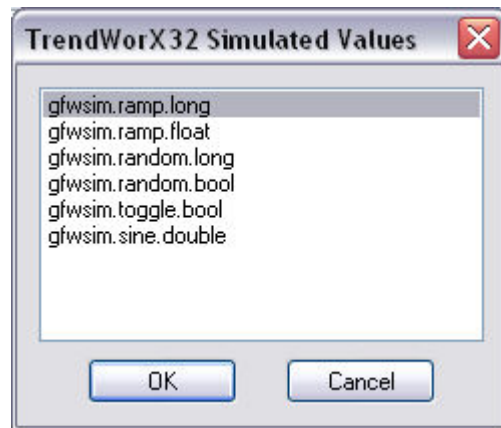
Simulation Variables

Selecting **Simulation Variables** from the **Tags** menu in the **Pens** tab of the **Properties** dialog box launches the **TrendWorX32 Simulated Values** dialog box, shown below, which lists all available simulated variables. Selecting one of these variables will create a pen attached to the simulated variable. These variables are helpful in testing the setup of your pens.

For simulation variables within an expression, use the following syntax:

```
{{SIMULATION_VARIABLE_NAME}}
X={{GFWSIM.RANDOM.LONG}}
```

Simulated Values Dialog Box



Persistent Trend

If the GENESIS32 Persistent Trending Automation Server is installed, configured, and running, selecting **Persistent Trend** from the **Tags** menu in the **Pens** tab of the **Properties** dialog box enables direct connections to the Persistent Trending server. A new dialog box appears, as shown below, showing all groups configured in the Persistent Trending server.

Persistent Trend Dialog Box



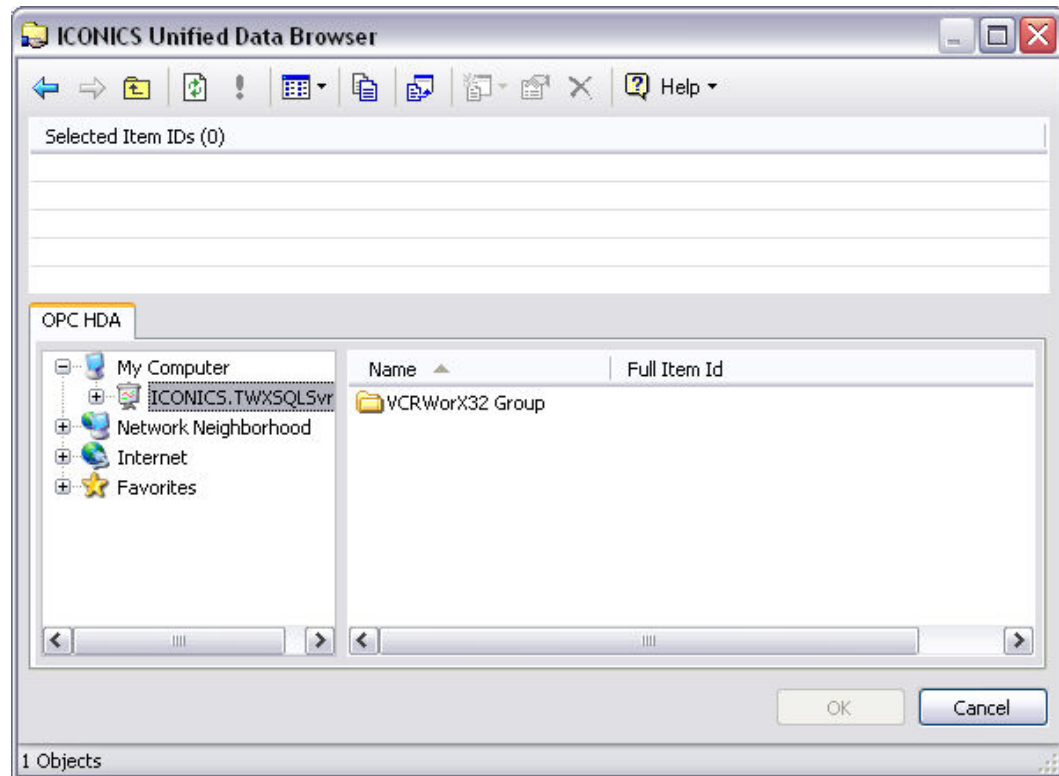
Double-clicking a group displays all signals configured for that specific group. You can select which signals to connect from the Persistent Trending server and click **Connect**. TrendWorX32 Viewer fills its buffer from the data existing in Persistent Trending prior to drawing.

History Tag

Selecting **History Tag** from the **Tags** menu in the **Pens** tab of the **Properties**

dialog box opens the **Unified Browser**. Then you can browse for OPC HDA

Browsing for Historical Tags



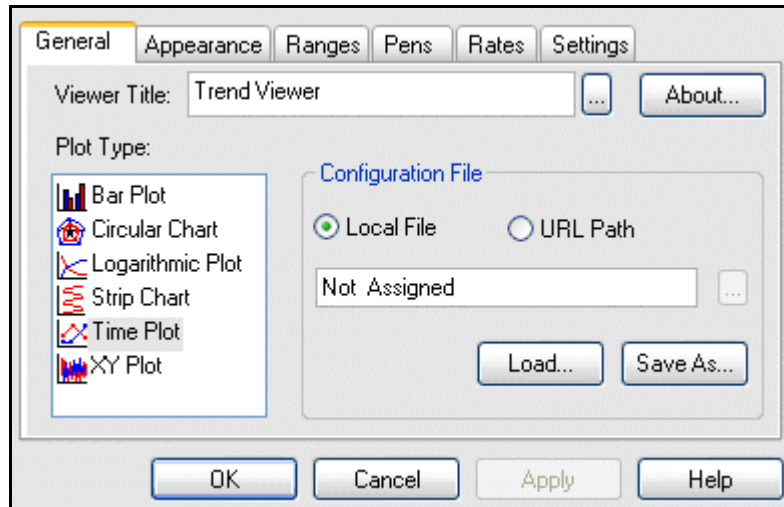
Asynchronous Downloading Features

The TrendWorX32 Viewer supports asynchronous downloading of configuration data when used inside GENESIS32 ActiveX document servers, such as GraphWorX32, to produce documents, which can be viewed using Microsoft Internet Explorer.

To enable this feature, select **URL Path** from the **General** tab of the **TWXView32 ActiveX Properties** dialog box, shown below, and supply a URL path. In the case of viewing ActiveX documents within an intranet setup, you can supply a server name and directory specifying the location of the TrendWorX32 Viewer configuration data (must be a shared directory), by using the convention `file:\\Server Name\\Directory\\File Name.v32`.

You can also enable the **Use Local Settings** option, which, if checked, stores runtime changes to a local copy of the remote configuration file. It will use this local file every time the HTML page that hosts the Viewer is loaded inside the Web browser.

TrendWorX32 Viewer ActiveX Properties: General Tab



Pens

About Pens

Pens are the trend lines that you see in your trend plot. A pen represents the value of a data source, either real-time, historical, or persistent. Pens have two important characteristics:

- The data that they represent
- The way in which the data is formatted on the plot.

You can modify the data source so that one or more pens show up on a trend in one or more windows. Multiple windows or split windows can show two or more pens separately allowing you to better compare their values.

In order to better visualize your data TrendWorX32 Viewer gives you a significant amount of control over how a pen looks. You can change a pen's color, line width, have a pen marker show on the right hand side of the plot, and more. The sections that follow describe pen options more fully.

Clicking **Edit** in the **Pens** tab of the **Properties** dialog box (when a pen is selected) opens the **Edit Trend Pen** dialog box, shown below, which contains the following tabs:

- General tab
- Alarms tab
- Ranges tab
- Totalizer tab
- Ideal Pens tab

To make real-time connections from the **Trend Pen Configuration** dialog box, click the OPC Tags button. This opens the **Unified Browser**, which enables you to browse all available OPC servers and their signals.

Pens General Tab Settings

The **General** tab, shown below, is the default tab of the **Edit Trend Pen** dialog box. This tab allows you to change the tag with which the selected pen is associated, the

description of the pen, and the units assigned to the pen. It also provides various options and style settings for the pen.



Note: In the new plot style, the pen description is used as the pen identifier/title in the ranges field in a stacked plot.

The Edit Trend Pen dialog box.

The General Setting table shows below details the options that are available to you in this dialog box.

General Settings.

Function	Description
Options - Visible	Indicates whether the plot of the selected pen will be visible. If Visible is not checked, the Viewer will still buffer data for the pen, but it will not draw it.
Options - Stair Plot	Describes how the plot will appear. The stair plot uses a stepwise draw method to plot the trend. It is ideal for plotting slowly changing signals or setpoints.
Options - Pen Comments	If the pen being edited is a historical pen, then the Pen Comments check box will be enabled. If checked, when the TrendWorX32 Viewer ActiveX is in freeze mode, it will retrieve and display all related historical comments and batch information (if any).
Options - Pen Marker	Provides a marker for the pen on the right-hand side of the trend display indicating the last data point drawn on the graph.
Options - Show Samples	Inserts a shape of your choice (e.g. square, circle, triangle, or diamond) around every point on the graph that represents an actual data point. The default shape is a square.

Options - X-Axis	Indicates the horizontal axis selection for XY plots.
Options - Auto Sync	This option applies to real-time pens. If enabled, it will shift the time axis of the pen so that the curve will be plotted within the current time frame of the Viewer. This option should be used when real-time pens are connected to remote OPC Data servers and there no network synchronization facility is applied.
Style - Line	Select a line style for the plot from the drop-down list: Solid , Dashed , Dotted , or Dotted Dash .
Style - Width	Determines the width of the plot line. If the line width is greater than 1, the Line field will be unavailable, and the Solid line style will be applied.
Style - Plotter	Used only for circular charts, determines the size of the plotter for the selected pen: small, medium, big, and huge.
Style - Color	Clicking the Color box opens the Color dialog box, from which you can select the color of the pen or define a custom color.
Details Format	Specifies how data will be displayed in the Details window of the Trend Viewer.
Filter	The Filter selection is mostly used for historical replay and corresponds to the averaging method used in retrieving historical data. For example, if Filter is set to Last Sample, the last sample of the historical data within each subinterval will be retrieved. The TrendWorX32 Viewer supports the Raw Data filter for historical replay as follows: • Select the Raw Data filter for a historical pen. • Select the Max. Samples to retrieve. As a result, the TrendWorX32 Viewer will ask the TrendWorX32 SQL Server to retrieve the Max. Samples number of raw samples (no interpolated/extrapolated) from the historical data. If more data exist for the time interval for which the data were requested, an X mark will appear at the ends of the curve to indicate that not all samples were retrieved for the time interval of the request. This feature does require some configuration in order to prevent usage of large amounts of memory. A typical way to estimate the maximum number of samples data-logged for a period of time is to divide the time period by the data-collection rate of the signal configured in the data logger. If no dead band is configured, and the signal that is data-logged changes frequently, the result indicates an upper limit of samples data-logged for that period.

In the Unicode version of TrendWorX32 Viewer, the **Description (Desc)**, **Units**, and **Details Format** fields can be language-aliased. If the language alias for the units also has a related equation, this will result in the automatic range and value scaling for the pen upon switching languages.

To select an alias to use, click the ... button to the right of the **Tag**, **Desc**, **Units**, **Persistent Group**, or **Details Format** fields and select either **Global Aliases** or **Language Aliases** from the respective alias browsers, which enable you to choose from a list of available aliases.

Alarms Tag

The **Alarms** tab of the **Edit Trend Pen** dialog box, shown below, sets the levels at which alarm lines will be drawn (if desired).

Edit Trend Pen dialog box Alarms Tab

The TrendWorX32 Viewer ActiveX allows the connection of OPC Data Access tags to its alarm limits. The OPC-enabled alarm limits will hold the most current value of the alarm limits. The alarm limits can be a constant value, an OPC Data Access tag, or an expression.

In addition, the alarm limits are interfaced to the Global Alias and Language Alias servers. This functionality is not available in History Trend mode due to the nature of this specific historical replay mode. Several OLE automation methods support this functionality:

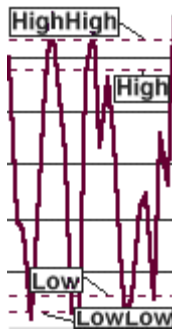
- void SetPenLoAlarmString(BSTR PenName, BSTR AlarmString, BSTR PenType)
- void SetPenLoLoAlarmString(BSTR PenName, BSTR AlarmString, BSTR PenType)
- void SetPenHiAlarmString(BSTR PenName, BSTR AlarmString, BSTR PenType)
- void SetPenHiHiAlarmString(BSTR PenName, BSTR AlarmString, BSTR PenType)

If **Show Alarm Lines** is checked, dashed lines at the **Low**, **LowLow**, **High** and **HighHigh** marks will be inserted into the trend. A sample of this is shown below.



Note: If you desire buffering of alarm values, historical replay functionality, etc., you should not use the alarm lines support of the TrendWorX32 Viewer ActiveX, but rather use individual pens to represent each alarm line (limit).

Alarm Lines Shown



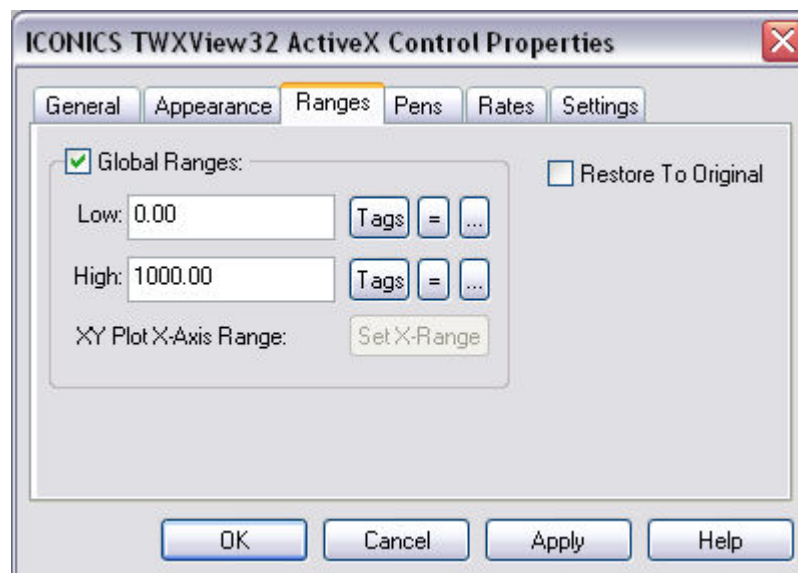
Ranges Tab

The **Ranges** tab of the **Edit Trend Pen** dialog box, shown below, deals with the field to the left of the trend display and the relative scaling of the pen curves for drawing. This tab is available only if the **Global Ranges** option is not enabled.

The range values can be constants, expressions, OPC tags, or global aliases. To select an OPC tag for the low or high ranges, click the **Tags** button. To select an expression, click the **=** button to open the Expression Editor. To select a global alias, click the **...** button to open the **Global Alias** browser, which enables you to choose from a list of available aliases.

In the Unicode version of TrendWorX32 Viewer, the **Format** field can be language-aliased. The language alias will be used to determine the ranges format on the range scale, if the **Global Ranges** option is not selected. To select an alias to use, click the **...** button to the right of the **Format** text box and select either **Global Aliases** or **Language Aliases** from the respective alias browsers, which allow you to choose from a list of available aliases.

Edit Trend Pen dialog box Ranges Tab



The Range Tab functions table below show the different features that are available to you.

Ranges Tab Functions

Function	Description
----------	-------------

Low	Sets the lowest visible point.
High	Sets the highest visible point.
Tags Button	Launches the Unified Browser .
= Button	Launches the Expression Editor.
... Button	Opens the alias browsers.
Text Color	Clicking the Text Color box opens the Color dialog box so that you can select/define a color for the text of the field.
Fill Color	Clicking the Fill Color box opens the Color dialog box so that you can select/define a color for the background of the field.
Format	Specifies how data will be displayed in the Ranges section of the Trend Viewer.
Autoscale	Disables the Low and High fields, and sets these limits automatically according to the values for the pens. Autoscaling, if checked, adjusts the range if the actual value is above or below the set limits. For example, if autoscaling is selected and the ranges are set from 0 (Low) to 200 (High) and the actual value is 250, then the ranges will autoscale to 0 to 280. The adjustment will be around 20 percent above the actual value.
Update From Server on Animate	If this option is enabled, the ranges of the pen are automatically updated from the OPC Data server or the OPC Historical servers upon entering animation mode.

Totalizer Tab

The **Totalizer** tab of the **Edit Trend Pen** dialog box, shown below, enables the totalizer function, which calculates the total amount covered within a certain time period based on the rate represented by the signal; for example, flow (gallons per minute) and speed (miles per minute). The TrendWorX32 Viewer has Totalizer support on a per-pen basis, even for non-circular chart plot types.

Edit Trend Pen dialog box Totalizer Tab

Totalizer Tab Functions

Function	Description
Input Signal - Amount Per Second	The signal represents data in seconds.
Input Signal - Amount Per Minute	The signal represents data in minutes.
Input Signal - Amount Per Hour	The signal represents data in hours.
Input Signal - Amount Per Day	The signal represents data in days.
Totalizer Type - Continuous	When Continuous is selected, the Totalizer will keep counting, starting from 0 until it comes to the end of the trend period, or until the integrated value exceeds the Auto Reset Level (a maximum limit).
Totalizer Type - Preload	When Preload is selected, the Totalizer commences counting from any value. This is especially useful when totalizing must be "held" (suspended) while a necessary operation is being performed. For example, the pipes are being cleaned and then started from a known value.
Totalizer Type - Preset	When Preset is selected, you simply specify a preset value. If you are counting upwards, the value will obviously be positive. If you are counting downwards, the preset value will be negative. A negative value would be relevant in a situation where a reservoir is being drained, for example. Then the Totalizer function, if enabled for a circular chart, would

	help monitor the flow rate. When counting upwards, when the total exceeds the preset value, it is reset. When counting downwards, the preset value is reset at a point when it becomes negative.
Initial Value	Specifies a counting option.
Enable Totalizer	When Enable Totalizer is checked, the Totalizer will run according to the other configurations on this tab.
Manual Reset	In runtime mode, the Manual Reset button is available in the Totalizer tab. When it is reset, the system returns to its initial value, and everything else is disabled.
Auto Reset Level	Sets the level at which the system will automatically reset, returning to its initial value and disabling everything else.

If you select two pens connected to the same OPC tag and enable the Totalizer function for one, you can view the details—namely that the Totalizer function is enabled—in the output window.

When the signal is 0, the Totalizer will remain at the same value. When it is on, it will show the cumulative value.

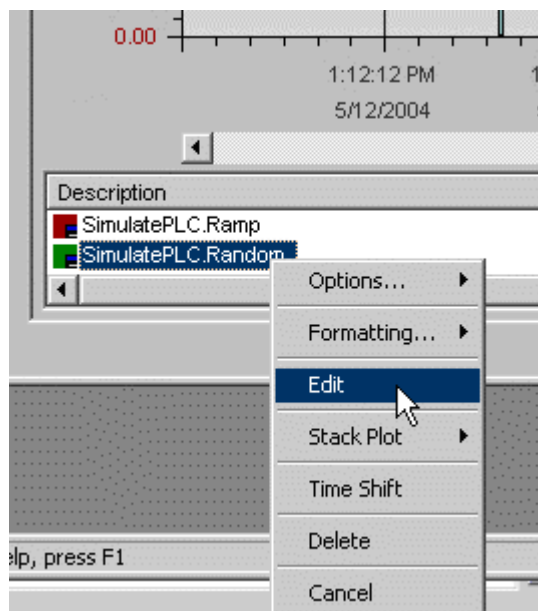
The TrendWorX32 Viewer has Totalizer support on a per-pen basis, even for non-circular chart plot types

Editing a Pen During Runtime Mode

To edit a pen during runtime mode, right-click on the pen in the Trend Viewer and select from the following pop-up menu items, as shown in the figure below:

- **Options:** Specifies various options and actions for viewing the selected pen during runtime mode.
- **Formatting:** Restores the default settings for the pen during runtime mode.
- **Edit:** Opens the **Edit Trend Pen** dialog box.
- **Stack Plot:** Displays multiple pens in a trend display in separate, stacked plots.
- **Time Shift:** Sets the interval and direction for the time shift.
- **Delete:** Removes the pen from the Trend Viewer.

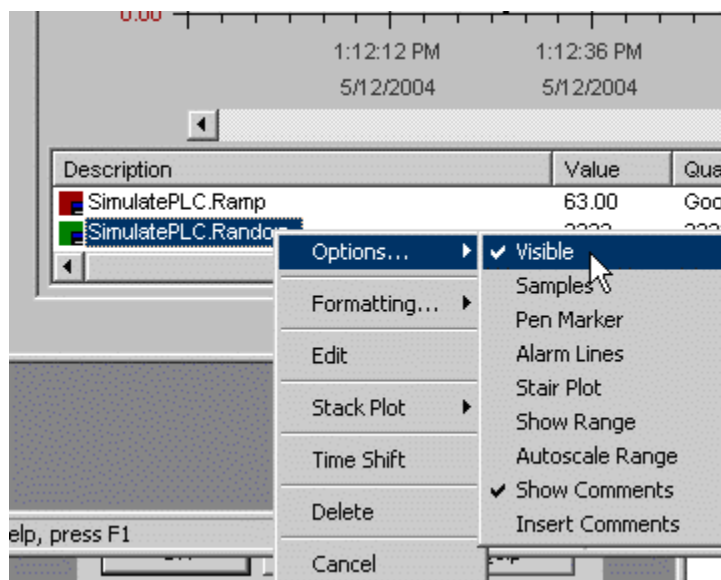
Editing Pens During Runtime Mode



Pen Options During Runtime

To view the options for pens during runtime mode, right-click the desired pen(s) in the **Details** window and select **Options** from the pop-up menu, as shown in the figure below.

Setting Pen Options in Runtime Mode



The **Options** submenu lists the following trend display options and actions for the selected pen:

- **Visible:** Shows/hides the pen in the Details view of the Trend Viewer.
- **Samples:** Retrieves historical data samples.
- **Pen marker:** Shows/hides the pen marker in the Details view of the Trend Viewer.

- **Alarm lines:** Shows/hides the dashed alarm lines at the Low, LowLow, High and HighHigh in the Details view of the Trend Viewer.
- **Stair plot:** Uses a stepwise draw method to plot the trend. This is ideal for plotting slowly changing signals or setpoints.
- **Show range:** Displays the range values for the pen in the Trend Viewer. In the old plot style, there is a range scroll bar (available only in old plot style) that enables you to switch between ranges of multiple pens. In stackable plots, you can simply click on the pen to switch ranges.
- **Autoscale range:** Disables the Low and High fields, and sets these limits automatically according to the values for the pens. Autoscaling, if checked on the Ranges tab, adjusts the range if the actual value is above or below the set limits. For example, if autoscaling is selected and the ranges are set from 0 (Low) to 200 (High) and the actual value is 250, then the ranges will autoscale to 0 to 280. The adjustment will be around 20 percent above the actual value.
- **Show comments:** If historical pens are configured in the TrendWorX32 Viewer, selecting Show Comments places the Viewer in freeze mode and retrieves all historical operator comments and batch information available.
- **Insert comments:** Displays the Comment(s) Entry dialog box for historical pens. This option is available only in freeze mode.



Note: The same functionality is available for real-time and historical trending.

Formatting Pens During Runtime Mode

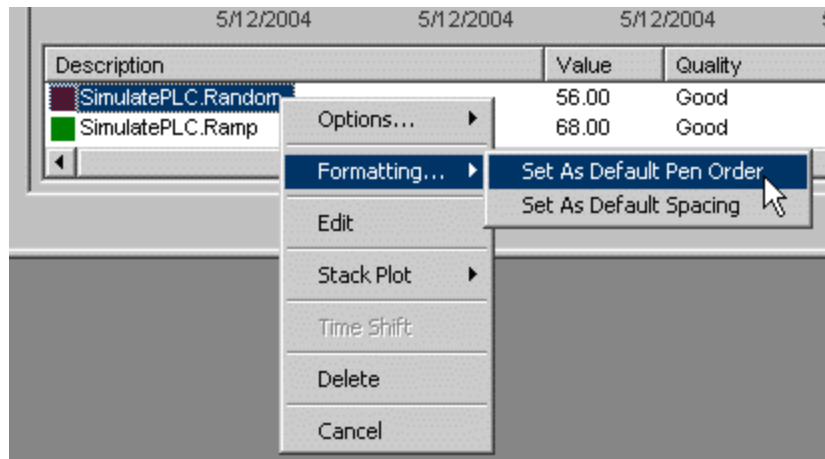
To restore the default settings for a pen during runtime mode, right-click the desired pen(s) in the **Details** window and select **Formatting** from the pop-up menu, as shown in the figure below. Choose from the following:

- **Set As Default Pen Order:** Restores the default order (arrangement) of the pen in the Details window during runtime mode.
- **Set As Default Spacing:** Restores the default spacing parameters format for the pen in the Details window during runtime mode.



Note: The TrendWorX32 Viewer ActiveX supports reordering of pens in configuration mode. In the **Pens** tab, select the trend pen(s) you would like to reposition, as shown in the figure below. The **Spacing** button in the **Details** section of the **Appearance** tab in the **Properties** dialog box allows you to configure a default format for the Details window to be recalled during runtime mode.

Formatting Pens During Runtime Mode



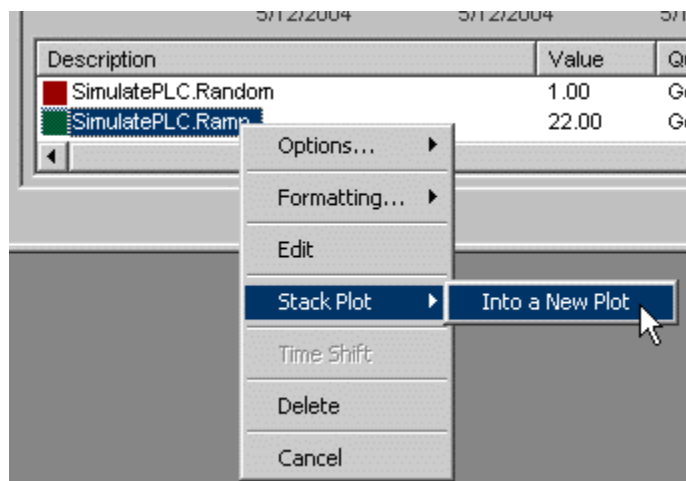
Stacking Trend Plots During Runtime Mode

If you have multiple pens displayed in a trend plot display, normally the two pens overlap each other inside the same plot. Now you can display multiple pens in a trend display in separate, stacked plots. To stack a plot, right-click the desired pen in the **Details** window and select **Stack Plot**, **Insert New Plot** from the pop-up menu, as shown in the figure below.



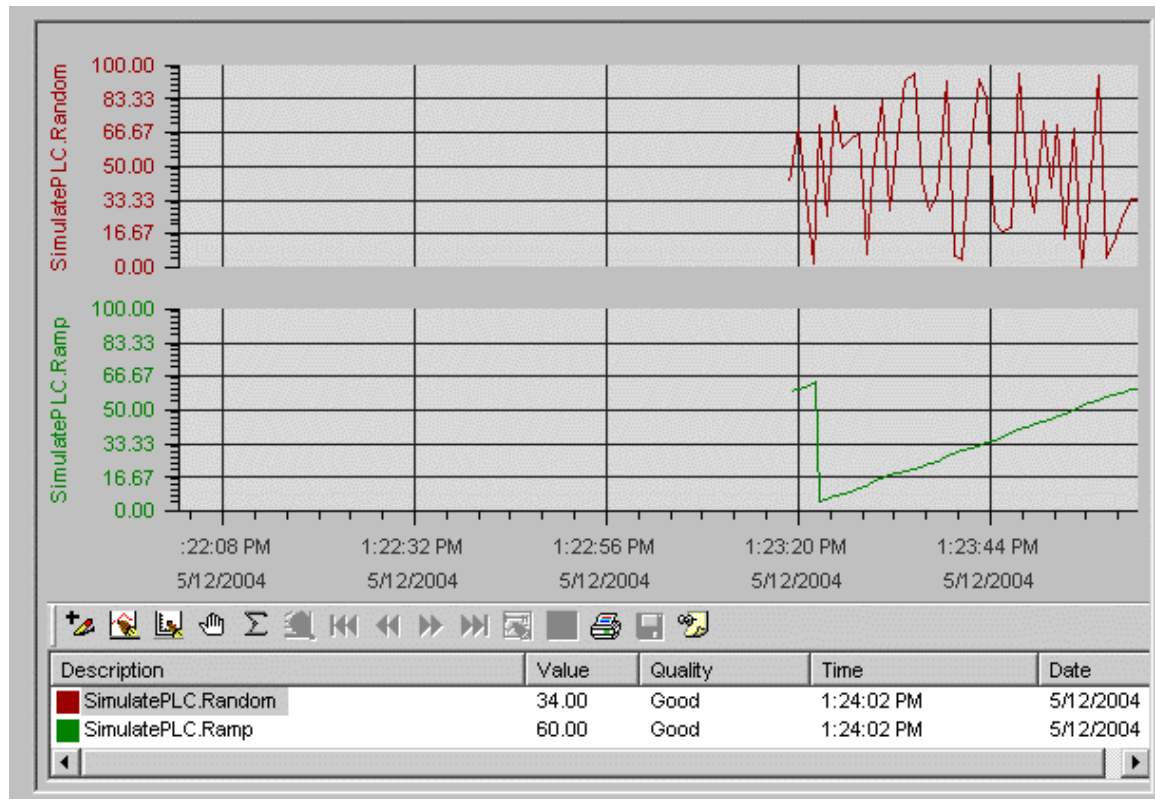
Note: Stacked plots are supported only in the new plot style. If you are viewing stacked plots (time plots), switch to a different type of plot (e.g. an XY plot), and then revert to the time plots, the time plots will no longer be stacked.

Stacking Trend Plots During Runtime Mode



The pens are stacked vertically, displaying the pens in two separate plots, as shown in the figure below.

Stacked Trend Plots



Switching Pen Ranges in Stacked Plots

If you have multiple pens displayed in a single stacked plot, the ranges for only one of the pens will be displayed in the stacked plot. To switch to the ranges view for a different pen in the same stacked plot, simply click on the pen name in the Details window.

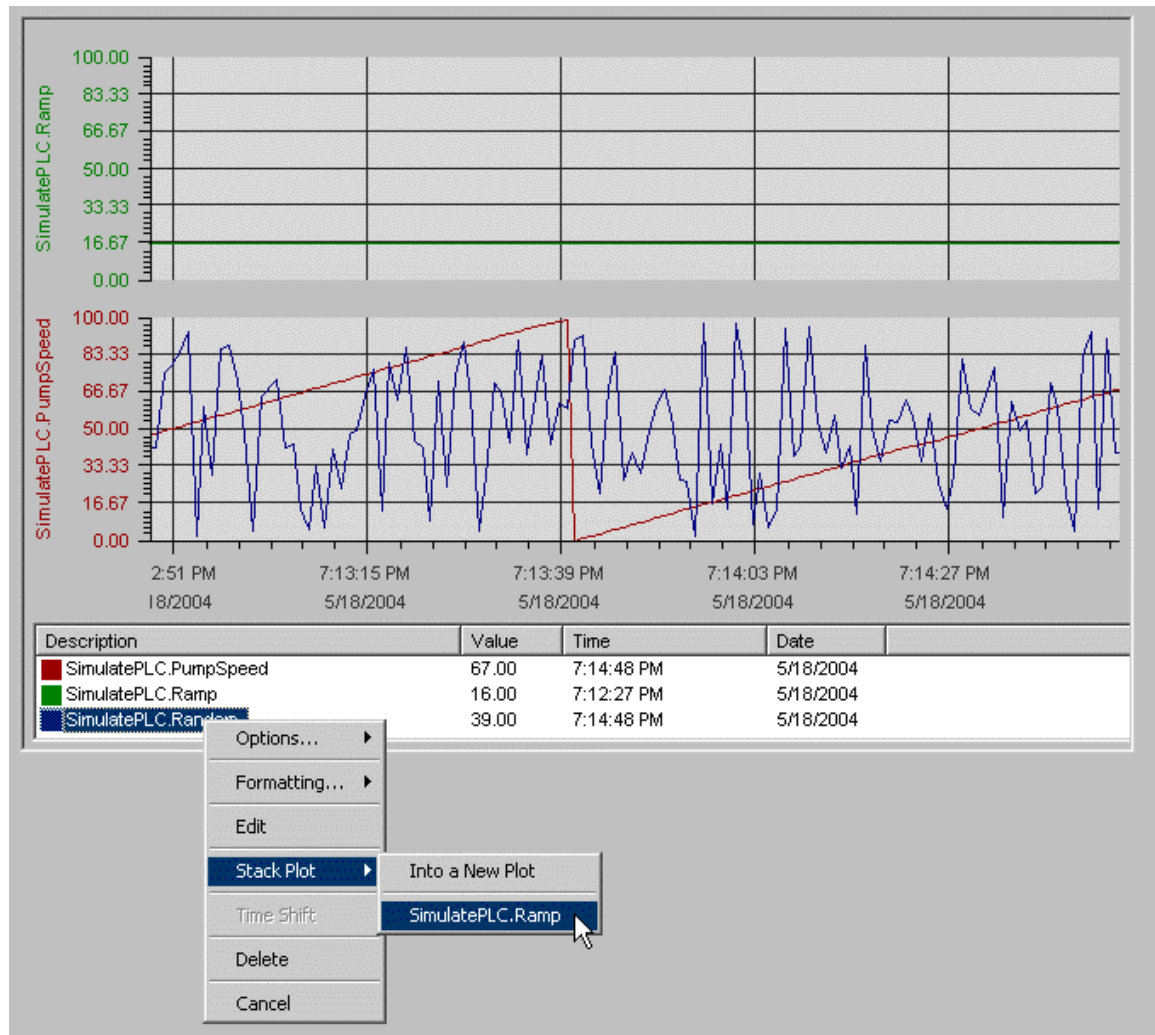
Combining Pens in a Stacked Plot

To combine or aggregate pens into a single stack plot, right-click a pen in the **Details** window and select **Stack Plot, [pen name]** from the pop-up menu, as shown in the figure below. The selected pen will be combined into a single stack plot with the pen name you selected.



Note: You can also combine pens into stacked plots by dragging and dropping pens into the trend plots. To see how this works, open the **Trend_DragDropData.gdf** GraphWorX32 display file in the \Program Files\ICONICS\GENESIS32\Examples\GEN32DEMO directory.

Combining Pens in a Stacked Plot

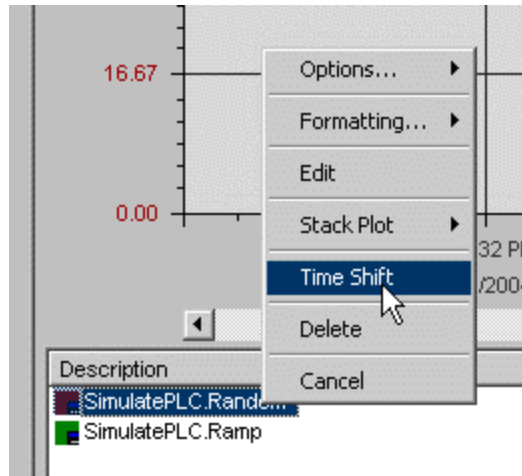


Time Shifting Pens During Runtime Mode

One feature of historical replay is the time shifting of pens in freeze mode. This allows for direct comparison of pens regardless of the time axis settings. To enable time shifting:

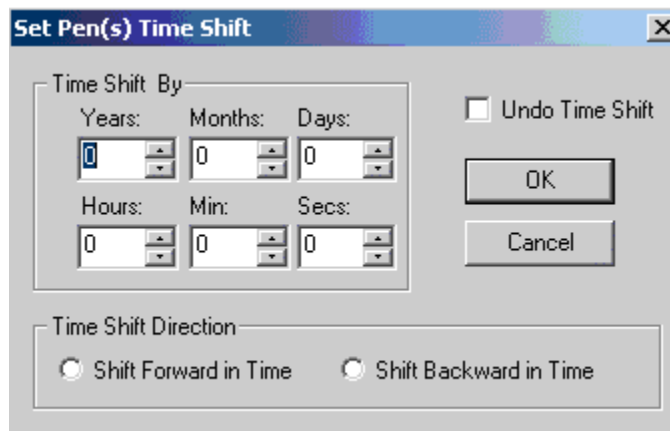
Right-click the desired pen(s) in the **Details** window and select **Time Shift** from the pop-up menu, as shown in the figure below.

Time Shifting Pens During Runtime Mode



This opens the Set **Pen(s) Time Shift** dialog box, as shown below. Choose the interval and direction for the time shift. When you click **OK**, the selected pens will be redrawn to display refreshed historical or real-time data. The time shift operation can be undone at any time by clicking **Undo Time Shift**.

Setting the Time Shift Parameters for Pens

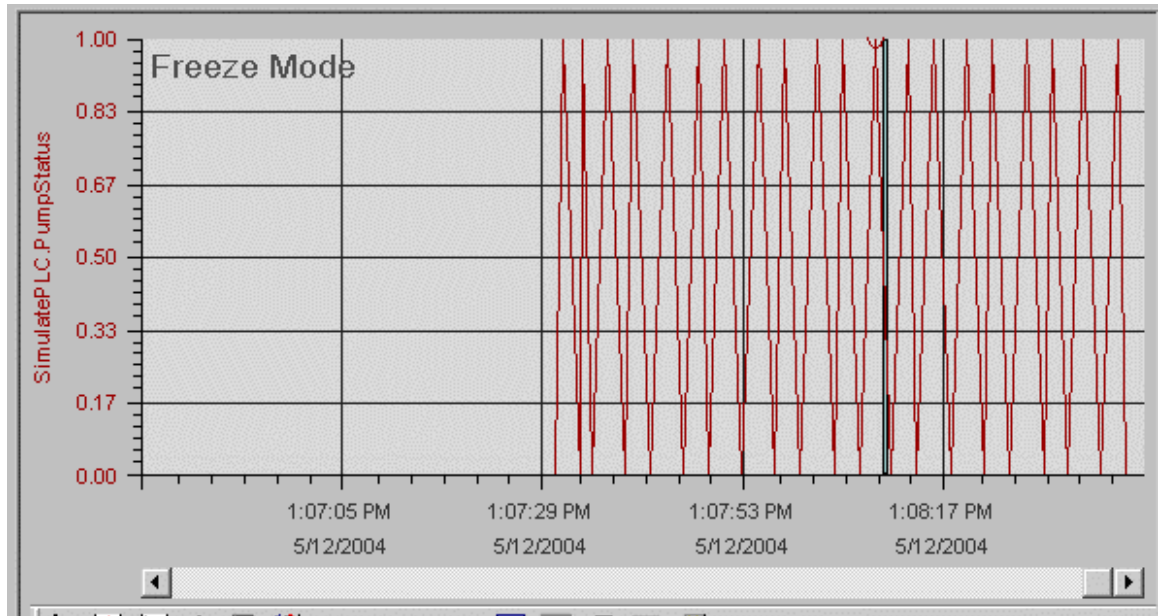


You can then choose the interval and direction for the time shift. When you click **OK**, the selected pens will be redrawn to display refreshed historical or real-time data. The time shift operation can be undone at any time by clicking **Undo Time Shift**.

Graphical Time Shifting

There is also a graphical interface for performing time shifting. Again, you need to select the desired pen(s) from the **Details** window. To perform graphical time shifting, press the **CTRL** key and move the mouse within the trend display area while pressing the left mouse button. The time shifting cursor appears, and you can shift backward or forward in time based on which direction you move the mouse.

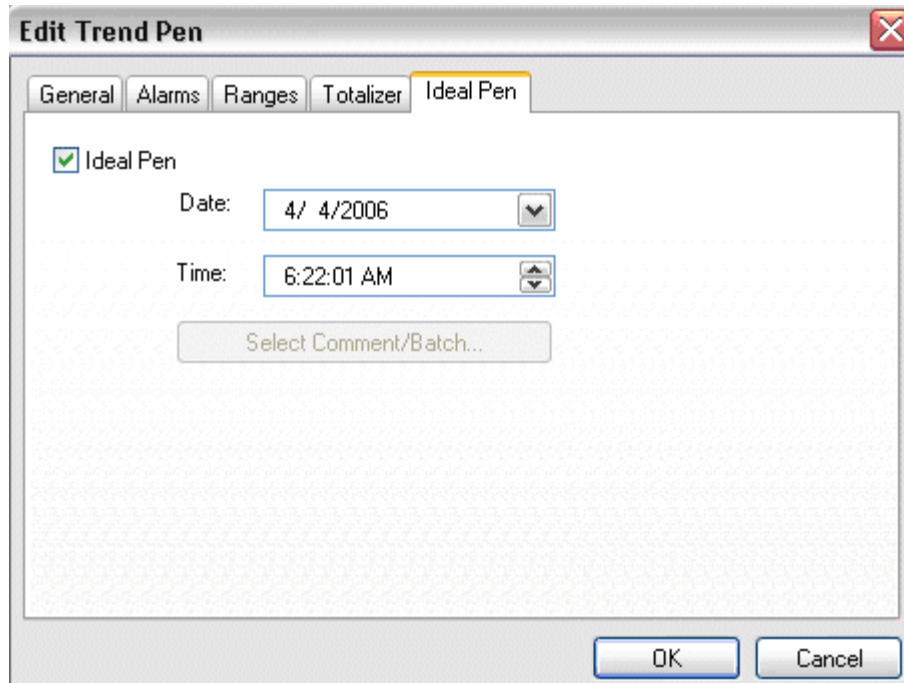
Graphical Time Shifting



Ideal Pens

Any historical pen can be configured as an ideal pen, and there is no limitation on the number of ideal pens per TrendWorX32 Viewer. As shown in the figure below, an **Ideal Pen** configuration tab is automatically inserted in the **Edit Trend Pen** dialog box to allow you to select ideal pens and to set their starting time and date. Upon entering animation mode, the TrendWorX32 Viewer will populate the ideal pens with historical data starting at the selected time and date, while all other nonideal historical pens will update with current data from the TrendWorX32 historical databases. To select a desired date for the trend period you want to view, click the down arrow in the **Date** field, and then choose a date from the calendar. This feature allows for powerful comparisons of past historical data with current historical data for the same historical pen.

Ideal Pen Configuration



You can set (or reset) any historical pen as an ideal pen at any time during animation mode, and you can modify its starting time and date. The **Ideal Pen** has time and date pick controls as well as an interface to the historical operator comments and batch information.

To set an ideal pen:

1. Select a history pen from the Details window of the trend display.
2. Right-click to display the pop-up menu.
3. Select Edit to display the Edit Trend Pen dialog box.

Alternatively, you can:

1. Click the Edit Pen button on the Trend Pen Configuration dialog box.
2. Select a historical pen from the list.
3. Click Edit to display the Edit Trend Pen dialog box.

In the **Select Comment /Batch (Lot)** dialog box:

1. Select a start time and date. To select a desired date for the trend period you want to view, click the down arrow in the Date field, and then choose a date from the calendar.
2. Select an end time and date.
3. Click Search to initiate the search.
4. Once the search is completed, use the << and >> buttons to scroll through multiple operator comments and batch entries.
5. When you locate the desired one, click OK.



Note: Selecting the **View Batch Only** option filters out the historical

operator comments so that only the related batch (lot) entries are displayed.

Editing Historical Pens

During runtime mode, you can edit a historical pen and change the filter type to obtain a different plot. For example, you can use **Max** to view the trend at its peaks. Note that the **MaxTime** and **MinTime** options retrieve the actual maximum and minimum values within the resample interval, as well as the actual time stamps at which these maximum and minimum values occurred.

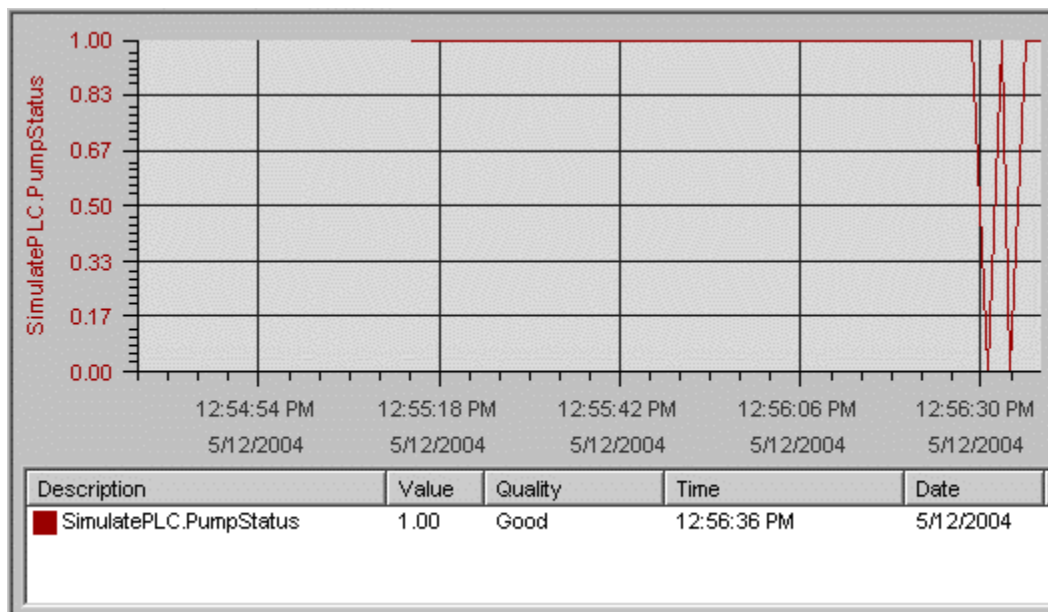
Quality Status

The Viewer has integrated quality status support for both Historical Data Access and OPC Data Access tags. If the **Quality** column is checked in the **Details** section of the **Appearance** tab of the **Properties** dialog box, the Viewer will display quality status information for each sample in the Details window of the trend display, as shown in the figure below.

Quality Status in the Details Window

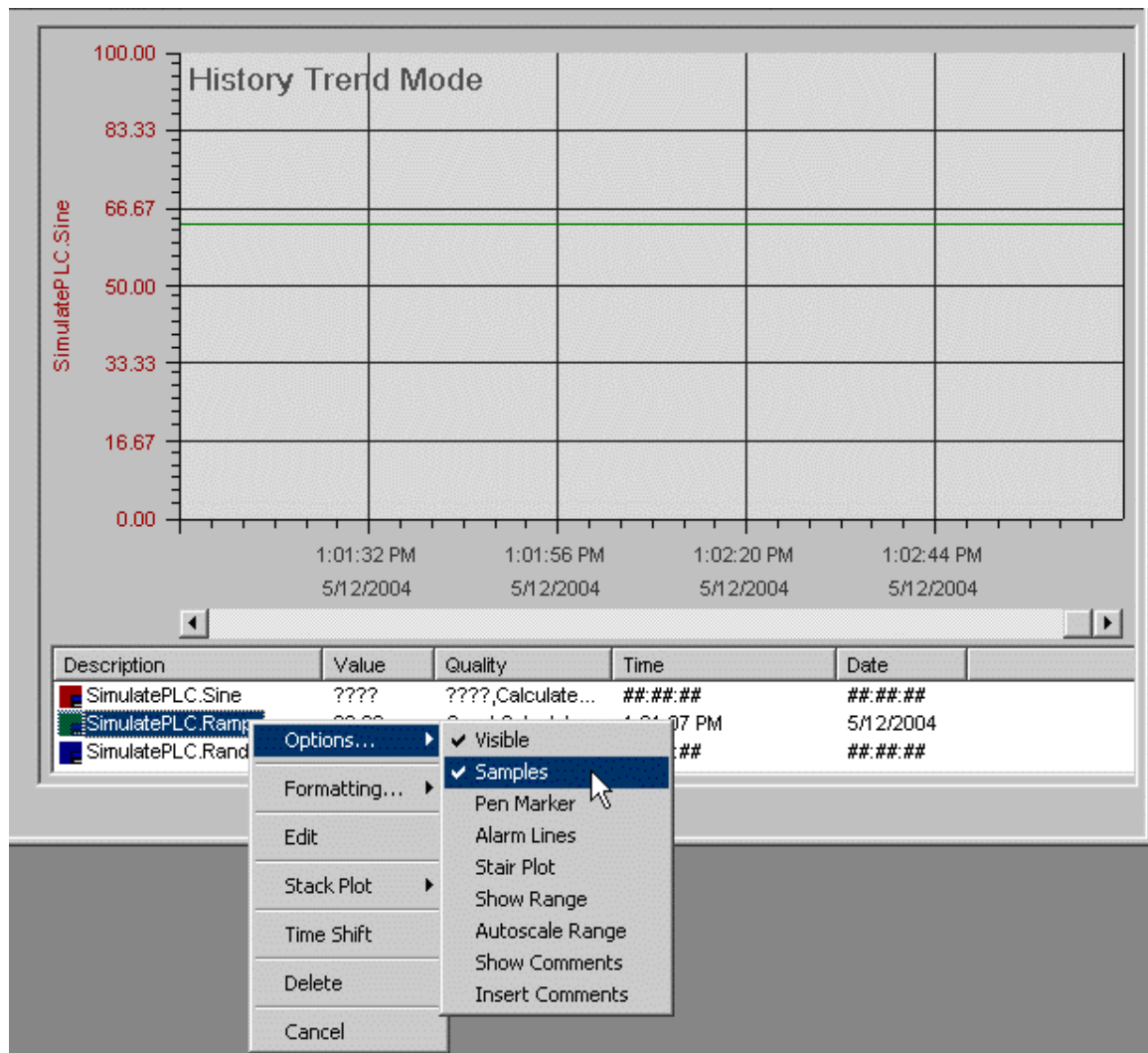
The Viewer has integrated quality status support for both Historical Data Access and OPC Data Access tags. If the **Quality** column is checked in the **Details** section of the **Appearance** tab of the **Properties** dialog box, the Viewer will display quality status information for each sample in the Details window of the trend display, as shown in the figure below.

Quality Status in the Details Window



In addition to the standard OPC Data Access qualities, the Viewer supports the Historical Data Access quality specification to indicate time intervals where data logging stopped, actual (raw) data samples, or calculated samples. During runtime mode, the Details window supports extended functionality on a per-pen basis or a group of pens (if selected).

Details Window Menu



Options for Pens

As shown in the figure above, you can select single or multiple pens from the **Details** window. When you right-click a pen, a pop-up menu opens, as shown in the figure above. The **Options** submenu lists the following trend display options and actions for the selected pen:

- **Visible:** Shows/hides the pen in the Details view of the Trend Viewer.
- **Samples:** Retrieves historical data samples.
- **Pen marker:** Shows/hides the pen marker in the Details view of the Trend Viewer.
- **Alarm lines:** Shows/hides the dashed alarm lines at the Low, LowLow, High and HighHigh in the Details view of the Trend Viewer.
- **Stair plot:** Uses a stepwise draw method to plot the trend. This is ideal for plotting slowly changing signals or setpoints.
- **Show range:** Displays the range values for the pen in the Trend Viewer. In the old plot style, there is a range scroll bar (available only in old plot style)

that enables you to switch between ranges of multiple pens. In stackable plots, you can simply click on the pen to switch ranges.

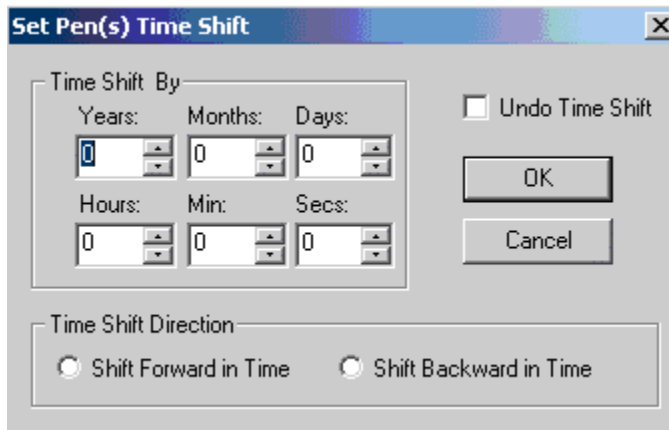
- **Autoscale range:** Disables the Low and High fields, and sets these limits automatically according to the values for the pens. Autoscaling, if checked on the Ranges tab, adjusts the range if the actual value is above or below the set limits. For example, if autoscaling is selected and the ranges are set from 0 (Low) to 200 (High) and the actual value is 250, then the ranges will autoscale to 0 to 280. The adjustment will be around 20 percent above the actual value.
- **Show comments:** If historical pens are configured in the TrendWorX32 Viewer, selecting Show Comments places the Viewer in freeze mode and retrieves all historical operator comments and batch information available.
- **Insert comments:** Displays the Comment(s) Entry dialog box for historical pens. This option is available only in freeze mode.

The same functionality is also available for real-time trending.

Time Shifting

One feature of historical replay is the time shifting of pens in freeze mode. This allows for direct comparison of pens regardless of the time axis settings. To use time shifting, select the desired pen(s) from the **Details** window. Then right-click and select **Time Shift** from the pop-up menu. This opens the **Set Pen(s) Time Shift** dialog box, shown below.

Set Pen(s) Time Shift Dialog Box



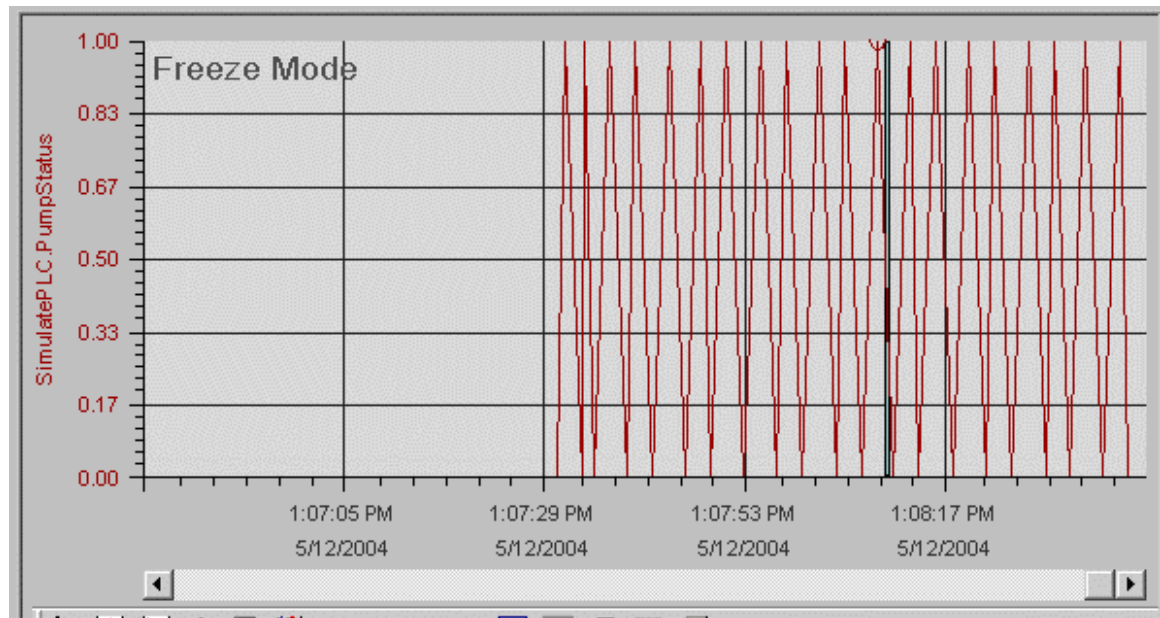
The dialog box titled "Set Pen(s) Time Shift" contains the following elements:

- Time Shift By:** A group box containing six spinners for Years, Months, Days, Hours, Min, and Secs. The Years spinner is currently set to 0.
- Undo Time Shift:** An unchecked checkbox.
- OK** and **Cancel** buttons.
- Time Shift Direction:** A group box containing two radio buttons: "Shift Forward in Time" (which is selected) and "Shift Backward in Time".

You can then choose the interval and direction for the time shift. When you click **OK**, the selected pens will be redrawn to display refreshed historical or real-time data. The time shift operation can be undone at any time by clicking **Undo Time Shift**.

Graphical time shifting. There is also a graphical interface for performing time shifting. Again, you need to select the desired pen(s) from the **Details** window. To perform graphical time shifting, press the **Ctrl** key and move the mouse within the trend display area while pressing the left mouse button. The time shifting cursor appears, and you can shift backward or forward in time based on which direction you move the mouse.

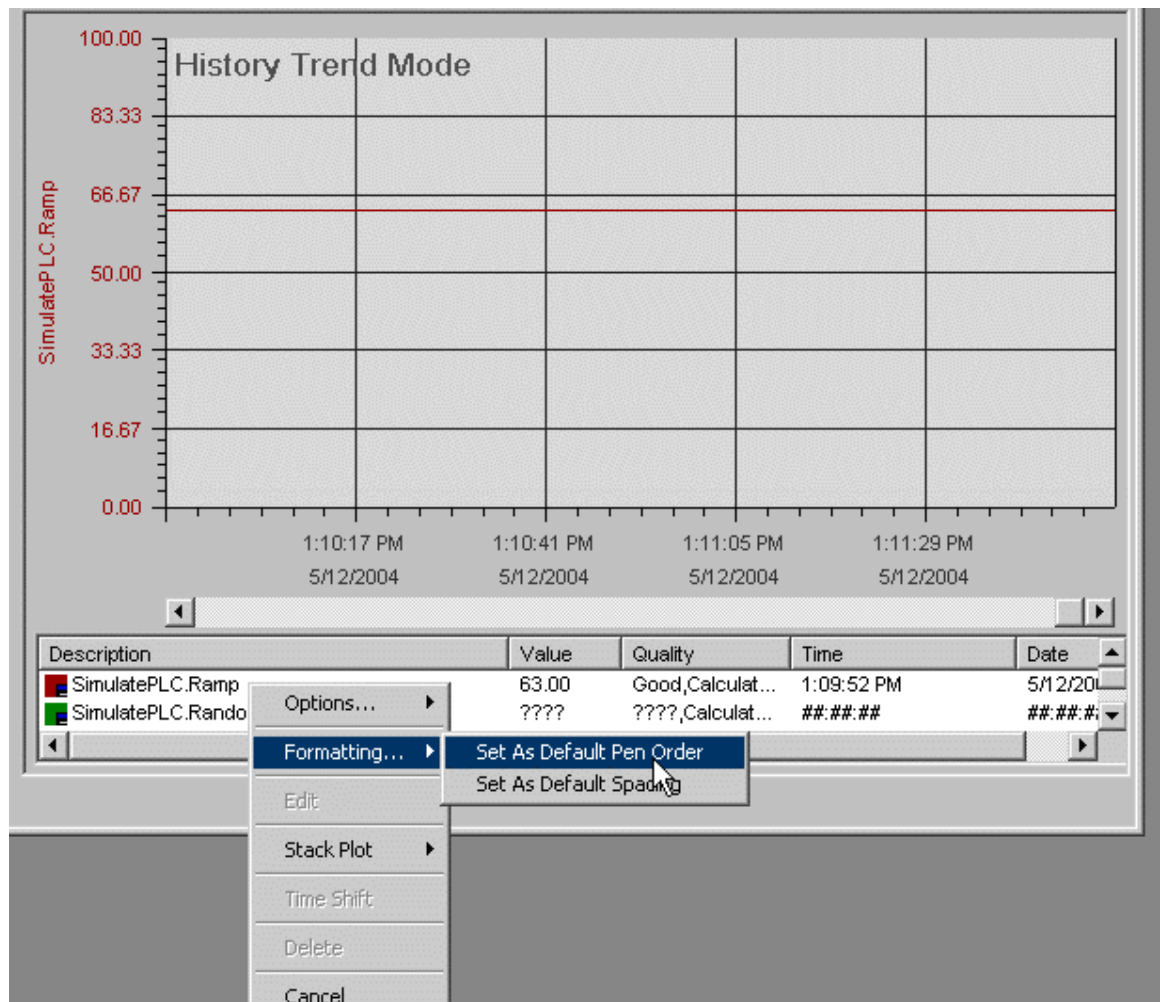
Graphical Time Shifting



Formatting Pens

If you do not select any pens but still right-click inside the **Details** window, the formatting options appear in the pop-up menu, as shown in the figure below. You can elect to restore the default settings for the pens.

Pen Formatting



Operator Comments

As an operator, you can insert historical comments (operator comments) into any historical pen or group of pens. To perform this task, do the following:

1. **Move the cursor** to where you want the comment to be inserted.
2. Select a **historical pen** in the Details window.
3. Right-click to **open the pop-up menu**.
4. From the **Options** submenu, select **Insert Comment**. This opens the Comment(s) Entry dialog box, shown below.
5. **Type in a comment** (it can be multiline).
6. **Type in a name** for the operator entering the comment (by default is the currently logged-in user).
7. Select **Insert As Group Comment**, if desired, to enter the comment for all the historical tags that belong to the same TrendWorX32 Configurator logging group as the currently selected historical pen.
8. Click **OK**.

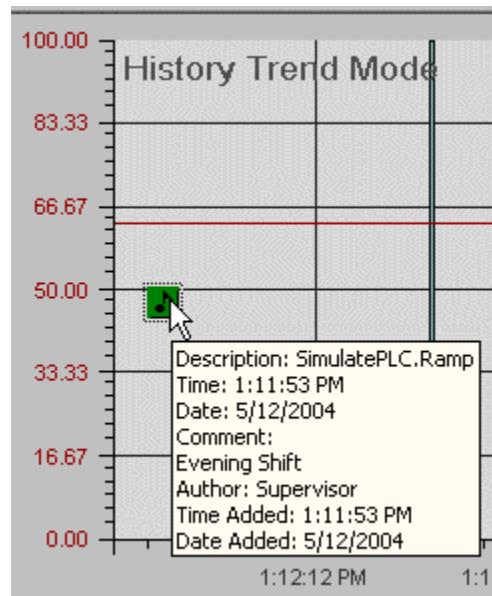


Note: Historical comments are integrated into the GENESIS32 Security Server. When the operator opens the **Comment(s) Entry** dialog box, the Viewer ActiveX will get the currently logged-in user(s) within the Security Server. If users are logged in, the Viewer ActiveX will set the author of the comment to be the logged-in user(s), and it will not allow the operator to modify the author field. If there are no logged-in users, the **Comment(s) Entry** dialog box will use the current Windows user and Node name, and it will allow the operator to modify the comment author field.

Comment(s) Entry Dialog Box

If the **Show Comments** option is enabled for the historical pen, the inserted comment will be visible on the screen, as shown below.

Operator Comments in the Trend Display



Adding Custom History Pens

You can easily view customer history pens using the pre-configured display that comes with your GENESIS32 installation. This document will take you through the steps of adding custom pens in this display and viewing the data.

To create a custom history pen:

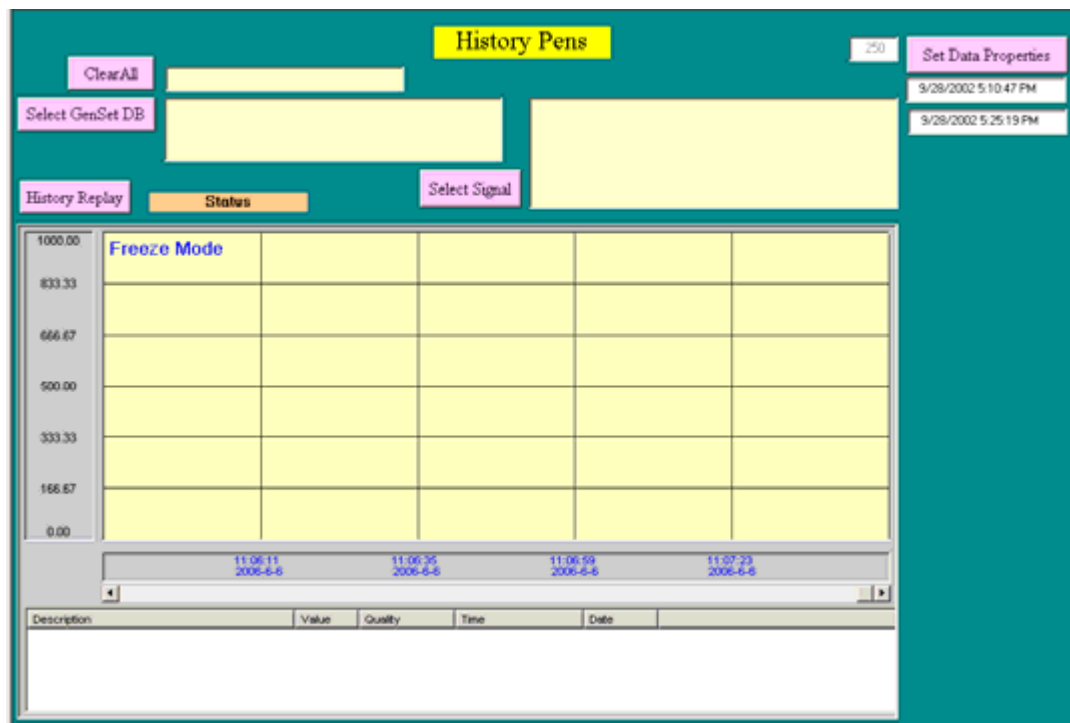
1. Locate the file **History-Pen-FinalV9.t32** in:

C:\Program
Files\ICONICS\GENESIS32\Examples\TrendWorX32\TrendWorX
Data Logging and Reporting

2. **Open** the file and go into runtime.

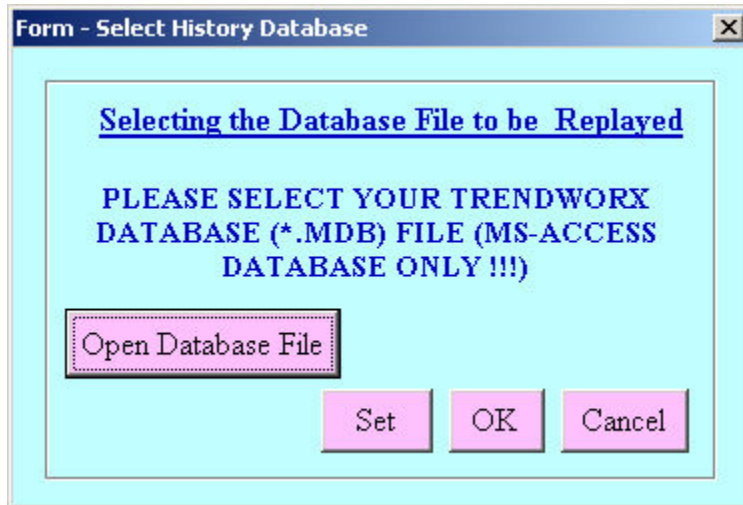
You should have a display similar to the figure shown below.

HistoryPen.t32 Runtime



3. Click on the **Select GenSet DB** button to open the Form – Select History Database window.

Select History Database



4. Click on the **Open Database File** button and browse to your TrendWorX32 Access logging database.
5. If you do not have a logging database, you can use the TwxLogData.mdb file located in:

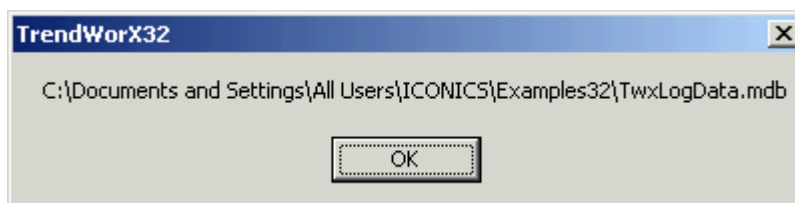
C:\Documents and Settings\All Users\ICONICS\Examples32



Note: You can only open MS Access database in this display. You should open the logging database NOT the configuration database.

6. Once you have selected a database file, a confirmation message will appear. Click on **OK** to return to the Select History Database window

TrendWorX32 File Select Confirmation



7. Click on **Set**, you will either get a success message or a failure message with the reason why it failed. Click on OK
8. You should see that the file path for the database you are using in the text box next to the **Select GenSet DB** button.
9. Click on the **Select Signal** button, the Select Signal window will come up. A database group, logging group, and signal has already been selected for you, you can change this using the dropdown list. Click on "Set" when you are done choosing your database group and logging group.
10. You need to click on the **Add** button for each signal that you want to add.

As an example the Sine tag is shown below.

Adding Signals

Select Signal

TrendWorX32 Data Logging Configuration

Database Groups VCRWorX32 Group
VCRWorX32 Group

Logging Groups VCRWorX32 Logging Group
VCRWorX32 Logging Group

Signals Pump Speed.Active
SimulatePLC.Sine

ICONICS.TWXSQLSvr.1\VCRWorX32 Group.VCRWorX32 Logging Group.SimulatePLC.S
ICONICS.TWXSQLSvr.1\VCRWorX32 Group.VCRWorX32 Logging Group.SimulatePLC.S

Clear Set Add OK



Note: You can select up to sixty-four signals, all of them must belong to the same logging group. To select Signals from a different logging group, repeat the step.

11. Click on "OK" when you are done adding the signals.

If you have made some mistakes in selecting you pens or if you have changed your mind in what you want to show, you can click on Clear to clear the tags.

To set the data properties:

1. Enter the **data/time** range for data display the range desired.
2. Click on the **Set Data Properties** button, in the Data Properties window, change the Start Time and End Time to that specified in the previous step.
3. Click on **OK** when you are done.

Set Data Properties

Data Properties

Set Data Filter Properties

Set Data Filter: Raw Data

Set Data Resolution: msec 5000

Set Max Samples: 250

Start Time: (yyyy/mm/dd , hh:mm:ss) 1/1/2006 10:00:00 AM

End Time: (yyyy/mm/dd , hh:mm:ss) 1/1/2006 10:00:00 PM

OK



Note: You can also change the data filter and the maximum samples you would like to show. Data Properties are optional; you do not have to set them to display data.

4. Click on **History Replay**.

You will see a message box come up for each pen that you have added.

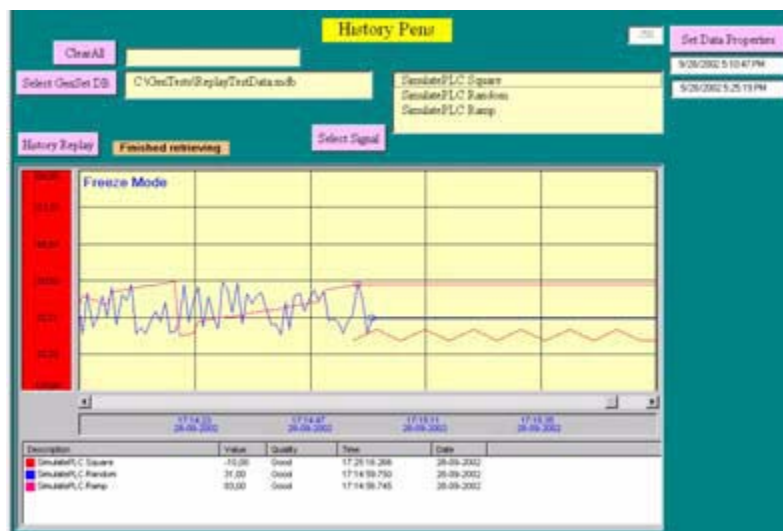
5. Click **OK** to each message box and noticed that pens being added with the replay after clicking on each alert message for the pen being added.

All of the pens are added has the same color.

6. Right-click on each pen and select **Edit** to edit the colors and ranges of the pen.

The figure below shows an example of what the trends would look like after clicking on the History Replay button.

Trends



7. Click on the Clear All button to clear the data and display a different trend from a different database.