FLUKE ®

Trend Link for Fluke

Reference Manual

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Chapter 1
Introducing Trend Link

Description   1-1.

Trend Link is a software package that graphs Real Time and historical trending data in the Microsoft Windows, Windows '95, and Windows NT operating environments. The package is easy to use and is modular so that it can be integrated into a wide variety of plotting solutions. Trend Link is ideal for viewing data in applications where large amounts of data are collected, such as continuous plant monitoring or batch processing. Trend Link allows this information to be distributed over a network for monitoring or analysis by a variety of people such as control room operators, process engineers, system managers, and administrative personnel. Alternatively, smaller applications can be developed which collect and log data under the Microsoft Windows multitasking environment while viewing the data with the Trend Link program.

By allowing network access to its data, Trend Link makes it easy for groups to simultaneously access Real Time information pertinent to their particular needs. For example, a control operator could view the Real Time updates of the two most recent hours of data from his control panel while the administrative personnel access and analyze the data from the past month. Since the log files consist of large amounts of data, Trend Link is used as a tool to find, select, and extract specific data that interests the operator. This data can be exported to various ASCII formats for use with popular spreadsheets. The data can then be manipulated in the spreadsheet for analysis or reporting purposes. New curves can easily be created from the results of the spreadsheet and can then be imported and visually reviewed with Trend Link.

Trend Link features are listed below and described in the Tutorial chapter.

- MDI Functionality
- Control Bar/Window
- Independent Scaling of Curves
- Highlight and Shaded Curve Limits

- AutoScaling
- Note System
- Selectable Time Range
- Zooming
- Undo/Redo Functions
- Curve Statistics Window
- XY Curve Plot
- Import/Export Data to Spreadsheets
- Statistical Processing Control (SPC) X-Bar R Format Curves
- Supports Data to 1 ms Sample Resolution

Trend Link provides a fast and accurate way of accessing large amounts of data in applications that track many variables over a long period of time through efficient file structures and rapid data accessing algorithms designed to work efficiently on both stand alone PC's and network file servers. In a typical Trend Link system, the data logger program collects data and logs the data at a user defined frequency into a current data file called the *.NOW file and an index *.KEY file. At the end of a predetermined time, the *.NOW file can be "Rolled Over," that is, the data is renamed as a historical *.TLG file after which a new *.NOW file and index *.KEY file are created. This process is transparent to a user, who is viewing data in Real Time. Since this process takes place on a multitasking system, these files can be sent to other disks or backup systems without interrupting the logging of new data. Multiple stations with Trend Link are able to read these files through transparent file accessing over the network. Trend Link automatically gets the time stamped data it needs from a file or multiple files and graphs the appropriate variables.

Trend Link uses Dynamic Link Libraries (DLLs) to perform the key functions of data access, time conversion, and the note system access. New DLL(s) can be written and substituted for any of these key functions without modification to the Trend Link application as long as the new DLL(s) provide the identical functional interface. The Dynamic Link Libraries consist of the TBASE32.DLL which is responsible for reading and writing trend data in the data base, the TIMES32.DLL which handles the display formatting of the time field, and the NOTESYS32.DLL which handles the database files for the note system. If, for example, a large existing database of trend data exists, the TBASE32.DLL can be rewritten to allow Trend Link to retrieve data using the existing format allowing Trend Link to access and display the data directly from the current trending database.

About Trending 1-2.

This section describes some of the terminology used in this manual to discuss trending and gives an overview of some of the different ways you can use Trend Link to view data.

Data Sets, Tags, and Batches 1-3.

A **tag (or Curve)** is a single channel of data. It resembles a single pen on a strip chart recorder.

A **data set** is a logical grouping of tags recorded together into a single database.

A **batch** is a period of time within a data set that corresponds to a particular period of data such as a single batch run. Trend Link marks a batch with a data set identifier when it writes data to the data set.

The figure below shows the relationship between Data Sets, Tags, and Batches:
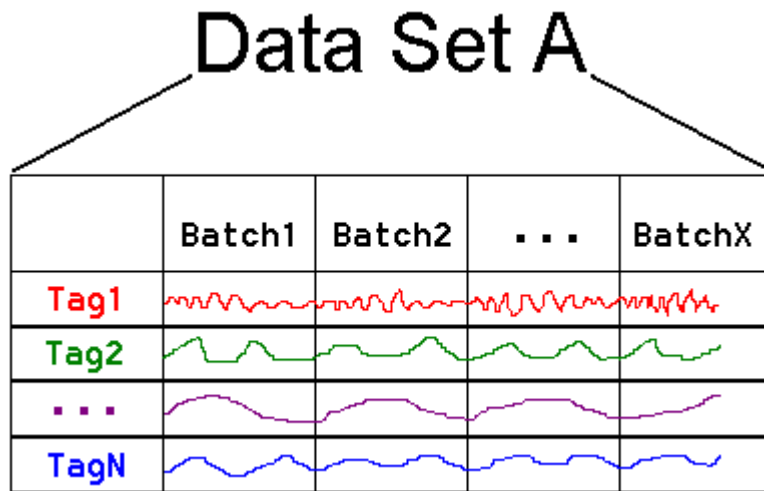
Batch Indicators placed in the database signal the beginning and end of batches. Each Data Set can have only one Tag producing batch indicators, so all of the Tags being logged into a given Data Set begin and end batches at the same time.

Trend Link allows you to simultaneously display Tags from different Batches within a Data Set, or even Tags from different Batches in different Data Sets as shown in the following diagram:
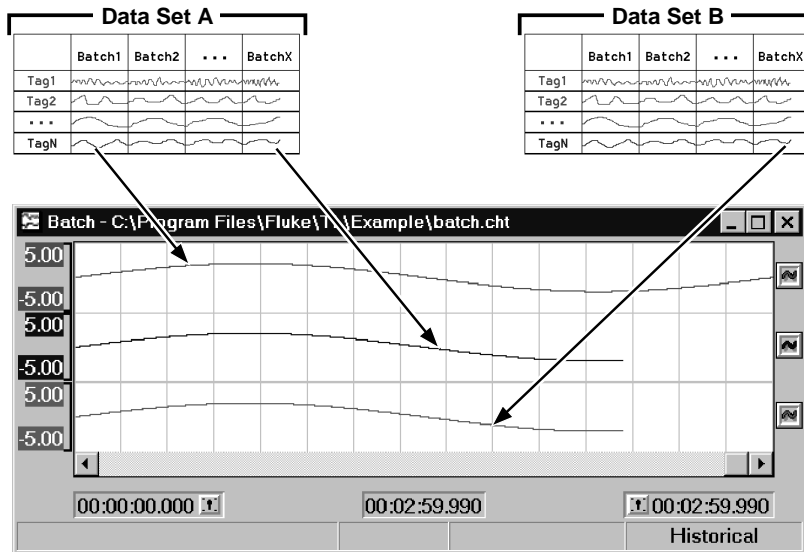
Viewing Batch Data with Trend Link   1-4.

Trend Link allows overlapping and comparing data from differing time ranges. The following paragraphs describe viewing methods.

One way to compare data from different time ranges is through the use of batch identifiers. When a batch run begins, Trend Link logs a batch identifier (or batch name) into the trend database with the time that marks the beginning of the batch. This happens for every batch run. When adding a curve to the Trend Link chart, you can choose the batch name from a list box of all available batches for that Data Set. In this mode, Trend Link no longer displays the absolute time range that is being viewed at the bottom of the screen, but displays the time range as the offset into the batch. Thus, you can add the same curve to a chart multiple times with a different batch name. This allows for plotting and comparing different batch runs simultaneously.

It is also possible to compare a batch run to an ideal batch. The ideal batch must first be generated and given a unique batch name. Then you can add the curves using the same batch techniques stated above. When in real-time, the current batch fills in on top of the completed batch. A feature allows for display of the current batch at a certain position on the screen (e.g., 50%) so that the current batch offset ends in the middle of the screen. The completed batch continues to display across the second half of the window as well.

When generating the first batch, you must log all absolute times in sequential (ascending) order. Therefore, if the ideal batch is a projected batch, it would be best to log this in the database first, before any real batch runs. However, if you log the ideal batch into a different Data Set from the actual batch runs, the absolute times can go into the future.

Finally, without using any actual batches, curves can be time-shifted manually. After adding the curve in Continuous Time mode, you can invoke a dialog to enter a positive or negative offset time. Trend Link then displays the curve so that its data does not actually match the absolute time that Trend Link is showing, but is shifted by the specified amount of time. All times in Trend Link appear as absolute times. The amount of the time shift appears in brackets beside the curve name or description in the curve status information window or the floating window. You can also use this technique for shifting the time with batch curves to match up the batches at particular times if the batches become out of sync.

Installation   1-5.

The Trend Link setup program automatically determines whether to install the 32-bit (for Windows 95 and Windows NT) or 16-bit version of the software. To install Trend Link, complete the following procedure:

1. Insert Disk 1 and run the setup application (setup.exe).

2. After clicking Next to get to the second dialog box, select the language of the User Interface. Click Next.

3. Uncheck components you do not want to install. Use Browse if you want to change the destination directory.

4. Click Disk Space if you want to find a disk with more space. Choosing another disk will change the destination disk. Click Next.

5. Select or type a name if you want to change the Program Folder name. Click Next.

6. Check the installation parameters. If they are correct, click Next to begin file transfer. If you want to change the parameters, click Back to go to the appropriate screen and make the change. Then click Next until the file transfer begins.

Quick Start   1-6.

For a quick start with Trend Link, install the sample data. Also, if data will be logged via the Windows DDE interface, install the DDE Logger.

Viewing Historical Data 1-7.

To view existing historical data, activate Trend Link by selecting Trend Link in the Trend Link for Fluke program folder (group). Next, open a chart by selecting the **File** | **Open**. A dialog box will appear allowing the user to select a chart file to be opened. If the sample data was installed, there will be a chart called SAMPLE.CHT in the SAMPDATA subdirectory of the Trend Link installation directory. By selecting the SAMPLE.CHT from the list box and clicking the OK button, the sample chart will be loaded. This chart has four curves from the Sample Data Set. Each curve shows one of four different curve types available. The sample chart shows a few of the curve display features of Trend Link. For a complete description of Trend Link features and functionality, continue with the Tutorial chapter of this manual.

Viewing Real Time Data 1-8.

To view data in Real Time using Trend Link, the data must first be placed in a format that is recognized by Trend Link. This is the function of the NetDAQ Logger for Windows or DDE Logger program. The full operation of the DDE Logger is discussed in the DDE Logger chapter of this manual. The DDE Logger may acquire data from any windows application that supports the windows DDE interface through the use of *.LCF configuration files. These configuration files describe the DDE links that are to be established and the location where the data is to be stored. DDE configuration files are described in detail in the DDE Logger chapter of this manual. Sample *.LCF configuration files have been included with the DDE Logger to allow the user to connect to certain applications immediately. GENDEMO.LCF may be used to connect to the DDE Curve Generator that is supplied with Trend Link. A description of the DDE Generator is found in the Connecting to a DDE Server Application chapter of this manual.

To connect the DDE Logger to the Generator, first activate the Generator by selecting DDE Generator in the Trend Link for Fluke program folder (group). This program simply generates sample data and makes it available to the Windows DDE. The user may minimize it once it is activated.

Next activate the DDE Logger by selecting DDE Logger (also in the Trend Link for Fluke program folder (group). Select the Open command from the File menu, and choose the GENDEMO.LCF configuration file from the EXAMPLE subdirectory of the Trend Link installation directory. The DDE Logger will establish a conversation with the Generator, and immediately start logging several variables. Once the DDE Logger is running, these variables will be available to be viewed in Trend Link under the Generator Demo Data Set.

A sample chart called GENDEMO2.CHT has been included which may be used to display some of the curves produced by the DDE Generator. This chart shows several curves running in Real Time mode. To view the chart, run Trend Link by selecting Trend Link in the Trend Link for Fluke program folder (group) and

select Open from the File menu. A list of chart files will appear. Select GENDEMO2.CHT from the EXAMPLE subdirectory. The chart will load, and data will begin to scroll onto the screen from right to left as it is logged. For a complete guide to viewing data using Trend Link, continue with the Tutorial chapter of this manual.

Chapter 2
Tutorial

Contents   **Page**

Introduction 2-1.

This section describes the following commonly used features of Trend Link:

- Control Bar/Window
- Adjusting the time range displayed
- Undo/redo functions
- Adding textual notes to a curve
- Printing a chart
- Importing / exporting data

After reading this section, you should be familiar with the above features, and you will be able to quickly access desired data from a Trend Link database.

When activated, Trend Link presents a blank chart as shown below:
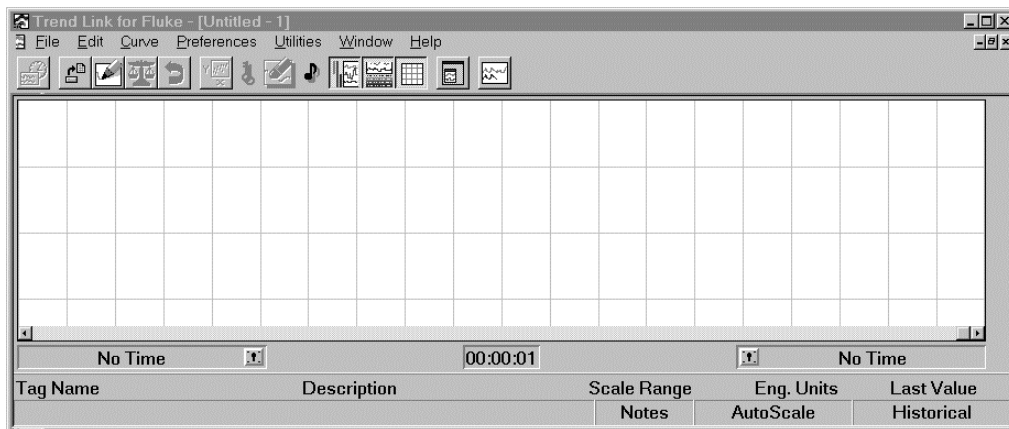
TO VIEW AN EXISTING DATA CHART, select File | Open. An Open Chart dialog box appears, allowing you to select the chart to load. Select the chart by highlighting its name and double clicking the left mouse button.

Since Trend Link is a Multiple Document Interface (MDI) application, it is possible to have more than one chart file open at a time. You may page between open charts by using Ctrl+F6 or the Window menu options to select the chart to view. You can minimize, maximize, or resize each chart independently by using the appropriate child window controls.

The following diagram shows a typical Trend Link chart display. Labels on various parts of the display allow you to become familiar with the components of the Trend Link display window. This section of the tutorial describes the various components of the Trend Link display window and explains how to view trending data.
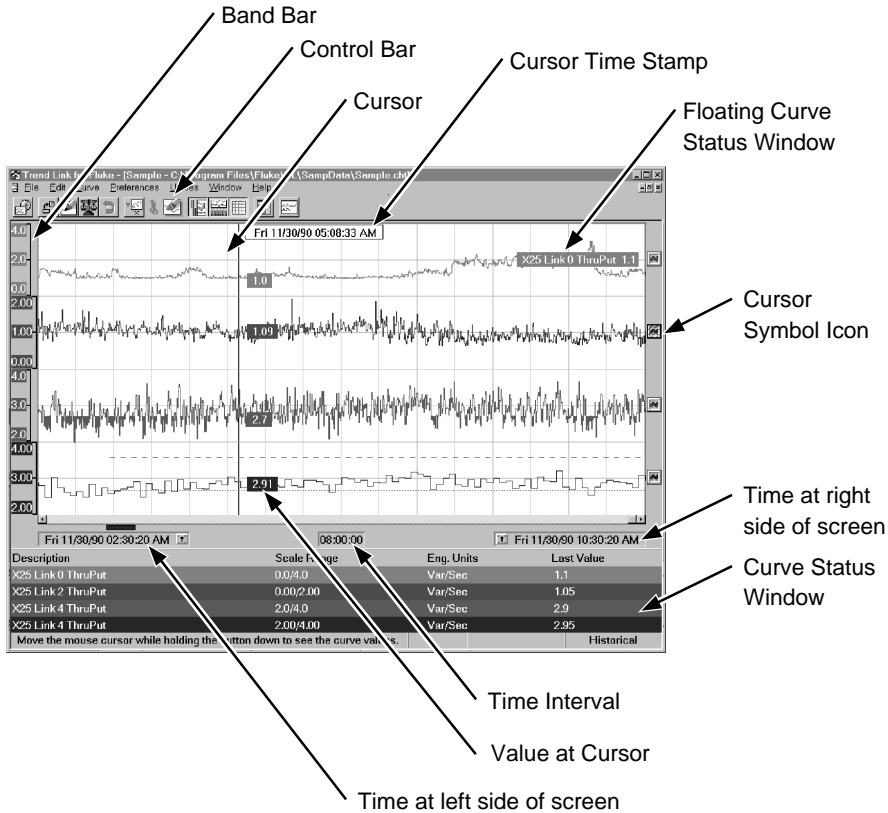
MDI Functionality 2-2.

Since Trend Link is an MDI (Multiple Document Interface) application, you can open multiple chart documents during a single session of Trend Link. To open additional charts, simply repeat the file open process described above. Below is a picture of Trend Link with three open charts.
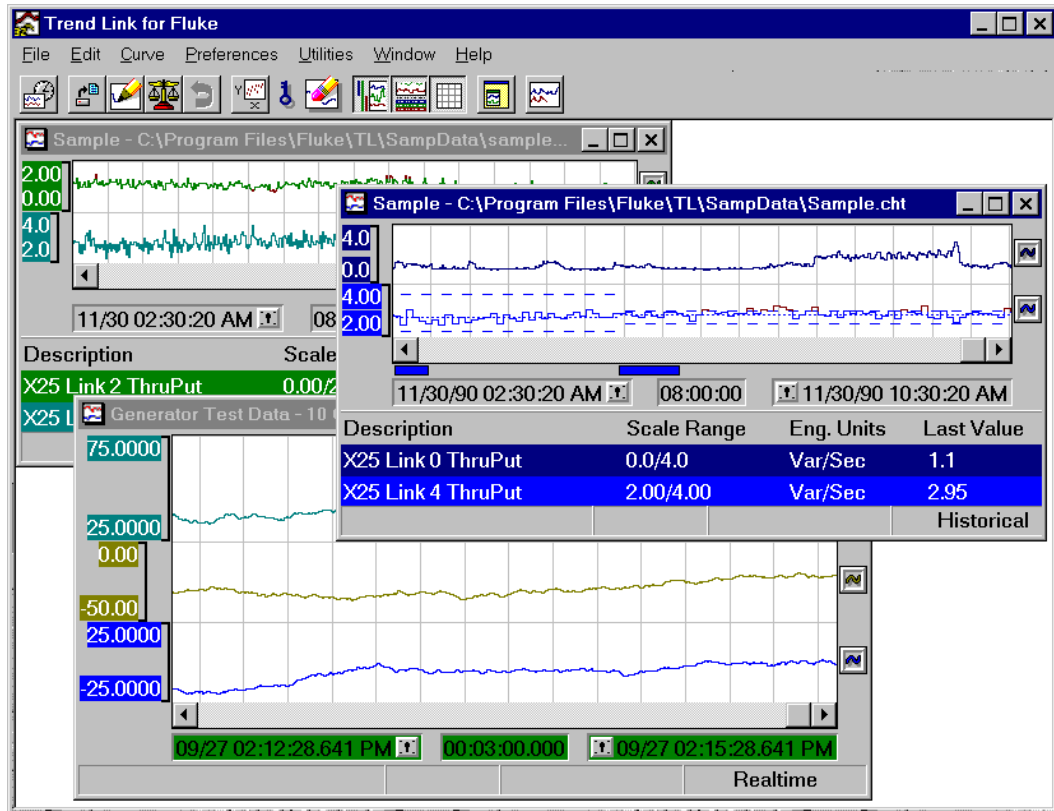
Control child window display by switching between windows using the Windows menu, and re-sizing the windows as desired. You can place the MDI chart windows anywhere within the Trend Display area of the application window. If the charts extend beyond this area, scroll bars appear, allowing you to scroll through the entire Trend Display area.

With more than one chart window open, the menus and toolbar controls apply commands to the MDI window that is currently active (the upper right window in the above example.) Users may also switch between different chart windows by clicking on the desired window.

Control Bar/Control Window 2-3.

Use the control bar and control window to speed up and simplify some of the most commonly used menu commands. They provide a more pictorial and intuitive working environment for you.

Control Bar 2-4.

The control bar appears at the top of the screen just below the menu bar. It consists of a row of icons representing functions that can be performed by Trend Link. This row of icons allows easy access to Trend Link's most commonly used controls without covering any part of the chart. The functions performed by each of the icons on the control bar are described in detail below. To activate a function represented by an icon on the control bar, simply position the mouse cursor over the icon and click the left mouse button.

Note

To see a short description of a tool bar icon's function, position the mouse over the icon. The description appears in the status window at the bottom of the active chart.

Control Window 2-5.

It is possible to change the location of the control bar by selecting **Preferences** | **Control Window**. This causes the control bar to become a floating window that you can move anywhere within the Trend Link viewer window. When you hold the left mouse button down with the mouse pointer over the control window but not over any of the controls, a box outline draws. You can then move the box around. Release the mouse button to move the window to the location of the box.

Double click the right mouse button (while over the viewer window or the control window) to hide the control window. Another double click causes it to become visible again. Using this feature, you can easily activate the control window.

Opening an Existing Chart 2-6.

It is possible to open an existing chart file without selecting **File** | **Open...** . Simply click the Chart Open button on the Control Bar/Window to activate the Chart Open dialog box. Load the desired chart by highlighting the name of the chart and then double clicking the left mouse button.

Viewing Curve Values (Value Cursor) *2-7.*

It is possible to see the value of all the curves on the chart at a specific location in the curve window. To do this, simply press and hold the left mouse button while the mouse cursor is over the curve window. As you move the mouse right and left in the curve window, a vertical line appears, marking a particular point in time. This line is the Value Cursor.

In addition to the vertical line, a small window near the top of the curve window displays the time slot being examined. A small window (value window) for each curve also shows the curve's value and/or other curve information at that location. Trend Link color codes these windows to match the corresponding curve. You can define the information displayed in the value window by selecting **Preferences** | **Value Cursor...** . For a complete description of the Value Cursor's display options, see Value Cursor in the Menu Commands section of this manual.

Note

The value windows sometimes can not display the curve information as fast as the mouse moves. With the mouse held at the desired position, the information appears very quickly. The following picture illustrates viewing the Value Cursor:

Value Cursor
Time Stamp

Value Cursor

Value of Curve at Value Cursor
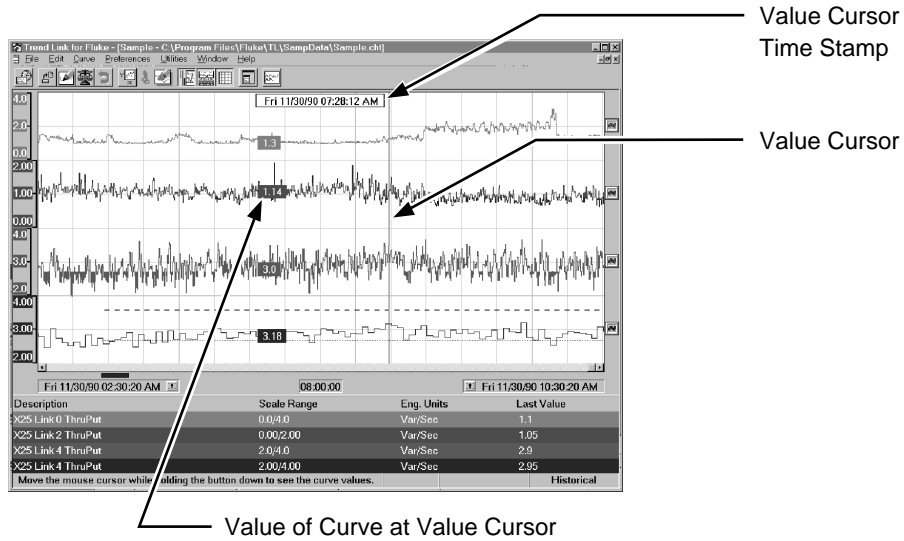
Note

After the left mouse button is depressed, the mouse cursor must be moved before the curve information appears.

Adding a Curve 2-8.

Add curves to a chart by activating the Add Curve dialog box. Click on the icon pictured above or select **Edit** | **Add Curve...** . Trend Link can switch between Continuous and Batch viewing modes. In Continuous viewing mode, the X axis is absolute time. In Batch viewing mode, the X axis is the time from the beginning of the batch. These viewing modes are described in detail in the Continuous/Batch Mode section of this chapter. To switch modes, select **Preferences** | **Batch Mode** or use the Batch Mode button on the Control Bar.

Adding Curves in Batch Mode 2-9.

The Batch Mode Add Curve dialog box appears as shown below.
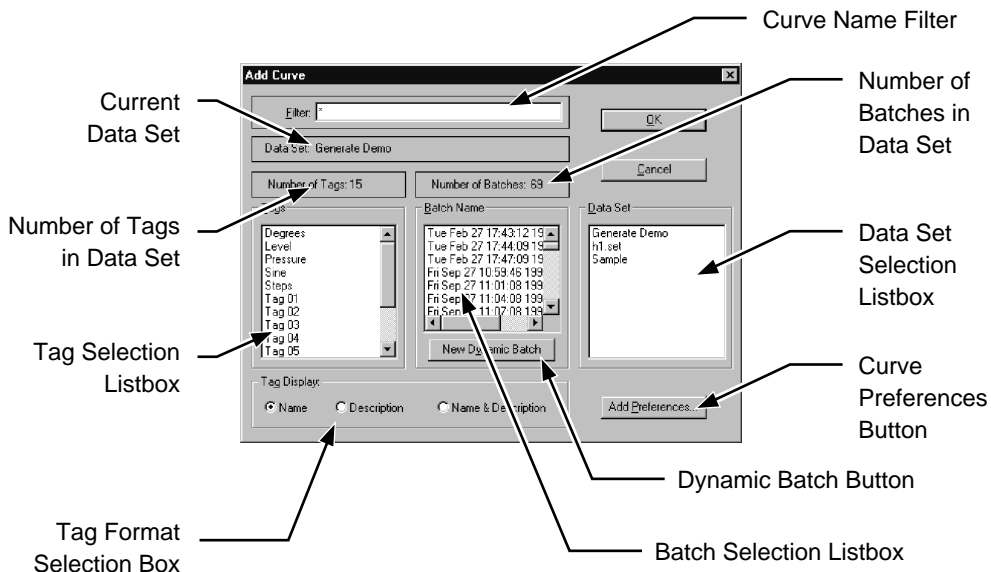
Add a curve to the chart by double clicking on the appropriate Data Set in the Data Set Selection listbox. Then select the Batch(s) by clicking on the desired batch name(s) in the Batch Selection listbox. Next, select the Tag(s) from the Tag Selection listbox.

Set the format used to display the Tag names by checking one of the choices in the Tag Display box. The available choices are Name, Description, and Name & Description. If you selected Name, the Tags appear using the Name field for the

Tag. If you selected Description, the Tags appear using the Description field for the Tag. If you selected Name & Description, both of these fields appear in the Tag Selection listbox.

You can add more than one curve to the chart at a time. Both the Tag Selection listbox and the Batch Selection listbox are multi-selection listboxes; you can choose more than one item simultaneously from the listbox. To choose multiple curves from these listboxes, hold down the shift key and select the range of items that you wish to add. You can also hold down the CTRL key and highlight the specific items that you wish to add. The listbox below shows how multiple curve selections would appear using the Add Curve dialog box:
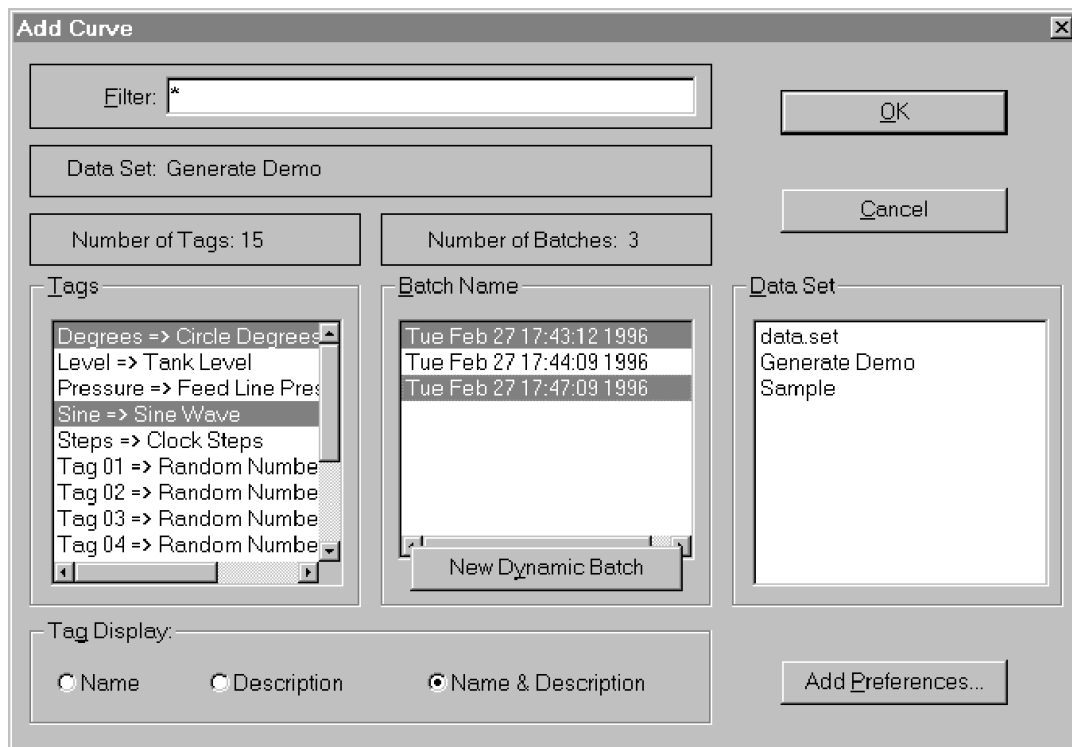
The above selection would add a total of four curves to the chart. Degrees and Sine would each be added to the chart two times (once each for the two batches highlighted). Notice that you do not need to highlight the Generate Demo Data Set because it is already the current Data Set.

Note

You can add a maximum of 32 curves to a chart at one time using the Add Curve dialog box.

With a batch unspecified for a curve being added, the curve adds as if the entire Data Set is the batch. That is, the start of the batch for this curve is the beginning of the Data Set and the batch continues throughout the Data Set. If the Data Set collects new data, the size of this curve's batch changes to reflect the current size of the Data Set.

Dynamic Batches 2-10.

Sometimes it is useful for a curve to always represent the current (most recent) batch for a particular Tag, or the second most recent batch (or the nth most recent batch). Trend Link allows curves to do this through the use of Dynamic Batches. A Dynamic Batch is a batch defined to be a particular number of batches into the past. Dynamic Batch 0 represents the Current Batch, Dynamic Batch-1 represents the batch before the current batch (Current Batch-1), and Dynamic Batch-2 represents the batch before that (Current Batch-2), etc.

When adding a curve using a dynamic batch, the curve updates automatically to display the appropriate data at the beginning of a new batch. For example, if you add a curve using Dynamic Batch 0 (Current Batch), it always displays the current batch. When a new batch begins, Trend Link overwrites the data displayed for the curve automatically with the new data for the new current batch. The Add Curve dialog box shown below defines Dynamic Batches:

Dynamic Batch Names

Dynamic Batch Button
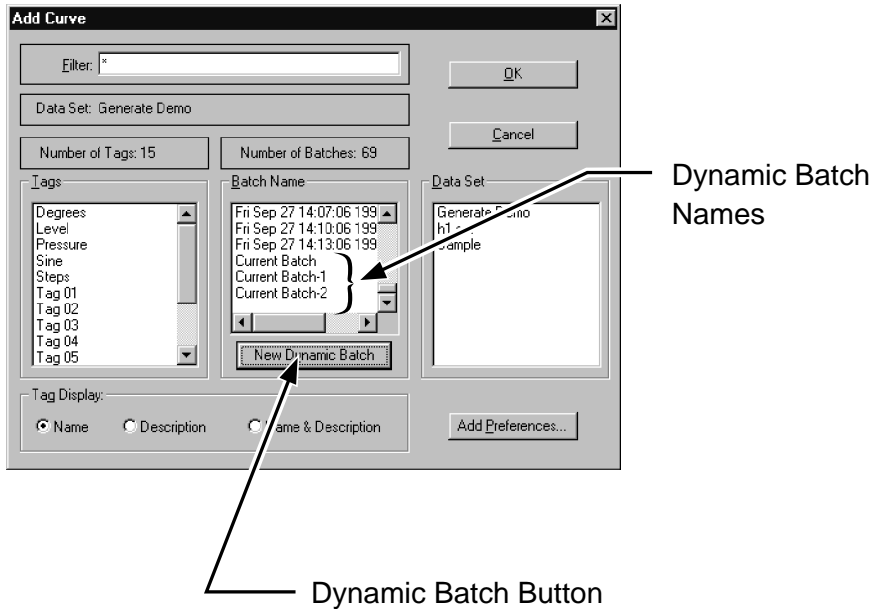
Each time you press the New Dynamic Batch button, Trend Link creates a new dynamic batch starting with the current batch and working back in time. In the above example, three presses of the New Dynamic Batch button caused creation of dynamic batches for the Current Batch, Current Batch-1, and Current Batch-2. With a dynamic batch created, you can add a curve using the dynamic batch by selecting it as if it were a regular batch as shown below:

Add Curve

Filter: *

Data Set: Generate Demo

OK

Cancel

Number of Tags: 15

Number of Batches: 69

Tags

Degrees => Circle Degree
Level => Tank Level
Pressure => Feed Line Pre
Sine => Sine Wave
Steps => Clock Steps
Tag 01 => Random Numb
Tag 02 => Random Numb
Tag 03 => Random Numb
Tag 04 => Random Numb

Batch Name

Fri Sep 27 14:01:06 1996
Fri Sep 27 14:04:06 1996
Fri Sep 27 14:07:06 1996
Fri Sep 27 14:10:06 1996
Fri Sep 27 14:13:06 1996
Current Batch
Current Batch-1

New Dynamic Batch

Data Set

_sylv.set
Generate Demo
h1.set
Sample
sample.set

Tag Display:

○ Name   ○ Description   ● Name & Description

Add Preferences...

In this example, Trend Link adds the tag Degrees using dynamic batches representing the Current Batch and the Current Batch -1. Trend Link also adds a static batch curve representing the Degrees tag from the batch Fri Sep 27 14:10:06 1996. The data displayed for this curve always comes from this batch. This is one way of displaying a template curve.

When you press the OK button in the above dialog box, Trend Link adds the three curves to the chart as shown below:

Template Batch
Fri Sep. 27 14:10:06 1996

Current
Batch

Current
Batch-1

Name of
Current Batch

Name of
Current Batch-1
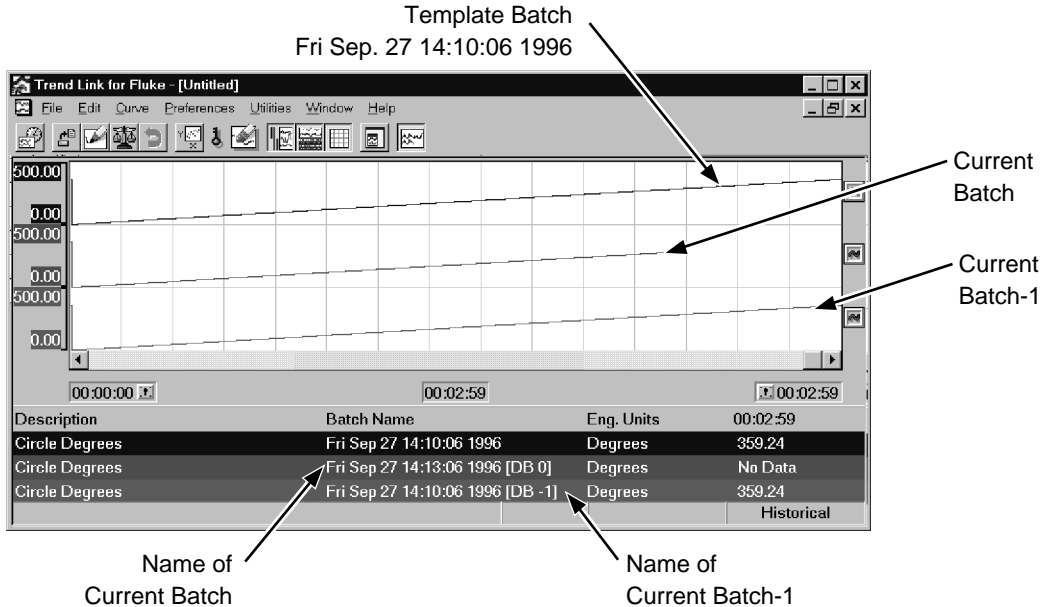
The Batch Name in the Curve Status window now shows the dynamic batch
number and the corresponding Batch name for the curve that is being displayed.

It is possible to add dynamic batches that do not yet have data available. For
instance, suppose that there are four batches currently recorded into a database. If
you press the New Dynamic Batch button five times, there are five dynamic
batches to choose from DB[0] (Current Batch) through DB[4] (Current Batch-4).
If you select Current Batch-4, Trend Link adds a curve for this Tag. The Batch
Name and any values for the Curve appear as Not Available until there are enough
batches to supply data for the curve.

Adding Curves in Continuous Time Mode   2-11.

When Trend Link is in continuous (non batch) mode, the Add Curve dialog box
functions exactly as described above except that the Batch Selection Listbox is not
present. Following is an example of this dialog box:
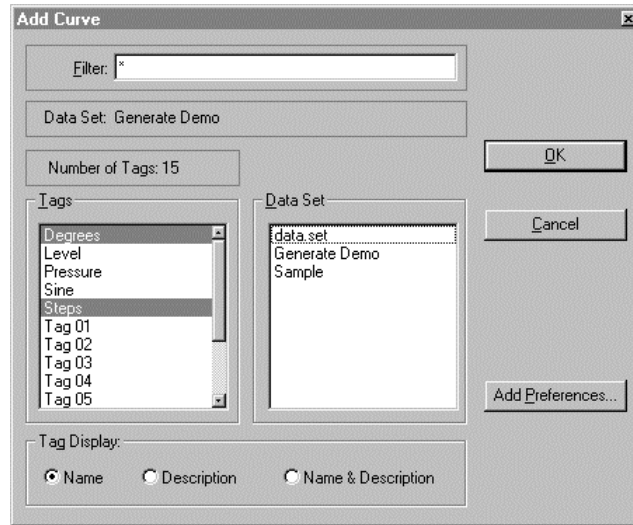
In this example, Degrees and Steps will be added to the chart. Because Trend Link adds all curves in a non-batch (absolute time) mode, there is no option to select a batch.

Add Preferences Dialog Box   2-12.

The Add Curve dialog box contains a button labeled Add Preferences. When you highlight a selection of Tag(s) and select the **Add Preferences...** button, a dialog box displays default preferences to use when Trend Link adds the selected curve(s). This dialog box also allows some of the curve(s) parameters to be changed before adding the curve(s) to the chart.

Note

Trend Link does not save changes made in the Add Preferences dialog box in the data file for the curve. They are only valid for the current chart.

The Add Preferences dialog box appears as shown below.

Add Preferences

Data Set

Start Time: Tue 02/27/96 02:44:08.790 PM

End Time: Tue 02/27/96 02:50:08.780 PM

Curve Type
- ● Normal
- ○ Highlight Limits
- ○ Shaded Limits
- ○ SPC

☑ AutoScale On Add

☑ AutoBand On Add

SPC Intervals: 15

Highlight Color

Large Data
- ● Average
- ○ First
- ○ Range

Small Data
- ● Sample/Hold
- ○ Interpolate

Add

Cancel
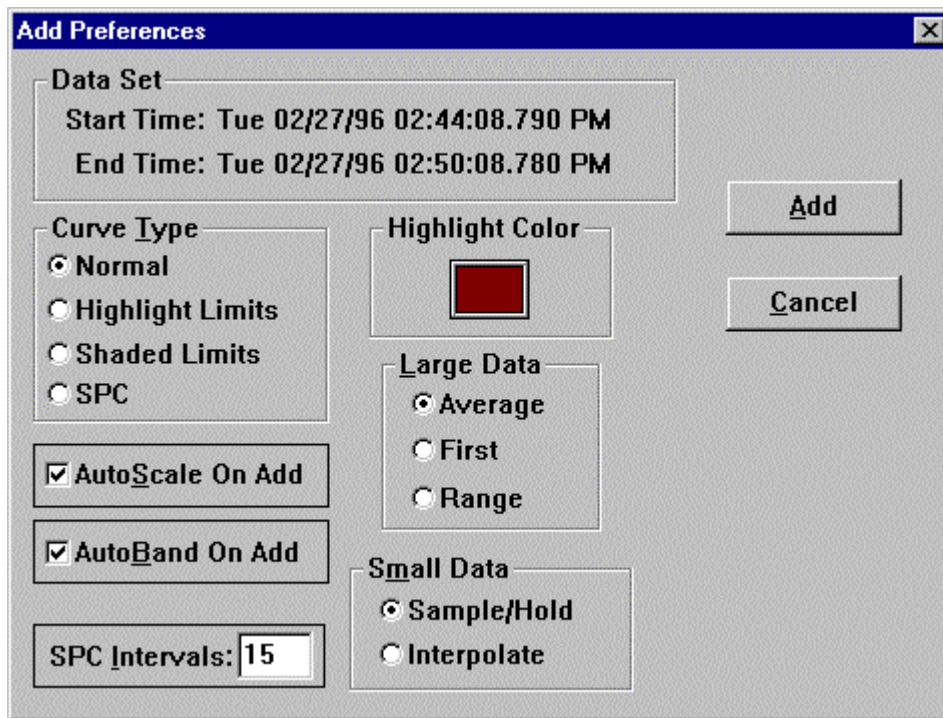
The curve type is set by selecting the appropriate button in the Curve Type section of the dialog box. Trend Link draws a **normal** curve on the screen as defined by its data and scaled to a particular band range on the chart. Curves are drawn in their normal color. For additional information on curve type, see the Curve Information Dialog Box section of this chapter.

A curve drawn with **highlight limits** appears differently. A highlight curve has two limits, one representing the high limit value and one representing the low limit value. All values equal to or above the high limit appear in the highlight color, and all values equal to or below the low limit appear in the highlight color. For example, if the high limit is 7.4 the curve appears in the highlight color for points above 7.4. Highlight curves display values in the highlight color in the value section of the curve status window, the value section of the floating curve information window, and the value bar section of the curve status window if the value being displayed is above the high limit or below the low limit.

When a **shaded limit** curve exceeds one of its limits, filling or shading occurs from the curve limit to the curve value. For example, if the high limit is 7.4 and the curve has ten values all above 7.4, the curve shades or fills from the limit to the resulting value. Shaded curves also display values in the highlight color in the value section of the curve status window, the value section of the floating curve information window, and the value bar section of the curve status window (if the value being displayed is above the high limit or below the low limit.) You can set

the highlight color for a shaded curve by temporarily changing the curve type to Highlight, setting the highlight color, and changing the curve type back to shaded. The default highlight color is red.

Below is an example showing four curve types: **normal**, **highlight limits**, **shaded limit**, and **SPC**.
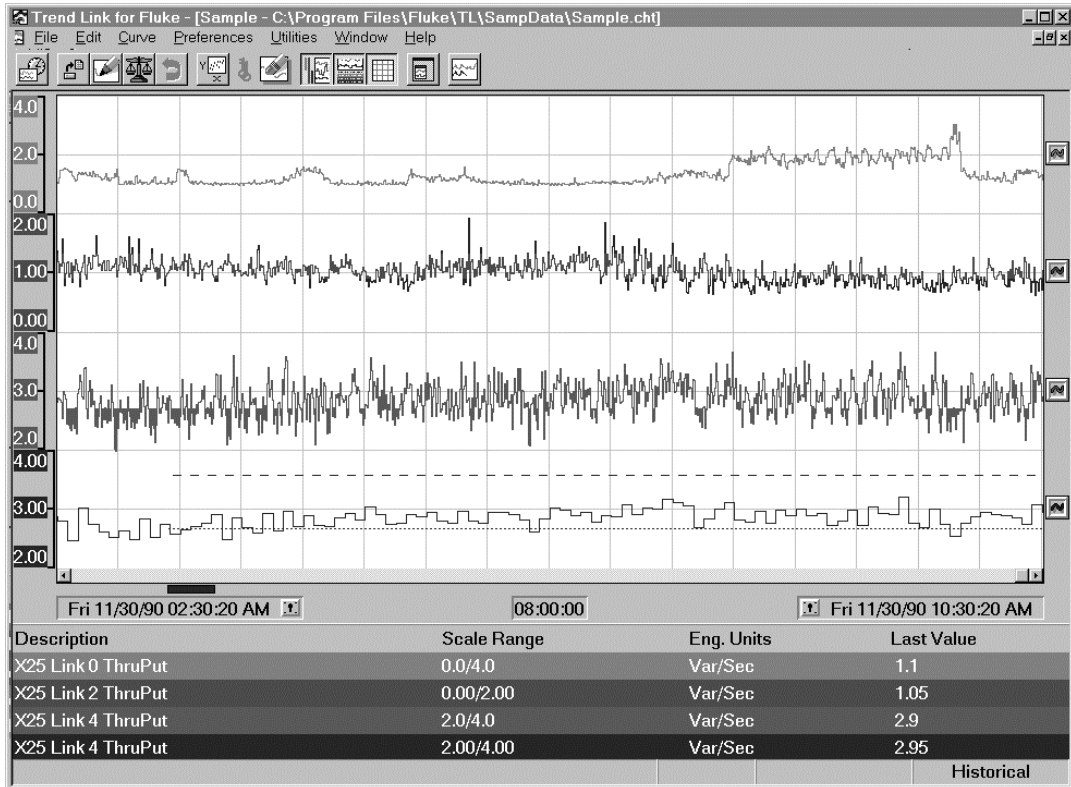
An **SPC** curve displays its data in an X-Bar R chart format. This type of curve allows for defining multiple SPC intervals with the mean and upper and lower control limits calculated for each interval. The mean and control limits appear over the curve as dotted and dashed lines, respectively. The **SPC Intervals** field defines the number of samples to average together to obtain each value. A value of 15 means that 15 samples average into one value; this value is valid from the first sample to the 16th sample in the average. For more information on using **SPC** type curves see the SPC Curves section in the Advanced Concepts chapter.

This dialog box also allows you to set the drawing technique used by Trend Link when displaying the curve. Choose two drawing techniques for each curve. Trend Link uses one technique for **Small Data** (when there is one or fewer data points per pixel in the display area). Trend Link uses the other technique for **Large Data**

(when there is more than one data point per pixel in the display area). For Small
Data curves, select **Sample/Hold** or **Interpolate**. The **Sample/Hold** technique
draws the current value and holds that value for the entire sample interval. This
tends to give the curve a step-like appearance, but provides an exact
representation of the data stored in the file. The **Interpolate** drawing method,
draws the current value and connects it to the previous value using a straight line.
This tends to give the curve a "smoother" appearance but introduces a degree of
error into the curve display. Below is a chart showing both drawing methods. The
sample/hold method drew the top curve, and the interpolate method drew the
bottom curve.
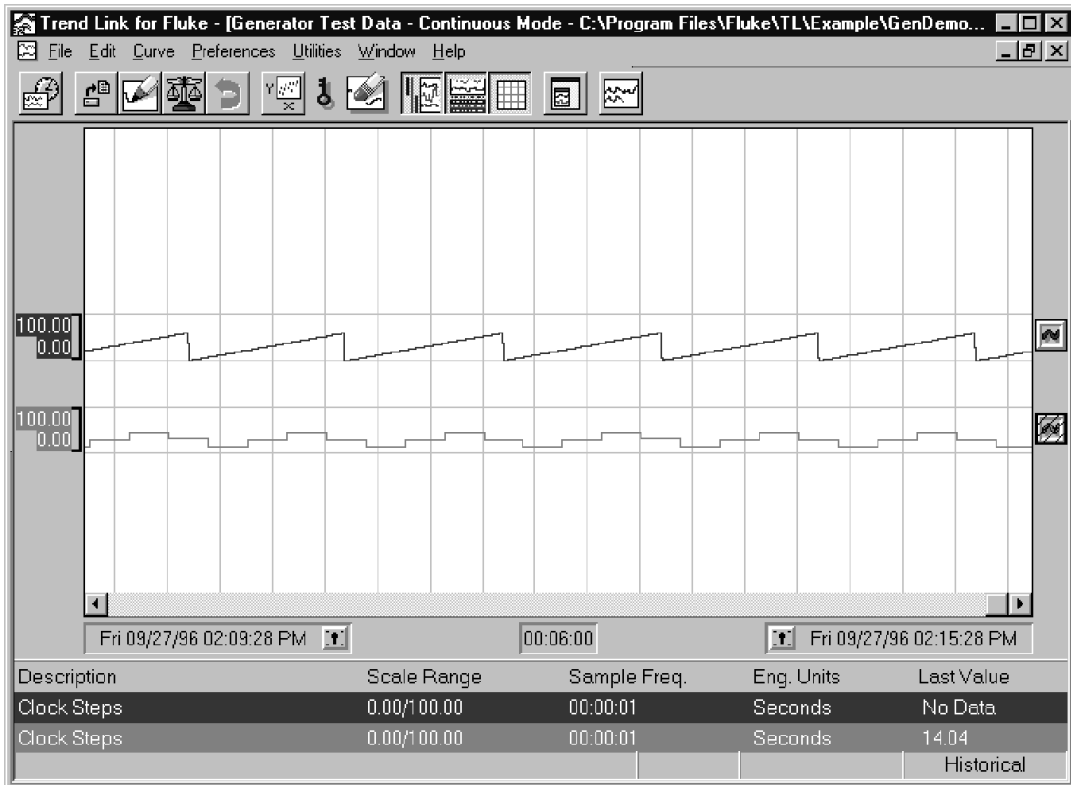
For **Large Data** curves, Trend Link provides three drawing techniques: **First**,
Average, and **Range**. If you select the **First** drawing technique, Trend Link draws
a point at the first value it encounters for the pixel. Although by far the fastest
drawing method, this technique sacrifices accuracy. Therefore, only use this
method when speed is very important or you only want a general view of the
trend. If you select the **Average** drawing mode, Trend Link averages all values
that fall within the pixel and draws a point at this average value. This provides a
fairly accurate display of the curve's behavior and is the default method used by

Trend Link. If you choose the **Range** drawing method, Trend Link looks at all the values corresponding to a given pixel, and draws a vertical line connecting the highest and lowest value for the pixel. This has the affect of providing a shaded curve showing the high and low value at each pixel. This drawing technique is useful when sudden changes or spikes in the data are important enough to emphasize, since these events can be "hidden" by the Average technique or missed completely by the First technique. Below is a picture of a curve using each of these drawing techniques. The First method drew the top curve. The Average method drew the second curve, and the Range method drew the bottom curve. Note how the Range method reveals spikes hidden using the other methods:
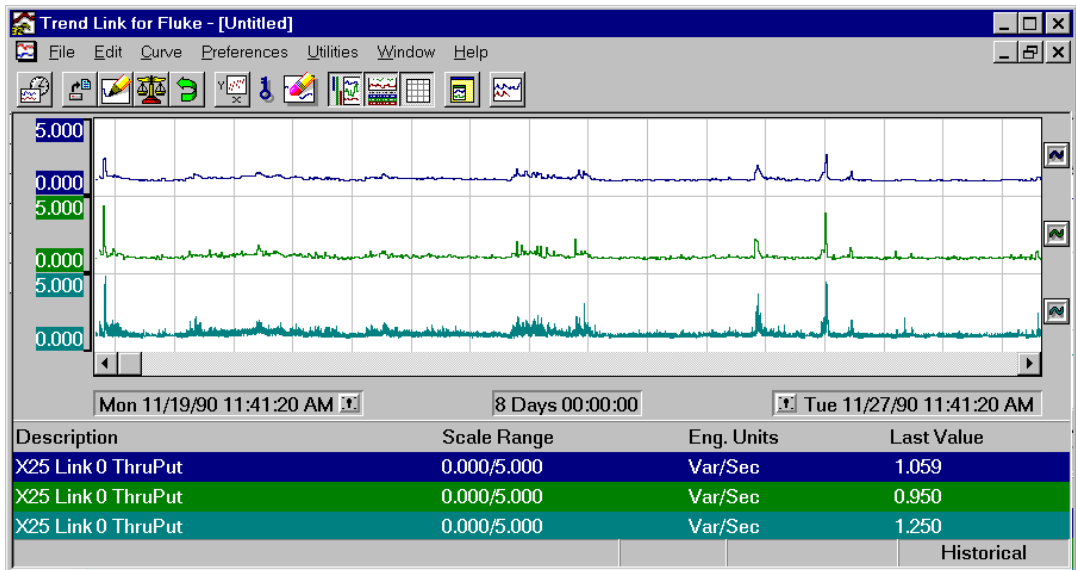
A check box allows you to specify if the curve should be **AutoScaled** when it is added. The AutoScale function scans the values that are currently visible for a curve and changes the high and low scale values so that the curve scales appropriately into the band area. Another check box allows you to specify if all curves on the chart should be **Auto Banded** when Trend Link adds the curve. The AutoBand function divides the trend display window evenly into horizontal bands so that each curve appears in its own band area. For additional information on curve bands, see the Band Range vs. Scale Range section of the Advanced Concepts chapter.

If the curve is a highlight limit or SPC curve, you can change the **highlight color**. By default, the curve color automatically changes for each additional curve added to the chart. However, the highlight color always defaults to red.

Historical Mode *2-13.*

Press this button to select historical mode. This button behaves like a radio button with the Real Time mode button. When you first run Trend Link, it is normally in this mode.

Real Time Mode *2-14.*

This button toggles Trend Link between Real Time and historical display modes. In Real Time mode, Trend Link polls, or requests, new data for each curve at a regular time interval. Set this time interval by selecting **Preferences | Real Time Freq ...**. A dialog box appears, allowing you to enter the real time update interval in seconds. With the real-time update interval set to 20 seconds, Trend Link checks to see if there is new data every 20 seconds. If so, the chart updates and the time range scrolls to reflect the new data.

When Trend Link is in Batch mode and displaying data in real time, it attempts to keep the current (real time) position of the current batch in the center of the screen. This allows you to look ahead and behind the current batch position to provide a better overview of how the current batch is progressing compared to other batches being displayed.

Trend Link automatically exits Real Time mode if you cause the time range to scroll in any way (clicking the scroll bar, using the arrow keys, etc.).

AutoScale All Curves *2-15.*

Press this button (or select **Edit** | **AutoScale**) to initiate an AutoScale on all of the curves on the chart. The AutoScale function scans the values that are currently visible for a curve and changes the high and low scale values so that the curve scales appropriately into the band area.

XY Curve Plot (Scatter Chart) 2-16.

This button activates the XY curve plot mode. Use an XY plot to plot the data values from one curve against the data values from another curve. To enter this mode, click the mouse pointer over the icon pictured above or select **Utilities | XY Curve Plot...** . Your mouse pointer becomes an X symbol. Move the X mouse cursor over the top of the Curve Symbol for the curve that you want to represent the x-axis. Click the left mouse button and the mouse cursor becomes a Y symbol. Move the Y mouse cursor over the top of the Curve Symbol that you want to represent the y-axis. Click the left mouse button again, and an XY Curve Plot or Scatter Chart is drawn for the two curves.

The X axis for the XY plot represents the scale values of the curve that you selected with the X cursor. The Y axis is the scale values of the Y curve. Trend Link creates a box with the X and Y scales, and the data begins to plot in the box as illustrated below:
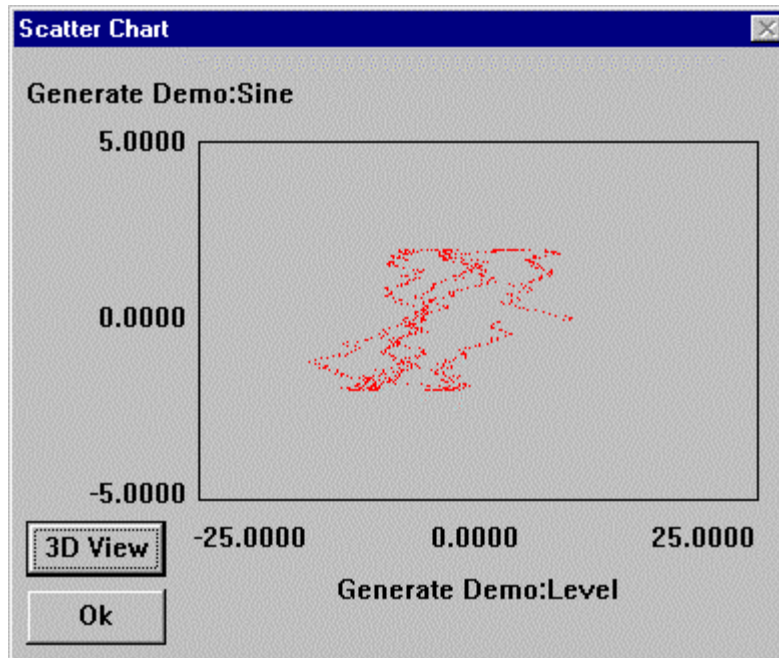
Trend Link plots a point for each sample value for the entire time range by using the sample value of the X curve for the X axis and the sample value of the Y curve for the Y axis.

While the values are being plotted, the mouse cursor changes into a clock shape showing the progress of the plotting. If you press the Escape key (Esc) while the values are being plotted, the plotting stops.

By pressing the left mouse button while the mouse pointer is within the XY Scatter Chart, the X and Y values display with the number of points that plotted at that location.

The 3D View button displays a window with a 3 dimensional view of the XY plot as in the example below:
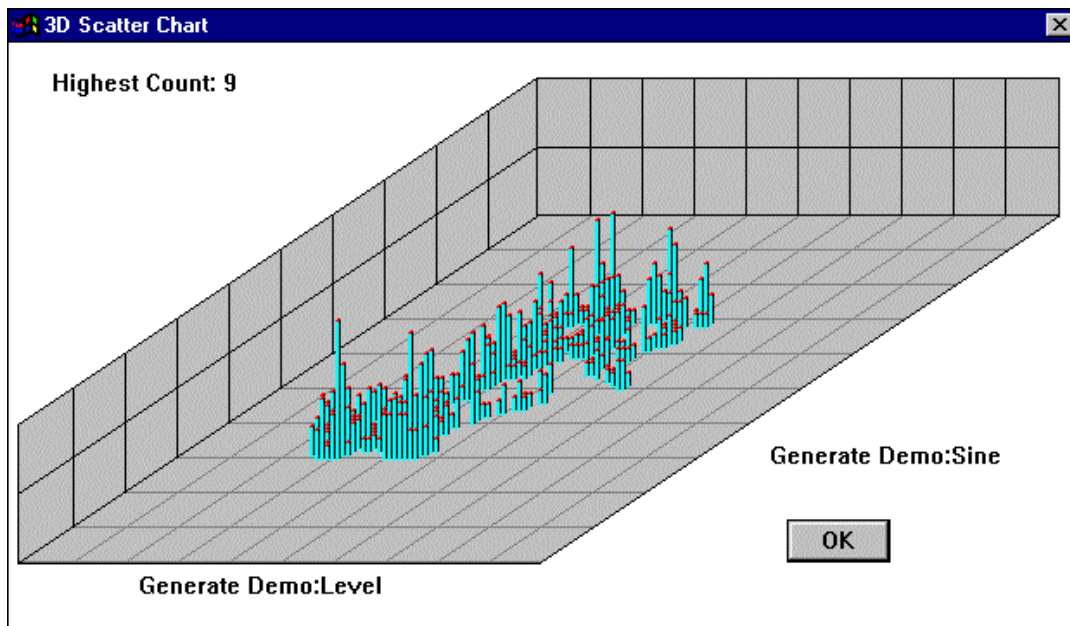
Erasing a Curve *2-17.*

By pressing the left mouse button while the mouse pointer is over the eraser and holding the button down, you can drag the eraser over a curve icon, or any point on a curve. When released, the curve is erased from the chart.

Curve Band Bars 2-18.

Use this button (or select **Edit** | **Band Bars**) to turn curve band bars on and off. When the button is down, the band bars are on and when the button is up, the band bars are off.

Every curve has a horizontal rectangle in the curve window. This area is the band area. Upper and lower boundaries define the band area. Trend Link scales the curve scale value (upper or lower) to the band value (upper or lower, respectively).

Trend Link can display the band area for all curves on the chart by selecting the button shown above. The band areas appear to the left of the curve window as thin colored bars. Band areas can also appear as colored scale values, where the color of the box is the same as the color of the curve that it represents. Overlapping band bars offset slightly to prevent hiding.

The following chart shows the band bars:
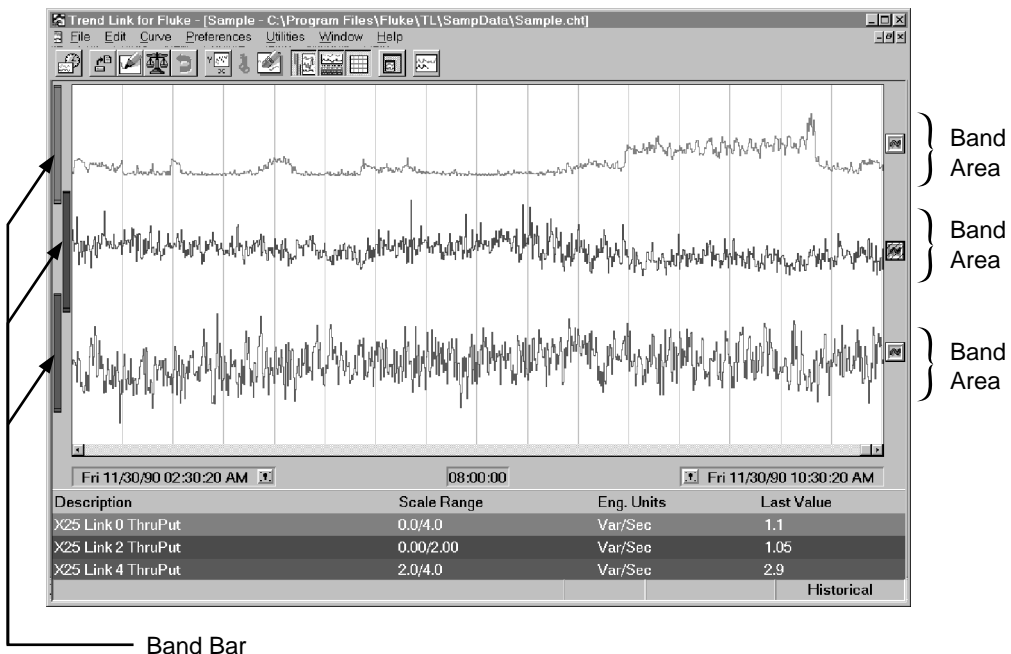
Band bars not only provide a visual indication of where the band area is for each curve, but they also provide an easy mechanism for changing that band area. By

pressing the left mouse button while the mouse cursor is over a band bar, a highlight box appears around the band bar. Moving the mouse cursor up or down causes the highlight box to move. When you release the mouse button, the band bar moves to the position of the highlight box.

As you move the mouse cursor over the top or bottom edge of the band bar, it turns into an up-down arrow cursor. By pressing the left mouse button while the cursor is an up-down arrow, a highlight box once again appears around the band bar. However, moving the mouse cursor up or down now causes the highlight box to grow or shrink on the grabbed side. When you release the mouse button, the band bar grows or shrinks to the size of the highlight box, causing the band area for that curve to change.

Each band bar can appear as a thin strip that is the same color as the curve it belongs to. You can change this strip on a curve-by-curve basis to display a graduated band bar showing the scale range of the curve as shown in the following picture:
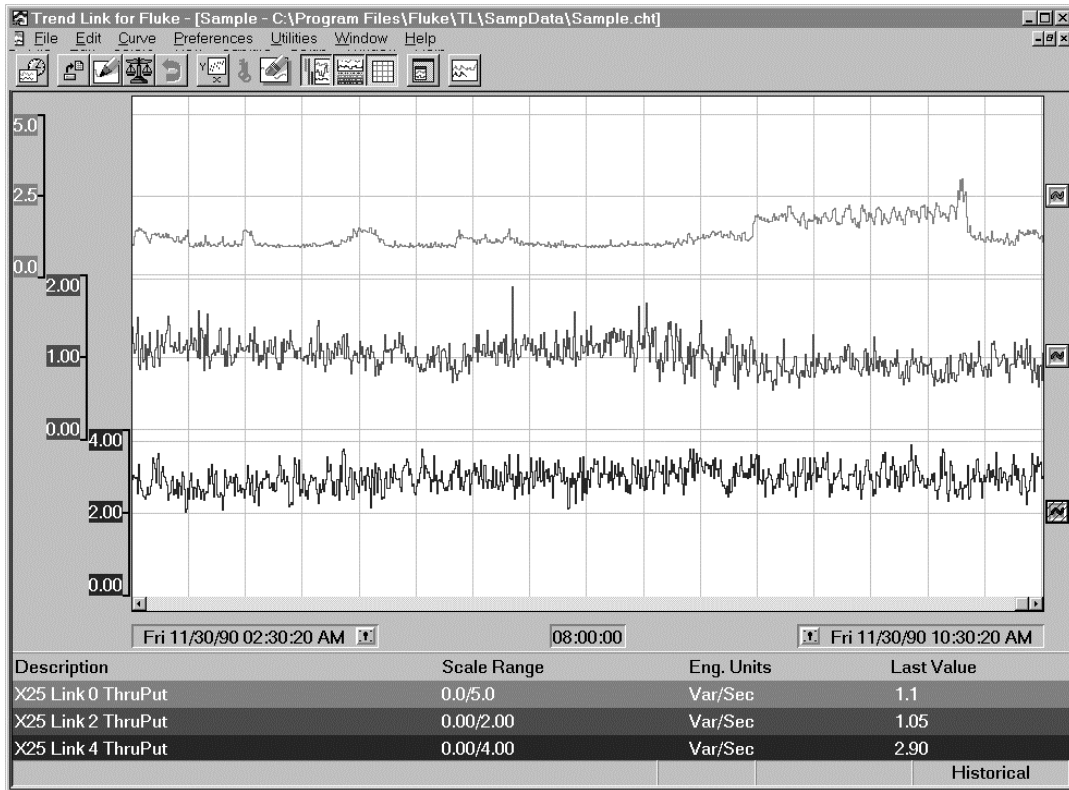
Trend Link automatically calculates the number of graduations displayed for a given band bar based on the size of the window, length of the band bar, and video

capabilities of the system. To enable the graduated band bar feature of Trend Link, bring up the Curve Info dialog box by double clicking on the curve's band bar (at the left of the screen) or double clicking on the curve's icon (in the right margin of the screen). From this dialog box, check the box in the lower left hand corner labeled Scale Values. You can select the precision of the scale values that appear by entering the desired number of decimal places in the box labeled Precision. This is useful in conserving space when displaying many curves. Once you have checked the Scale Values box and entered the desired precision, press enter or click on the OK button to close the Curve Info dialog box; the band bar re-draws, showing the scale range.

Likewise, you can use the Curve Info dialog box to change the scale range back to a band bar. While the scale range appears, it still functions in the same way as the band bar, allowing the band area to be moved and re-sized. Use this feature as an alternative to displaying the scale range values in the Curve Status Window.

Curve Status Window   2-19.

Sometimes it is desirable to display certain pieces of information for each curve all of the time. Trend Link provides a mechanism to do this through the Curve Status window. You can toggle this window on and off by depressing the button pictured above. When activated, a window appears underneath the curve window and time displays. This window contains a header line followed by one status line for each curve on the chart. Each status line displays current status information for one of the curves on the chart and appears using the same color as the curve it represents.

An example of the Curve Status window follows:

Curve Status Window   Status Bar
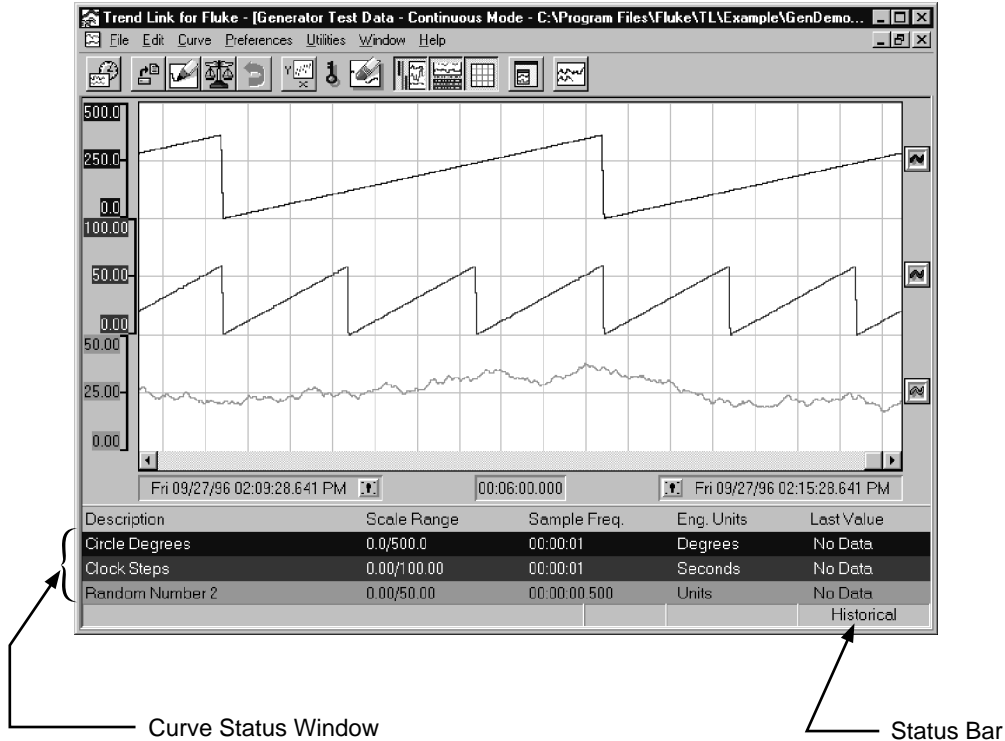
You can turn any of the fields in the Curve Status window on or off individually, allowing more or less room for the other fields. Do this by selecting **Edit | Curve Status Info...** . The fields currently available for display are described below.

- **Tag Name**: This is the name of the curve in the form of *DataSet:Tag name*.

- **Description**: This is the description of the curve as provided by the TBASE module when the tag was first added to the chart.

- **Batch Name**:   This is the name of the batch that the curve belongs to. This label may only appear when Batch viewing mode is on.

- **Scale Range**:   This is the low and high scale values currently defined for the curve.

- **Sample Freq**:   This is the sample frequency of the curve as provided by the TBASE module when the tag was first added to the chart. The sample frequency represents the rate at which Trend Link logged the curve data.

- **Engineering Units**: This is the engineering units of the curve as provided by the TBASE module when the tag was first added to the chart.

- **Value Bar**: This is the current value of the curve at the value bar. This value appears in the highlight color for highlight and shaded curve types if the value

exceeds the high or low limit. For more information on the value bar, see "Snap Shot" print feature in the Tutorial section of this manual.

- **Last Value**: This is the value of the curve at the timestamp displayed at the top right of the Curve Status window. This timestamp is equal to the right side of the screen when Trend Link is in continuous time mode or in historical mode. When Trend Link is in real time batch mode, this timestamp equals the time from the beginning of the most recent batch at which data is currently being recorded. The value appears in the highlight color for highlight and shaded curve types if the value exceeds the high or low limit. The value changes as the chart scrolls in either historical or Real Time mode.

Other choices in this dialog box include the option of not showing any curve status lines, number of lines, and first line.

You can re-size the Curve Status Window vertically to display as many of the curve status bars as you desire. If you re-size the status window so that it does not display all of the status bars for the chart, a scroll bar appears, allowing you to scroll through the window.

Grid Lines   *2-20.*

Use this button to turn the grid lines on and off in the background of the curve window. When the button is down, the grid lines are on; when the button is up, the grid lines are off.

Continuous/Batch Mode   *2-21.*

Use this button to switch Trend Link between Continuous and Batch viewing modes. In Continuous viewing mode, the X axis is absolute time. In Batch viewing mode, the X axis is the time from the beginning of the batch.

Continuous Viewing Mode   *2-22.*

Continuous Viewing mode allows Trend Link to display curves on a common "absolute" time axis. Curves may be time shifted by entering a time displacement for the curve in the Curve Information dialog box. Activate this box by double clicking on the curve symbol or the bandbars.

When viewing in this mode, the curves' batches are "hidden" and the data for the curve is simply displayed in continuous time as recorded. In the example below, two curves are being displayed in continuous time mode. The bottom curve is displaying the same tag as the top curve, but is time shifted by one minute. The batches for the curves as labeled here show how batch data would appear in continuous mode. Trend Link, however, does not label batches in this mode.

Time Shift 1 Minute
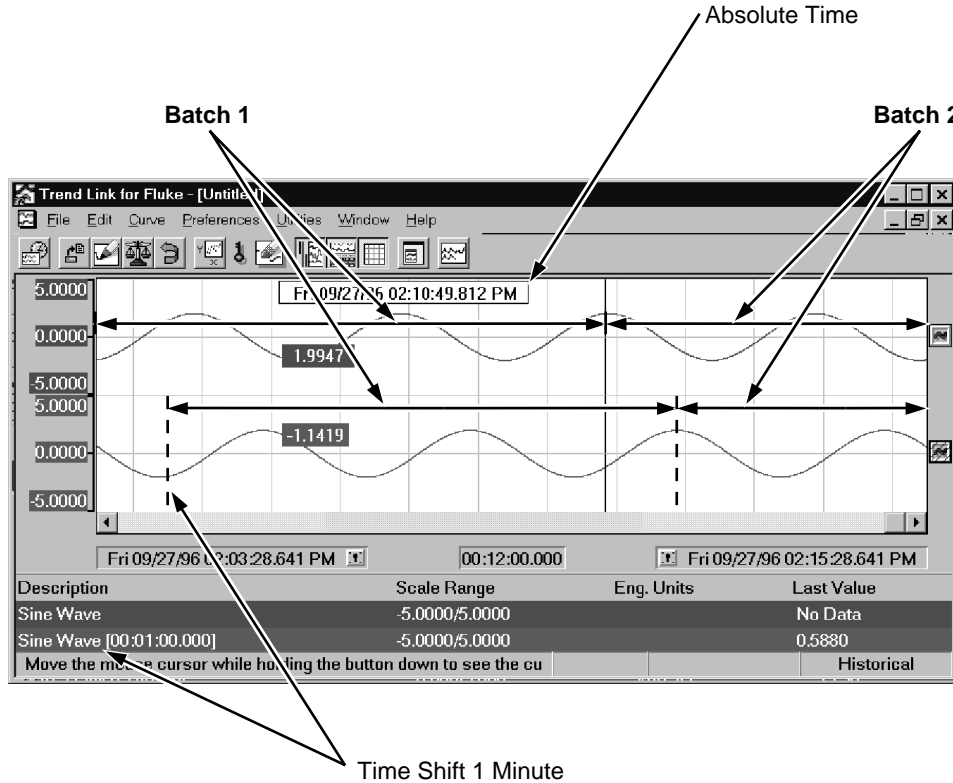
Batch Viewing Mode *2-23.*

Batch Viewing Mode allows Trend Link to display curves on a "relative" time axis that represents the time from the beginning of the batch. In this mode, Trend Link adds curves by specifying both a tag name and a batch name, so only one batch appears for each curve. Batches may be time shifted for comparison by entering a time displacement for the curve in the curve information dialog box (activated by double clicking on the curve symbol or band bars.)

In the example below, three batches of the Sine tag are being displayed. The bottom batch has been time shifted by one minute. Note that the time displayed by the value cursor is the time from the beginning of the batch.

Batch 1

Batch 2

Batch 1
Time Shifted
1 Minute

Time Shift 1 Minute
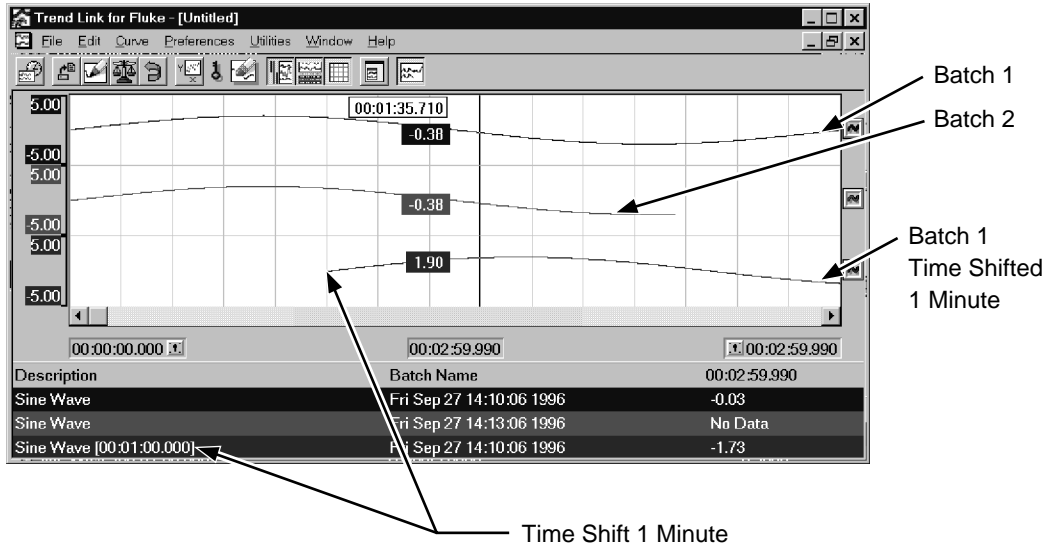
Curve Symbol 2-24.

A box similar to the one above appears to the right of the curve window for each curve on the chart. The box centers vertically in the curve's band area. The color of the symbolic curve in the box is the same as that of the actual curve that it represents. A double click of the left mouse button while the mouse cursor is over the curve symbol activates the Curve Information dialog box for the curve. This dialog box appears as shown below.

Curve Information Dialog Box 2-25.

Double click on the Curve Symbol button (described above) to open the Curve Information dialog box.

Note

You can also activate this dialog box by double clicking on the band bar of the desired curve or by selecting **Curve | Curve Information...** *and then selecting the appropriate curve.*

This dialog box allows you to specify parameters for Trend Link to use when displaying the curve. Refer to the Add Preferences Dialog Box section earlier in this chapter for additional curve type information.

The **High** and **Low** Scale entries fix the displayed curve scale. (The Scale entries are ignored if you have checked Dynamic AutoScale in the Preferences menu.) See the Band Range vs Scale Range section in the Advanced Concepts chapter for further information.

The **Band Area** represents the percentage range of the curve window to which Trend Link scales the curve. Band values of 100 and 0 represent the whole curve window, band values of 100 and 50 represent the top half of the curve window, and band values of 50 and 0 represent the bottom half of the curve window. The upper scale value always appears at the upper band position and the lower scale value always appears at the lower band position.

Use the **OK** button to enable any preference changes, such as color or scale values. Use the **Cancel** button to ignore any changes. The **AutoScale** button causes the curve to perform an AutoScale as previously discussed. The next two buttons are useful when two or more curves overlap so that one curve draws over the top of another. The **Draw First** button causes the curve to draw over all other curves. The **Draw Last** button causes the curve to draw underneath all other curves. The **Statistics...** button activates a window displaying statistical information regarding the curve such as mean, standard deviation, maximum value, minimum value, etc. For more information on the statistics window see the Curve Statistics Window section of this chapter. You can also change the curve type from this dialog box by checking the box corresponding to the desired curve type (Normal, Highlight, Shaded, or SPC).

Clicking on the **More...** button brings up a dialog box allowing you to specify additional information for specific types of curves as follows:

Curve Type	Additional Information
Normal Curve	Drawing Method
HighLight Curve	Highlight Limits, Highlight Color, Drawing Method
Shaded Curve	Upper / Lower Shading Limits, Drawing Method
SPC Curve	Highlight Color, SPC Interval, Drawing Method

Note

It is possible to activate the Curve Information dialog box for more than one curve at a time. This allows you to compare scale, band, or limit values for several curves. It is also possible to compare the Statistics Windows of different curves.

You can also minimize the Curve Information dialog box to the chart by a click on the minimize arrow in the upper right hand corner of the dialog box. The minimized box then becomes a floating window on the chart that displays information about the curve. You can define the exact information displayed in the floating window by clicking on the **Minimized...** button located at the bottom center of the Curve Information dialog box and then selecting the fields to display. The fields displayed in the minimized floating window are listed below:

- **Tag Name**: This is the name of the curve in the form of *DataSet:Tag name.*

- **Description**: This is the description of the curve as provided by the TBASE module when the tag was first added to the cart.

- **Batch Name**:   This is the name of the batch that the curve belongs to.

- **Scale Range**:   This is the low and high scale values currently defined for the curve.

- **Sample Freq**:   This is the sample frequency of the curve as provided by the TBASE module when the tag was first added to the chart. The sample frequency represents the rate at which the curve data was logged.

- **Engineering Units**: This is the engineering units of the curve as provided by the TBASE module when the tag was first added to the chart.

- **Last Value**: This is the value of the curve at the time stamp displayed at the top right of the Curve Status window. This timestamp is equal to the right side of the screen when Trend Link is in continuous time mode or in historical mode. When Trend Link is in real time batch mode, this timestamp equals the time from the beginning of the most recent batch at which data is currently being recorded. The value displays in the highlight color for highlight and shaded curve types if the value exceeds the high or low limit. The value changes as the chart scrolls in either historical or real-time mode.

To move the minimized floating window anywhere on the chart, hold down the left mouse button over the floating window, drag it to the desired position, and release the mouse button. A double click of the left mouse button while over a minimized window restores the window to the Curve Information dialog box.

The following is an example of three minimized dialog boxes on the chart:
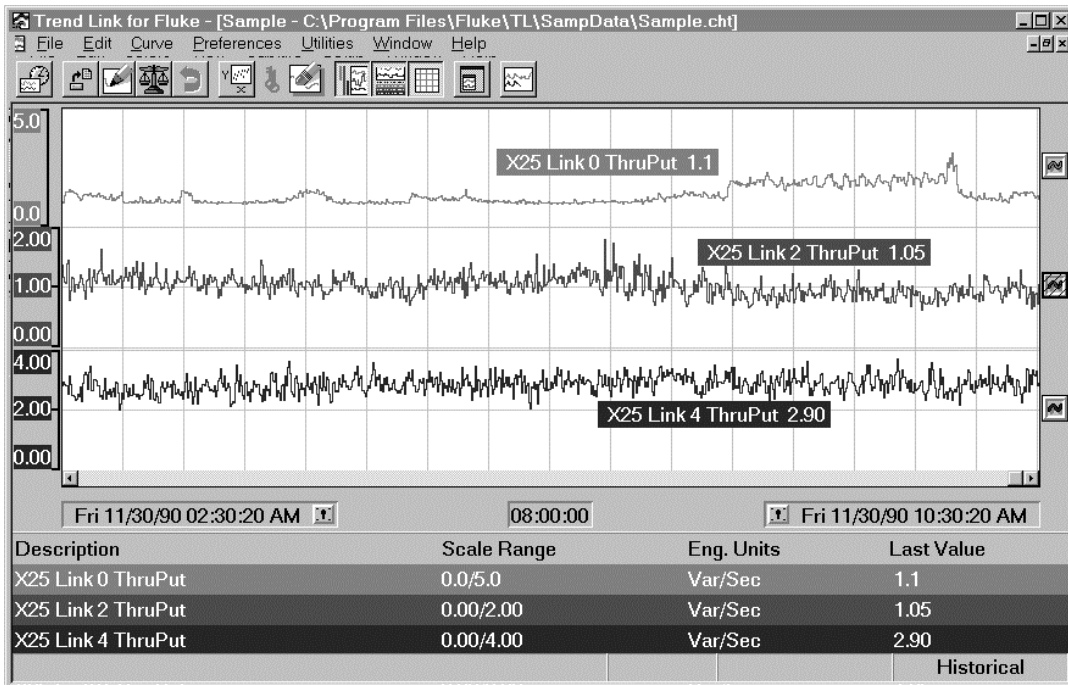
Time Shifting Curves 2-26.

Curves may be time shifted in the Trend Link display using the Time Shift parameter located in the center of the Curve Information dialog box shown below:

Time Shift Parameter
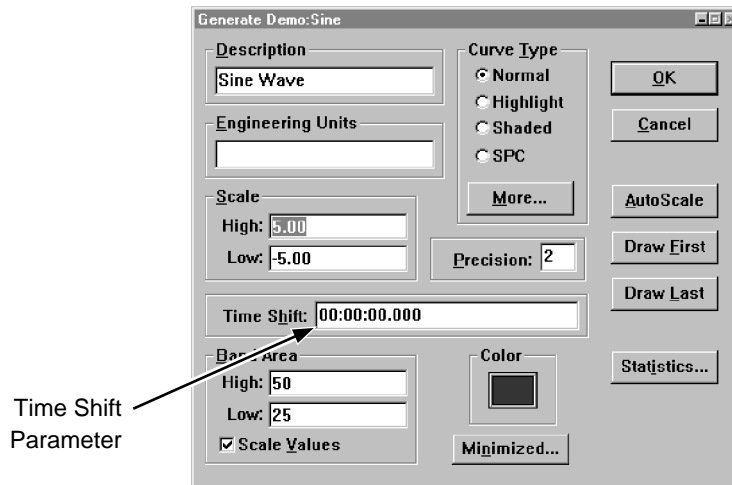
Shift a curve in time by entering the amount of time to displace the curve in the Time Shift parameter box (located in the center of the Curve Information dialog box.) This displacement time can be a positive time value, in which case the curve shifts forward in time (right on the screen). The displacement can also be a negative time value, in which case the curve shifts back in time (left on the screen).

When you press the OK button of the Curve Information dialog, the curve redraws to reflect the appropriate amount of Time Shift. The amount of time that the curve shifts displays in brackets as part of the Tag Name field in the curve status window at the bottom of the Trend Link display.

Batch 1

Batch 2

Batch 1
Time Shifted
1 Minute

Time Shift 1 Minute
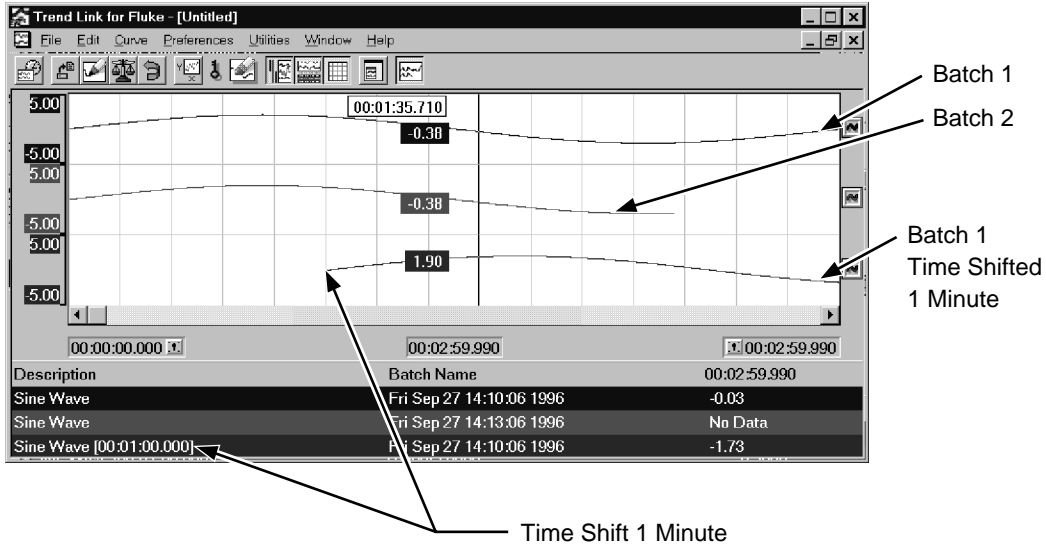
If the Tag Name field is not being displayed, the displacement time appears in the Description field for the tag. The amount of time a curve displaces also displays in the Tag Name field or Description field of the Value Cursor and the minimized Curve Information window if these items are being displayed.

Curve Statistics Window *2-27.*

Pressing the **Statistics...** button in the Curve Information dialog box causes the statistics window to display for that curve. As the statistics are being calculated for the curve, the cursor changes to a clock showing the progression of the calculations. By pressing the Escape key (ESC) while the cursor is in the clock form, the calculations abort.

This window shows various statistics for the portion of the curve that is within the time range of the curve window. These include the beginning and end of the sample range, the number of valid samples, mean sample value, standard deviation, and the summation of the curve within the time range. The curve statistics window also displays a box plot that shows the 25th 50th and 75th percentiles and a histogram that displays the sample distribution. By holding the left mouse button down while the mouse is inside the histogram, you can obtain the exact sample count for a specific value range.

Note

Trend Link calculates all of the statistics from all available samples for the given time range. Trend Link does not use the scaled screen values.

An example of the Curve Statistics Window follows:

Curve Statistics: Sample:LINK4THRUPUT ☒

From : Fri 11/30/90 02:30:20 AM
To : Fri 11/30/90 10:30:20 AM
Sample Interval : 00:00:20
Valid Samples : 1440   (100%)

[<u>O</u>K]

Histogram

87
43.5
0
1.65   2.975   4.3

From: 1.65
Up to: 1.676
Count: 1

Box Plot

2.588   3.09
25 [   ] 75
2.85

Sum : 4094.25
Mean : 2.84323
Std. Dev. : 0.374181
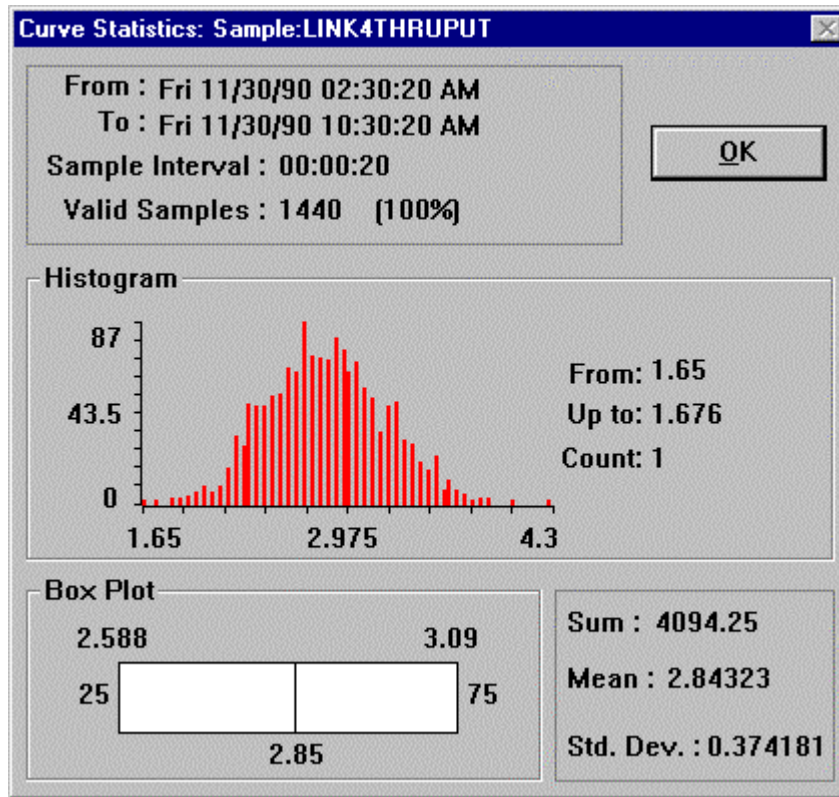
Selecting a Curve   2-28.

You can select the curve with the mouse. A single click of the left mouse button
while the mouse cursor is over the curve symbol draws the curve symbol with a
cross-hatched pattern over the top of it. This pattern identifies a selected curve.
An additional click causes the curve to be de-selected. You can select only one
curve at a time. This means that if you select a new curve, any previously selected
curve is automatically de-selected.

Currently, Trend Link only uses the curve selection feature when adding SPC
intervals to an SPC curve. For more information on using SPC curves, see the
Statistical Processing Control (SPC) Curves section in the Advanced Concepts
chapter.

Time Range 2-29.

The Time Range refers to the interval of time that is visible on the current chart. There are two time displays at the bottom of the curve window as well as an interval time showing the difference between the two. The time on the right side of the curve window is the most recent time being displayed. The curve value represented by the last pixel in the curve window represents the value for the specified time in the right time display. The time on the left side of the curve window is an earlier time than that of the right. Thus the time in the middle is the difference or interval between the two times.

Scrolling the Time Range 2-30.

Trend Link uses the horizontal scroll bar to represent the current time range within the context of all available data for the chart. The chart ranges from the earliest available data for any of the curves on the chart to the newest available data. If the available data for the curve exceeds the chart on either side as curves are added to a chart, Trend Link extends the chart. The scroll bar thumbtrack represents the position of the right-side or most recent time of the current time range in the overall chart. For example, if the chart ranges from *Jan 10, 1991 12:00:00 AM* to *Jan 16, 1991 12:00:00 AM*, there is *6 Days* of available data. If the right-side time is *Jan 16, 1991 12:0:00 AM*, the thumbtrack is on the extreme right of the scroll bar. Assuming that the interval is *02:00:00* if the right-side time is *Jan 10, 1991 02:00:00 AM*, the thumbtrack is on the extreme left of the scroll bar. If the right-side time is *Jan 13, 1991, 12:00:00 AM,* the thumbtrack is approximately in the middle of the scroll bar.

The time range can scroll to the left or right, which would be into the past or into the future, respectively, from the current right-side time. To accomplish this, click the left mouse button on one of the arrows on the horizontal scroll bar. The time range does not scroll past the edges of the chart in either direction. The amount that the time range scrolls is equal to about 20% of the time range interval.

The time range can also scroll by clicking the left mouse button inside the scroll bar to either side of the thumbtrack. In this case, the time range scrolls the length of time defined by the middle chart time interval.

One final alternative for scrolling the time range with the scroll bar is by pressing and holding the left mouse button while the mouse pointer is over the thumbtrack. Then as the mouse moves right or left, the times change to reflect the relative position of the thumbtrack. When the times reflect the desired time range, releasing the mouse button causes the time range to scroll to reflect the time displays. If the mouse pointer moves so that it is not over the scroll bar, the thumbtrack returns to its original position so that releasing the mouse button does not cause any change.

Note

Because of the scaling between the time interval being displayed and the number of pixels available to display that interval, the thumbtrack is usually only an approximation. There may be times when it is completely to one side, but the time range can still scroll in that direction some small amount.

Directly Modifying the Time Range   2-31.

A more precise way to set the time range is by entering the exact time desired in the time input dialog boxes. A double click of the left mouse button on the left or right-side times causes a dialog box to appear with the time in an edit field. If you change the time, use the exact format displayed in the edit field to guarantee correct results. If the new time would move the time range outside the chart, the time range only moves to the edge of the chart.

You can also use this technique for the interval time located in the middle of the chart. By changing the input field to a new interval time, the time range changes to reflect the new interval. The right-side time stays the same, and the left-side decreases or increases as appropriate. This also only changes within the constraints of the chart. If the desired interval reflects one or more days, the input may have the word *days* or just a *d* after the number. Enter any desired specific time after the day specification. If no *d* is present, Trend Link interprets the first number found as hours. Following a colon, *:*, the next number represents minutes, and then seconds. Numbers left off automatically become zeros. Thus an entry of *1 d 12:17* would be *1 Day 12:17:00* and *10* would *10:00:00*. You can specify hours in military time or with the morning, usually *AM*, and evening, usually *PM*, distinctions. The following is an example of how to change the time interval to eight days:
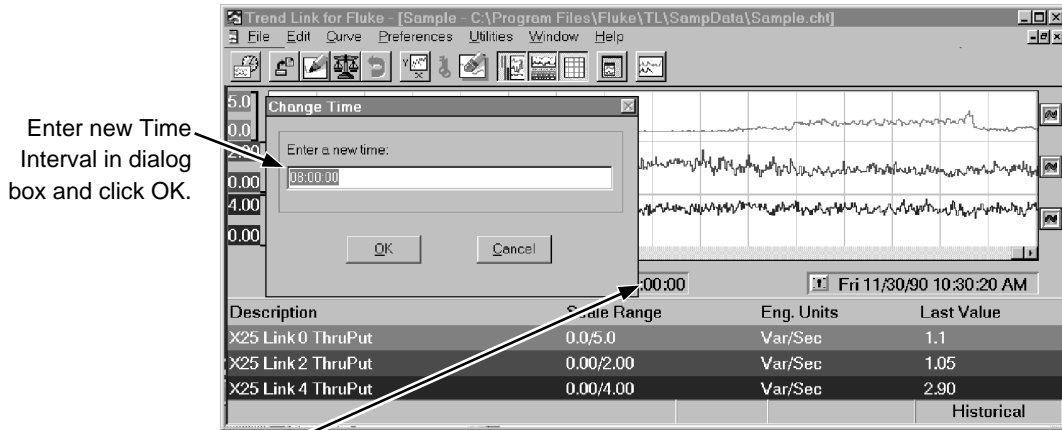
Enter new Time
Interval in dialog
box and click OK.

Double click on the Time
Interval to activate dialog.

Locking a Time   2-32.

Both the right and left-side times contain a small icon that resembles a lock. It is
possible to lock one side of the time range, preventing that side's time from
changing when the time range scrolls. For example, if the right-side of the chart is
locked, scrolling the chart to the left has the effect of increasing the time interval
of the time range by the amount of time scrolled. Scrolling to the right decreases
the interval. The opposite is true if the left-side time is locked down.

This is very useful for increasing the time range interval without having to enter
the specific time interval in the interval input dialog box as described above. For
example, if the right-side time is locked, you can drag the thumbtrack to the left
and the interval and left-side time increase as you do so. When you release the
mouse button, the time range changes to reflect the time displays.

Note

*The thumbtrack may not stay in the position on the scroll bar that it
was in when you released the mouse button. This is because when
moving the thumbtrack with the right-side time locked, the
thumbtrack represents the relative position of the left-side time to
the left side of the entire chart. However, normally the scroll bar
represents the right-side time relative to the left-side of the chart.*

You can lock a time in two ways. First, if the Control Bar/Window is visible,
there is a key on it. If you press the left mouse button while over the key and hold

it down, you can drag the key over one of the locks in the two time displays. By releasing the button while over one of the locks, you place the key in that lock. A shortcut to accomplish the same task is by double clicking the mouse while over one of the locks. This causes the key to automatically go into the lock.

To unlock a time, simply click over the lock and drag the key off the lock and release it. If you release the key while not over a lock, it automatically goes back to the Control Bar or Window if they are active. The short cut for this operation is the same as the last. Double click on the lock with the key and the key comes out of the lock.

Zooming the Time Range 2-33.

Zooming the time range refers to making the time range interval smaller. Two techniques which make it possible to accomplish this were presented above. There is another technique which allows you to zoom in on a portion of the chart that is currently visible in the curve window.

A double click of the left mouse button while the mouse cursor is over the curve window causes a vertical line to appear over the curve window from the top to the bottom. This line represents one side of the new time range. A second double click with the mouse to either the left or the right of the first line represents the other side of the new time range. The time range changes to reflect the new right and left times chosen. Thus, the time range has zoomed to the chosen size as shown here:
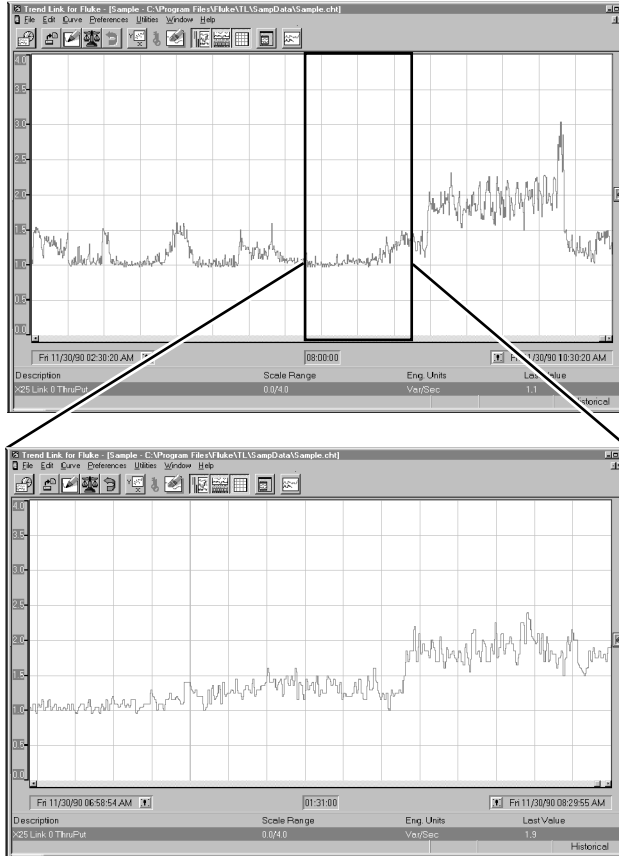
If you inadvertently activate the first line for the zoom function, you can abort the zoom by pressing the Escape key (Esc).

Undo and Redo of the Time Range 2-34.

The Undo and Redo functions are very similar in action. Click on the Undo Time button to perform the Undo function. The Undo and Redo functions are also available under the **Edit** menu.

Use the Undo function to perform the opposite action of the last time range change. A time range change is any action that causes the period of time visible in the curve window to change. Scrolling the time range either with the scroll bar or by directly changing the right-side or left-side times qualifies as a time range change. Also, changing the length of time being viewed by zooming or expanding the time interval qualifies as a time range change. The undo facility stores any

change to the time range. This facility can store multiple changes. The number of changes stored is configurable using **Preferences** | **Undo/Redo**. If the storage buffer becomes full, Trend Link discards the earliest recorded change.

Choosing the undo function reverses the last recorded change. Choosing the undo function immediately again reverses the last recorded change. Whenever you choose the undo function, the redo facility stores the original (and unchanged) change. Thus, the redo is like an undo for the undo function.

As the undo facility stores each new time range change, it clears any previously executed and stored undo changes.

An example may be helpful. You have just loaded a chart into Trend Link with a curve on it. Both the undo and redo are clear or empty. You scroll the time range to the left using the scroll bar. The undo now has that change recorded. You expand the time range. Undo records that change also. You scroll back to the left. There are now three changes in the undo facility. Now you select undo. The time range scrolls back to the right opposite of the scroll left. The redo facility records the original change and the undo now has two changes left. You select undo again, and the time range zooms exactly opposite of its previous expansion. Now undo contains one change, the first one performed, and redo has two changes. If you select **Edit** | **Redo Time**, the time range once again expands and undo again stores the change. There are now two changes in the undo facility and one in the redo facility. Now you scroll the time range right. The undo facility now contains three changes and the redo facility clear. The redo always clears when a new time range change occurs.

The other aspect of undo and redo is the group facility. When grouping is turned on using **Preferences** | **Undo/Redo**, all changes of the same type consolidate into one encompassing change. The different types include scrolling left, scrolling right, expanding, and zooming the time range. Therefore, if the chart scrolls left three times consecutively, the changes are all consolidated, and undo stores only one change. So, when you choose undo, the time range scrolls back to the right to its position before the first scroll.

♪

Notes   *2-35.*

A note is a small textual comment, that you can attach to a given curve at a specific time location. You can add a note to a chart to comment on a particular event of the curve, such as a spike in the data, or a gap with no recorded data.

Each curve gets a list of its current notes when it is added to a chart or when a new chart is loaded. Therefore, if a new note is added automatically to the curve while it is currently being displayed, the note will not be shown on the curve until the curve is added to a chart, the chart is re-loaded again, or the note system is turned off and back on.

A note is represented on a curve with the note symbol. When a curve is drawn and a note is defined for the curve within the time range which is being viewed, the note symbol will be drawn on top of the curve at the specified time.

Adding Notes to a Curve   2-36.

To add a note to a curve, first enable the Note System by selecting **Preferences** | **Note System**. Next, move the mouse over the note symbol (shown above) located on the Control Bar/Window. Press the left mouse button and hold it down. The mouse cursor changes into a note shape. Drag the note over the top of a curve in the curve window and release the mouse button at the note attaching location. The Note Text Entry dialog box will be activated. Enter the text for the note in the dialog box and then select OK.

After the text entry dialog is exited with an OK, a confirmation dialog is activated. This dialog asks if you wish to add the note permanently to the curve. If you choose YES, the note will be added to the curve. If you choose NO, the text entry dialog will be activated again with the previously entered text so that changes can be made to it. After a note is attached to a curve, it can not be removed from Trend Link.

For a complete description of the note system, see the Note System section in the Advanced Concepts chapter.

Stay On Top Mode   2-37.

You can place Trend Link in a Stay On Top Mode by pushing the Control Bar button pictured above or selecting **Preferences** | **Stay On Top**. Use this mode when running Trend Link in conjunction with another application to cause Trend Link to overlay the other application while still allowing interaction with the other application.

For example, if a Windows based process control system is being run, you can run Trend Link over the top of this software. You can size Trend Link to cover the appropriate part of the screen. When Trend Link is in Stay On Top Mode, Trend Link stays on top even when another application is active. Pressing the Stay On Top Mode button again causes Trend Link to return to regular operation.

Removing the Menu Bar   2-38.

You can remove (hide) the Menu Bar from the Trend Link viewer screen. To remove the menu bar, activate the Control Menu for the Trend Link application by

clicking on the Control Menu box at the left of the application title bar. Select **Hide Menu Bar**. The menu disappears from Trend Link. To show the menu again, click on the Control Menu box and select **Show Menu Bar**. The chart file saves the status of the menu bar; when you save a chart with the menu bar hidden, the menu bar remains hidden when you load the chart.

Note

When Trend Link is in Operator Lockout mode, the Control Menu is disabled. This means that you cannot change the state of the menu bar while in this mode.

Print Command 2-39.

Select **File** | **Print** to print the current chart on a printer. A Print dialog box is activated, allowing you to specify the size and position of the chart on the paper.

All numbers in the Print dialog box are in printer pixels. The default values are the size of one full page. The X and Y offsets specify the location of the upper-left corner of the chart on the page. If the size given for the chart is outside the available range on the page, the size defaults to a full page size.

Note

If the printer driver is in portrait mode, the upper-left corner of the chart is in the upper left corner of the screen. If the printer driver is in landscape mode, the chart is printed sideways on the paper so the upper left corner of the chart is in the upper right corner of the page.

As the curves are printed, Trend Link recalculates the data for the curves from the original data to the chart size, so the data may appear slightly different due to differences in display resolution and scaling.

Use the Cancel button to cancel the print job while the Print dialog is visible. While the Print dialog is visible, you cannot interact with Trend Link. However, Trend Link processes that portion of the printing in the background so that you may switch to another application during this time.

Trend Link should print on nearly all printers for which there is an appropriate Windows print driver including laser printers, plotters, dot matrix printers and various types of color printers. A color printer yields the best results.

"Snap Shot" Print Feature 2-40.

This feature allows you to position a vertical time bar to a specific time on the current chart and produce a print out of the current chart showing the exact value

of each curve at the specified time. To enable this feature, enable the curve status bars at the bottom of the screen. To enable the Snap Shot feature select **Edit | Curve Status Info…**. From the curve status dialog box check the box labeled Value Bar and click on the OK button. The dialog window closes and a solid black vertical bar appears at the center of the chart shown below.

Value Bar   Value Bar TimeStamp

Tag Values at Value Bar
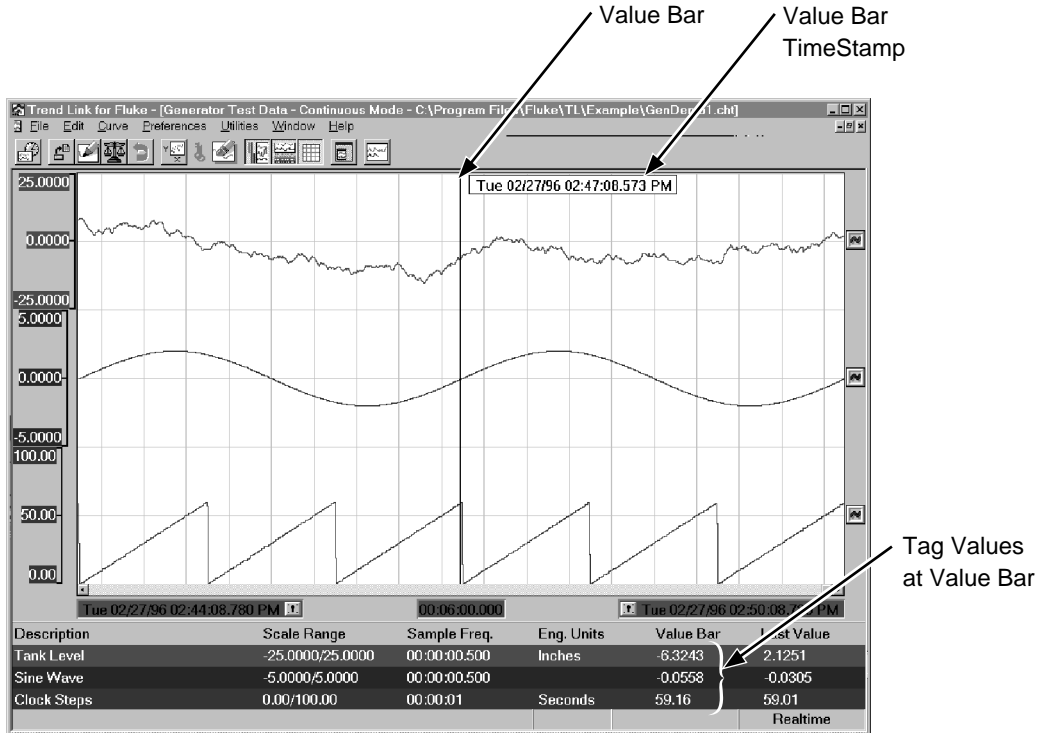
Position this bar (using the mouse) to any desired point in time on the chart. The status information bars at the bottom of the screen have an additional field labeled Value Bar that shows the value of the curve at the value bar. For a hard copy of the chart including the value bar, select **File** | **Print...** .

Previous Charts   2-41.

Trend Link saves a list of most recently used charts (listed at the bottom of the **File** menu.) Trend Link loads a chart name selected from the **File** menu.

Import and Export Facilities 2-42.

There are two utility functions that are available to assist you in analysis of the trend data. The first is an export function used to generate a file containing ASCII data for report generation purposes or for use with a spreadsheet or analysis package. When you select **Utilities | Export CSV Data…,** the following dialog box appears.

You should select the desired export file type from the drop down list box at the bottom of the dialog box. This determines the format for the ASCII export file. There may be several export file formats defined. See the Export Facility section in the Advanced Concepts chapter for details about creating new export formats. Four export formats come with the Trend Link package: "Standard Comma Separated Values", "MathCad" (exports a file that is compatible with the MathCad software package format,) Column Heading Format (a column-oriented format compatible with most spread sheet programs), and "Std. Batch Separated Values".

The selection of the export format references a file with an EXP file extension defining data format during the export. The standard CSV format is commonly used with spreadsheet programs such as Microsoft Excel. You must name the destination data file. When displaying information on the screen, Trend Link displays information from curves sampled at different rates and can display very large amounts of data. Spreadsheet and database programs often have limited storage facilities and can only handle a limited amount of data. You can select the sample rate at which the export facility should write the data into the file. If the screen displays 10 days of data sampled at a 20 second interval, there are 43,200 sample points. Write a condensed version of the data to the export file by selecting a sample interval of 01:00:00 (1 hour). This causes data averaging to 1 hour intervals, generating 240 samples.

The Import function is useful for displaying data with Trend Link that is available in a spreadsheet format. When you select **Utilities | Import CSV Data…**, the following dialog box appears.
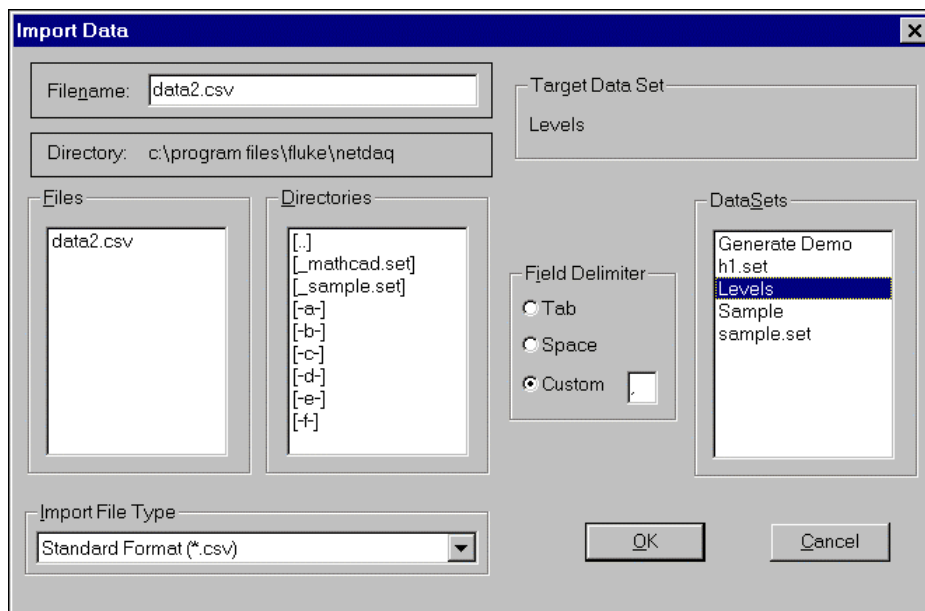
From this box you must select the ASCII file containing the data to be imported and a target Data Set for data placement. In the above example, Trend Link will import data from the file named DATA2.CSV and store it in the Data Set Levels. The selected import file type for the ASCII file should be the appropriate format as described below. The target Data Set must be an empty Data Set. Remove any existing TLG or NOW files from the Data Set directory or create a new Data Set (see the Editing Data Sets section in the Configurator chapter) prior to invoking the import facility. The only exception would be when importing the exact same

curves from multiple files where the files have increasing time ranges. In this case, leave the old data in the Data Set, and Trend Link links the data files together in time when the curves are displayed.

The possible import types currently defined for Trend Link are:

- Standard (CSV) format as defined in the export section of the Advanced Concepts chapter of this manual.

- Iconics (PRN) format files produced by the Iconics WinWorx Package.

- FLUKE (CSV) comma separated value formats used by FLUKE data logging software.

By using the import and export utilities, you can export data to a spreadsheet, generate new data curves with math formulas, and import the resulting curve back into Trend Link for display.

Chapter 3
Using Menu and Keyboard Commands

Contents   **Page**

File Menu Commands 3-1.

The **File** menu performs actions on a chart file. A chart file stores the information that defines the configuration of a chart. This includes curve information (such as position, scale values, etc.), most preferences, and time range information. The chart file stores this information in an ASCII file format that can be viewed or edited in a standard ASCII editor such as Notepad. The chart file is in a standard INI format. Much of the preference information stored in the file may be omitted in deference to default values. In this case, Trend Link first tries to use the values used by the last chart closed. If there are no previous closed charts, Trend Link uses a standard set of defaults for the chart preferences. For detailed information on the format of a chart file, see the Chart File Format section of the Advanced Concepts chapter.

New 3-2.

Use this command to begin a new chart or create a new chart file. Selecting **File** | **New** erases all curves from the new chart, but retains most preferences.

Open 3-3.

Use this command to load a previously defined chart file. A chart file contains the information for the configuration of a chart. This includes curve information such as position, scale values, etc., most preferences, and time range information.

Close 3-4.

This command closes the active chart file. If the current chart has changed since the last save, a prompt asks if you want to save the chart before closing.

Clear 3-5.

This command removes all of the curves from the active chart file. All of the chart information (size, location, background configuration, etc.) remains unchanged.

Save 3-6.

Use this command to save the current status of the active chart in a chart file. The file defaults to a CHT extension. The information saved in the file includes the following:

- **All Curves**: Curve information includes the type of curve, scale values, band values, color, limit values, etc.

- **Preferences**: Background status, application window position, curve status information, band bar status, etc.

- **Time Range**: Right side time, time interval, and if the chart is in the Real Time update mode.

Note

If the chart scrolls so that the most recent data available for each curve appears, the Right side time sets to the time of the most recent available data for all of the curves on the chart when the chart is loaded. Thus, if the chart is scrolled completely to the right when saved, any new data added to the curves on the chart is displayed when the chart is loaded again.

Save As 3-7.

Use this command to save the active chart under a new name or directory or for an untitled active chart. Trend Link uses a CHT file extension by default. This command then performs the same function as the **Save** menu option.

Print 3-8.

Use this command to print the active chart on a printer. Selecting **Print...** opens a dialog box for specifying the size and position of the chart on the paper. For more information on printing, see the Print Command section in the Tutorial chapter.

Printer Setup … 3-9.

Use this command to specify various setup parameters for the printer. This is the same dialog box that you can access from Print Manager.

Exit 3-10.

This command closes the Trend Link application. If there have been changes to a chart since the last save, a prompt asks you to save the changes now.

When Trend Link closes, it saves the current configuration attributes of the curve display window. These attributes are loaded the next time Trend Link is activated so that Trend Link maintains its appearance between sessions. This is the default feature set in the TLLOCAL.INI file under the [TL Local Settings] section using the Save Configuration and Load Configuration parameters.

- If the Save Configuration parameter is set to yes, Trend Link saves its attributes at the end of the session. Otherwise, Trend Link ends without saving the current attributes.

- If the Load Configuration parameter is set to yes, Trend Link loads the last set of attributes that was saved to the TLLOCAL.INI file. Otherwise, Trend Link uses the default configuration attributes that it originally was installed with.

Previous Charts 3-11.

Trend Link saves a list of most recently used charts (listed at the bottom of the **File** menu.) Trend Link loads a chart when its name is selected from the **File** menu.

Edit Menu Commands 3-12.

Use the **Edit** menu to manipulate the objects on the active chart. These include Adding or Erasing curves, Undoing or Redoing time range changes, AutoScaling all curves, AutoBanding all curves, or manipulating the Curve Status Info and Band Bar displays.

Undo Time 3-13.

Use this command to *undo* the last time range change made. This includes scrolling in both directions as well as expanding or zooming the displayed time interval. You can store several levels of undo. You can group or store time changes on an individual basis as described in the Time Range section in the Tutorial chapter.

Redo Time 3-14.

Use this command to *redo* the last time range change caused by the Undo Time command. For a more thorough description of the undo and redo commands see the Time Range section in the Tutorial chapter.

Add Curve… 3-15.

Use this command to add a curve to the current chart. It activates the Add Curve dialog box. For information on using the Add Curve dialog box, see the Adding a Curve section in the Tutorial chapter.

Erase Curve… 3-16.

Use this command to erase a curve from the current chart. It activates the Erase Curve dialog box, allowing the curve to be chosen by name from a list box.

AutoScale 3-17.

This command performs an AutoScale on all curves in the active chart. For additional information on AutoScaling see the AutoScale section in the Advanced Concepts chapter.

AutoBand 3-18.

This command performs an AutoBand on all curves in the active chart. For additional information on band ranges see the Band Range vs Scale Range section in the Advanced Concepts chapter.

Curve Status Info 3-19.

Use this command to activate a dialog box for setting the preferences for the Curve Status Information window that appears at the bottom of the chart display. You can activate or deactivate the various fields in the display. Also, you can activate or deactivate the entire Curve Status window.

For more information on the Curve Status window, see the Curve Status Window section in the Tutorial chapter.

Band Bars (ON/OFF) 3-20.

Use this command to toggle the display of the curve Band Bars. If an X appears in the box before the Band Bars menu option, the band bars are being displayed. Otherwise, the band bars are not being displayed.

See the Curve Band Bars section in the Tutorial chapter for additional information on curve band bars.

Turn SPC Area (ON/OFF) 3-21.

Use this command to toggle the display of the Statistical Processing Control (SPC) Interval bars. If an X appears in the box before the SPC Area menu option, the option is currently in effect, and the SPC area is being displayed. Otherwise, the SPC area is not being displayed.

For additional information on the use of the SPC area, see the SPC Curves section in the Advanced Concepts chapter.

Curve Menu Commands   *3-22.*

The **Curve** menu contains options that are for a specific curve. Typically, you choose the curve by name from a list of available curves.

Add Note…   *3-23.*

This command activates the Add Note dialog box when the Note System has been enabled by selecting **Preferences** | **Note System**.With this dialog, you can select one of the curves on the chart from a list and edit the exact time to attach the note to the curve. Choosing the OK button (with appropriate entries) attaches a note to the selected curve. For additional information on the notes system, see the Note System section in the Advanced Concepts chapter.

Curve Information…   *3-24.*

This command brings up a dialog box with a list of all of the curves on the chart. Choosing a curve from this list activates the Curve Information dialog box for the curve. This dialog box allows you to set the various display options for a curve. A complete description of this dialog box appears in the Tutorial chapter.

Preferences Menu Commands   *3-25.*

The **Preferences** menu has options to change the behavior or appearance of Trend Link. You can change the background color and grid appearance and the font used to display the times at the bottom of the curve window. You can activate the Control Bar or Control Window and set other preferences from this menu.

Background… 3-26.

This command activates the Background Preferences dialog box shown here.
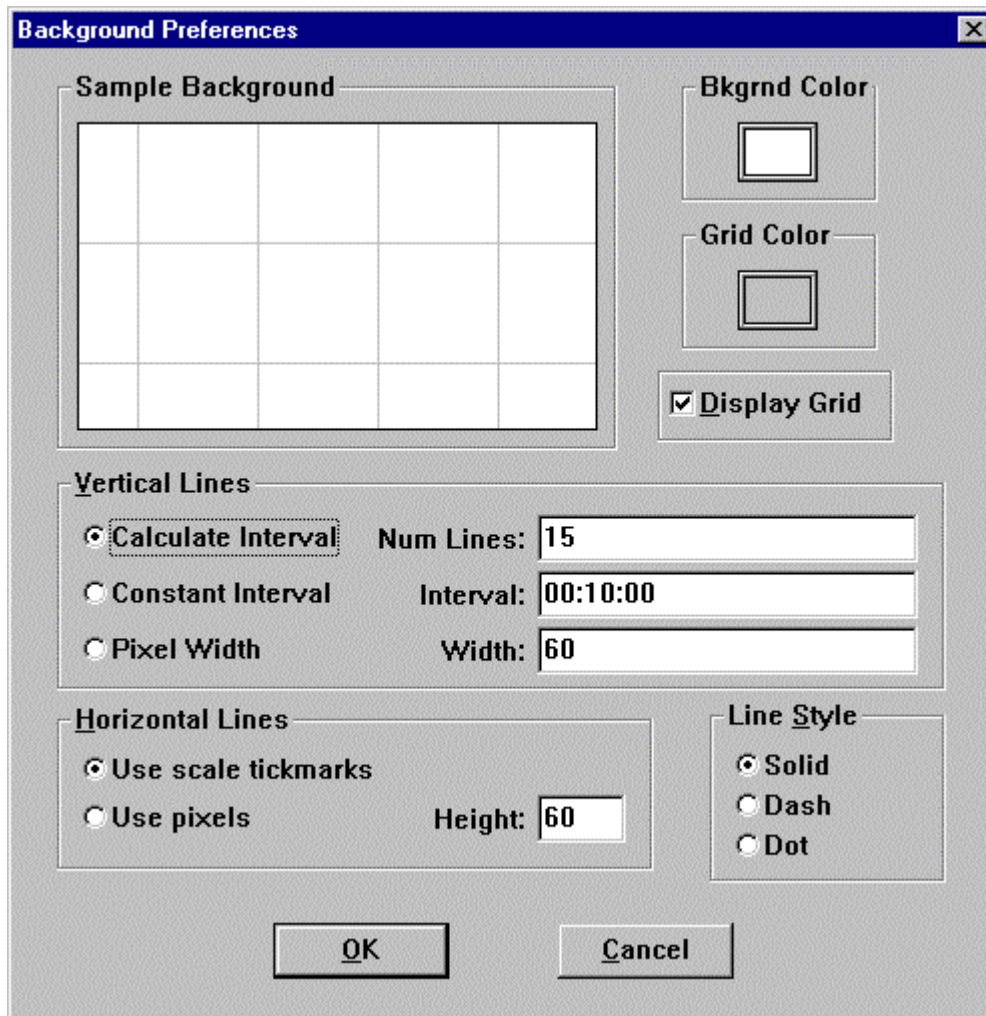
Use this dialog to change the grid line parameters. You can also change the
background color by clicking on the background color sample in the upper right of
the dialog box and selecting the desired background color.

Grid and Background Color 3-27.

To change the color of the grid or the background, click on the appropriate color sample located in the upper right of the dialog box. A color palette pops up, allowing you to select a color from the available colors.

Note

The 16 colors displayed at the bottom of the color pallet work best in most situations.

Display Grid 3-28.

You may set the status of the grid display (On or Off) by checking or un-checking the box labeled Display Grid respectively.

Vertical Lines 3-29.

You may select the method to use to calculate the placement of vertical (time axis) grid lines using one of the three options below:

- **Calculate Interval:** Select this option to enter the number of vertical grid lines to display. Trend Link calculates the time interval represented by each grid line so that the desired number of grid lines appear on the display.

Note

Trend Link makes the grid lines represent a "reasonable" time span (30 sec, 1 min., 1 hour, etc.) so the actual number of grid lines that appear may vary slightly from the number specified.

- **Constant Interval:** Select this option to enter the exact time interval that a grid line should represent.

- **Pixel Width**: Select this option to enter the distance between vertical grid lines in pixels.

Horizontal Lines 3-30.

You may select the method used to calculate the placement of horizontal (Y axis) grid lines using one of the two options below:

- **Use scale tickmarks:** If you select this option, horizontal grid lines draw to match the tickmark labels on the band bars.

Note

With this option set, horizontal grid lines only appear with a displayed band bar set to display scale values.

- **Use Pixels:** If you select this option, you can enter the distance between horizontal grid lines in pixels.

Line Style 3-31.

You may select the style of line to use when drawing the grid by clicking the radio button in front of the desired style. The possible line styles are solid, dashed, and dotted.

As you make changes to the background preferences, the sample background window displays a sample of what the screen looks like using the current selections. If the modifications to the background are acceptable, click on the OK button or press enter; the appropriate background changes take effect. To abort changes, click on Cancel or press escape to exit.

Display Font 3-32.

This command activates a dialog box that allows you to change the font used by Trend Link to display the times, curve information, and scale values in the curve window. An example of the display font dialog box appears below:
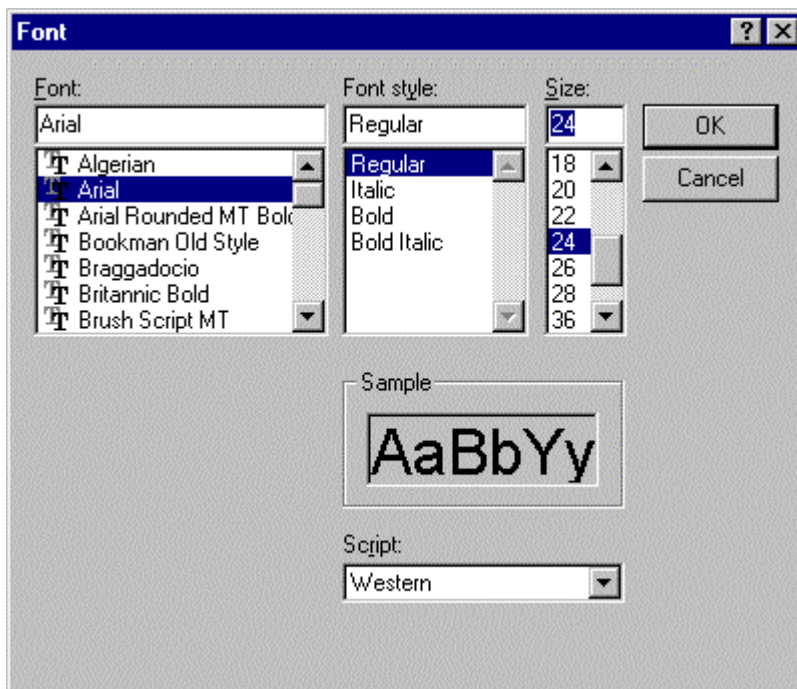
On the left side of the dialog box is a list box with the available fonts on the system. You may select a font by moving the mouse cursor over the selection and clicking the left mouse button. The list box in the center allows you to select the font style in the same manner, and the list box on the right allows you to select the

font size. There is a sample box in the lower right of the dialog box that shows how the new font appears on the screen.

Millisecond Display… 3-33.

This option allows you to select the resolution for the time display; click on the appropriate choice for the time display in the dialog box.
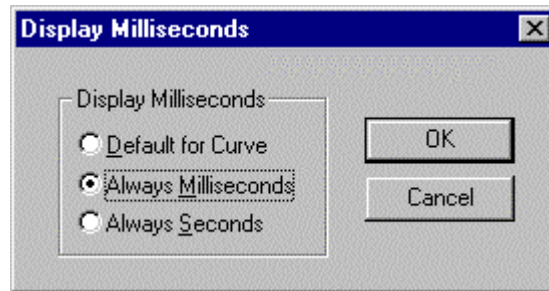
As shown above, the three resolution choices that are currently available are as follows:

- **Default for Curve** - This option causes Trend Link to check the sample frequency for each curve. If the frequency of a given curve is less than a second, the frequency displayed for that curve shows milliseconds. If the frequency of a given curve is one second or greater, the frequency displayed does not show milliseconds. When operating in this mode, the times at the bottom of the curve window showing the time range show milliseconds if any one of the curve sampling frequencies are faster than one second.

- **Always Milliseconds** - This option causes Trend Link to show milliseconds in all of the times regardless of the sample frequencies of the curves.

- **Always Seconds** - This option causes Trend Link to never show milliseconds in any of the times regardless of the sample frequencies of the curves.

Real Time Freq… 3-34.

Use this command to set the length of the Real Time update interval. This is the time that elapses before Trend Link looks for updates to the curves on the chart when in Real Time mode.

The number represents seconds and must be an integer. Trend Link does not support fractional seconds. If you use an illegal value, the old number does not change. For more information on Real Time mode see the Real Time Mode section in the Tutorial chapter. The default value for this parameter is the fastest sample rate for any curve on the chart (minimum 1 second).

Undo/Redo… 3-35.

Use this command to activate a dialog box for configuring the undo and redo facility.

The levels of undo represent how many different time ranges to store. For example, a level of 10 stores the last 10 time range operations. As the number of time range changes exceeds the maximum, Trend Link discards the oldest changes.

The group feature allows for grouping undo's according to the type of time range change performed. So if you scroll the time range left three times consecutively, the three changes consolidate into one larger scroll; an undo then reverses all three scrolls.

See the Time Range section in the Tutorial chapter for additional information on the undo/redo facility.

Chart Title… 3-36.

Use this command to set the title of a chart. You can give each chart a title that appears on the application caption bar.

Logical Data Sets… 3-37.

This command activates the Logical Data Sets dialog box. Use this dialog to change the physical Data Set associated with a logical Data Set. Trend Link lists all of the logical Data Sets in the logical Data Set list box. You can highlight one logical Data Set. All of the physical Data Sets defined for the highlighted logical Data Set appear in the physical Data Sets list box. Trend Link highlights the physical Data Set currently associated with the logical Data Set in the physical Data Set list box. To change the associated Data Set simply highlight a new physical Data Set and select the OK button.

Note

You can change only one Data Set association with this dialog box.
If you highlight a new logical Data Set without selecting the OK
button, Trend Link discards any previous changes.

For more information on the use of Logical Data Sets see the Data Sets section in the Advanced Concepts chapter.

Value Cursor… 3-38.

The value cursor option allows you to specify what information to display in the value cursor. When you select this option, a dialog box appears allowing you to select the options to display by the value cursor.

See the View Curve Values (Value Cursor) section of the Tutorial chapter for more information.

Real Time (ON/OFF) 3-39.

Use this command to toggle Trend Link between Real Time mode and historical mode. If an X appears in the box before the Real Time menu option, Trend Link is currently in Real Time mode. If you then select the Real Time menu item, the X disappears and Trend Link switches to historical mode.

See the Real Time Mode section in the Tutorial chapter for additional information on the Real Time mode.

Note System (ON/OFF) 3-40.

Use this command to toggle the note system on and off. If an X appears in the box before the Note System menu option, the note system is currently active and the note icon appears on the Control Bar. If you then select the Note System menu item, the X disappears and the note system is deactivated. See the Note System section of the Advanced Concepts chapter for additional information on the note system.

Dynamic AutoScale (ON/OFF) 3-41.

Use this command to toggle the operation of the Dynamic AutoScale feature. If an X appears in the box before the Dynamic AutoScale menu option, the option is currently in effect, and the curves are scaled automatically. If you then select the Dynamic AutoScale menu item, the X disappears and the Dynamic AutoScale feature is deactivated.

Dynamic AutoScaling works by adjusting the scale factors of all of the curves automatically whenever needed. If curve data goes outside the Band Area, an AutoScale executes on that curve.

For additional information on scaling curves see the AutoScale section in the Advanced Concepts chapter.

Status Bar (ON/OFF) 3-42.

Use this command to show or hide the status bar that appears at the bottom of each Trend Link chart window. The left side of the status line displays context

sensitive information (such as the function of the control currently under the cursor). The right side of the status bar displays information regarding the state of the various modes of Trend Link (Real Time Mode, AutoScale Enabled, etc.).

Batch Mode (ON/OFF)   3-43.

Use this command to toggle the Trend Link application between Continuous Time display mode and Batch display mode.

Stay On Top (ON/OFF)   3-44.

Use this command to toggle the Stay On Top feature.

Control Bar (ON/OFF)   3-45.

Use this command to show or hide the control bar. If an X appears in the box before the Control Bar menu option, the Control Bar is displayed. If you then select the Control Bar menu item, the X disappears and the control bar is not displayed.

Note

You cannot display the control bar and the control window simultaneously. Therefore, if you activate the control bar when the control window is visible, the control window disappears automatically and the control bar is displayed.

See the Control Bar/Window section in the Tutorial chapter for additional information on the control bar and control window.

Control Window (ON/OFF)   3-46.

Use this command to show or hide the control window. If an X appears in the box before the Control Window menu option, the Control Window is displayed. If you then select the Control Window menu item, the X disappears and the control window is no longer displayed.

Note

You cannot display the control window and the control bar simultaneously. Therefore, if you activate the control window when the control bar is visible, the control bar disappears automatically and the control window is displayed.

See the Control Bar/Window section in the Tutorial chapter for additional information on the control bar and control window.

Utilities Menu Commands 3-47.

There are several utility functions that are available to assist you in analysis of the trend data. Use the **Utilities** menu to activate the Trend Link utilities.

Import CSV Data… 3-48.

The Import utility is useful for displaying data with Trend Link that is available in a spreadsheet format. This utility translates the spreadsheet data into the Trend Link data format. Refer to the Import and Export Facilities section of the Tutorial chapter for more information.

Export CSV Data… 3-49.

Use this command to activate the export utility. This utility takes the currently displayed data in the Trend Link curve window and exports it in a standard ASCII comma separated value format for report generation purposes or as an import source to a spreadsheet or analysis package. Refer to the Import and Export Facilities section of the Tutorial chapter for more information.

XY Curve Plot… 3-50.

This command activates the XY curve plot mode. Use an XY plot to plot the data values from one curve against the data values from another curve.

When you enter this mode from the menu, a dialog box activates with two lists. Each list contains all of the curves on the chart. One list represents the X dimension and the other represents the Y dimension of the XY plot.

The X axis for the XY plot represents the curve scale values selected with the X dimension listbox. The Y axis is the scale values of the Y curve. Trend Link creates a box with the X and Y scales, and the data begins to plot in the box. A point plots for each sample value for the entire time range by using the sample value of the X curve for the X axis and the sample value of the Y curve for the Y axis. For example, say the first sample value occurs at *12:34:00*. The X curve sample value at that time is *3.4* and the Y curve sample value at that time is *27.3*. A point plots in the box at location (*3.4, 27.3*). This continues for all sample values over the entire time range.

While the values are plotting, the mouse cursor changes into a clock shape that shows the progress of the plotting. If you press the Escape key (Esc) while the values are plotting, the plotting stops.

By pressing the left mouse button while the mouse pointer is over the XY plot box, the X, Y values display with the number of points plotted at that location.

The 3D View button displays a window with a 3 dimensional view of the XY plot.

Window Menu Commands 3-51.

Use the **Windows** menu to access the following options:

Cascade Use this command to overlap the open chart file windows.

Tile Vertically Use this command to arrange the open chart file windows side-by-side vertically.

Tile Horizontally Use this command to arrange the open chart file windows side-by-side horizontally.

Arrange Icons Use this command to arrange the iconic chart file windows along the bottom of the Trend Link window.

Close All Use this command to close all the open chart file windows. If a chart has changed since the last save, a prompt asks if you want to save the chart before closing.

Open Charts Select a chart file to make it the active window.

Help Menu Commands 3-52.

Use the **Help** menu to invoke the Online Help for Trend Link.

Trend Link Contents 3-53.

This command activates the help application with the Trend Link help file, starting in the Contents (sometimes called Index) section. This file provides you with help on the various features of Trend Link.

Using Help 3-54.

This command activates the help application with the help on help file.

Note

You can obtain Help on Help by pressing the F1 key while in the help application.

About Trend Link 3-55.

This command activates the About dialog box for Trend Link. This dialog box displays the current version and copyright notices for Trend Link for Fluke.

Keyboard Commands 3-56.

In addition to the standard methods of invoking the commands outlined above, Trend Link supports a "Hot Key" feature that allows the more commonly used commands to be selected using keyboard accelerator keys. This allows you to bypass the menus. Below is a table that lists the functions that you can invoke using accelerator keys. Keys that you must press simultaneously appear separated by a plus sign.

Trend Link Function	Hot Key
Add Curve	Ins
AutoBand	F3
Autoscale	F2
AutoScale (Dynamic) (ON/OFF)	Ctrl+A
Band Bars (ON/OFF)	Ctrl+B
Batch / Continuous Time Mode (Toggle)	Ctrl+D
Chart Title	F4
Control Bar (ON/OFF)	Ctrl+T
Control Window (ON/OFF)	Ctrl+W
Curve Status Window (ON/OFF)	Ctrl+S
Curve Information Box	Ctrl+I
Erase Curve	Del
File Open	Ctrl+F12
File Print	Ctrl+Sh+F12
File Save	Sh+F12
File Save As	F12
Grid Lines (ON/OFF)	Ctrl+G
Help	F1
Note System (ON/OFF)	Ctrl+N
Password Dialog Box (Operator Lockout)	Ctrl+P
Quit (Close)	Alt+F4
Real-time Display Mode (ON/OFF)	Ctrl+R
Real-time Frequency	Ctrl+F
Redo Time	Alt+Shft+Bkspc
SPC Area (ON/OFF)	F5
Stay On Top Mode (ON/OFF)	Ctrl+O
Undo Time	Alt+Backspace

Chapter 4
Advanced Concepts

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Data Sets 4-1.

A Data Set is a logical group of Tags (or points). These are most likely a group of data collected at the same data rate. In applications where there are a large number of Tags being logged, such as a refinery containing 10,000 Tags, the Data Set can refer to a group of points from a particular section of the plant. A Data Set can handle from 1 to 2,000 different Tags. However, when you use a large number of Tags in a Data Set, it becomes more difficult to find a particular tag unless you know the exact name.

The INFOLINK.INI file contains the definitions of the Data Sets available to Trend Link in a section titled [TL Data Set Paths]. Define a Data Set by giving it a name, followed by an equals sign and a path to the directory(ies) that hold the data for the Data Set. For information on creating Data Sets, see the Creating a Data Set section below.

The following is a sample [TL Data Set Paths] section that defines the Data Sets for a sample data system:

```
[TL Data Set Paths]
Hydro Hour=X:\hydroarc\hr; T:\hydro\hr;
Hydro Minute=X:\hydroarc\min; T:\hydro\min;
Hydro 10sec=T:\hydro\sec -A;
Hydro 30sec=T:\hydro\sec -B;
```

This sample divides up the four different Data Sets for this system based on the logging frequency. The first Data Set represents data from the *Hydro Cracker*, logged on an hour basis.

Note

This Data Set points to two different directories. The first directory is on the X: *drive called* hydroarc\hr *that is on a network server that is responsible for long term archival storage. You can store data in this directory on line for a 2 year period. The second directory pointed to by the* Hydro Hour Data Set *is* hydro\hr *on the* T: *drive. This networked drive is the short term storage drive and may contain the hour data for the last month.*

The directory list format is the same as the DOS PATH mechanism, with a semicolon separating each of the directories. Trend Link scans all directories in the path, and pulls data from the various TLG and NOW files and seamlessly pulls the data together for trending. You should place the Real Time updates into the last directory in the Data Set path.

The last two Data Sets in the above example show how you can define multiple Data Sets into one directory. The switch added after the path for the Data Set

specifies an alphabetic prefix to use on all data files in the Data Set. In the above example, all data files in the Hydro 10sec Data Set begin with an A and all data files in the Hydro 30sec Data Set begin with a B. Trend Link places all files for both Data Sets in the T:\hydro\sec directory. By using the alphabetic prefix to distinguish between Data Sets in a directory, Trend Link is capable of having up to 26 Data Sets in a single directory. The default prefix used by Trend Link is T.

In systems that rewrite TBASE32.DLL to access data directly from a host computer, the information following the Data Set name may be different depending on what type of information the TBASE32.DLL needs. Although Trend Link incorporates the concept of the Data Set, the TBASE32.DLL uses the data following the name to help in accessing the data. The example above is using the standard TBASE32.DLL in a system where the data logger is a server on the network, and Trend Link is being executed from a workstation PC.

Creating a Data Set   4-2.

Data Sets can be managed using the Configurator program, or they can be managed manually, or they can be created automatically by the Logger program.

Use the Configurator to create, delete, or otherwise manage Trend Link Data Sets as described in the Configurator chapter of this manual.

To create a Data Set manually, you must first add a Data Set definition line to the [TL Data Set Paths] section of the INFOLINK.INI file. The Data Sets section above describes the Data Set definition line. The line consists of the Data Set's name, followed by an equals sign, followed by the DOS path(s) to the directory(ies) that hold data for the Data Set. You must also manually create the directory(ies) for the Data Set (using the MD command from a DOS prompt, Windows File Manager, or Windows Explorer).

The DDE Logger creates Data Sets automatically if the Data Set referenced by the current LCF configuration file does not appear in the [TL Data Set Paths] section of the INFOLINK.INI file. In this event, the DDE Logger program creates the Data Set as follows. First, the DDE Logger adds a Data Set definition line to the [TL Data Set Paths] section of the INFOLINK.INI file. To create the Data Set definition line, it uses the name of the Data Set as referenced in the LCF configuration file, and a storage path that is a sub-directory of the directory containing the Logger program (LOGGER32.EXE). The name of the Data Set determines the name of this sub-directory. For example, if the DDE Logger program is located in the C:\TL directory, and the name of the Data Set referenced in the LCF configuration file is "Test DataSet1", the Data Set definition line that would be placed in the [TL Data Set Paths] section of the INFOLINK.INI file might appear as follows:

```
Test DataSet1=C:\TL\TSTDST1
```

The Logger automatically creates the sub-directory referenced in the Data Set definition line. If you use this method, the Data Set creation process is completely automatic and requires no action from you.

Logical Data Sets   4-3.

A Logical Data Set is a referenced Data Set. Since they indicate specific directory path(s), the Data Sets referred to above are Physical Data Sets. A Logical Data Set points to a physical Data Set. You can redirect a Logical Data Set to another physical Data Set via a dialog box in the **Preferences** menu. The INFOLINK.INI file specifies the physical Data Sets that are available for each Logical Data Set under the [TL Logical Data Set Groups] section. For example:

```
[TL Logical Data Set Groups]
Alka Seltzer=UBE alk, UBE hr, UBE 10min, UBE min, UBE x20
Scrubber=Flat hr, Flat 10min, Flat min
Hydro Cracker=UBE 20sec, UBE x20
Blender=UBE x20, Flat x20
```

This system has four Logical Data Sets defined. The first Logical Data Set points to one of the Data Sets *UBE alk, UBE hr, UBE 10min, UBE min, or UBE x20.* The above section describes the group of physical Data Sets that each Logical Data Set refers to. To use Logical Data Sets, the INFOLINK.INI file must define this section. Another section [TL Logical Data Set Assignments] located in the TLLOCAL.INI file indicates which specific physical Data Set a Logical Data Set currently represents. For example:

```
[TL Logical Data Set Assignments]
Alka Selzer=UBE alk
Scrubber=Flat hr
Hydro Cracker=Demo
Blender=Flat x20
```

In the above example, Trend Link interprets the Logical Data Set *Alka Selzer* to be the physical Data Set *UBE alk*. With the Logical Data Set selected (such as when adding a curve), Trend Link uses its corresponding physical Data Set to actually process the Tag data.

A Data Set and Tag name define a curve on a chart. The Data Set can be either a physical or logical Data Set. Logical Data Sets provide you with a way to define a chart with specific Tag names and then interactively redirect them to another Data Set. For example, suppose that there are two identical parallel reactors and 100 different charts to view data within the system. If you use logical Data Sets to define the Tag references, you can point the chart curve references to either reactor by making the assignment of the physical Data Set using the Logical Data Sets function in the **Preferences** menu.

The '@' character always appears before the actual name of Logical Data Sets. You can assign a Logical Data Set to any of the pre-defined set of physical Data Sets. It is the system manager's responsibility to determine which physical Data Sets to assign to a Logical Data Set. Normally these Data Sets contain parallel data, such as two parallel plants, or data collected from the same Tag source but at different logging rates. The physical Data Sets must contain the same Tag names or unresolved references to Tags occur when the logical Data Set changes.

AutoScale 4-4.

Trend Link has the ability to automatically change the scale values of any of the curves on the chart to fit the data being displayed into the band area for each curve. You can do this manually on an individual curve by curve basis or for all curves on the chart. Alternatively, you can activate the Dynamic AutoScale function to continually monitor the data for each curve as it changes on the display, and perform an AutoScale when necessary.

The algorithm used to determine the scale range values attempts to pick a reasonably normal range through a multi-step process. First, Trend Link scans the data being displayed for the curve and records the high and low values. Trend Link uses the range between these values to select a pre-defined *normal* range. Below is list of the pre-defined normal ranges:

   0.1, 0.25, 0.5, 1.0, 2.0, 5.0, 10, 25, 50, 100, 250, 500, 1000, 2500, 5000, 10000

For example, if the highest value being displayed by the curve is *182.7* and the lowest value is *112.2*, the range between these two numbers is *182.7 - 112.2 = 70.5*. The corresponding normal range for the actual range is *100*.

Next, the algorithm rounds the low scale value to the nearest divisible of the normal range below the actual lowest value. Trend Link performs a similar function on the high scale value. In the example, Trend Link rounds the low value of *112.2* down to *100* because the range needs to fit into an even interval of *100*. It rounds the high value of *182.7* up to *200*. Thus, the new scale range is *100 to 200*.

Note System 4-5.

The Note System provides a mechanism for storing and retrieving simple textual notes associated with a particular Data Set:Tag name at a specified time. The implementation of the physical database for the note system is all contained in the NOTESYS32.DLL. The standard NOTESYS32.DLL provided with Trend Link writes data to a standard DBase IV format. This allows the Notes database to be accessed by a wide variety of packages which support DBase IV protocol.

The NOTESYS32.DLL can alternatively be replaced with one which provides the same set of interface functions thus allowing the database implementation to be

changed without actually changing Trend Link. For example, if a company uses a corporate database such as ORACLE and wants to store the trend notes in an ORACLE database format, they could write a new NOTESYS32.DLL which would make calls to the corporate ORACLE database to store and retrieve the note information. They could then use their familiar ORACLE database tools for database maintenance.

For additional information on replacing the standard NOTESYS32.DLL, contact Canary Labs.

When a curve is added to a chart and the Note System is turned on, the curve will query the NOTESYS32.DLL requesting the times for all notes defined for that particular curve. A curve note is identified by its Data Set:Tag name reference. If a Tag is referenced by more than one Data Set, a note defined in one Data Set will not be carried over into the others.

With the list of available note times, Trend Link will display a note symbol on top of the curve at every location where a note is defined for that specific time. A double click of the left mouse button while the mouse cursor is over a note symbol will cause Trend Link to display the text for that note. At this point Trend Link will ask for the note text from the NOTESYS32.DLL and display that text in a dialog box which can be resized.

A note can be added to a curve in two different ways. One way is to use the Add Note option under the Curve menu. This allows the Tag name to be entered or selected from a list box and a specific time to be entered. Then a dialog box is activated allowing the text for the note to be entered and saved in the database. The second method is to use the curve symbol located on the Control Bar/Window. By depressing the left mouse button while the mouse cursor is over the note symbol on the Control Bar/Window the mouse cursor will take the shape of the note symbol. With the button held down the note symbol can be dragged over the top of one of the curves on the chart. If the mouse button is released while over one of the curves on the chart, a dialog box will be activated allowing text to be entered for the curve at the time where the note symbol was dropped.

Both methods of adding a note to a curve use the NOTESYS32.DLL to add the note text to the database for the specified Data Set:Tag name at the specified time. Also, the list of note times for the curve is updated so that the new note will appear on the curve at the appropriate location.

Curve notes can be used for a variety of purposes. An operator can leave a note at a place on a curve where an anomaly has occurred explaining the situation. Notes can be left in places where the data collection was interrupted. Also, notes can be added automatically by another computer in certain situations. If a note is added by another operator or automatically by a computer to a curve which is currently being examined, the curve will not reflect the new note unless the note system is turned off and back on to reload the list of available notes. This is necessary

because Trend Link does not currently query the NOTESYS32.DLL periodically to see if new notes have been added.

Curve Drawing Techniques   *4-6.*

You can define the drawing technique used by Trend Link when displaying a given curve. Do this from the Curve Information dialog box. Trend Link specifies two drawing techniques for each curve. One technique is for **Small Data** (when there is one or fewer data points per pixel in the display area). The other technique is for **Large Data** (when there is more than one data point per pixel in the display area). For Small Data curves, Trend Link provides two drawing techniques: **Sample/Hold** and **Interpolate**. The **Sample/Hold** technique draws the current value and holds that value for the entire sample interval. This tends to give the curve a step-like appearance for a small number of sample intervals, but provides an exact representation of the data stored in the file. The **Interpolate** drawing method, draws the current value and connects it to the previous value using a straight line. This tends to give the curve a "smoother" appearance but introduces a degree of error into the curve display. Below is a chart showing both drawing methods. Trend Link drew the top curve using the sample/hold method and the bottom curve using the interpolate method.
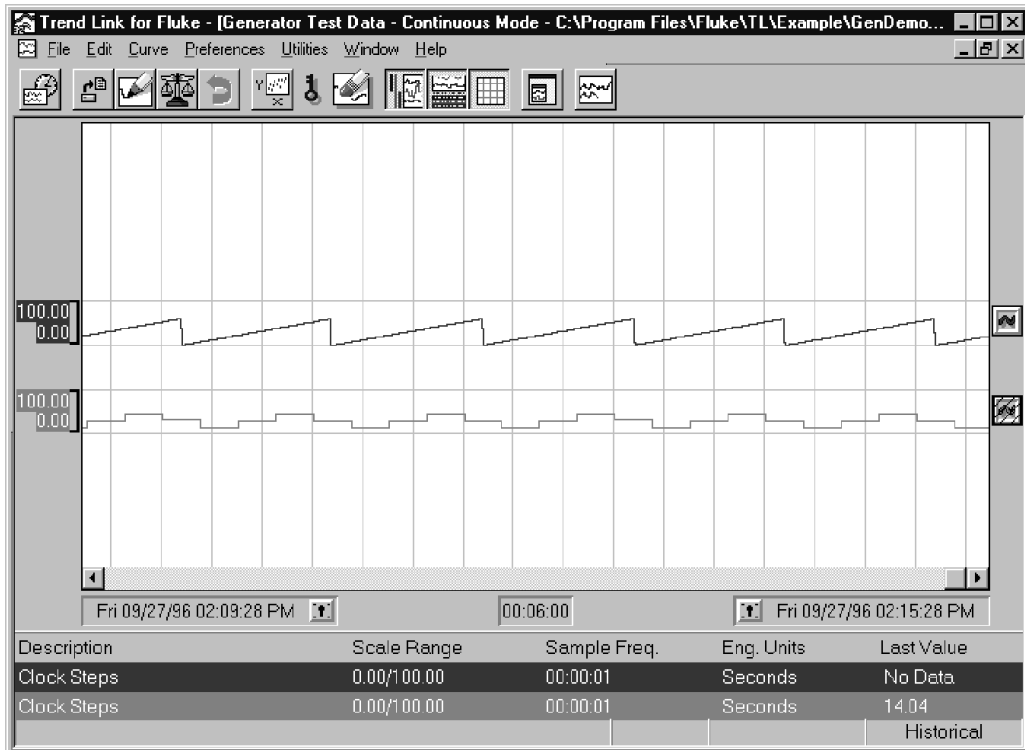
You can also set this parameter in the CHT file using the Expansion Technique parameter in the Curve section of the CHT file. An Expansion Technique parameter of 0 selects the Sample/Hold method. An Expansion Technique parameter of 1 selects the Interpolate method. For a complete description of setting parameters using the CHT file, see the Chart File Format section of this chapter.

For **Large Data** curves, Trend Link provides three drawing techniques: **First**, **Average**, and **Range**. With the **First** drawing technique selected, Trend Link draws a point at the first value it encounters for the pixel. This is by far the fastest drawing method. Since it sacrifices accuracy, the only use is generally when speed is very important or you only want a general view of the trend. If you select the **Average** drawing mode, Trend Link averages all values that fall within the pixel and draws a point at this average value. This provides a fairly accurate display of the curve's behavior and is the default method used by Trend Link. If you choose the **Range** drawing method, Trend Link looks at all the values corresponding to a given pixel, and draws a vertical line connecting the highest and lowest value for the pixel. This has the affect of providing a shaded curve showing the high and low value at each pixel. Since these events can be "hidden" by the Average technique or missed completely by the First technique, this drawing technique is useful when sudden changes or spikes in the data are important. Below is a picture

of a curve drawn using each of these drawing techniques. The top curve uses the First method. The second curve uses the Average method, and the bottom curve uses the Range method. Note how this method reveals spikes hidden using the other methods:
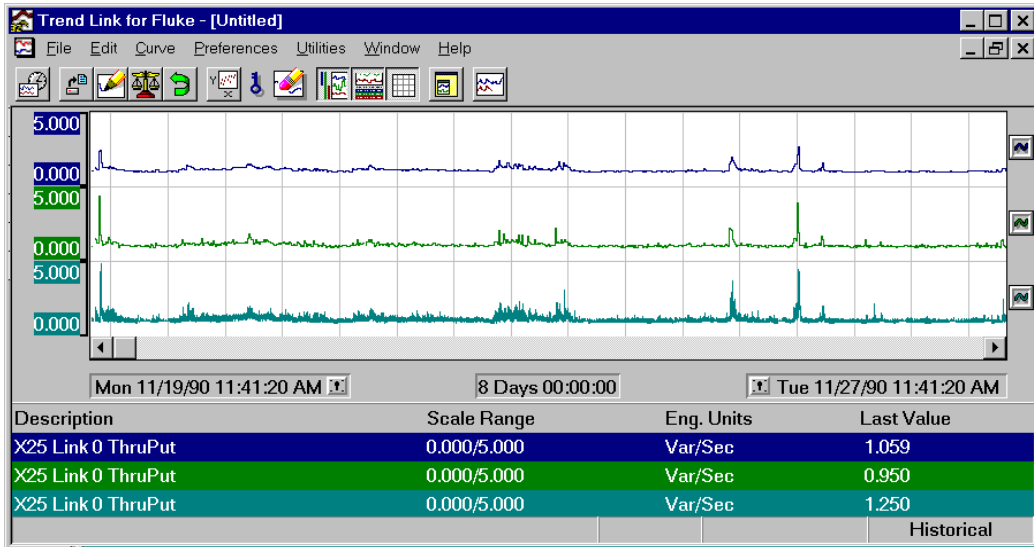
You can also set this parameter in the CHT file using the Compression Technique parameter in the Curve section of the CHT file. A Compression Technique parameter of 0 selects the Average method. A Compression Technique parameter of 1 selects the First drawing method. A Compression Technique parameter of 2 selects the Range method. For a complete description of setting parameters using the CHT file, see the Chart File Format section of this chapter.

Trend Link normally plots the curve in the assigned color. However, you can modify the drawing of the curve to identify when the curve reaches pre-defined high and low limits. Trend Link assigns defaults for these limits from the database (via TBASE32.DLL); you can modify them with the Add Preferences button when adding the curve or by modifying the limit fields in the Curve Information dialog box. You can select two different drawing mechanisms. The first shades the curve to a solid color when the value of the curve exceeds the upper limit or when the value of the curve falls below the lower limit. A second drawing mechanism changes the color of the curve when the value of the curve exceeds the pre-defined limits. This is the highlight color. You can set it using the Add Preferences button when adding the curve, or from the Curve Information dialog box. You can set the type of curve and the curve drawing technique from the Curve Information dialog box when adding the curve to the chart, or in the CHT file for the curve.

Band Range vs Scale Range   4-7.

Two possibly confusing Trend Link concepts are curve band range and scale range. Every curve has a band range and a scale range which act independently of any other curve.

The scale range defines the extent of Y-axis scaling needed to fit the curve in the curve drawing area. The high scale value is the number that appears at the top of the curve drawing area. For example, if the high scale value is 35.0, scaling insures that a value of 35.0 is at the top of the drawing area. Trend Link draws any higher values above the drawing area. Likewise, the low scale value indicates the number that appears at the bottom of the curve drawing area. Thus, these two values make up a range of values for scaling the curve. You can view the scale values for a curve by activating the Curve Information dialog box through the **Curve** menu or by performing a double click with the mouse on the curve symbol for the curve located to the right side of the chart. Also, the values can be viewed but not changed by activating the Curve Status window for all curves displayed under the chart.

The curve drawing area described above does not necessarily refer to the curve drawing window of the application. It actually refers to the band range for the curve. The band range is the scaled portion of the curve drawing window. The high band represents a percentage value of the drawing window, where 100 is the top of the window and zero is the bottom. A curve with band values of 100 and zero takes up the entire drawing window. A curve with band values of 100 and 50 takes up the top half of the drawing window. This allows curves to have their individual positions on the screen so that they do not generally draw over the top of each other. The default for Trend Link is to keep the band areas separate for each curve when you add a new curve. However, you can set the band range for any of the curves to overlap in any way desired. You can view and change the band values for a specific curve using the Curve Information dialog box. Alternatively, the band values for all curves may be viewed by turning on the Band Bars option under the **Edit** menu or selecting the Band Bars icon on the Control Bar/Window. You can then move or size these band bars using the mouse. See the Curve Band Bars section in the Tutorial chapter for more information about using the Band Bars.

Trend Link scales a curve (using the scale values) to the portion of the drawing window indicated by the band values. Trend Link does not clip a curve to the band range; it scales the curve to a size appropriate to the scale values. If a value for the curve is larger than the high scale value, Trend Link draws the curve outside the band range assuming the band is not at the top of the drawing window. Likewise, the curve can draw below the band range. Therefore, it is possible for curves to overlap even when their band ranges do not overlap.

Export Facilities   *4-8.*

Use the export function to generate a file containing ASCII data for report generation purposes or as an import source to a spreadsheet or analysis package. When you select **Utilities** | **Export CSV Data...** , the following dialog box appears:
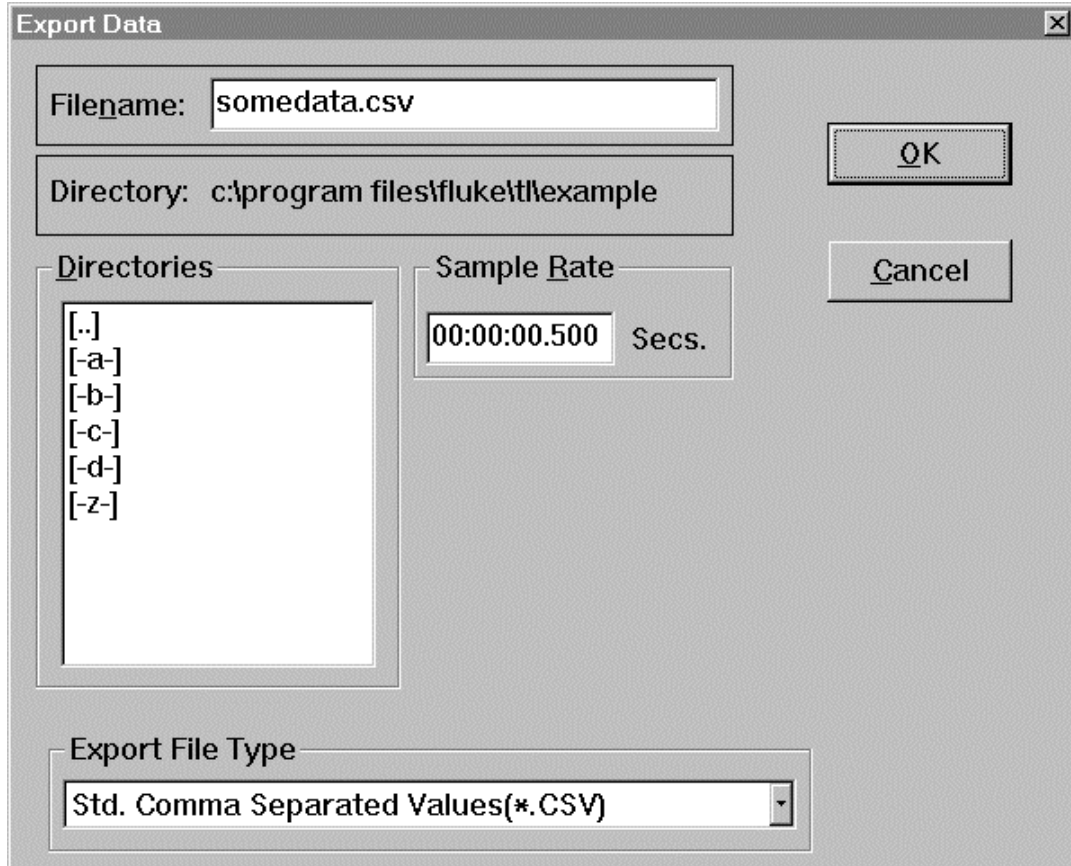
You should select the desired export file type from the drop down list box at the bottom of the dialog box. This determines the format for the export ASCII file. The INFOLINK.INI file in the section [Export Types] defines the available formats. The following is an excerpt from the INI file showing an example in which there are three formats defined. The first format is called Std. The file STD.EXP contains Comma Separated Values and the format specifications. The export file type description includes the (.CSV) so that you know the default file extension.

Note

The export specification file (not the description in the INFOLINK.INI file) defines the actual default file extension.

[Export Types]
Std. Comma Separated Values (.CSV)=STD.EXP
MathCad Array Format (.PRN)=MATHCAD.EXP
Spread Sheet Column Oriented (.CSV)=SPSHEET.EXP

The STD.EXP file is a standard text file that defines export data formatting. Following is the information from the STD.EXP file. A directive starts with the : character. The first line defines the default file extension to use for the export file in the filename edit box. Exporting commands should be placed on individual lines in the file. The *start* command begins the generation of the export data. The next line contains the command, *NOW*, which causes the PC's current time to be written into the export file. The next line contains the *LSEP* command. This command tells the parser to place a list separator character at that location. The list separator character is the character defined in the International settings of Windows under the control panel. *INTERVAL* displays the number of seconds between samples as defined in the Sample Rate edit box in the export dialog. Following the next list separator is the *CHART_DESCRIPTION* or title and then a *NEWLINE* that places a carriage return/line feed in the export file, terminating the first line.

Note

When the export parser can not find a matching export command for the data on a line, such as the quote character before and after the curve **DESCRIPTION** *in the example below, it places that data directly into the export file. In this case a list separator character and then a quote character follow the curve* **NAME**. *You can place any string of one or more characters into the export file in this manner.*

```
:DefaultExtension=.CSV
start
NOW
LSEP
INTERVAL
LSEP
CHART_DESCRIPTION
NEWLINE
forall_curves
NAME
LSEP
"
```

```
DESCRIPTION
"
LSEP
ENG_UNITS
LSEP
SCALE_HI
LSEP
SCALE_LO
LSEP
LIMIT_HI
LSEP
LIMIT_LO
NEWLINE
next_curve
forall_times
DATE_TIME
LSEP
forall_curves
VALUE
if not_last_curve
LSEP
endif
next_curve
NEWLINE
next_time
done
```

The following table describes the commands that you can use in the export specification file:

Command	Description of Action
start	Starts the exporting of data.
NOW	Places the PC's current time into the export data stream.
LSEP	Places a list separator character, as defined by Windows international settings, into the export data stream.
INTERVAL	Places the interval (in seconds) between samples into the export data stream.
CHART_DESCRIPTION	Places the chart description into the export data stream.
NEWLINE	Places a carriage return / line feed into the export data stream.
forall_curves	Begins to cycle through all curves on the chart, selecting each curve in sequence.
next_curve	Selects the next curve on the chart and returns the exporting sequence to the command immediately following the forall_curves command until all curves on the chart have been processed.
NAME	Places the currently selected curve's name into the export data stream.
BATCH_NAME	Places the currently selected curve's Batch name into the export data stream.
DESCRIPTION	Places the currently selected curve's description into the export data stream.
ENG_UNITS	Places the currently selected curve's engineering units into the export data stream.
SCALE_HI	Places the currently selected curve's high scale value into the export data stream.
SCALE_LO	Places the currently selected curve's low scale value into the export data stream.
LIMIT_HI	Places the currently selected curve's high limit value (for shading or highlighting) into the export data stream.

LIMIT_LO	Place the currently selected curve's low limit value into the export data stream.
forall_times	Begins to cycle through time periods starting at the time displayed on the left side of the screen and ending at the time displayed on the right side of the screen. The interval between the times is defined by the 'Sample Rate' input in the export dialog box.
next_time	Selects the next time period in the sequence and resets the exporting sequence to the command line immediately following the forall_times commands, until all time periods have been cycled.
DATE_TIME	Places the current time period into the export data stream.
BATCH_START	Places the time of the beginning of the current batch into the export data stream.
BATCH_END	Places the time of the end of the current batch into the export data stream.
BATCH_SHIFT	Places the value of the time shift of the current batch into the export data stream.
ABSOLUTE_TIME	Places the current absolute time into the export data stream.
TIME_OFFSET	Places a number of seconds offset from the first time period to the current time period into the export data stream.
LOTUS_EXCEL_TIME	Places the current time period in the Lotus / Excel time format (as defined by MicroSoft) into export data stream.
VALUE	Places the value for the currently selected time period and curve into the export data stream.
STATUS	Places the status byte for the current value and time period into the export data stream.
IF	Handles various conditional checks. If the condition is FALSE, Trend Link skips the command on the following line. See the following list for the various types of conditional checks.
done	Terminates the exporting sequence and closes the export file.

The following list shows the conditional checks that the IF command can process:

```
NOT_LAST_CURVE
LAST_CURVE
NOT_FIRST_CURVE
FIRST_CURVE
NOT_LAST_TIME
LAST_TIME
NOT_FIRST_TIME
FIRST_TIME
```

If you used the STD.EXP described above to export data from a chart showing two curves over a two hour time period with a 20 second sample interval, the output would have the following format:

```
09/11/92 03:00:00 PM,20,Communications Performance
UBE x20:LINK0THRUPUT,"X25 Link 0 ThruPut",Var/Sec,5,0,100,0
UBE x20:LINK2THRUPUT,"X25 Link 2 ThruPut",Var/Sec,2,0,100,0
11/30/90 12:30:20 PM,2.05,0.7
11/30/90 12:30:40 PM,2.05,1.05
11/30/90 12:31:00 PM,2.05,0.8
11/30/90 12:31:20 PM,1.95,1.1
....
....
....
11/30/90 01:29:20 PM,1.3,1
11/30/90 01:29:40 PM,1.2,0.75
11/30/90 01:30:00 PM,1.4,0.7
11/30/90 01:30:20 PM,1.15,1.05
```

The format of the "date and time" is the same as the format used by Trend Link. Notice that the comma appears as a separator between fields. The comma character appears in the export configuration file. Since the comma is not a specific export command, it appears directly in the export data stream. Also notice that Trend Link places quotation marks around the curve description in the same manner. If you desire another type of field separator such as the | character or the tab character, substitute the appropriate character as necessary.

Note

When creating new export formats, use a new EXP file name instead of modifying the STD.EXP file. The STD.EXP format is the expected format when importing ASCII data into Trend Link.

Statistics 4-9.

You can display basic statistical information on a curve by pressing the 'Statistics' button in the curve information dialog box. Trend Link computes statistics for the curve data displayed on the screen. Depending on the amount of data, it may take a couple of seconds to perform the computations. During this time, a cursor clock appears and progressively fills as it completes the task. You can abort the process at any time by pressing the 'ESC' key.

Trend Link displays the statistical results in the dialog box shown here:
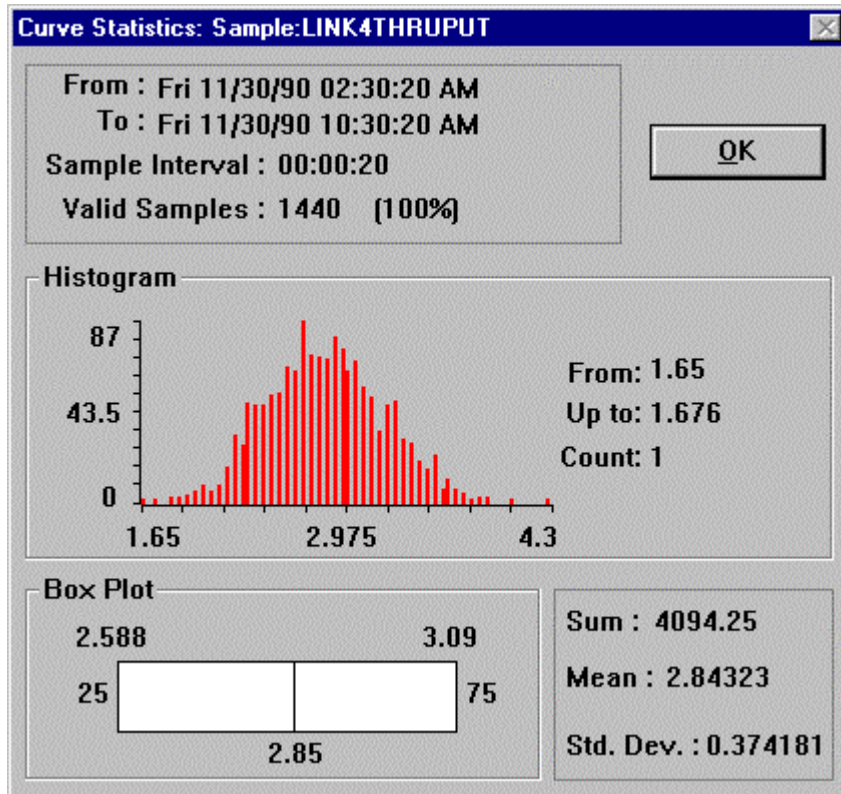
At the top, the starting and ending times for the data appear along with the sampling interval. The heading Valid Samples shows the number of values that fall within this range. Immediately following this number is a percent number in parenthesis. There can be time intervals in the data range for which no data is available. This value shows the percentage of overall data that is valid. For example, if the value is 100%, there are no time intervals in which data is missing. If the value is 80%, 20% of the data is unknown and unavailable for analysis.

The middle section of the statistics dialog shows a histogram of the data. The range of values, from the lowest to the highest appears across the bottom, and the number of samples appears along the vertical axis. When you position the cursor along the horizontal axis and press the left mouse button, the value range at the cursor and number of samples displays on the right side of the histogram.

At the bottom of the statistics dialog, is a box plot and the curve values for the summation, mean, and standard deviation. The box plot shows the values at the 25th, 50th, and 75th percentiles. The percentile values are extrapolated approximations from the histogram data. The value on the left side of the box plot is the value at the 25th percentile, while the value on the right side of the chart is for the 75th percentile. A vertical line through the middle shows the relative position of the 50th percentile and its value. The standard deviation value is the square root of the sample variance.

Operator Lockout 4-10.

This feature allows system administrators to limit the level of interaction allowed between Trend Link and an operator. This is useful in factory floor settings to avoid allowing an operator to accidentally exit Trend Link and fall into Windows. When enabled, this feature does not allow you to exit Trend Link. It also disables the main menu bar options except for the following that are available as hot keys only:

File Open	(Ctrl-F12)
Print	(Ctrl-Shift-F12)
Help	(F1)
Toggle Real-time	(Ctrl-R)
Password Box	(Ctrl-P)
Scroll Time Forward	(Right Arrow)
Scroll Time Backward	(Left Arrow)
Page Forward In Time	(Page Up)
Page Backward In Time	(Page Down)

When using the operator lockout feature, you should disable the Windows task manager. You can do this by adding the following line to the [BOOT] section of the windows SYSTEM.INI file:

```
TASKMAN.EXE =
```

To enable the Operator Lockout feature, add the following two lines to the [TL Local Settings] section of the TLLOCAL.INI file:

```
Security=On
Password=Yourpassword
```

For Yourpassword, use the password that cancels the user lockout function and returns Trend Link to its normal status. For a complete description of Trend Link's INI files, see the Trend Link INI Files section of this chapter.

Statistical Processing Control (SPC) Curves   4-11.

Trend Link can display SPC type curves that are in an X bar R format. SPC curves display the mean, upper control limit, and lower control limit for the last calculated SPC interval on the chart. Trend Link draws values above the upper control limit and below the lower control limit in the highlight color. This behavior is the same as a highlight limit curve when the product limits are exceeded. However, in SPC type curves, the product limits have no meaning. Also, you can apply a Rules-Of-Seven that draws the curve in the highlight color under certain conditions.

You can display multiple SPC curves on the same chart. However, with the mean and control limits drawn on the chart, the screen may become cluttered if you view several SPC curves. Also, SPC curves display more slowly, especially with Rules-Of-Seven turned on, and therefore slow down the operation of Trend Link.

You add an SPC curve to a chart in the same way as other types of curves. See the Adding a Curve section in the Tutorial chapter for information on adding a curve to the chart. In the Add Preferences dialog box, select the SPC curve type. Also, set the number of samples to average for smoothing the data in the SPC Intervals edit control in this dialog box. This number refers to the number of samples to average together to yield each SPC sample value. For example, if the sample frequency for the curve is 20 seconds and the SPC Intervals setting is 15, Trend Link treats the curve as if it has a sample frequency of 300 seconds (15 times 20 seconds.) Trend Link averages every 15 samples to create one value for trending the curve.

SPC Intervals   4-12.

Each curve may have from zero to any number of SPC intervals. Do not confuse these intervals with the SPC Intervals edit field in the Add Preferences dialog discussed above. That has a completely different meaning. An SPC interval defines a section of a curve used to calculate and define the mean, upper control limit, and lower control limit.

An SPC curve added to the chart does not have any SPC intervals defined. Before you can define an SPC interval, you must turn the SPC area on. Accomplish this by enabling the SPC Area (ON/OFF) option from the Edit menu. The following picture shows a chart with a normal curve at the top, an SPC curve at the bottom, and the SPC area turned on.
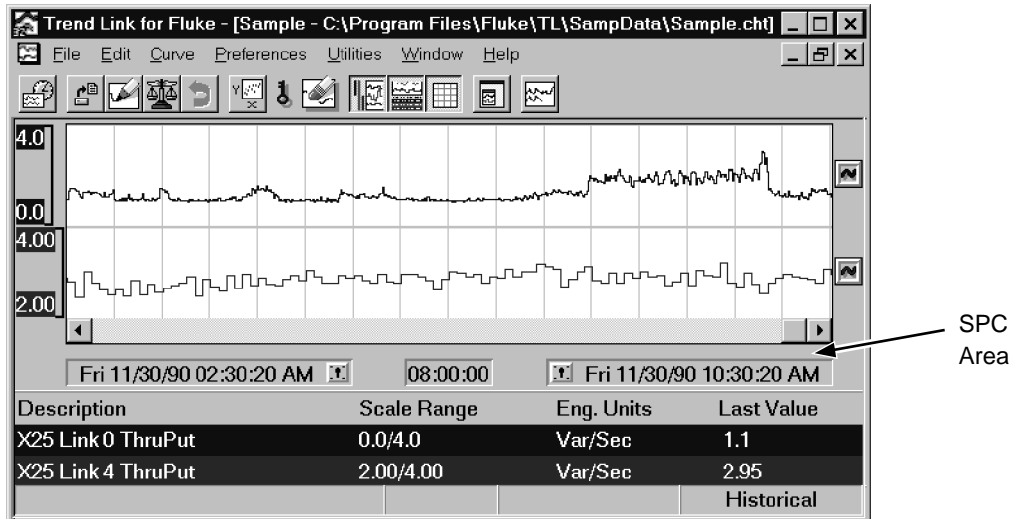
Notice the area between the scroll bar and the time displays. Trend Link uses the SPC area to hold the SPC interval bars. All SPC interval bars for all curves appear in this area. With the SPC area off, the SPC interval bars do not appear. Also, the mean and control limits do not appear on the curve. Turning the SPC area on causes all previously defined SPC intervals to appear.

Adding an SPC interval to an SPC curve once the SPC area is on is a two step process. First, you must select the curve symbol for the desired SPC curve. Accomplish this by clicking the left mouse button once while the mouse cursor is over the SPC curve symbol. For more information on what the curve symbol is see the Curve Symbol section in the Tutorial chapter. You have selected a curve symbol when a cross-hatch pattern appears over the top of it. Another click of the left mouse button while over the curve symbol causes the curve symbol to become de-selected.

Note

You can select only one curve symbol at a time.

With an SPC curve selected, you can add a new SPC interval. With the mouse cursor in the SPC area (and not over any previously defined SPC intervals), a double click of the left mouse button places a new SPC interval bar at the location

of the cursor. The SPC interval bar is the same color as the related curve. It also
has a cross-hatched pattern. This pattern indicates that Trend Link has not applied
the SPC interval that this bar represents to the curve. In other words, the curve
display does not reflect the SPC interval. The picture below shows a normal curve
at the top and an SPC curve at the bottom:

This Curve
Selected

SPC Interval Selected
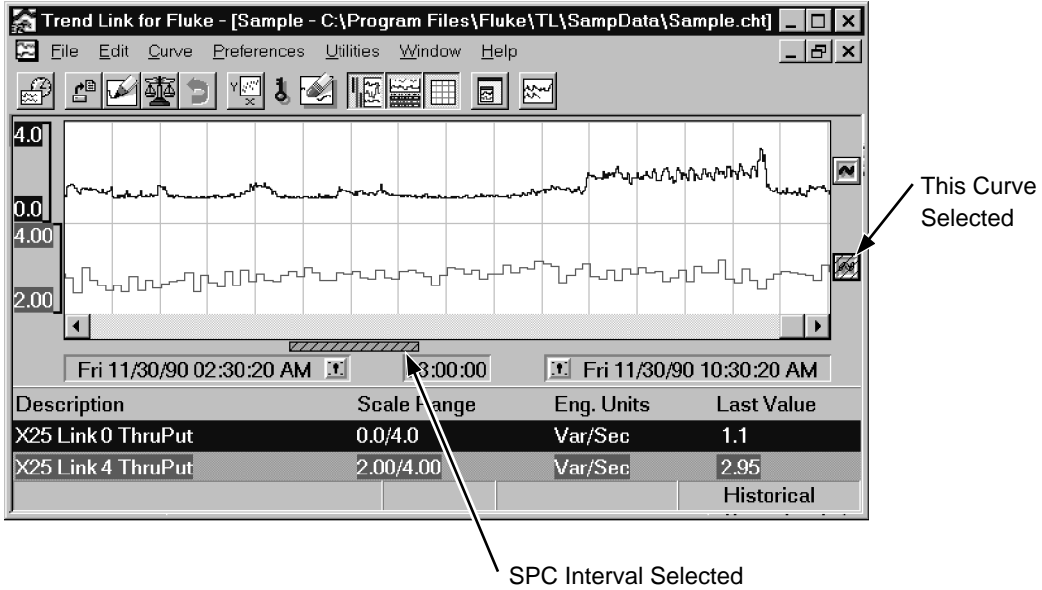
Trend Link has just created a new SPC interval bar for the SPC curve. Notice the
currently selected SPC curve symbol; it has a cross-hatched pattern. The cross-
hatched pattern on the SPC interval bar shows that Trend Link has not yet applied
it to the curve. Notice that the curve is not displaying the mean or control limits
for the SPC interval.

You can easily move or resize the SPC bar with the mouse. When the mouse
cursor is over the top of the SPC bar, hold down the left-mouse button to draw a
highlight box around the SPC bar. Moving the mouse with the button held down
moves the highlight box. With the button released, the SPC bar moves to the
location of the highlight box. If the mouse cursor is near the left or right side of
the SPC bar when you press the button, the highlight box changes shape rather
than moves. Releasing the button causes the SPC bar to change to the size of the
highlight box.

The following picture shows an SPC curve at the bottom of the chart with two
SPC interval bars which have both been applied to the curve:

SPC Interval Applied
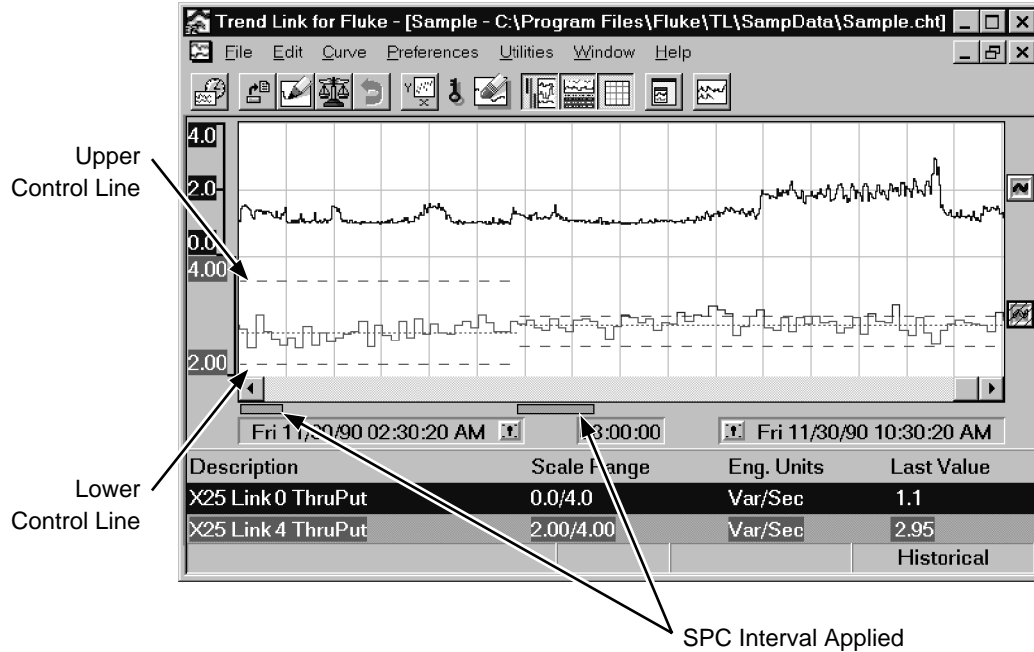
Notice that both SPC interval bars **do not** have the cross-hatched pattern. This indicates that they have both been applied to the SPC curve. The mean calculated for the first SPC interval appears as a dotted line. The control limits appear as dashed lines. The curve draws in its highlight color when the value exceeds the limits. When the second SPC interval begins, Trend Link calculates a new mean and set of control limits. The positions of those lines change to reflect that.

You can still modify an applied SPC interval. You can move or size the SPC interval bar using the same technique used for a new SPC interval bar. If you move the SPC interval bar, it does not automatically apply to the SPC curve. The SPC interval bar appears again with a cross-hatched pattern. This pattern indicates that the position or size of the SPC interval bar does not reflect the drawing of the mean and control limits of the SPC curve. The SPC interval must be either re-applied to the SPC curve or changed back to its previous state.

Calculating the SPC Interval Information   4-13.

A cross-hatched pattern on an SPC interval bar indicates a need to apply the interval to the SPC curve. First, you must calculate the SPC interval information. A double click of the left mouse button while the mouse cursor is over an SPC interval bar causes the dialog box shown below to appear:

If the SPC interval bar did not have the cross-hatched pattern, the values in the upper portion of the dialog box are the values currently being used in the SPC interval. If it did have a cross-hatched pattern, Trend Link calculates the values before the dialog box appears. As Trend Link calculates the values, the mouse cursor becomes a clock that fills in to reflect the progress of the calculations. If you press the 'Esc' key before completion of calculations, the calculations abort.

The time range used for calculating the mean and standard deviation is the range specified by the position of the SPC interval bar. The **Start** and **End** edit boxes contain the start and end times for the SPC time range. You can change the times manually to reflect specific times.

Note

*If you change either of the times for the time range, use the **Calc...** button to recalculate the SPC information.*

Trend Link calculates the **Upper** and **Lower Control Limits** automatically. Trend Link sets the upper control limit to three standard deviations above the mean and the lower control limit to three standard deviations below the mean. You can set either control limit manually.

A check box indicates if Trend Link is using a **Rules of Seven** drawing technique when drawing the portion of the SPC curve for which that SPC interval applies.

Use the **Previous** button to exit the dialog box and return the SPC interval bar to its previous state. Use this button if you have already applied an SPC interval to the SPC curve and have then moved or sized the SPC bar, causing the SPC bar to change to the cross-hatched pattern. If it is not desirable to apply the change to the SPC interval, you can set the SPC bar back to its previous position and size. If you have not previously applied the SPC interval bar, this button has no effect.

Use the **Apply** button to apply the current settings in the dialog box to the SPC curve. This draws the mean and control limits on the SPC curve to reflect their values in the dialog box and set the SPC interval bar to reflect the time range indicated in the dialog box.

The **Cancel** button exits the dialog box without affecting the SPC interval in any way.

The **Delete** button deletes the SPC interval from the SPC curve, causing the drawing of the mean and control limits for that SPC interval to cease.

Configuring the Tool Bar 4-14.

You can configure the tool bar at the top of the Trend Link screen, allowing you to selectively enable/disable specific features. Do this by editing the Control Bar Buttons string found in the [Section: Main Window] section of the TLLOCAL.INI file as shown here.

[Section: Main Window]
Control Bar Buttons=2 0 3 4 5 6 0 7 0 8 0 9 0 10 0 11 12 13 0 14 0 15

This string shows how each of the controls appears on the control bar in Trend Link. Numbers 1 through 18 identify the controls, and a zero represents a break (or space) in the control bar. The picture below shows how to use a Control Bar Buttons string to define the control bar.
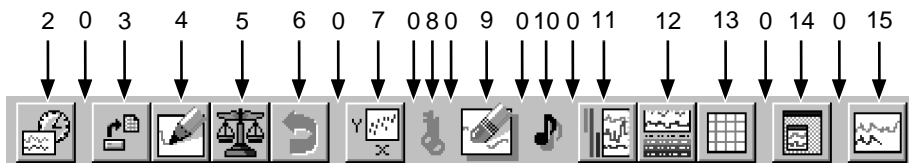
The following table shows the icons and tool bar items that correspond to the numbers used in the Control Bar Buttons string:

Ctrl No.	Icon	Corresponding Control Item
0	none	Inserts a space between icons on the control bar
1		Historical Mode Button
2		Toggle Real-time Mode Button
3		File Open Button
4		Add Curve
5		Auto Scale
6		Undo Time
7		X-Y Scatter Chart
8		Time Lock Key
9		Erase Curve Icon
10		Add Note Icon
11		Toggle Band Bars
12		Toggle Curve Status Info
13		Toggle Background Grid Lines
14		Stay On Top Mode
15		Batch Mode
16		Save Chart
17		File New
18		Print Chart

You can also configure the control bar for a specific chart by specifying a Control Bar Buttons string in the [Canary Labs - Trend Link Chart: Main Section] section of the chart file.

Note

A Control Bar Buttons string specified in the chart file takes precedence over the string in the TLLOCAL.INI file. When closing, Trend Link records the Control Bar Buttons configuration to the TLLOCAL.INI file (unless the Save Configuration parameter is NO in the [TL Local Settings] section of the TLLOCAL.INI file.)

Command Line Arguments   4-15.

Trend Link allows for specifying certain parameters as part of the command line. You can use the command line parameters to control the way in which Trend Link launches (or closes) by specifying which chart files Trend Link should use and the mode in which to activate Trend Link. The format for specifying parameters in the command line is as follows.

C:\PATHTL\TL32.EXE -X C:\PATHCHT1\FILE1.CHT C:\PATHCHT2\FILE2.CHT

where the parameter definitions are as follows:

- **C:\PATHTL\TL32.EXE** The complete path and file name of the Trend Link executable (TL.EXE for 16-bit Trend Link and TL32.EXE for 32-bit Trend Link.)

- **-X** The optional startup mode parameter that specifies the mode in which to activate Trend Link. A complete description of the possible values for this parameter appears below.

- **C:\PATHFIL1\FILE1.CHT** The optional parameter specifying the full path and file name of the first CHT file to load.

- **C:\PATHFIL2\FILE2.CHT** The optional parameter specifying the full path and file name of the second CHT file to load.

You can specify additional CHT files by adding their path and file names to the end of the parameter list. Separate all parameters in the command line with a space or a comma.

For example, the command line:

C:\TL\TL32.EXE C:\TL\GENBATCH.CHT C:\TL\MIXER.CHT

would cause Trend Link to run from the TL directory, and load the chart files C:\TL\GENBATCH.CHT and C:\TL\MIXER.CHT.

Startup Mode Parameters 4-16.

You can launch or shut down Trend Link in several different modes by using the Startup Mode parameter in the command line. Possible values for this parameter appear below.

Startup Parameter	Description of Startup Mode
-C	Use this switch to launch Trend Link in a REPLACE Mode. An instance of Trend Link that is already running activates, and charts specified on the command line replace charts currently loaded by that instance. If Trend Link is not running, a new instance launches and any charts specified on the command line load.
-E	With this switch, the command line closes the current instance of Trend Link. This allows you to shut down Trend Link from a command line.
-F	With this switch, the command line operates in a TOGGLE mode. If an instance of Trend Link is already running, it closes. If Trend Link is not running, a new instance launches and charts specified on the command line load.
-N	With this switch, Trend Link launches in an ADD mode. In this mode, an existing instance of Trend Link activates and opens any charts specified in the command line without closing any of the charts already opened by the current instance. If no instances of Trend Link are running, a new instance launches and any charts specified on the command line load.
-S	With this switch, Trend Link launches in ACTIVATE mode. An existing instance of Trend Link activates, ignoring any charts specified on the command line. If there is no instance of Trend Link running, a new instance launches and any charts specified on the command line load.

Time Zone Adjustments 4-17.

You must calibrate Trend Link to the time zone used by the PC that it is running on. The method used by Trend Link to make adjustments for the different time zones varies for different operating systems as described below.

Windows 95 and Windows NT 4-18.

Windows '95 and Windows NT versions of Trend Link automatically use the time zone configuration that is being used by the operating system.

Windows 4-19.

In Windows 3.x, Trend Link makes corrections from Greenwich mean time (GMT) to whatever the local time zone is by using the conversion functions that reference the environment variable TZ (Time Zone). The format of the TZ environment string is as follows:

TZ=zzz[+/-]d[d][lll]

Where zzz is a three-character comment string representing the name of the current time zone. All three characters are required. For example, you could use the string "PST" to represent Pacific Standard Time.

[+/-]d[d] is a required field containing an optionally signed number with 1 or more digits. This number is the local time zone's difference from GMT in hours during standard time. Positive numbers adjust westward from GMT. Negative numbers adjust eastward from GMT. For example, the number 5 = Eastern Standard Time, 8 = Pacific Standard Time, and -1 = Continental Europe Standard Time. This number is used in the calculation of the global variable 'timezone' that is the difference in seconds between the GMT and the local time zone.

[lll] is an optional three-character comment string that represents the local time zone's daylight savings time. For example, you use the string "PDT to represent Pacific daylight savings time. If this field is present, the timezone variable automatically adjusts for daylight savings time changes on the first weekend of April, and the last weekend of October each year. If this field is not present, the timezone variable reflects standard time the entire year.

If the daylight-savings-time (DST) is never in effect, as is the case in certain states and localities, set TZ without a DST zone name.

If the TZ environment string isn't present or isn't in the preceding form, a default TZ="EST5EDT" is presumed by Trend Link for purposes of calculating the global time variables.

Setting the TZ Variable 4-20.

Since other applications may default to a different TZ variable value, set the TZ variable to match the appropriate time zone. Do this in the AUTOEXEC.BAT file by adding the line:

SET TZ=zzz[+/-]d[d][lll]

Where zzz[+/-]d[d][lll] represents the appropriate time zone information as described above.

Logging Data During Time Cross Overs 4-21.

If the DDE Logger is running at the time the Standard/Daylight Savings Time Cross Over occurs, it automatically compensates for the shift in local time. Do not change the PC clock while the Logger is running. If the DDE Logger is not running when the Cross Over occurs, adjust the PC clock BEFORE starting the Logger.

IMPORTANT: Do not adjust the PC clock while the DDE Logger is running. If the Logger is running during a cross over, the Logger compensates for the local

time shift and logs a correct time-stamp. Only change the PC clock AFTER shutting down the DDE Logger.

With the TZ variable properly set, the time functions in Trend Link properly compute the local time, compensating automatically for the Spring and Fall cross-overs between standard time and daylight savings time.

During the Spring and Fall crossovers, Data logs as follows :

In the Spring, (when the clock shifts ahead), no data records for the hour that runs from 2:00:00am to 2:59:59am. When viewing data for this hour with Trend Link, the No Data Value indicator appears. The net result as displayed by Trend Link for the spring crossover appears below:

1:00:00am------1:59:59:am | | 3:00:00am------->

                                    No Data shown for this hour

In the Fall, (when the clock turns back), the hour from 2:00:00am to 2:59:59am repeats and data records for both instances of this hour. When viewing data for this hour with Trend Link, the time runs along up to the first instance of 2:59:59am and then resets to 2:00:00am. Data records for both instances of the 2:00:00am to 2:59:59am hour. The net result as displayed by Trend Link for the fall crossover appears below:

2:00:00am------2:59:59am|2:00:00am------------2:59:59am|3:00:00am--------->

                    | This hour repeats. |

Chart File Format   4-22.

The following is a sample chart file generated by Trend Link Version 3.0. Chart files are in an ASCII format (the same as any standard Windows INI file) which you can edit with any text editor. The comments (denoted with a semicolon) describe the chart file entries.

```
; This is the main section for a Trend Link chart file. It specifies
; parameters specific to the application.

[Canary Labs - Trend Link Chart: Main Section]
File Version=300                  ; Current version of the chart file.
Title=Sample                      ; Title of the chart.
Maximized=NO                      ; Is application maximized?
Application Window X=33           ; X location of TB (% of screen size).
Application Window Y=43           ; Y location of TB (% of screen size).
Application Window Width=40       ; Width of TB (% of screen size).
Application Window Height=78      ; Height of TB (% of screen size).
Control Bar=ON                    ; Is Control Bar turned on?
Control Window=OFF                ; Is Control Window turned on?
Font Name=Helv                    ; Name of font used for time and info displays.
Font Family=34                    ; Value representing font family in Windows.
Font Character Set=0              ; Value representing Windows character set.
Font Point Size=10               ; Numerical value of font point size
Font Weight=400                   ; Numerical value of font weight
Font Italic=0                     ; Numerical value of font italic
DataSet Mask=UBE X20 Data         ; DataSet Mask used in Add Curve dialog box.
Tag List Index=10                 ; Index of Tag displayed at top of the list
box;
Stay On Top Mode=OFF              ; Stay On Top mode turned OFF

; This section specifies parameters which are specific to the curve
; window such as times and background attributes.

[Section: Curve Window]
Curve Window Recent Time=659989820 ; The GMT time the right side of the chart.
Curve Window Interval Time=7200000 ; The length of time being displayed in ms.
Last Curve Color=2                ; Index into last color used by a curve (0 -
15).
Background Color=16777215         ; Background color in RGB COLORREF format.
Grid Color=12632256               ; Grid color in Windows RGB COLORREF format.
Grid Line Style=0                 ; Grid line Style (0=Solid, 1=Dash, 2=Dot).
Grid Display=ON                   ; Display of grid lines (Off/On).
Grid Width=60                     ; Width in pixels of grid lines.
```

```
Grid Height=60                       ; Height in pixels of grid lines.
Grid Horizontal Pixels=ON            ; Status of measure horiz. grid in pixels.
Grid Vertical Pixels=OFF             ; Status of measure vert. grid in pixels.
Grid Calculate Interval=ON           ; Status of calculate grid intervals param.
Grid Number Vertical Lines=15        ; Number of vert. grid lines to display.
Grid Time Interval=600000.000        ; Time interval between grid lines.
Note System=OFF                      ; Status of Note System.
Dynamic AutoScale=OFF                ; Dynamic AutoScale status.
Undo Facility=ON                     ; Status of Undo feature.
Undo Grouped=ON                      ; Status of Group feature within Undo facility.
Undo Levels=30                       ; Number of levels of undo available.
Realtime=OFF                         ; Status of real-time polling.
Realtime Polling=20000               ; Time between real-time polling in
milliseconds.
Curve Info Display=ON                ; Status of Curve Info. Display for all curves.
Curve Info Name=ON                   ; Status of Name field in curve info display.
Curve Infp Batch Name=ON             ; Status of Batch Name in curve info display.
Curve Info Description=ON            ; Status of Description in curve info display.
Curve Info Scale Range=ON            ; Status of Scale Range in curve info display.
Curve Info Sample Frequency=ON       ; Status of Sample Freq. in curve info display.
Curve Info Eng Units=ON              ; Status of Eng. Units in curve info display.
Curve Info Last Value=ON             ; Status of Last Value in curve info display.
Curve Band Bars=ON                   ; Status of Curve Band Bars feature.
SPC Display=ON                       ; Status of displaying SPC intervals.
Number of Curves=2                   ; Number of curves on chart.
Curve Info Value Bar=OFF             ; Status of SnapShot Value Bar
Value Bar Percent Position=0.647     ; position (as % of screen size) of value bar
Millisecond Display=Milliseconds.    ; Status of Time Resolution parameter.


;Default Add Curve Parameters        ; These parameters define the default
parameters
;                                    ; that will be used by the add curve function


Default AutoScale=YES                ; Status of Autoscale Parameter for Add Curve
Fn
Default AutoBand=YES                 ; Status of AutoBand Parameter for Add Curve Fn
Default Curve Type =1                ; Curve Type 0-Norm 1-Highlight 2-Shaded 3-SPC
Default Expansion Technique=0        ; Epansion Technique 0-Sample/Hold 1-
Interpolate
Default Compression Technique=0      ; Compression Technique 0-Average 1-First 2-
Range
Default Num SPC Samples=15           ; Number of SPC Samples
Default Highlight Color=128          ; Highlight color of curve in COLORREF format.
Batch Mode=ON                        ; Batch Mode Status (ON-Batch, OFF-Cont.Time)
Value Cursor Name=ON                 ; Status of Name field in Value Cursor display.
```

```
Value Cursor Batch Name=ON         ; Status of Batch Name in Value Cursor display.
Value Cursor Description=ON         ; Status of Description in Value Cursor
display.
Value Cursor Batch Time=ON          ; Status of Batch Time in Value Cursor Display.
Value Cursor Scale Range=ON         ; Status of Scale Range in Value Cursor
display.
Value Cursor Sample Frequency=ON    ; Status of Sample Freq. in Value Cursor
display.
Value Cursor Eng Units=ON           ; Status of Eng. Units in Value Cursor display.
Value Cursor Value=ON               ; Status of Value field in Value Cursor
display.
Default Add Curve Mode=3            ; Display mode for curve name in add curve box.
Default Dataset Name=Sample         ; Name of default Dataset for Add Curve Dialog.


; This section is for the first curve on the chart. There is a similar
; section for each curve on the chart.

[Section: Curve #1]
Name=Sample:Degrees                 ; ID of curve in DataSet:Tagname format.
Description=Circle Degrees          ; Description of the curve.
Eng Units=Degrees                   ; Engineering Units for the curve.
Color=8388608                       ; Color of curve in Windows RGB COLORREF
format.
Color Hightlight=128                ; Highlight color of curve in COLORREF format.
Scale High=5.0                      ; Upper scale value of curve.
Scale Low=0.0                       ; Lower scale value of curve.
Band High=100.0                     ; Upper band value of curve (percentage).
Band Low=50.0                       ; Lower band value of curve (percentage).
Limit High=100.0                    ; Upper limit value if limit curve.
Limit Low=0.0                       ; Lower limit value if limit curve.
Numeric Precision=3                 ; Precision of values displayed.
Type of Curve=0                     ; Numeric value representing type of curve.
Expansion Technique=0               ; Value representing Small Data drawing method
Compression Technique=0             ; Value representing Large Data drawing method
Name Window Display=OFF             ; Status of Floating Info Window display.
Name Window X=-1                    ; X location in pixels of Name/Value Window.
Name Window Y=-1                    ; Y location in pixels of Name/Value Window.
Name Window Show Name=NO            ; Status of Name Field in Floating Window
Name Window Show Description=YES    ; Status of Description Field in Floating
Window
Name Window Show Batch Name=YES     ; Status of Batch Name Field in Floating Window
Name Window Show Scales=NO          ; Status of Description Field in Floating
Window
Name Window Show Sample Interval=NO ; Status of Sample Interval in Floating Window
```

```
Name Window Show Engineering Units=NO ; Status of Engineering Units in Floating
Window
Name Window Show Last Value=YES      ; Status of Last Value in Floating Window
SPC Sampling Rate=300                ; Number of seconds to average samples for SPC.
Number of SPC Intervals=2            ; Number of SPC intervals defined for the
curve.
Display Scale Range=YES              ; Tells if Band Bar should display scale range.
Batch Name=Mon May 08 14:16:30 1995 ; Batch That Curve Belongs To.
Dynamic Batch Index=-1               ; The Dynamic Batch (Offset From Current
Batch).
Time Shift=0                         ; Amount of Time Curve Is Shifted.
SPC Interval #1 Start Time=659985109; Start of calc. range for first SPC interval.
SPC Interval #1 End Time=659970030   ; End time of calc. range for first SPC
interval.
SPC Interval #1 Lower Limit=0.916283; Lower Control Limit for first SPC interval.
SPC Interval #1 Upper Limit=1.122456; Upper Control Limit for first SPC interval.
SPC Interval #1 Mean=1.019369        ; Mean for first SPC interval.
SPC Interval #1 Standard Deviation=0.034362  ; Std deviation for first SPC
interval.
SPC Interval #1 Rules Of Seven=0     ; Status of using Rules of Seven for 1st SPC
Int.
SPC Interval #2 Start Time=659985109 ; Start of calculation range for second SPC
Int.
....
SPC Interval #2 Rules Of Seven=0     ; Status of using Rules of Seven for 2nd SPC
Int.
; This pattern continues for all SPC Intervals defined for this curve.


; This section is for the second curve on the chart.

[Section: Curve #2]
Name=Sample:Random_00                ; ID. of curve in DataSet:Tagname format.
Description=Random Number            ; Description of the curve.
....
Name Window Y=-1                     ; Y location in pixels of Name/Value Window.
```

Note

If the value of Curve Window Recent Time is -1, Trend Link sets the
time for the chart to the most recent time for which data is available
for any of the curves on the chart.

Note

*If the value of Name Window X is -1, Trend Link places the
name/value window approximately in the middle of the band range
for that curve.*

Note

*The values available for the Type of Curve are as follows:
0=Normal Curve, 1=Highlight Limit Curve, 2=Shaded Limit Curve,
3=SPC X-Bar Curve.*

Short Format 4-23.

You do not have to define all of the parameters listed in the file format in every
chart. If it is desirable to create a chart from a source other than Trend Link, you
need to define only a small number of the above fields. The following example
shows the minimum fields required for Trend Link to successfully read a chart:

```
[Canary Labs - Trend Link Chart: Main Section]
File Version=3.00
Title=Example Short File

[Section: Curve Window]
Number of Curves=2

[Section: Curve #1]
Name=UBE X20 Data:LINK0THRUPUT

[Section: Curve #2]
Name=UBE X20 Data:LINK2THRUPUT
```

In the above example, many of the fields are missing. Trend Link assumes
defaults for many of the fields. For others, Trend Link leaves settings as they were
before it added the chart. In general, the chart appears as if you manually added
each of the curves to the chart.

Trend Link INI Files 4-24.

Trend Link uses two INI files to store various types of configuration information
for the application. All of the applications in the Trend Link for Fluke series use
the INFOLINK.INI file. The other INI file used is the TLLOCAL.INI file. The
Trend Link application uses this only once. This chapter describes the entries used
by Trend Link in both of the INI files.

INFOLINK.INI   4-25.

Trend Link uses the INFOLINK.INI file to store configuration information that may be global to all operators of the Trend Link application. This is especially useful if the application is being used on a network by several different workstations where all operators use the same Data Sets.

Trend Link looks for the INFOLINK.INI file in one of three places. First Trend Link looks in the WIN.INI file located in the Windows directory. Trend Link searches this file for a section labeled **[Trend Link for Fluke]** and an item under that section in the form of **Infolink Path=F:\INFOLINK** where F:\INFOLINK is the network drive and directory (or full path) where the INFOLINK.INI file resides. Thus if Trend Link runs off a network server, a common location for the INFOLINK.INI file may be specified in the WIN.INI allowing the INFOLINK.INI file to be shared by all workstations.

If the location of the INFOLINK.INI file is not specified in the WIN.INI file, Trend Link looks for the INFOLINK.INI file in the directory where Windows was run from. This is the standard place to put INI files in the Windows environment.

If the INFOLINK.INI file's path is not specified in the WIN.INI file and it is not located in the Windows directory, Trend Link looks in the directory from which Trend Link was executed. If Trend Link cannot locate the INI file, an error message appears, and Trend Link does not run.

Following is a sample INFOLINK.INI file with all of the entries used by Trend Link. The file contains comments (denoted by a semicolon at the beginning of a line) which describe the various sections and fields.

```
;This section holds general settings which are used by Trend Link.

[TL Settings]

; This field indicates the path which is used to store the NOTES database
; If this field is blank, the note system defaults to the Trend Link
; executable directory.

Note System Path=\trndlnks\notes

; This field indicates the path where the TLLOCAL.INI file is located. If the field is
; set to a specific path, Trend Link will look for the file in that directory. If the
; field is set to the "Windows" (as shown below), Trend Link will look for the file in
; the directory from which Windows is executed. If the field is blank, Trend Link will
; look for the file in the directory from which it is executed. If the TLLOCAL.INI file
; does not exist, it will automatically be created.
```

```
TLLocal Path=Windows

; This section defines the DataSets which are used by Trend Link to group the
; curves into different categories. The field name (in front of the equal sign)
; is the name of the Data Set. The field value is the directory(ies) where the tag
; data is located. A Data Set may point to more than one directory as illustrated
; in the first Data Set below, UBE. Also, more than one Data Set may point to the same
; directory, thus making the same tag(s) available in more than one Data Set.

[TL Data Set Paths]
Sample=C:\tbatch\sample
Real Time=C:\tbatch\realtime
UBE=w:\x20;w:\min
20sec data=w:\20sec
min data=w:\min
10min data=w:\10min
hr data=w:\hr

; This section defines the Logical Data Sets which are used in Trend Link. A Logical
; Data Set is a further abstract grouping of Data Sets. The field name is the name of
; the logical Data Set and the list that follows the equal sign is a list of Data Sets
; which make up that logical grouping. All Data Sets listed in this section must be
; Data Sets which were defined in the section above. Logical Data Sets can be changed
; dynamically in Trend Link to represent any of the physical Data Sets shown in their
; list. For more information on Logical Data Sets see the Advanced Concepts chapter.

[TL Logical Data Set Groups]
Alka Selzer=alk, hr data, 10min data, mindata, x20data
Scrubber=hr data, 10min data, min data
Hydro Cracker=20sec data, x20 data
Blender= x20 data, x20 data
```

TLLOCAL.INI   4-26.

Trend Link uses the TLLOCAL.INI file to store setting and configuration information that may be different for each workstation. This file resides on the local hard drive of each workstation. As a result, each operator can independently store information such as the last few charts that were open or the Logical Data Set assignments.

Trend Link looks for the TLLOCAL.INI file in one of three places. First, Trend Link looks in the INFOLINK.INI file for a setting that indicates the location of the TLLOCAL.lNI file. This setting is the *TLLocal Path* field in the *[TL Settings]* section. For more information about the INFOLINK.INI file and this setting see the information above. If the *TLLocal Path* field equals a specific directory path, Trend Link looks for the TLLOCAL.INI file in the specified directory. If the field

equals the word Windows, Trend Link looks for the INI file in the directory from which Windows is executing. If the field is blank or is not present, Trend Link looks for the INI file in the directory from which Trend Link is executing.

If both Trend Link and Windows are being executed off a network server, you should set the value of the *TLLocal Path* field to a specific directory path that created on each workstation that runs Trend Link. Following are descriptions for the several sections of the TLLOCAL.INI file.

```
; The TL Local Settings section defines the default time span of a chart
; This time span is defined by setting the Interval Samples parameter
; equal to the number of time intervals to display. For example, if the
; sample interval is 1 minute, and interval Samples is set to 60, Trend
; Batch will display one hour of data.
; This section also holds parameters for activating the user lockout
; feature. These parameters are Security and Password.
; If the Security parameter is set to On, The user lockout feature is
; activated.
; The Password feature should be set to the desired password for
; removing the user lockout.
; For more information on the user lockout feature, see the user lockout
; feature section in the advanced concepts section of this manual


{TL Local Settings]
Interval Samples=240       ; Set chart width to 240 Sample intervals
Security=On                ; Turn on user lockout feature
Password=canarylabs        ; Set user lockout password to canarylabs
AutoSave=always            ; Save chart every time it is closed
Load Configuration=YES     ; Load previous TL display configuration parameters
Save Configuration=YES     ; Save current TL display configuration parameters
Password Character=YES     ; Display * characters when password is typed
SPC Sigma=3.0              ; Number of std. Deviations from mean for SPC limits


; This section holds up to the last five charts which were open in Trend Link.
; Each field is set equal to the full path of a chart file. In the example below,
; three different charts have been open in Trend Link when running on the
; workstation which holds the particular TLLOCAL.INI file. This section is
; automatically created and maintained by Trend Link.

[TL Previous Charts]
Previous Chart 0=w:\engineer\charts\nine.cht
Previous Chart 1=w:\operator\charts\unit1.cht
Previous Chart 2=w:\testing\charts\logical.cht


; This section indicates what physical DataSet each Logical DataSet really represents.
```

```
; Each Logical DataSet is listed and set equal to one of the physical DataSets listed
; in its DataSet group in the above section. This section may be created initially, but
; the values are maintained by Trend Link through the options menu. For more
; information on Logical DataSets see the Advanced Concepts chapter.

[TL Logical Data Set Assignments]
Alka Selzer=UBE alk
Scrubber=Flat hr
Hydro Cracker=Demo
Blender=Flat x20


[Section: Main Window]
Maximized=NO                         ; Is application maximized?
Application Window X=33               ; X location of TL (% of screen).
Application Window Y=43               ; Y location of TL(% of screen).
Application Window Width=74           ; Width of TL(% of screen).
Application Window Height=47          ; Height of TL (% of screen).
Control Bar=ON                       ; Is Control Bar turned on?
Control Window=OFF                    ; Is Control Window turned on?
Font Name=Helv                       ; Name of font used for time and info displays.
Font Family=34                       ; Value representing font family in Windows.
Font Character Set=0                  ; Value representing Windows character set.
DataSet Mask=Sample                  ; DataSet Mask used in Add Curve dialog box.
Tag List Index = 10                  ; Index of Tag to display at top of list box;
Stay On Top Mode=OFF                 ; Status of Stay On Top mode
Application Menu=OFF                  ; Status of the Menus


[Section: Curve Window]
Background Color=16777215            ; Background color in RGB COLORREF format.
Grid Color=12632256                  ; Color in Windows RGB COLORREF format.
Grid Line Style=0                    ; Style of Grid lines (0=Solid, 1=Dash, 2=Dot).
Grid Display=ON                      ; Display of grid lines.
Grid Width=60                        ; Width in pixels of grid lines.
Grid Height=60                       ; Height in pixels of grid lines.
Grid Horizontal Pixels=ON            ; Status of measure horiz. grid in pixels.
Grid Vertical Pixels=OFF             ; Status of measure vert. grid in pixels.
Grid Calculate Interval=ON           ; Status of calculate grid intervals param.
Grid Number Vertical Lines=15        ; Number of vert. grid lines to display.
Grid Time Interval=600000.000        ; Time interval between grid lines.
Note System=OFF                      ; Status of Note System.
Dynamic AutoScale=OFF                ; Dynamic AutoScale status.
Undo Facility=ON                     ; Status of Undo feature.
Undo Grouped=ON                      ; Status of Group feature within Undo facility.
Undo Levels=30                       ; Number of levels of undo available.
Curve Info Display=ON                ; Status of Curve Info. Display for all curves.
```

```
Curve Info Name=ON                      ; Status of Name field in curve info display.
Curve Infp Batch Name=ON                ; Status of Batch Name in curve info display.
Curve Info Description=ON               ; Status of Description in curve info display.
Curve Info Scale Range=ON               ; Status of Scale Range in curve info display.
Curve Info Sample Frequency=ON             ; Status of Sample Freq. in curve info display.
Curve Info Eng Units=ON                  ; Status of Eng. Units in curve info display.
Curve Info Last Value=ON                 ; Status of Last Value in curve info display.
Value Bar Percent Position               ; position (as % of screen size) of value bar
Curve Band Bars=ON                       ; Status of Curve Band Bars feature.
SPC Display=ON                           ; Status of SPC intervals for SPC curves.
Millisecond Display=Default              ; Status of Millisecond Display Parameter
;Default Add Curve Parameters            ; These parameters define the default parameters
;                                        ; that will be used by the add curve function
Default AutoScale=YES                    ; Status of Autoscale Parameter for Add Curve Fn.
Default AutoBand=YES                     ; Status of AutoBand Parameter for Add Curve Fn.
Default Curve Type =1                    ; Curve Type 0-Norm 1-Highlight 2-Shaded 3-SPC
Default Expansion Technique=0            ; Epansion Technique 0-Sample/Hold 1-Interpolate
Default Compression Technique=0          ; Compression Technique 0-Average 1-First 2-Range
Default Num SPC Samples=15               ; Number of SPC Samples
Default Highlight Color=128              ; Highlight color of curve in COLORREF format.
Batch Mode=ON                            ; Batch Mode Status (ON-Batch , OFF-Cont.Time)
Value Cursor Name=ON                     ; Status of Name field in Value Cursor display.
Value Cursor Batch Name=ON               ; Status of Batch Name in Value Cursor display.
Value Cursor Description=ON              ; Status of Description in Value Cursor display.
Value Cursor Batch Time=ON               ; Status of Batch Time in Value Cursor Display.
Value Cursor Scale Range=ON              ; Status of Scale Range in Value Cursor display.
Value Cursor Sample Frequency=ON         ; Status of Sample Freq. in Value Cursor display.
Value Cursor Eng Units=ON                ; Status of Eng. Units in Value Cursor display.
Value Cursor Value=ON                    ; Status of Value field in Value Cursor display.
Default Add Curve Mode=3                 ; Display Mode Used For Name In Add Curve Box.
Default Dataset Name=Sample              ; Name of default Dataset for Add Curve Dialog

[Section: Curve]
Numeric Precision=3                      ; Precision of values displayed in Band Bar
Display Scale Range=YES                  ; Tells if the Band Bar should display scale.
Name Window Display=OFF                  ; Status of Floating Info Window display.
Name Window X=-1                         ; X location in pixels of Name/Value Window.
Name Window Y=-1                         ; Y location in pixels of Name/Value Window.
Name Window Show Name=NO                 ; Status of Name Field in Floating Window
Name Window Show Description=YES         ; Status of Description Field in Floating Window
Name Window Show Scales=NO               ; Status of Description Field in Floating Window
Name Window Show Sample Interval=NO      ; Status of Samp Interv. Field in Floating Window
Name Window Show Engineering Units=NO    ; Status of Eng. Units Field in Floating Window
Name Window Show Last Value=YES          ; Status of Last Value Field in Floating Window
```

Chapter 5
Connecting to a DDE Server Application

Contents   Page

Connecting to a Server Application 5-1.

To connect Trend Link to a Windows DDE server application, data must be read from the Windows DDE and written to a file in a format recognized by Trend Link. Do this using the DDE Logger program (LOGGER32.EXE) provided with Trend Link. Use the following steps to connect Trend Link to a DDE server application.

1. Use the Configurator (CONFIG32.EXE, see the Configurator chapter for more information) to create a Data Set where the data will be stored. (See Data Sets in the Advanced Concepts chapter of this manual.)

2. Define the DDE HotLinks using the Configurator. Select **File** | **New** to create a new configuration, then select **Group** | **Add** to create one or more DDE HotLink groups. Fill in the blanks of the configuration and then select and fill in the DDE groups. See the Configurator chapter for more information.

3. Save the LCF file for this set of DDE links using the Files menu in the Configurator program.

4. Run the DDE Logger program and open the LCF file saved in step 3 above.

5. Run Trend Link and select the Data Set defined in step 1 above (select **Edit** | **Add Curve** to open the dialog box.)

DDE Logger 5-2.

The DDE Logger program provides a simple method of logging small to medium amounts of data into the Trend Link program. The data can be read from many different applications using the Window's DDE interface. For more information on this method, see "Using Logger With Other Applications" farther in this chapter. When reading data using the Window's DDE interface, the XL Table format defined by Microsoft may also be used.

DDE Logger is activated by selecting the DDE Logger icon in the Trend Link for Fluke program folder (group). When the program is activated, the Logger window will appear. This window allows the user to monitor the progress of all logging sessions that are active within the current instance of the Logger. Initially, there will be no sessions displayed indicating that no data is being logged. To start a logging session, follow the procedure outlined in the Logging Sessions on the following page.

Logging Sessions *5-3.*

A logging session involves using the DDE Logger to establish a set of links with other applications in order to acquire data for a set of Tags and then logging the data for these Tags to a format that is recognized by Trend Link. The configuration information required to establish these links as well as information used to describe how and where the Tags are to be logged is stored in a Logger configuration file (LCF File). Each logging session requires a LCF configuration file to describe it. A complete description of the LCF configuration file is given in the Configurator's help file.

To start a logging session, the user must select **File** | **Open.** An Open File dialog box will be activated allowing the user to select a LCF configuration file from a list of available files. The LCF configuration file defines the data that will be logged for this session as well as the source of the data and the Data Set that the data is to be stored in. As an alternative to choosing the LCF Configuration file from this list, the user can specify the LCF configuration file(s) in the command line for the LOGGER32.EXE file. For example, if the command line reads "C:\TL\LOGGER32.EXE C:\TL\GEN_TB50.LCF" the Logger will be invoked from the "TL" directory using the GEN_TB50.LCF configuration file. (Note that the full path name for the LCF configuration file must be included in the command line.) Multiple LCF files may be specified on the command line as long as they are separated by a space. A delay parameter may also be specified in the command line which causes Logger to wait a specified period of time before trying to connect to a DDE server. (See the Command Line Arguments section below.)

Logger may handle multiple logging sessions. To start additional logging sessions, simply repeat the above procedure using the appropriate LCF configuration file for each logging session. The Logger will open a separate document window for each logging session and simultaneously update the windows for all sessions. When running multiple logging sessions, it is not permitted to log data from two different sessions into the same Data Set.

Once the Logger begins to write data to a log file, data concerning the status of the log file for the current session will be displayed in a status window like the one shown below:

EAch Logger session will have its own status window that displays information pertinent to that session. The status window gives the name of the current LCF configuration file, the name of the current NOW file, the size of the current NOW file, the number of Tags currently being logged, and the total number of updates (counting all Tags) that have occurred since the start of the current logging session. There is also a check box that allows the user to specify if a Roll Over is to be performed at the end of the current logging session. If this box is checked, Logger will automatically roll the file over when the logging session is closed. The first time the Logger is started for a given Data Set, a trend data logging file will be created using a unique file name with a DOS file extension of NOW. This name is 8 characters long and is generated as follows. This first character defaults to T, but may be set to any character. For more information see the INFOLINK.INI file section of the INI files chapter in this manual. The next seven characters of the file name represent the file creation time in UNIX time (number of seconds since 12:00AM GMT January 1, 1970) encoded numerically in base 32. When the Logger is run subsequent times, trending data will be appended to the current NOW file until a file Roll Over is performed.

Command Line Arguments   5-4.

DDE Logger allows certain parameters to be specified as part of the command line. The command line parameters may be used to automatically initiate logging sessions by loading LCF configuration files and specifying the amount of time logger should wait before attempting to connect to a server. These parameters will be used by Logger at startup. The format for specifying parameters in the command line is as follows:

```
C:\PATHLOGR\LOGGER32.EXE -DSS C:\PATHLCF1\FILE1.LCF
C:\PATHLCF2\FILE2.LCF
```

where the parameter definitions are as follows:

C:\PATHLOGR\LOGGER32.EXE	The complete path and file name of the Logger executable.
-DSS	The optional delay parameter consisting of -D followed by two digits specifying the number of seconds that Logger should wait before loading LCF File(s).
C:\PATHLCF1\FILE1.LCF	The optional parameter specifying the full path and file name of the first LCF file to be loaded.
C:\PATHLCF2\FILE2.LCF	The optional parameter specifying the full path and file name of the second LCF file to be loaded.

Additional LCF files may be specified by adding their path and file names to the end of the parameter list. All parameters in the command line should be separated by a space or a comma.

For example, the command line:

```
C:\TL\LOGGER32.EXE -D20 C:\TL\GENBATCH.LCF C:\TL\EXCEL.LCF
```

would cause LOGGER32.EXE to be run from the TL directory, then wait 20 seconds and load the LCF files C:\TL\GENBATCH.LCF and C:\TL\EXCEL.LCF.

File Roll Over *5-5.*

The term Roll Over is used to describe the process of ending a NOW file when it is considered to be complete, marking it as historical data, and starting a new NOW file to store subsequent data. This is useful as a method of breaking up the data into files of manageable size.

The user may choose to perform the Roll Over manually at any time by selecting **Data Set** | **Roll Over**. This option causes the current NOW log file to be copied to the same name with a TLG extension, indicating that this data is now considered historical. A new NOW file is created to log current data without interruption to the data logging process. Trend Link will seamlessly connect the data from the TLG files created by the Roll Over with the data from the new NOW file for viewing purposes. There is also an Automatic Roll Over option available that may be set in the LCF configuration file. If the Automatic Roll Over option is set in the LCF configuration file, the NOW file will automatically roll over to a TLG file when the specified condition is met, and a new NOW file will be created. See the Configurator chapter for further information about setting the Automatic Roll Over option.

Tag Info Dialog Box 5-6.

The user can activate the Tag Info dialog box by selecting **Data Set** | **Tag Info**.
This dialog box allows the user to examine information about Tags that are being
logged, such as the names of the Tags, individual Tag information, the current
value of a Tag and when a Tag was last logged. It also assists the operator in
determining that the Logger is correctly linked to the server application and is
logging the data properly. An example of the Tag Info dialog box is shown below:
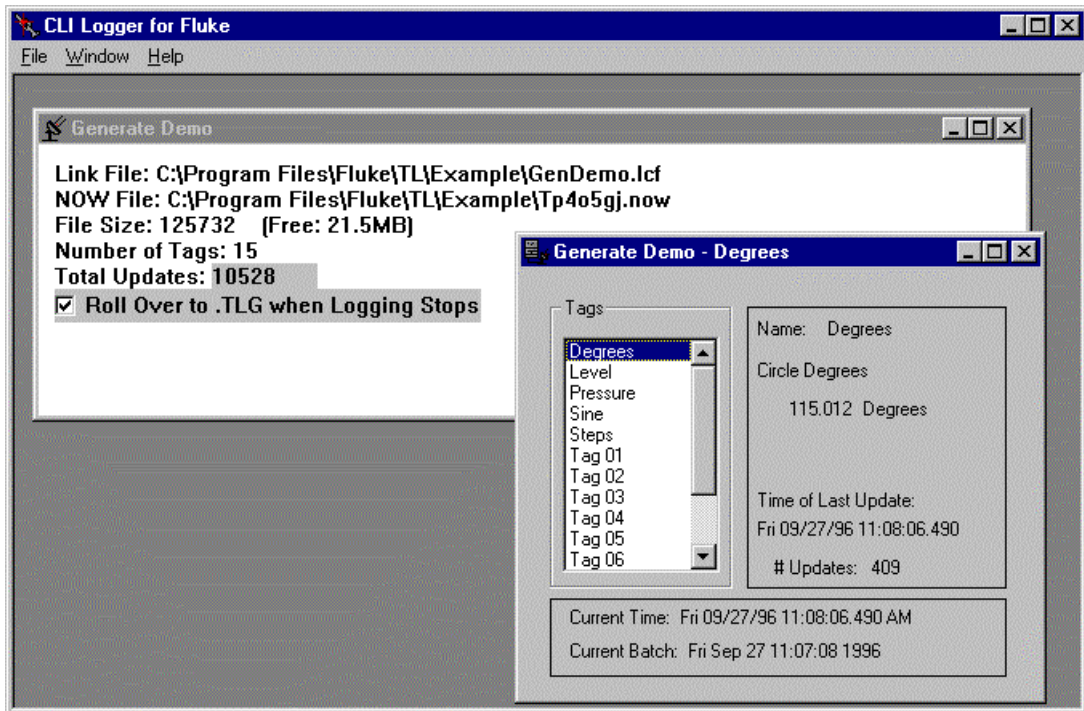
In this example, the information for the Tag named Degrees is being displayed.
From this dialog box we can see the current value of the Degrees Tag, the current
time, and the number of updates that have been written for the Degrees Tag during
the current logging session.

Current Tag information may be displayed for any Tag being logged in the current
session by clicking on the name of the appropriate Tag within the Tag list.

The information in this dialog box is updated approximately once a second.

Ending a Logging Session   5-7.

To end a logging session, click on the Control menu box in the upper left corner
of the document window for the session that is to be terminated. From the menu
that pops up, select Close. This will cause the Logger to terminate all links for the
logging session, close the NOW log file, and close the document window for the
selected session.

Ending a session in this manner will not end the Logger program or any other
sessions that may be currently active in the Logger. All other sessions will
continue logging without interruption.

If the user wishes to end all logging sessions and close the current instance of the
Logger, the Exit command should be selected from the File menu of the Logger.
When this is done, a message box appears asking if the Logger should stop
logging and close. If OK is selected, the Logger will terminate all links for all
logging sessions contained in the current instance of the Logger, close the current
log file for each logging session, and then end the current instance of the Logger.

Note

Ending a session does not end the NOW log file for the session
unless the Roll Over upon exit box is checked.

File Menu Options   5-8.

The File menu is used for performing actions on a Logger Configuration file
(LCF file). A Logger Configuration file stores the information that defines the
data that is to be logged. This includes Tag information, such as name,
description, and scale limits. For detailed information on the format of an LCF
configuration file, see the Logger Configuration Files section of the Configurator
chapter.

Open   5-9.

The Open option under the File menu is used to initiate the logging process.
Selecting this option causes an Open File dialog box to be activated, allowing the
user to select a LCF configuration file from a list of available files. The LCF
Configuration file defines the data that will be logged as well as the source of the
data. A full description of the LCF configuration file is given in the Configurator
chapter under the Logger Configuration Files topic.

As an alternative to choosing the LCF Configuration file from this list, the Logger
Configuration file can be specified in the command line for the LOGGER32.EXE
file. For example, if the command line reads

```
C:\TL\LOGGER32.EXE GEN_LK5.LCF
```

the Logger will be invoked from the "TL" directory using the GEN_LK5.LCF configuration file.

Close   5-10.

The Close option is used to end the current logging session. Selecting this option will cause the Logger to terminate all links for the current logging session, close the NOW log file, and close the document window for the selected session.

Ending a session in this manner will not end the Logger program or any other sessions that may be active in the current instance of the Logger. All other sessions will continue logging without interruption. If the Roll Over upon exit option is checked for the current session, a Roll Over will occur after the file is closed. For a complete description of the Roll Over process, see the File Roll Over section of this chapter.

Exit   5-11.

The exit command is used to close all logging sessions and end the Logger program. Upon execution of this command, all active links for all sessions will be closed and all of the data logging files will be closed.

Data Set Menu Options   5-12.

The Data Set menu   is used to examine information about Tags that are being logged, and to determine if the Logger is correctly linked and is logging properly. The Data Set menu also allows the user to perform a manual Roll Over.

Tag Info   5-13.

The user can activate the Tag Info dialog box by selecting the Tag Info menu option from the Data Set menu. This dialog box allows the user to examine information about Tags that are being logged such as the names of the Tags, individual Tag information, the current value of a Tag, and when a Tag was last logged. It also assists the operator in determining that the Logger is correctly linked to the server and is logging the data properly.

Current Tag information may be displayed for any Tag being logged in the current session by clicking on the name of the appropriate Tag within the Tag list.

The information in this dialog box is updated approximately once a second.

Roll Over 5-14.

This command is used to cause a manual Roll Over of the current NOW logging file to a historical TLG data file. A new current NOW logging file is then created for subsequent data. For a complete description of the Roll Over process, see the File Roll Over section of this chapter.

Help Menu Options 5-15.

The Help menu displays the selections for Online assistance, including Help, Search, and Tutorial, plus a display of the copyright and version of the application.

About Logger 5-16.

The About Logger... option under the Help menu will display a logo screen that gives the version information of the Logger.

Contents 5-17.

The Contents... option under the Help menu can be selected to access context sensitive help pertaining to the Logger.

Using Logger with Other Applications 5-18.

There is a set of sample LCF configuration files provided with Logger and further instructions for connecting to some of the server applications that are most commonly used with the Logger program.

Import/Export Facility 5-19.

You can import data to or export data from the Trend Link database in various ASCII formats using the Import/Export facility. A complete description of this utility appears in the Advanced Concepts chapter of this manual.

Using Logger with Microsoft Excel® 5-20.

An LCF configuration file may be used to log data from Microsoft Excel using the Excel table DDE format as defined by Microsoft. For a description of how to create an LCF file to connect to Excel, refer to the Blocked DDE Group Page section in the Configurator chapter.

To connect to Excel via the Windows DDE using an LCF configuration file, first start Excel and create or load the spreadsheet that contains the cells that are referenced by the configuration file.

Note

The spreadsheet that is referenced by the LCF configuration file must be loaded in Excel before the Logger can connect to the spreadsheet through Windows DDE.

Once the appropriate spreadsheet is loaded in Excel, activate the Logger application by selecting the DDE Logger icon in the Trend Link for Fluke program folder (group). When the program is activated, the Logger window will appear showing the status of the Logger, initially, there will be no logging sessions established, indicating that no data is being logged.

To begin the logging process, select **File** | **Open**. This will bring up a dialog box allowing the user to select the LCF configuration that will be used to log the data. Select the configuration file by double clicking on the file name. The dialog box will disappear, and the Logger will begin logging data.

Once the Logger has begun logging the data, Trend Link may be used to view the data. To do this, activate Trend Link by selecting the Trend Link icon in the Trend Link for Fluke program folder (group). Next create or load a chart file which contains the Tags that are referenced by the Configuration file. (See the Tutorial chapter of this manual for further information on creating a chart file.) Once the chart file is loaded, Trend Link will display data from Excel in Real Time.

Using DDE Logger with the Fluke Wireless Logger 5-21.

DDE Logger may be used to log data from one or more Fluke Wireless Logger data acquisition tools by using the Wireless Loggers data acquisition tool setup (STP) file as a configuration file instead of a standard LCF configuration file.

To connect to a Wireless Logger data acquisition tool using this method, first configure the Wireless Logger data acquisition tool to log the desired data and save the setup (STP) file using the Wireless Logger software. Logger will access the STP file to obtain configuration information needed to log the data from the Wireless Logger data acquisition tool. (This includes the number of Tags, Tag names, etc.) The data will be placed in a subdirectory of the directory that contains the STP file. This sub-directory will be automatically created by Logger and will be given the same name as the STP file (without the STP extension). For example if the file that is used as the Logger Configuration file is C:\WIRELESS\TESTDATA.STP, then a directory called C:\WIRELESS\TESTDATA will be created by Logger and all data for the Hydra(s) defined in the TESTDATA.STP file would be placed in this directory.

Note

Logger will only receive configuration information that has been saved to an STP file. Any changes that are made to the Wireless Logger data acquisition tool configuration since the last time the STP file was saved will not be recognized by Logger.

After the STP file has been saved, the data collection process may be started by selecting Start Hydra from the Wireless Logger data acquisition tool software. This will cause the Wireless Logger to begin collecting data and make it available to the Windows DDE. Once the Wireless Logger data acquisition tools are running, the DDE Logger application may be activated by selecting the DDE Logger icon in the Trend Link for Fluke program folder (group). When the program is activated, the Logger window will appear showing the status of the Logger, initially, there will be no active logging sessions, indicating that no data is being logged.

To begin the logging process, select the Open option from the File menu. This will bring up a dialog box that allows the user to select the STP configuration that will be used in logging the data. Select the STP file that corresponds to the current Wireless Logger data acquisition tool configuration by double clicking on the file name. The dialog box will disappear, and the Logger will begin logging data.

Once the Logger has begun logging the data, Trend Link may be used to view the data. To do this, activate Trend Link by selecting the Trend Link icon in the Trend Link for Fluke program folder (group). Next select the Add Curve option from the Edit menu (or click on the pencil icon from the control bar). This will bring up an Add Curve dialog box used to select a curve to be added to the chart. From the list of available Data Sets displayed on the right side of the dialog box, select the Data Set corresponding to the desired Hydra by double clicking on the Data Set's Name in the list box. Logger will create one Data Set for each Hydra that is defined in the Wireless Logger data acquisition tool's STP file. The names of the Data Sets are constructed by concatenating the name of the Wireless Logger data acquisition tool's STP file (without the .STP extension) with the string '_HydraN' where N is the number of the Hydra as defined in the STP file. For example, if TESTDATA.STP contained definitions for five Hydras, the Data Set containing data for Hydra1 would be called TESTDATA_HYDRA1, the Data Set containing data for Hydra2 would be called TESTDATA_HYDRA2, etc. Files containing data for Hydra1 will begin with an 'A', files containing data for Hydra2 will begin with a 'B', etc. Data Sets for up to 20 different Hydras may be defined in a single STP file.

When a Data Set has been selected, a list of Tags available in the Data Set will be shown on the left side of the dialog box. The user may select the appropriate Tag to be added by double clicking on the Tag name in the list box. The Tag will then be added to the current chart. Additional Tags may be added by repeating the Add Curve process.

DDE Generator   *5-22.*

The DDE Generator program is a DDE server program that generates curves in Real Time. This program is provided with Trend Link as a testing and evaluation tool so that the user can see how Trend Link performs with Real Time data.

The Generator is activated by selecting the DDE Generator icon in the Trend Link for Fluke program folder (group). When the program is activated, the Generator will automatically minimize itself. To begin logging the curves created by the DDE Generator, activate the DDE Logger program and select the GENDEMO.LCF (from the EXAMPLE subdirectory) configuration file from the dialog box. (For details on running the Logger, see the DDE Logger section earlier in this chapter.) The curves may then be viewed by activating Trend Link and selecting the GENDEMO1.CHT file from the EXAMPLE subdirectory, or by selecting curves using the Add Curve option. The curves generated by the DDE Generator will be placed in the Generate Demo Data Set.

Exchanging Data with Other Applications   5-23.

Trend Link provides the following facilities that allow for data transfer between Trend Link and other applications.

Using OLE to Embed Trend Link Charts in Other Applications   5-24.

Trend Link includes OLE functionality that allows for embedding Trend Link charts into applications that are compliant with embedding OLE objects. To embed a Trend Link chart into another application, select insert object from the target application. From the list of embeddable objects, select Trend Link x.x Chart File Document.

A Trend Link document then embeds into the client application, as shown here with MS Word:
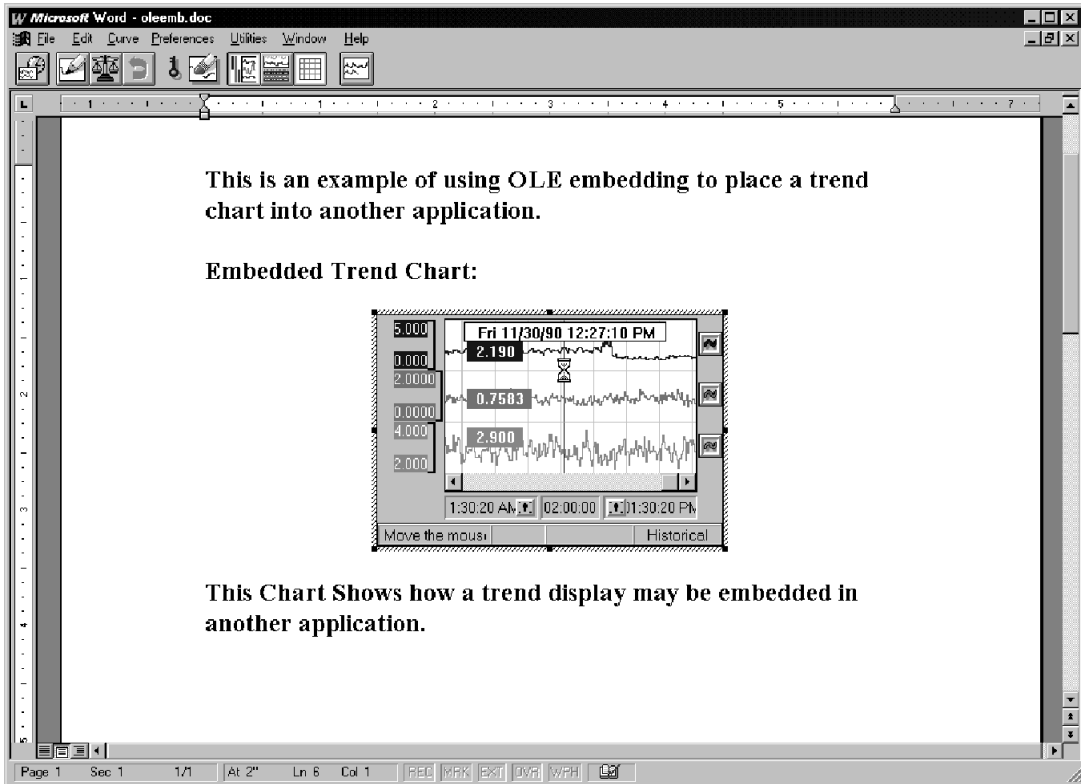
When the trend chart object inserts into the client application, it is active. The Trend Link menu and Control bar replace the menu bar of the client application. You can interact with the embedded chart as if it were a chart running in Trend Link.

As long as the focus is on the embedded chart, and you are interacting with the chart (the mouse is being moved), the chart continues to update and reflect current information including real time updates if the chart is in Real Time mode. Once you stop interacting with the object or the window loses focus, the embedded chart becomes inactive, and Trend Link writes the contents of the chart to a Windows Meta File (WMF) embedded in the client application as shown here:
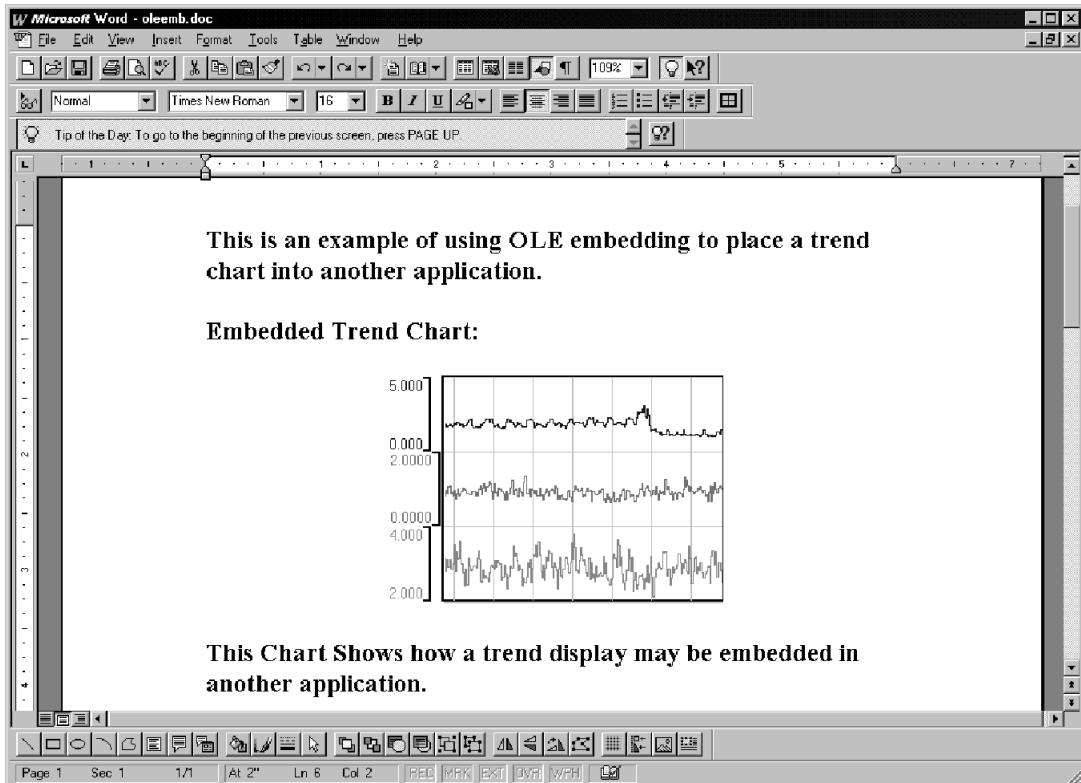
By double clicking on the embedded metafile, the chart may be re-activated, becoming interactive once again.

Performing ODBC Queries Into the Trend Link Database 5-25.

Trend Link comes with an ODBC driver that allows users to perform ODBC queries into historical data files created by Trend Link. This ODBC driver is read-only. It does not allow users to write data into the historical database.

The ODBC driver allows users to select data from two different types of tables that relate to Trend Link historical files. These table types are Data Set tables and Tag tables.

Data Set Tables 5-26.

The names for these tables are the same as for the Data Sets in the historical databases and contain information regarding the contents (Tag Information) of the Trend Link Data Sets they represent. The columns defined for these tables are as follows:

- **Tag_Name:** This is a 64 byte character column containing the name of the tag.

- **Description:** This is a 64 byte character column containing the description of the tag.

- **Engineering_Units:** This is a 64 byte character column containing the Engineering units of the tag.

- **Log_Rate:** This is a Double Precision Numeric field containing the rate at which Trend Link logs samples for the tag.

- **High_Scale:** This is a Double Precision Numeric field containing the value that appears as the upper limit of the band area for the tag.

- **Low_Scale:** This is a Double Precision Numeric field containing the value that appears as the lower limit of the band area for the tag.

- **Hi_Limit:** This is a Double Precision Numeric field containing the value that used as the upper alarm limit for the tag.

- **Low_Limit:** This is a Double Precision Numeric field containing the value to use as the lower alarm limit for the tag.

Tag Tables *5-27.*

Trend Link names these tables by using the Data Set name that contains the tag followed by a colon, followed by the name of the tag that the table represents (i.e. Data Set:Tag Name). Tag tables contain the information that logged into the database for the tag they represent. The columns that defined for these tables are as follows:

- **ASCII_Time:** This is a 64 byte character column containing the ASCII representation of the timestamp.

Note

When performing queries on this field, it is important to remember that this is a character field; comparison operations on this field are alphabetically (not time) based.

- **Double_Time:** This is a Double Precision Numeric field containing the GMT time (Number of milliseconds since 12:00:00am Jan. 1, 19970) for the tag.

- **Lotus_Time:** This is a Double Precision Numeric field containing the Lotus time (Lotus spreadsheet time format) for the tag.

- **Value:** This is a Double Precision Numeric field containing the value logged to the database for the tag.

- **Status:** This is a Double Precision Numeric field containing the status logged to the database for the tag.

Performing an ODBC Query 5-28.

To query data from the Trend Link historical database, activate the client application that reads data from the database. From the client application, activate the SQL query option that allows ODBC queries and select the Trend Link (TLODBC Driver) as the data source for the query.

Retrieve the desired information for the query by choosing the selection criteria and executing the query. The TLODBC Driver returns the data that meets the selection criteria.

Configuring the Trend Link TLODBC Driver 5-29.

You can configure the options used by the TLODBC Driver to select data from a Trend Link database. To configure the TLODBC Driver, run Control Panel from the Main group and select the icon labeled ODBC to activate the ODBC Driver configuration utility.

From the list of ODBC Drivers, select the one labeled TBase32 (TBase ODBC Driver) and click on the Setup... button. A dialog box appears as shown below, allowing you to enter the parameters for the driver.
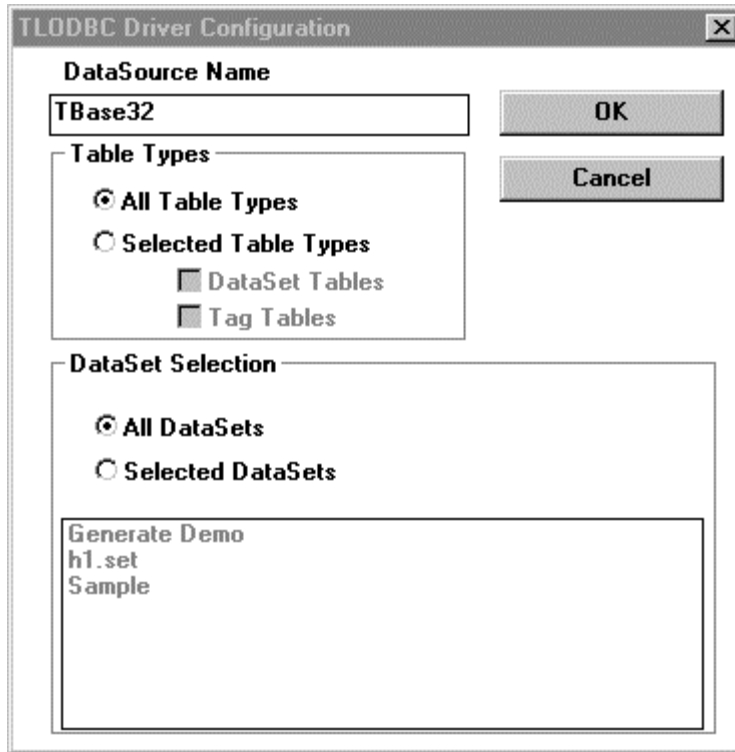
From this dialog box you can specify any restrictions that are to be placed on queries done by the TLODBC driver. At the top of the dialog, you can specify the DataSource Name for the TLODBC Driver. The default DataSource name is TBase32.

The Table Types section of the dialog box (just under the DataSource Name box) allows you to select the table types (described above) that the TLODBC Driver should consider when processing queries. The default for this section is All Table Types.

The section at the bottom of the dialog box allows you to specify which Data Sets for the TLODBC Driver to consider when processing queries. The default for this section is All Data Sets

Chapter 6
Configurator

Contents   **Page**

Introduction *6-1.*

The Configurator program provides a simple method of creating Logger
Configuration files. Using the Configurator, the user can create configuration files
to connect to any DDE server application. When reading data using the Windows
DDE Interface, the user can also use the XL Table format defined by Microsoft.

You can also use the Configurator to maintain Trend Link Data Set files. This
allows the user to rename, change, or delete Data Sets without having to use the
Windows File Manager, Windows 95 Explorer, or a text editor for the
INFOLINK.INI file. See the Editing Data Sets section farther on in this chapter
for more information on these functions.

Activate the Configurator by selecting the Configurator icon in the Trend Link for
Fluke program folder (group); the Configurator's Main window appears. This
window allows the user to create and modify various Logger Configuration files.

Configurator Window *6-2.*

The Configurator is a Windows Multiple Document Interface (MDI) application.
The Configurator's Main window that appears at startup is the MDI parent
window. The menus that appear in this window may apply to the Main window or
to the active MDI window depending on the usage of the menu command.

This section describes the basic features of the Configurator's Main window. The
following diagram shows the components of the Main Window:

File New Button
File Open Button
File Save Button
Cut Text Button
Copy Text Button
Paste Text Button
Undo Button
Find Text Button
Find Next Button

Status Bar
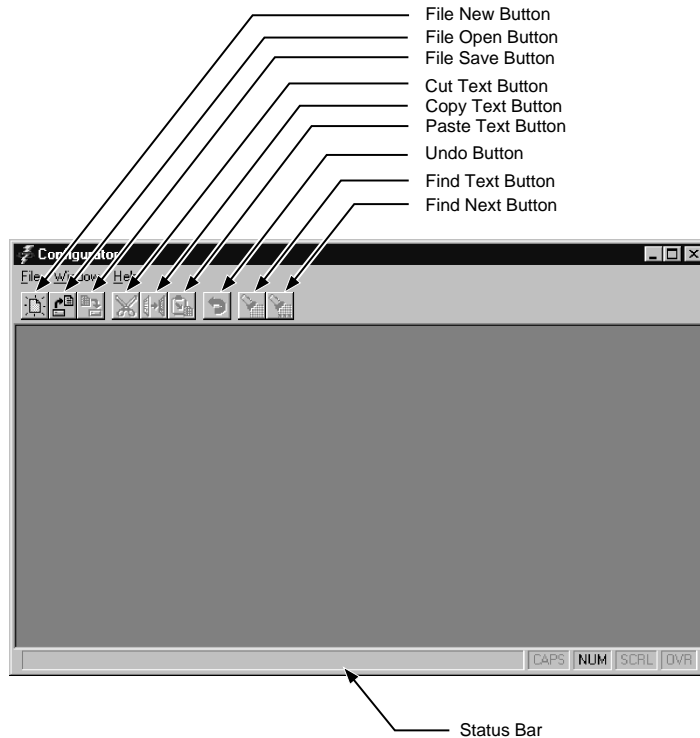
TUTorial 6-3.

This section describes how to create a Logger Configuration file using the Configurator. In this section, the user will create the sample Logger configuration file GEN_LK5.LCF. which connects to five Tags in the Generator program using standard DDE HotLinks.

Open a New Configuration File 6-4.

Open a new configuration file by selecting NEW from the File menu or by pressing the File New button on the toolbar. This will bring up a new configuration file folder as shown below:
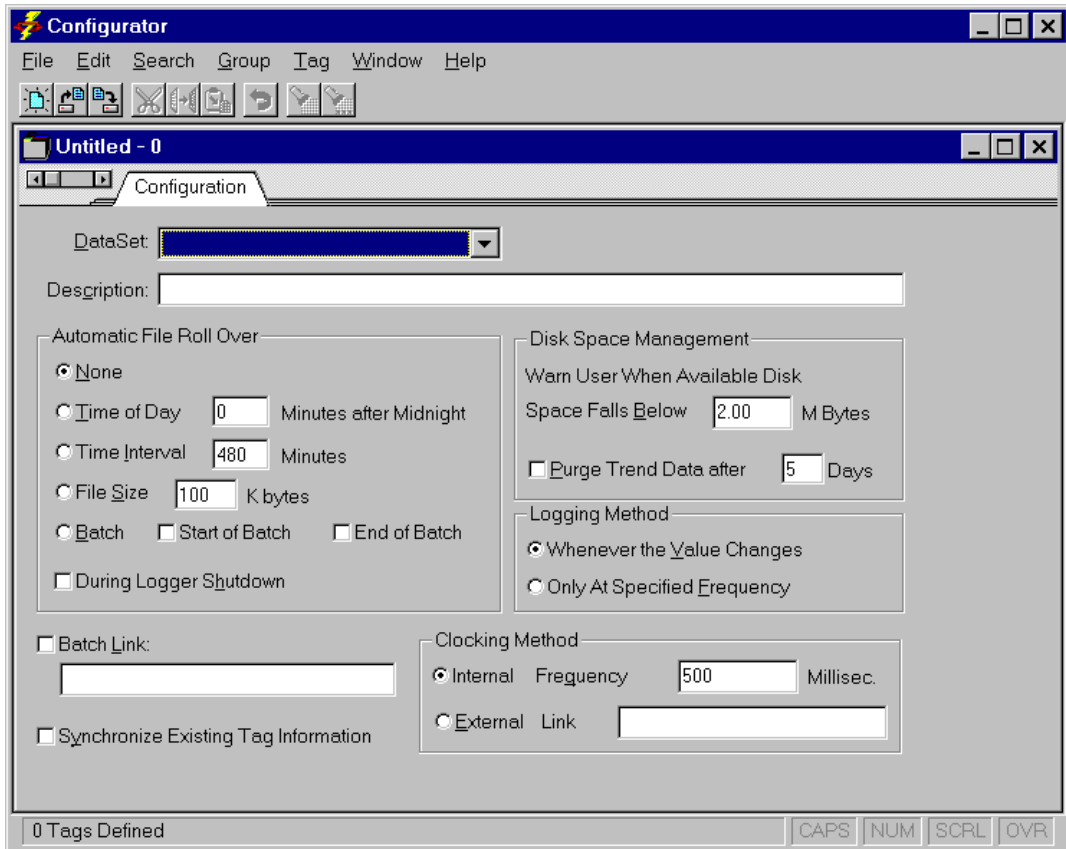
Complete the Configuration Page   6-5.

The first page of the configuration file is the configuration page. When a new file is opened, the configuration page will appear as shown above. This page contains information about the Logger Configuration file that is common to all groups in the file. The page should be completed as described on the following pages.

Select a Data Set. The Data Set that will be used by the configuration file may be selected from the Data Set list box at the top center of the configuration page. Press the arrow at the end of the list box and all Data Sets currently defined will appear in a drop down list. Select the Generate Demo Data Set by highlighting it in the drop down list.

Enter a Description of the Data. A description of the data defined by the configuration file may be entered in the description field just below the Data Set list box. Enter "Test Data" in the description field.

Select a File Roll Over Method. The Automatic File Roll Over method may be selected by choosing the appropriate option from the Automatic File Roll Over section at the center of the configuration page. The possible choices for Automatic Roll Over are None (no Automatic Roll Over), Time of Day (number of minutes from midnight), Time Interval (number of minutes between Roll Overs), File Size (size in kilobytes the file should reach before Roll Over occurs), and Batch (beginning and/or end of a batch). Select the button in front of None.

Set the Purge Feature. The automatic Purge feature may be set by checking the box in front of the Purge option and entering the number of days that Logger should keep data files before deleting them. When this option is set, Logger will automatically delete files in this Data Set that are older than the specified number of days. For this example, we will not use the purge feature, so be sure that the box in front of the Purge option is not checked.

Note

If you set Automatic Purge but disable Automatic Roll Over you risk losing your current data file if it gets too old. For example, if you set Automatic Purge for 5 days and you select no Automatic Roll Over method, after 5 days your current data file will be deleted. To prevent this situation, make sure that your file Roll Over method causes a Roll Over before the time period set for Automatic Purge.

Set the Logging Method. The user may also select the Logging Method that is to be used by the Logger by checking the appropriate option in the Logging Method section at the bottom of the configuration page. Check the box in front of Only at Specified Frequency. This will cause the Logger to use the log rates specified in this file.

Set the Clock Source. The user may elect to reference an External Clock to generate the timestamps for data being recorded by Logger by checking the box in front of the External Clock option and then specifying a DDE clock source in the box. For this example, however, we will be using Logger's internal clock, so be sure that this check box is not selected and that an internal clock frequency of 500 milliseconds is entered. This tells the Logger to check for new data and update the file timestamp on the disk every 500 milliseconds.
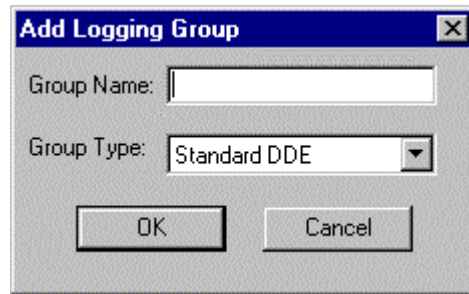
When the configuration page is complete for this file, it should appear as shown below:
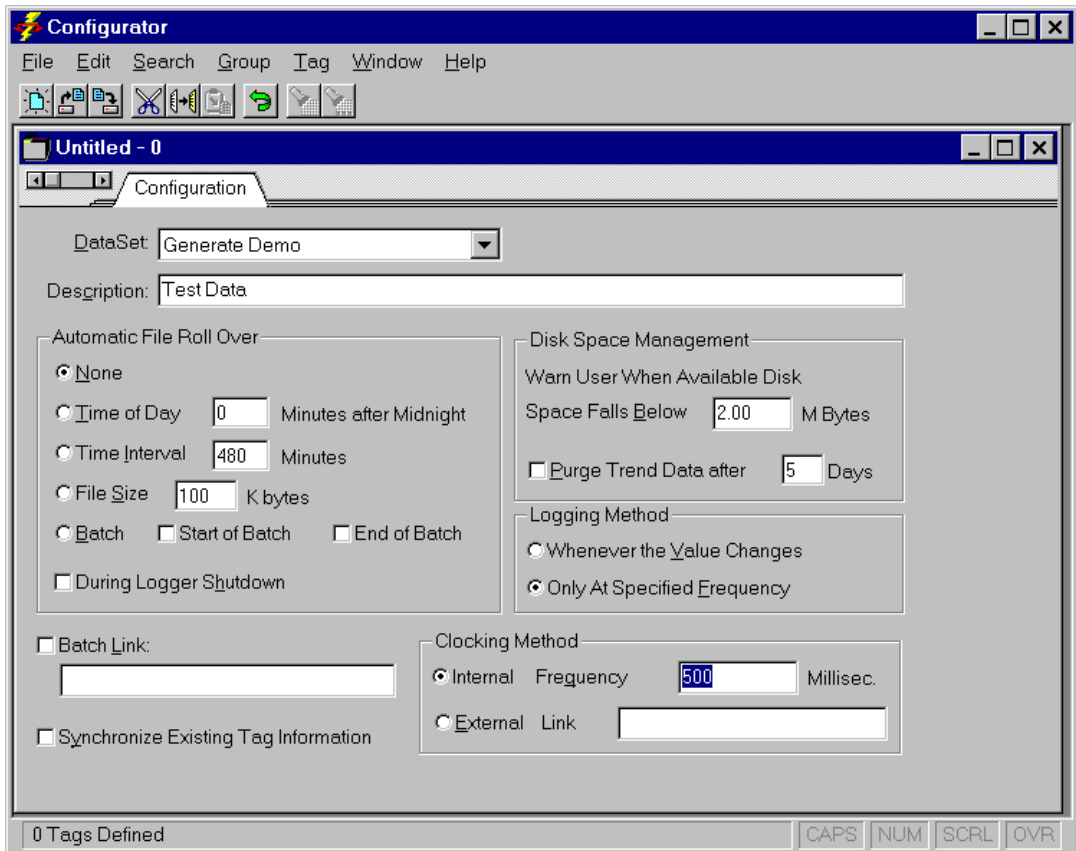
Add a Group to the File 6-6.

Select Add.. from the Group Menu. Add a group to the configuration file by selecting Add... from the group menu. This will cause the Add Logging Group dialog box to appear as shown below:

Complete the Add Group Dialog Box   *6-7.*

Enter a Group Name. Enter the name of the logging group that you wish to add by typing the group name, "DDE Tags", in the group name box at the top of the Add Logging Group dialog box.

Select a Group Type. Select the standard DDE group type. To do this, click on the arrow at the end of the box labeled Group Type. This causes a drop down list box containing a list of all valid group types to appear. From this list select Standard DDE.

Once the group name and type have been specified, click on the OK button. A new group page called DDE Tags will be added to the current booklet. Click on the page tab labeled DDE Tags, and the new group page will appear as shown below:
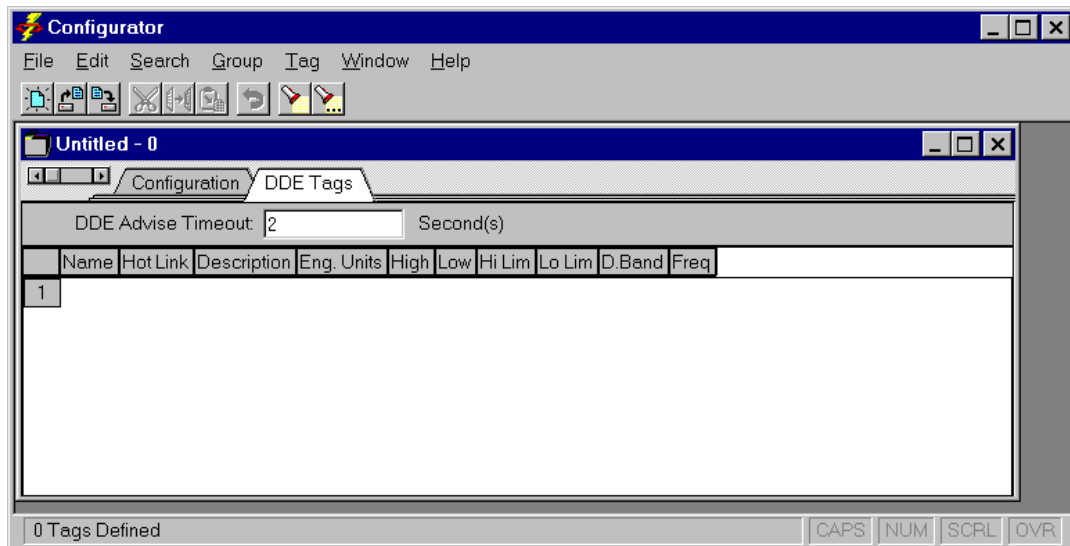
Complete the Group Page   *6-8.*

Enter the DDE Advise Time-Out Parameter. Enter the value for the DDE Advise time-out parameter in the box at the top of the DDE Tags group page. This tells the Logger how long to attempt to establish a DDE connection before timing out. Since the Generator will be running on the same machine as the Logger, this value should be set to 2 seconds. (This is the default value.)

Complete the Table of DDE Connections For This Group   *6-9.*

Add a Tag to the Table. Add a Tag to the group by selecting Add Blank Tag from the Tag menu. A new row will appear in the table on the group page. This row will not contain any data, but the cell borders will be shown in gray.

Fill in the Tag Information For the New Tag. Fill in the information corresponding to the Tag that you just added by selecting a cell and entering the appropriate parameter.

The first cell in the row is the name of the Tag. This is the name that will be used by Trend Link to identify the Tag. The first Tag in the sample file is called Steps, so enter the name **Steps** in this cell.

The second cell is the DDE Hotlink name. This is the name of the Tag in the DDE Server application that you wish to connect to. This name is defined by the server application. In this case, the Hotlink name for the Steps variable in the Generator is **GENERATE|TAGNAME!Steps**. Enter this name into the Hotlink Cell.

The third cell in the row is a Description of the data that is being logged. Trend Link will use this description to describe the data that is displayed. Enter **Stepping Curve** into this cell.

The fourth cell in the row is the Engineering Units that the values for the Tag will be given in. Since the stepping curve is simply a number (not meters, or degrees, etc.), we will leave this cell blank.

The fifth cell in this row is the High Scale value. This is the default upper scale limit that Trend Link will use when drawing the Tag. Enter a value of **100** in this cell.

The sixth cell is the Low Scale value. This is the default lower scale limit that Trend Link will use when drawing the Tag. Enter a value of **0** in this cell.

The seventh cell in the row is the High Limit value. If the Tag goes above this value, it will be drawn in the highlight color for the curve, indicating that this limit was exceeded. Enter a value of **100** in this cell.

The eighth cell in the row is the Low Limit value. If the Tag goes below this value, it will be drawn in the highlight color for the curve indicating that this limit was exceeded. Enter a value of **0** in this cell

The ninth cell in the row is the logging Deadband value for the Tag. If the value of the Tag has not changed by this deadband value since the last logged value, no new value will be logged for the Tag. This deadband allows Logger to ignore insignificant fluctuations in the data (noise). Enter a value of **0** for the deadband. (This will cause Logger to record a new value any time the value changes.)

The final cell in the row is the Log Rate. This is the sampling interval in seconds (use decimal numbers for interval values of less than 1 second) that the Logger should check for new data. Enter a value of 0.5 in this cell. This completes the definition of the Tag.

Add Additional Tags. Add the additional Tags by repeating the previous two steps for each Tag that is to be added to the group. The information for the remaining sample Tags is shown in the following table:

Name	HotLink	Desc.	Units	Hi Scale	Lo Scale	Hi Limit	Lo Limit	Dead band	Log Rate
Degrees	GENERATE| TAGNAME! Degrees		Circle Degrees	100	0	100	0	0	1
Sine	GENERATE| TAGNAME! Sine	Sine Wave		100	0	100	0	0	2
SysLoad	GENERATE| TAGNAME! SysLoad	System Load		100	0	100	0	0	0.5
Random_00	GENERATE| TAGNAME! Random	Random Number		100	0	100	0	0	10

Once the information for all of the Tags has been entered, the Group page is complete and should appear as follows:
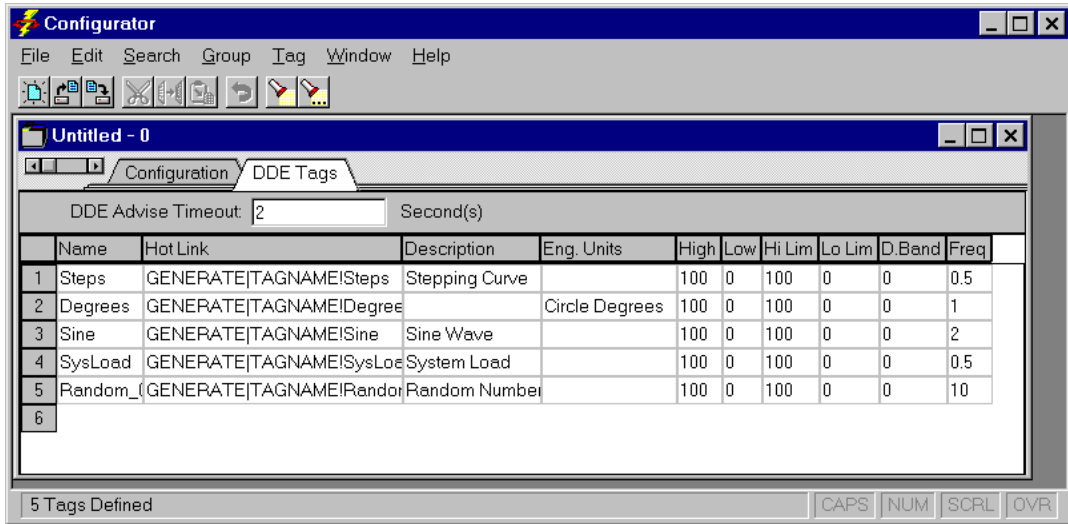
Save the New Logger Configuration File   6-10.

The Logger configuration file definition is now complete. To save the file, select the Save As... option from the file menu and save the file as GEN_LK5.LCF. This file may now be used by Logger to connect to the Generator application. See the DDE Logger section in this manual.

File Menu Options   6-11.

The File menu. is used for performing actions on a Logger configuration file. A configuration file stores the information that defines the data that is to be logged. This includes Tag information such as name, description, and scale limits. For detailed information on the format of a Logger Configuration file, see the Logger Configuration Files section of this chapter.

Open   6-12.

This command is used to load an existing configuration file and begin an edit session for the file. The file will be assigned a configuration window as shown below for the GenDemo.LCF file:
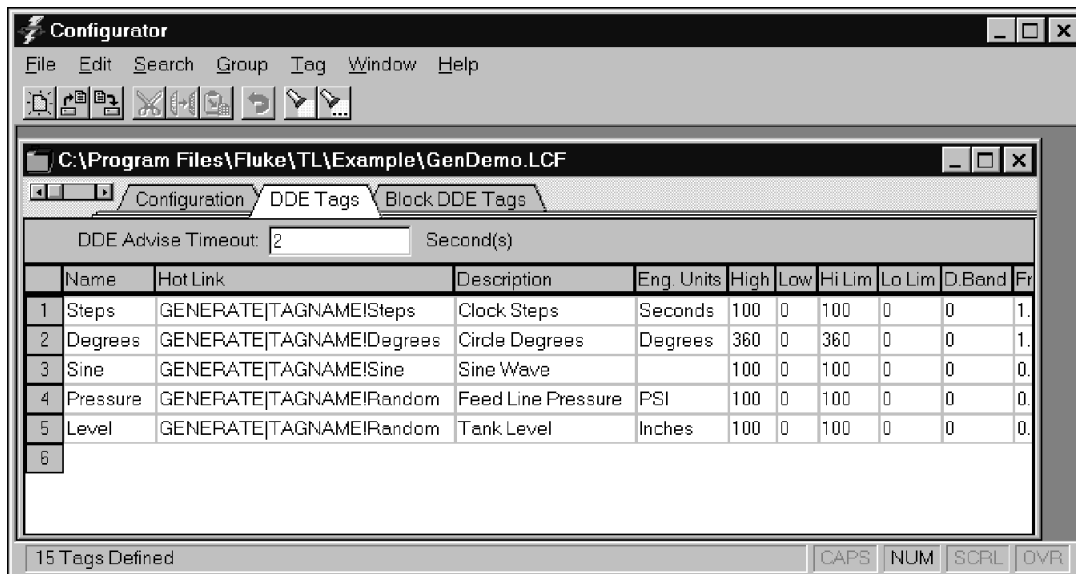
This window contains all the information that pertains to the corresponding configuration file. Multiple configuration files may be opened for editing at one time. Each will be assigned its own configuration window for editing. For more information on editing configuration files see the Configuration Windows section in this chapter. This command can also be activated by pressing the File Open button on the tool bar.

New 6-13.

This command is used to create a new configuration file. It will cause a new configuration window to be created and start an edit session for the new file as described in the Open File section earlier in the chapter. This command can also be activated by pressing the File New button on the toolbar.

Close 6-14.

This command is used to close the current edit session for a configuration file. If the file has been altered since the last time it was saved, the user will be prompted by a dialog box asking if the file should be updated before closing.

Save 6-15.

This command is used to save the configuration file that is being edited in the active configuration window. The Save command will be grayed if no changes have been made to the file during the current edit session. This command can also be activated by pressing the File Save button on the toolbar.

Save As 6-16.

This command is used to save the configuration in the active configuration window to a different filename or directory. The Save As command will be grayed if no changes have been made to the file during the current edit session.

Data Set 6-17.

This command activates the Data Set maintenance facility, which allows the user to perform operations such as adding a Data Set, deleting a Data Set, and modifying a Data Set. A complete description of this facility may be found in the Editing Data Sets section located later in this chapter. For a complete description of Data Sets, see the Data Sets section of the Advanced Concepts chapter in this manual.

Databases 6-18.

This command activates the Define Databases dialog box. This dialog box allows the user to set the paths for database definition files that allow the Configurator to access certain databases.

Exit   6-19.

This command is used to close all configuration file edit sessions and end the Configurator program. Upon execution of this command, all active edit sessions will be ended and all of the configuration files will be closed. If a file has been altered since the last time it was saved, the user will be prompted by a dialog box asking if the file should be updated.

Edit Menu Options   6-20.

The Edit menu is used for performing special actions on a selected block of text or cells. The Edit menu is also used for undoing previous commands.

Undo   6-21.

The Undo function is used to reverse the effect of the last action performed. For example, to restore a block of text that was accidentally deleted. If the undo function is immediately chosen again, the action will be repeated.

Cut   6-22.

The Cut function is used to remove a selected block of text from an edit field and place it into the Windows clipboard. A block of text may be selected by using the mouse to highlight the text. A block of text that has been cut to the clipboard will remain there until something else is placed on the clipboard by another cut command or a similar command like Copy.

Copy   6-23.

The Copy function is used to copy a selected block of text from an edit field and place it into the Windows clipboard. A block of text may be selected by using the mouse to highlight the text. A block of text that has been copied to the clipboard will remain there until something else is placed on the clipboard by another copy command or a similar command like Cut.

Paste 6-24.

The Paste function is used to place a copy of the contents of the Windows clipboard at the current cursor location. This does not clear the current contents of the clipboard.

Clear All 6-25.

The Clear All function removes the contents of the currently selected field(s). The current field is the field that currently contains the cursor. Note that this command clears the entire contents of the field, not just the highlighted portion.

Delete 6-26.

The Delete function removes selected text from a field. Text is selected by using the mouse to highlight the desired text. Note that this command does not delete the entire contents of the field, only the highlighted portion

Search Menu Options 6-27.

The Search menu offers functions that allow the user to locate and modify specific text in a configuration file.

Find 6-28.

The Find command activates a search facility that allows the user to locate a desired text string. When this command is activated, a window will appear that asks the user to define the string that is to be located. Once the string is defined, the user should click on the Find Next button, and the cursor will jump to the next occurrence of the string.

Replace 6-29.

The Replace command activates a facility that allows the user to automatically replace existing occurrences of a text string with a different text string. When this command is activated, a window will appear that asks the user to define the string that is to be replaced and the string to replace it with. Once the strings are defined, the user should click on the Replace or Replace All button to replace the first occurrence of the search string or all occurrences respectively.

Next 6-30.

The Next command activates a search facility that will locate the next occurrence of the last string that was searched for using the Find command.

Group Menu Options 6-31.

The Group menu provides functions that allow the user to add and delete groups of links to the current configuration file.

Add 6-32.

The Add command allows the user to add a new group of links to the configuration file. When this command is selected, the following dialog box appears allowing the user to enter the name of the new group and select the type of group that is to be added to the configuration file from a drop down list box of available group types:
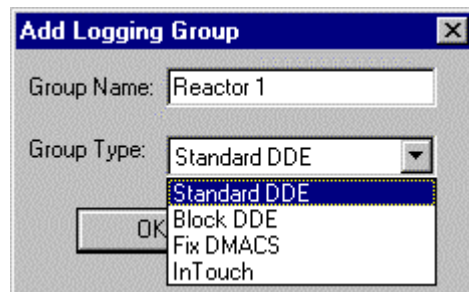
There are four different types of groups that may be defined in the configurator: Standard DDE Groups, Blocked DDE Groups, FIX DMACS Groups, and InTouch Groups.

A Standard DDE Group is a set of links that will use the standard DDE protocol to connect to the Server application.

A Blocked DDE Group is a set of links that will connect to the Server application using the XL Table DDE format as defined by Microsoft, which allows an array of values to be passed as a single DDE message. This method is generally faster than the standard DDE protocol when dealing with multiple links, but the DDE server application that is being linked to must support the XL Table protocol.

A Fix DMACS Group is a set of links that will connect directly to the Fix DMACS real time database via DLL. Using Fix DMACS groups provides a faster throughput between Logger. Fix DMACS can also cut down on the amount of DDE overhead when connecting to a large number of Tags. The user may also elect to connect to Fix DMACS using Standard DDE groups. However, for a large number of links, it is recommended that the user connect via Fix DMACS Groups to reduce the amount of overhead involved and take advantage of the greater speed offered by direct connection to the database.

An InTouch Group is a set of links that will connect directly to the InTouch real time database using the PTACC DLL. Using InTouch groups provides a faster throughput between Logger and InTouch and can also cut down on the amount of DDE overhead when connecting a large number of Links. The user may also elect to connect to InTouch using Standard DDE groups; this is fine for relatively small numbers of links (<50). However, for a larger number of links, it is recommended that the user connect via InTouch Groups to reduce the amount of overhead involved and take advantage of the greater speed offered by direct connection to the database.

Delete 6-33.

The Delete command allows the user to remove the current group from the configuration file. When the users selects this command, a dialog box appears asking the user to confirm the delete. If the user clicks OK, the group will be removed from the configuration file.

Tag Menu Options 6-34.

The Tag menu is used for performing functions on the current Tag. The current Tag is the Tag that currently has the cursor in one of its fields. A Tag may also be selected (and hence made the current Tag) by clicking on the appropriate Tag number in the group window. This will cause the current Tag to be highlighted.

Add Blank Tag 6-35.

The Add Blank Tag command adds a Tag to the end of the current group. This Tag will initially be blank and must be filed in by the user. For more information on adding Tags to a group, see the Group Pages section of this chapter.

Delete Tag 6-36.

The Delete Tag command removes the current Tag from the group.

Help Menu Options 6-37.

The Help menu displays the selections for Online assistance, including Help, Search, and Tutorial, plus a display for the copyright and version of the application.

About 6-38.

The About... option under the Help menu will display a logo screen giving the version information of the Configurator.

Contents 6-39.

The Contents... option under the Help menu can be selected to access context sensitive help pertaining to the Configurator.

Configuration Windows 6-40.

Configuration windows allow the user to edit the Logger Configuration files. Each configuration window contains a workbook that holds all of the configuration information for a Logger Configuration file. Each configuration file that is opened will have its own configuration window holding the workbook for the current configuration file.

Each workbook contains a Configuration page and may contain one or more Group pages. These pages are described on the following pages.

The Configuration Page 6-41.

The Configuration page contains information that is common to all groups in the configuration file. There will be exactly one configuration page for each Configuration Window (File). The configuration page will appear as shown below:
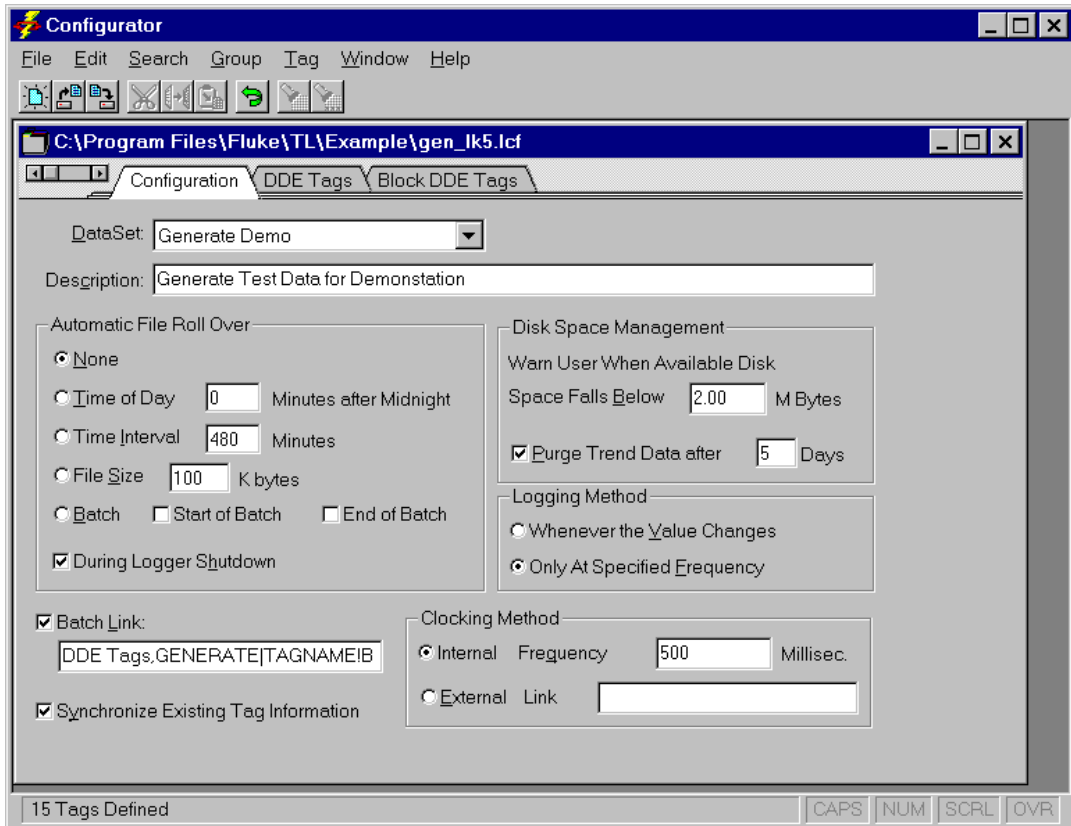
The Data Set that will be used by the configuration file may be selected from the
Data Set list box at the top center of the configuration page. All Data Sets
currently defined will appear in this list box. A description of the data defined by
the configuration file may be entered in the **Description** field just below the Data
Set list box.

The Automatic File Roll Over method may be selected by choosing the appropriate option from the **Automatic File Roll Over** section at the center of the configuration page. The possible choices for Automatic Roll Over are None (no Automatic Roll Over), Time of Day (number of minutes from midnight), Time Interval (number of minutes between Roll Overs), File Size (size in kilobytes the file should reach before Roll Over occurs), and Batch (beginning and/or end of a batch). The user may also instruct Logger to perform a Roll Over every time Logger is closed by checking the box in front of the **During Logger Shutdown** option. For a complete description of the file Roll Over process, see the File Roll Over section of the Connecting to a DDE Server Application chapter in this manual.

Logger may be configured to warn the user when available disk space falls below a preset amount. To enable this feature, enter the desired amount of disk space remaining (in Megabytes) in the section labeled **Warn User When Available Disk Space Falls Below _____M Bytes**. If the user does not wish to be warned about low disk space, enter 0 in the box. It is highly advised that this feature be used because running out of storage space while logging data will result in loss of data and may also result in corrupting the existing data file.

Note

When the low disk space threshold is reached, Logger will display a dialog box displaying the low disk space warning and will suspend logging until this warning is acknowledged. No additional data will be logged as long as the warning dialog is displayed.

The automatic Purge feature may be set by checking the box in front of the **Purge** option and entering the number of days that Logger should keep data files before deleting them. When this option is set, Logger will automatically delete data files in this Data Set that are older than the specified number of days.

The user may also select the Logging Method that is to be used by the Logger by checking the appropriate option in the Logging Method section at the bottom of the configuration page. The two methods available are **Log Whenever the Value Changes** and **Log Only at Specified Frequency**. If the Log Whenever Value Changes method is selected, Logger will log a new value for a given Tag each time the value of the Tag changes, regardless of the logging frequency defined for the Tag in the configuration file. If the Log Only at Specified Frequency method is selected, the Logger will only check for changes to a Tag at the frequency specified for that Tag in the configuration file. If the value has changed since the last sample interval then it will be recorded. Regardless of which logging method is used, the timestamp will be continuously updated so that no data is lost in the event of a system crash. For a complete description of the logging methods available to the Logger, see the Logging Methods section of this chapter.

The user may elect to reference an External Clock to generate the timestamps for data being recorded by Logger. To do this, the box in front of the **External Clock** option should be checked, and the name of the DDE link that will provide the timestamp should be placed in the box following the external clock option. This DDE link should provide a timestamp in the MS GMT time format.

If an **Internal Clock** is specified, a clock frequency should also be provided. This is the frequency in milliseconds that the clock will update and write timestamps to the disk. The default value for the internal clock of the logger is 500 ms. This is not a limit and may be set faster for high speed applications.

Note

Since this frequency is the maximum speed at which Logger will update tags, it should be at least as fast as the fastest frequency that any tag is being recorded at so that no data will be lost for that tag.

If Logger is being used in batch mode, the user may specify a Batch Identifier Link, which is used by the Logger to determine when the current batch ends and the next batch begins. This Link will provide the Logger with the batch name for the current data. Whenever this Link changes value, a new batch will be created using the new Batch name provided by the link identifier.

To specify a Hot Link that will act as a batch identifier, check the **Batch Link** option, and enter the appropriate information describing the batch identifier. To define the Batch Identifier Link, the user must provide the following parameters. These parameters are separated by commas and must appear in the order shown below:

```
Group Name,Hot Link,Lograte,Batch Prefix Indicator,Batch Prefix
```

Group Name: This is the name of the Tag Group that has the same link properties as the link that will be used as the batch identifier. For instance, in the above example the group name specified is DDE Tags, which is a Standard DDE group; the batch identifier will use a Standard DDE link.

Hot Link: This is the name of the link that will provide the Batch Identifier. In the above example, the Hot Link is GENERATE|TAGNAME!Batch Name, which is a Standard DDE link. If a different group type would have been specified as the first parameter, the type of Hot Link entered here would match the format for that group type. A description of the various group types and link formats is given below under Group Pages.

Lograte: This field is the rate in seconds that the batch identifier should be checked to see if a new batch has begun. This parameter defaults to 1 if no parameter is specified.

Batch Prefix Indicator: This is used to indicate whether the user wants to attach a prefix string to the batch indicator. If this parameter is 1, no string should be attached, and the parameter should be displayed as is. If this parameter is 0, the string specified by the Batch Prefix parameter should be added to the batch identifier as a prefix. This parameter defaults to 1 (no string) if it is not specified.

Batch Prefix: This is a string that will be added as a prefix to the batch identifier. For instance, if the batch identifier is a numerical batch number X, the user may opt to use "Batch Number" as a batch prefix so that Trend Link will display "Batch Number X" when referring to the batch. If no value is assigned to the Batch Prefix parameter, it defaults to "Batch Num.".

Group Pages 6-42.

Group pages allow the user to configure the various Link groups that may be present in a configuration file. There are currently four types of group pages, two of which are explained below:

Standard DDE Group Page 6-43.

This page allows the user to enter information for standard DDE connections. At the top of the page the user may enter the **DDE Advise Timeout** parameter. This parameter is the amount of time in seconds that the Logger should attempt to establish a DDE link before timing out and failing the attempt. For a normal DDE Link to an application running on the same system as the Logger, 2 seconds should be sufficient for this parameter. If connecting to a DDE server on another PC via NetDDE, this parameter may have to be raised to 10 seconds or more, depending on the speed of the network. In general, if Logger gives the error "Advise HotLink Failed", try increasing the Advise Timeout parameter.
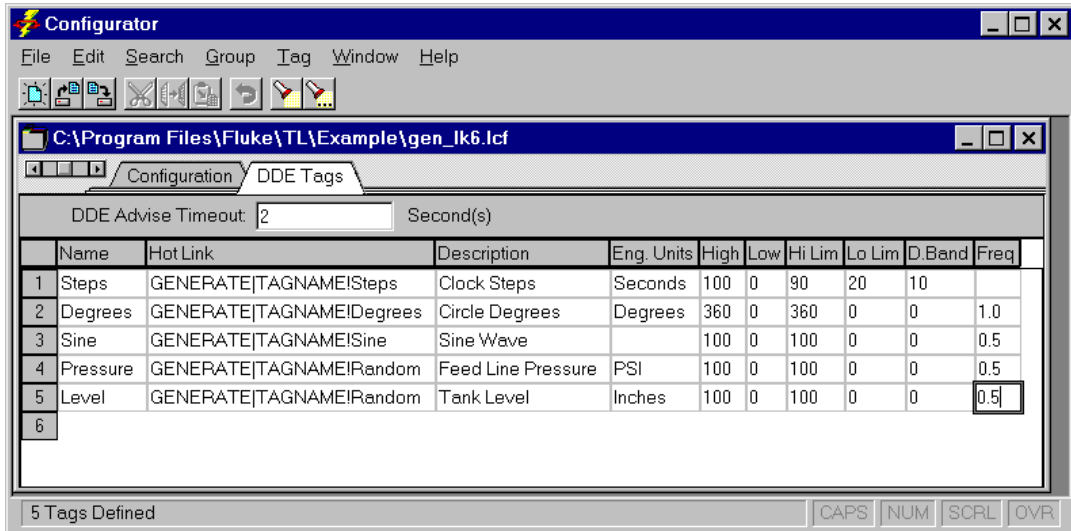
The remainder of the page is a table defining the Tags that are to be connected via standard DDE. The first row of the table is a header row that shows the fields that are to be defined for each Tag. Each of the fields in this row will be described in detail below. The first column of the table is the number of the Tag that is being defined. This numbering is simply how the Tags will be listed in the configuration file and has no functional significance.

Name is the name of the Tag (curve) that will be placed in the log file. This is the Tag name that is displayed by Trend Link. This field is limited to 63 characters.

The **HotLink** field describes the DDE Hotlink that will provide data for the Tag. It is composed of three components: the application name, the topic name and the item name. These three components of the DDE Link Field are separated using the | and ! symbols as shown in the following line:

```
GENERATE|TAGNAME!Steps
```

In this case GENERATE is the application name, TAGNAME is the 'topic' name and Steps is the item name. You must use the | and the ! symbols as separators between the DDE Link components.

The application name, topic, and item are defined by the DDE server that is issuing the DDE Tag information. GENERATE and TAGNAME are the application and topic used by the DDE Generator application. Steps is a Tag variable that is generated and made available as an item to the DDE. The DDE Link fields may also refer to a Network-DDE type of HotLink. Some Net-DDE addresses use a comma in the HotLink name. Since the DDE Logger uses a comma as a field delimiter, HotLink Names containing commas must be enclosed in quotes.

The following fields are used when creating the Tags in the log file. The **Description** (63 bytes max.) and **Eng. Units** (31 bytes max.) are labels that are displayed by Trend Link to help describe the data for a given Tag data. The **High** Scale and **Low** Scale parameters determine the default scale range used by Trend Link when the Tag is first added. **HiLim** defines the default value above which Trend Link will display the curve in its highlight color. Similarly, **LoLim** defines the default value below which Trend Link will display the curve in its highlighted color. These fields are used as defaults when the Tag curve is graphed. Their values can be modified from within Trend Link for individual trend charts.

The next field is the **Deadband**, which determines the amount of change that a variable must undergo before an updated value is logged into the file. This allows the user to eliminate insignificant fluctuations of the data. A value of zero, will cause any change in the value to be logged.

The Final field is the Log Rate **Frequency** field. This is an optional field. If this field is left blank, the data is checked for logging into the file at the maximum rate of one sample per second. If this field is set, it represents the sample rate in seconds that the data will be checked for logging. Periods of less than one second are represented using decimal values. For example, if this parameter is set to 60 the data for the Tag will be checked for logging every minute. If this parameter is set to .5, the data for the Tag will be checked for logging twice a second. Please note when setting this value, that the Logger only looks at the current data value when checking a data point for logging. It does not average the values over the time period.

This sample configuration file shown on the prior page will establish DDE links with 5 different Tags. The first Tag definition line consisting of

```
Steps=GENERATE|TAGNAME!Steps,Clock Steps,Seconds,100,0,90,20,10
```

will log the variable (Tag) called Steps when the value changes by more than 10. The default Maximum Value is 100 and the default Minimum Value is 0. The Alarm (or Highlight) Limits are set when the value exceeds 90 or drops below 20. Seconds is the description of the Engineering Units that Steps is measured in. Data for this Tag will be checked for logging at a rate of once per second (the default rate), since the Log Rate Frequency field was omitted.

Blocked DDE Group Page 6-44.

This page allows the user to enter information for Blocked DDE connections that use the XL Table format as defined by Microsoft to transfer a block of data as a single DDE message. At the top of the Blocked DDE Group page, the user should enter the **HotLink** that is to be used to transfer the block of data.
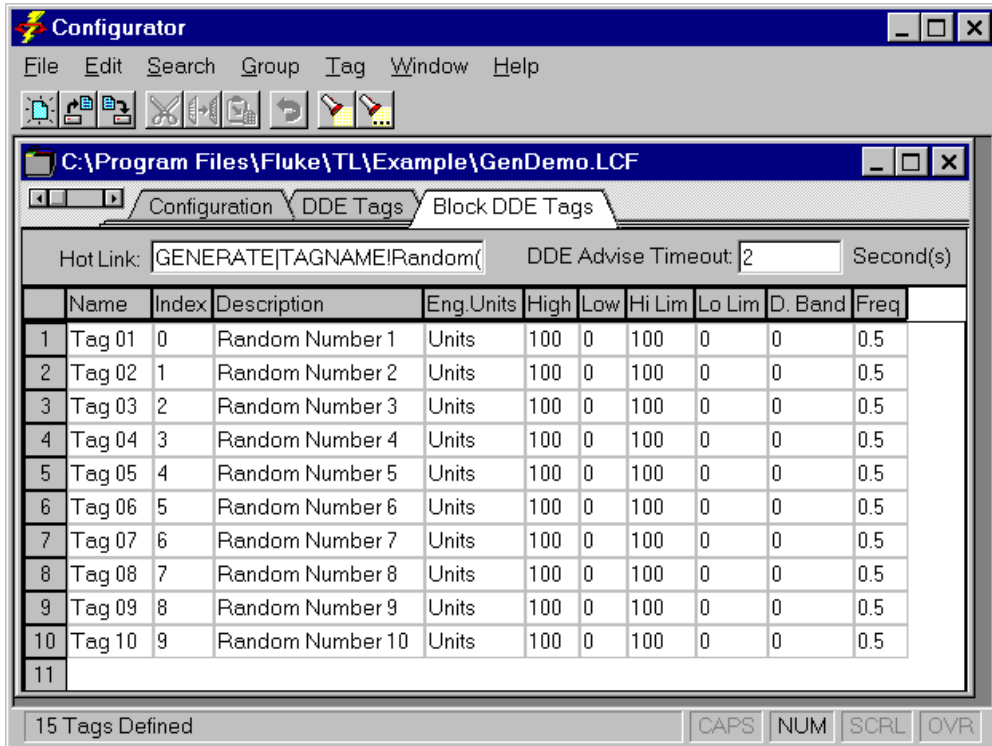
In the above example, the HotLink is as follows:

GENERATE|TAGNAME!Random(10)

This hooks to a one dimensional array of random numbers in the DDE Generator program:

[R0 R1 R2 R3 R4 R5 R6 R7 R8 R9]

The remainder of the page is a table defining the Tags that correspond to the various DDE items of the DDE block connection. The first row of the table is a header row that shows the fields that are to be defined for each Tag. Each of the fields in this row will be described in detail below. The first column of the table is the number of the Tag that is being defined. This numbering is simply how the Tags will be listed in the configuration file and has no functional significance.

Name is the name of the Tag (curve) that will be placed in the log file. This is the Tag name which is displayed by Trend Link. This field is limited to 63 characters.

The **Index** field indicates which member of the Blocked DDE array will provide data for the Tag. The index may be any integer between 0 (the first array element) and one less than the array size (array size -1, which would point to the last element of the array).

The following fields are used when creating the Tags in the log file. The **Description** (63 bytes max.) and **Eng. Units** (31 bytes max.) are labels that are displayed by Trend Link to help describe the data for a given Tag data. The **High** Scale and **Low** Scale parameters determine the default scale range used by Trend Link when the Tag is first added. **HiLim** defines the default value above which Trend Link will display the curve in its highlight color. Similarly, **LoLim** defines the default value below which Trend Link will display the curve in its highlighted color. These fields are used as defaults when the Tag curve is graphed. Their values can be modified from within Trend Link for individual trend charts.

The next field is the **Deadband** which determines the amount of change that a variable must undergo before an updated value is logged into the file. This allows the user to eliminate insignificant fluctuations of the data. A value of zero will cause any change in the value to be logged.

The final field is the Log Rate **Frequency** field. This is an optional field. If this field is left blank, the data is checked for logging into the file at the maximum rate of one sample per second. If this field is set, it represents the sample rate in seconds that the data will be checked for logging. Periods of less than one second are represented using decimal values. For example, if this parameter is set to 60, the data for the Tag will be checked for logging every minute. If this parameter is set to .5, the data for the Tag will be checked for logging twice a second. Please note when setting this value, that the Logger only looks at the current data value when checking a data point for logging. It does not average the values over the time period.

Keyboard Commands 6-45.

In addition to the standard methods of invoking the commands that are outlined above, Configurator also supports a Hot Key feature that allows the more commonly used commands to be selected using keyboard accelerator keys. This allows the user to bypass the menus. Below is a table that lists the functions that may be invoked in the Configurator application using accelerator keys and the accelerator keys that are used to invoke them. Keys that must be pressed simultaneously are shown separated by a plus sign.

Trend Link Function	Hot Key
Clear All	Ctrl + Del
Copy	Ctrl + Ins
Cut	Shift + Del
Delete	Del
Exit	Alt + F4
Find Next	F3
Paste	Shift + Ins
Undo	Alt + BkSp

Logger Configuration Files 6-46.

Logger Configuration files provide the Logger with information regarding the data that is to be accessed and the log files that are to be created. These files normally have a file extension of LCF. The configuration files are in ASCII format with commas separating their fields. Any line that begins with a semicolon character (;) will be treated as a comment line and ignored by the Logger. All text fields such as the DDE link, name, description, and engineering units may be surrounded by single or double quotes to allow commas to be embedded in a field. Below is an example of a Logger Configuration file followed by a line-by-line description of its contents.

```
[Logger Configuration]
CLI Link File Version=250
DataSet=Real Time
Description=Test Data
AutoRollOver=FS:1200
AutoDelete=10
LogOnRate=Yes
WarnAtMinDiskSpace=2048
AutoTagInfoChange=1
ShutDownRoll=1
Clock=Excel|sheet1!R1C2

[Standard DDE Groups]
STANDARD 1=1

[STANDARD 1]
;Name=HotLink,Description,Eng. Units,High,Low,Hi Lim,Lo Lim,D.Band,Freq
Steps=GENERATE|TAGNAME!Steps,Stepping Curve,,100,0,100,0,2,1
Sine=GENERATE|TAGNAME!Sine,Sine Wave,,10,0,10,0,0,1
Degrees=GENERATE|TAGNAME!Degrees,Degrees,Circle Degrees,360,0,300,0,0,1

[Block DDE Groups]
```

Blocked 1="EXCEL|SHEET.XLS!R2C4",2

[Blocked 1]
;Name=Index,Descriptioni,Eng.Units,High,Low,Hi Lim,Lo Lim,D. Band,Freq
Cell1=0,Units Produced,Number,1000,0,800,0,0,1
Cell2=1,Cost Per Unit,Dollars,5000,0,3000,0,0,1
Cell3=2,Total Cost,Dollars,10000,0,5000,0,0,1

This configuration file uses the standard Windows INI file format and is divided into sections (additional sections may be added to define new Group Types). The total size of a DDE configuration file cannot exceed 64 kilobytes.

The first section is the Logger Information section, which contains information about the log file that is to be created by the Logger. Parameters in this section may be listed in any order but should be placed on separate lines. For complete descriptions of these parameters, see the Configuration Windows section of this chapter.

The first parameter is the CLI Link File Version number. This parameter defines the version number of the Configurator that was used to create the link file. Configurator and DDE Logger use this version number to ensure that the LCF files are compatible with the Logger. The version number is the same as the current version of the Configurator with the decimal point removed. For example, Configurator version 2.50 will set the CLI Link File Version parameter to 250.

The second parameter is the name of the Data Set into which the data will be written. The list of Data Sets that are currently defined may be found in the [TL Data Set Paths] section of the INFOLINK.INI file. Additional Data Sets may be created manually by the user or automatically by the Configurator program. For more information on Data Sets, see the Data Sets section of the Advanced Concepts chapter of this manual. In the above example the DataSet Parameter is set to Real Time.

The third parameter is a description of the Data Set that will be used when creating the log file. In the above example this description is set to Test Data.

The fourth parameter is the Automatic Roll Over parameter. This parameter is optional and may be used to implement an Automatic Roll Over of the data file at a specified interval. The interval may be defined in one of three ways. It may be a file size, a time interval, or a specific time of day. To specify that a file should be rolled over when it reaches a specific file size, this parameter should equal FS, followed by a colon, followed by the file size (in kilobytes) at which the file should be rolled over. For instance, if this parameter contained FS:1400 the current logging file would Roll Over each time it reached a size of 1400K. To specify that a file should be rolled over at a given time interval, this parameter should contain TI, followed by a colon, followed by the number of minutes between each Roll Over. For example, if this parameter contained TI:600 the logging file would be rolled over every 10 hours. To specify that a file should be

rolled over at a certain time of day, this parameter should contain TOD, followed by a colon, followed by the number of minutes from 12:00AM that the file should be rolled over. For example, if this parameter contained TOD:600 the logging file would be rolled over at 10:00AM every day. If the Logger is not running when the specified time of day for Roll Over occurs, it will roll the logging file over the next time data is logged to the Data Set. This parameter may be omitted or set to No if no Automatic Roll Over is desired.

The fifth parameter, AutoDelete, is used to specify if the Logger should automatically delete TLG files that are older than a specified number of days. If old TLG files are to be deleted, this parameter should be set to the number of days to keep old TLG files before deleting them (This is the number of days from the creation date of the file). For example if this parameter contained AutoDelete = 10, all TLG files in the current Data Set that were created more than 10 days ago would be automatically deleted. If the TLG files are not to be automatically deleted, this parameter should be set to NONE.

The sixth parameter is the LogOnRate parameter. This parameter specifies the Logging method that is to be used by the Logger. If LogOnRate is set to YES, Logger will only log a new value for a Tag once each sample frequency defined for that Tag (i.e., Logger will use the sample frequency for the Tag as defined in its Tag definition line). If LogOnRate is set to NO, Logger will log a new value for a Tag any time it changes (i.e., Logger will ignore the sample rate defined for the Tag if it is changing at a faster rate).

The seventh parameter is the WarnAtMinDiskSpace parameter. This parameter is used to specify if Logger should issue a warning when it is running out of storage space. This is an optional parameter and it value should be set to the number of kilobytes at which to issue a warning. If the amount of available storage space falls below this amount, a dialog box will pop up in the Logger issuing a warning that disk space is low. It is recommended that this parameter be set to 2048 (2 megabytes).

Although Logger was designed to recover from a "disk full" condition, it is not recommended that the system be allowed to run out of storage space because data will be lost if it cannot be written to disk.

The eighth parameter is the AutoTagInfoChange parameter.

The ninth parameter is the ShutDownRoll parameter. This parameter specifies whether or not the Logger should perform a Roll Over when the configuration file is closed. If this parameter is set to 1, Logger will perform a Roll Over before closing the configuration file. This means that the next time Logger is started, a new NOW file will be created, and the data for each run of Logger will be separated into individual files. If ShutDownRoll is set to 0, Logger will not Roll Over before closing the file, and the next time the file is opened, data will be appended to the existing NOW file. Please note that this parameter does not

override the Automatic Roll Over parameter. Automatic Roll Overs will still occur normally as long as the conditions for the Automatic Roll Overs are met.

The last parameter in this section is the Clock parameter. If this parameter is present, it signals Logger to use an external source to obtain the timestamps for the data. This parameter should be set to equal the DDE Link that will provide the timestamp information.

In the above example the Logger Configuration section is as follows:

[Logger Configuration]
CLI Link File Version = 250
DataSet = Real Time
Description = Test Data
AutoRollOver = FS:1200
AutoDelete = 10
LogOnRate = Yes
WarnAtMinDiskSpace = 2048
AutoTagInfoChange = 1
ShutDownRoll = 1
Clock = Excel|sheet1!R1C2

This section tells the Logger to write the data into the Data Set named Real Time (which must be one of the Data Sets defined in the [TL Data Set Paths] section of the INFOLINK.INI file). The description Test Data will be used to describe the log file. Timestamps for the data will be provided externally by the DDE Link Excel|sheet1!R1C1. The log file will be automatically rolled over to a TLG file each time it reaches a file size of 1.2 megabytes and each time Logger closes the file. A warning should be issued if available disk space falls below 2 megabytes, and any TLG files that were created more than 10 days ago will be automatically deleted.

The remaining sections of the file register and define the Groups of Tags that will be logged. There are two optional sections that register the groups that are to be defined: Standard DDE Groups and Block DDE Groups. For a complete description of these categories, see the Group Pages section of this chapter.

In the above example the Group registration sections are defined as follows:

[Standard DDE Groups]
STANDARD 1=1

[Block DDE Groups]
Block 1="EXCEL|SHEET.XLS!R2C4",2

The first section, (Standard DDE Groups) defines one group called STANDARD 1, which will contain standard DDE Links. The 1 on the right side of the equals sign indicates that the Advise Time-out parameter for this group of DDE links is

set to 1 second. Additional Standard DDE groups would be registered by adding additional registration lines to this section of the form:

Group Name = Advise Time-out Parameter

For a complete description of Standard DDE Groups, see the Group Pages section of this chapter.

The second section, (Block DDE Groups) defines one group called Block 1, which will contain a block DDE Link. The parameters on the right side of the equals sign define the HotLink for the Block connection, followed by a comma followed by the advise time-out parameter for the block connection. Additional Block DDE groups would be registered by adding additional registration lines to this section of the form:

Group Name = HotLink Name, Advise Time-out Parameter

For a complete description of Block DDE Groups, see the Group Pages section of this chapter.

The remaining sections of the LCF file define the groups that have been registered in the above sections.

The STANDARD 1 section (shown below) describes the standard DDE Group STANDARD 1:

```
[STANDARD 1]
;Name=HotLink,Description,Eng. Units,High,Low,Hi Lim,Lo Lim,D.Band,Freq
Steps=GENERATE|TAGNAME!Steps,Stepping Curve,,100,0,100,0,2,1
Sine=GENERATE|TAGNAME!Sine,Sine Wave,,10,0,10,0,0,1
Degrees=GENERATE|TAGNAME!Degrees,Degrees,Circle Degrees,360,0,300,0,0,1
```

The first line of this section table is a header line that shows the fields that are to be defined for each Tag. This row will be treated as a comment by Logger because it begins with a semicolon. Each of the fields in this line will be described in detail below.

Name is the name of the Tag (curve) that will be placed in the log file. This is the Tag name that is displayed by Trend Link. This field is limited to 63 characters.

The HotLink field describes the DDE HotLink that will provide data for the Tag. It is composed of three components: the application name, the topic name, and the item name. These three components of the DDE Link Field are separated using the | and ! symbols as shown in the following line:

GENERATE|TAGNAME!Steps

In this case GENERATE is the application name, TAGNAME is the 'topic' name, and Steps is the item name. You must use the | and the ! symbols as separators between the DDE Link components.

The application name, topic, and item are defined by the DDE server that is issuing the DDE Tag information. GENERATE and TAGNAME are the application and topic used by CLI's DDE Generator application. Steps is a Tag variable that is generated and made available as an item to the DDE.

The DDE Link fields may also refer to a Network-DDE type of HotLink. Some Net-DDE addresses use a comma in the HotLink name. Since the Logger uses a comma as a field delimiter, HotLink Names containing commas must be enclosed in quotes.

The following fields are used when creating the Tags in the log file. The Description (63 bytes max.) and Eng. Units (31 bytes max.) are labels that are displayed by Trend Link to help describe the data for a given Tag data. The High Scale and Low Scale parameters determine the default scale range used by Trend Link when the Tag is first added. HiLim defines the default value above which Trend Link will display the curve in its highlight color. Similarly, LoLim defines the default value below which Trend Link will display the curve in its highlighted color. These fields are used as defaults when the Tag curve is graphed. Their values can be modified from within Trend Link for individual trend charts.

The next field is the DeadBand, which determines the amount of change that a variable must undergo before an updated value is logged into the file. This allows the user to eliminate insignificant fluctuations of the data. A value of zero will cause any change in the value to be logged.

The Final field is the Log Rate Frequency field. This is an optional field. If this field is left blank, the data is checked for logging into the file at the maximum rate of one sample per second. If this field is set, it represents the sample rate in seconds that the data will be checked for logging. Periods of less than one second are represented using decimal values For example, if this parameter is set to 60, the data for the Tag will be checked for logging every minute. If this parameter is set to .5, the data for the Tag will be checked for logging twice a second. Please note when setting this value, that the Logger only looks at the current data value when checking a data point for logging. It does not average the values over the time period.

The Block 1 section (shown below) describes the standard DDE Group Block 1. Note that the section name must be the same as the group name defined in the group definition section described above:

```
[Block 1]
;Name=Index,Descriptioni,Eng.Units,High,Low,Hi Lim,Lo Lim,D. Band,Freq
Cell1=0,Units Produced,Number,1000,0,800,0,0,1
Cell2=1,Cost Per Unit,Dollars,5000,0,3000,0,0,1
Cell3=2,Total Cost,Dollars,10000,0,5000,0,0,1
```

The first line of this section is a header line that shows the fields that are to be defined for each Tag. This line will be treated as a comment by Logger because it begins with a semicolon Each of the fields in this line is described in detail below.

Name is the name of the Tag (curve) that will be placed in the log file. This is the Tag name that is displayed by Trend Link . This field is limited to 63 characters.

The Index field indicates which member of the Blocked DDE array will provide data for the Tag. The index may be any integer between 0 (The first array element) and one less than the array size (array size -1 which would point to the last element of the array).

The following fields are used when creating the Tags in the log file. The Description (63 bytes max.) and Eng. Units (31 bytes max.) are labels that are displayed by Trend Link to help describe the data for a given Tag data. The High Scale and Low Scale parameters determine the default scale range used by Trend Link when the Tag is first added. HiLim defines the default value above which Trend Link will display the curve in its highlight color. Similarly, LoLim defines the default value below which Trend Link will display the curve in its highlighted color. These fields are used as defaults when the Tag curve is graphed. Their values can be modified from within Trend Link for individual trend charts.

The next field is the DeadBand which determines the amount of change that a variable must undergo before an updated value is logged into the file. This allows the user to eliminate insignificant fluctuations of the data. A value of zero will cause any change in the value to be logged.

The Final field is the Log Rate Frequency field. This is an optional field. If this field is left blank, the data is checked for logging into the file at the maximum rate of one sample per second. If this field is set, it represents the sample rate in seconds that the data will be checked for logging. Periods of less than one second are represented using decimal values. For example, if this parameter is set to 60, the data for the Tag will be checked for logging every minute. If this parameter is set to .5, the data for the Tag will be checked for logging twice a second. Please note when setting this value, that the Logger only looks at the current data value when checking a data point for logging. It does not average the values over the time period.

Logging Methods *6-47.*

The method used by DDE Logger to determine if a value is to be logged may be configured by the user in the Configurator program by using the various Logging methods parameters that are described below. Some of these parameters are only applicable when logging from specific applications.

The Whenever the Value Changes Option   6-48.

The Whenever the Value Changes option may be set in the Logging Methods section of the Configuration window. This option and its counterpart ,"Only at Specified Frequency," are mutually exclusive and control whether deadbanding or sample frequency has priority in determining whether a value should be logged at a given time.

If the Whenever the Value Changes option is selected, deadbanding will have priority and values will be logged whenever the deadband is exceeded, regardless of the logging frequency that was defined for the Tag.

This method should be used if all changes should be considered for logging. It is, however, generally inefficient in that it causes Logger to spend a considerable amount of time reading and comparing values that it may not need to record.

Regardless of the method used, the timestamp is continuously updated by Logger so that a minimum amount of data will be lost in the event of a system crash.

The Only at Specified Frequency Option   6-49.

The Only at Specified Frequency option may be set in the Logging Methods section of the Configuration window. This option and its counterpart ,"Whenever the Value Changes," control whether deadbanding or sample frequency has priority in determining whether a value should be logged at a given time.

If the Only at Specified Frequency option is selected, then sample frequency has priority and Logger will check for new values at the frequency specified for the Tag in the Logger Configuration file, if the value has changed by the deadband at that time, the new value will be logged.

Note

The Deadband defined in the configuration file is still in effect when this option is chosen.

It is generally more efficient to use this option because it will cut down considerably on the overhead that is caused by the Logger constantly checking values and comparing them to the deadband.

Regardless of the method used, the timestamp is continuously updated by Logger so that a minimum amount of data will be lost in the event of a system crash.

Editing Data Sets 6-50.

Data Sets may be edited by selecting **File** | **Data Sets...** . When this option is selected, a dialog box will appear as shown below:
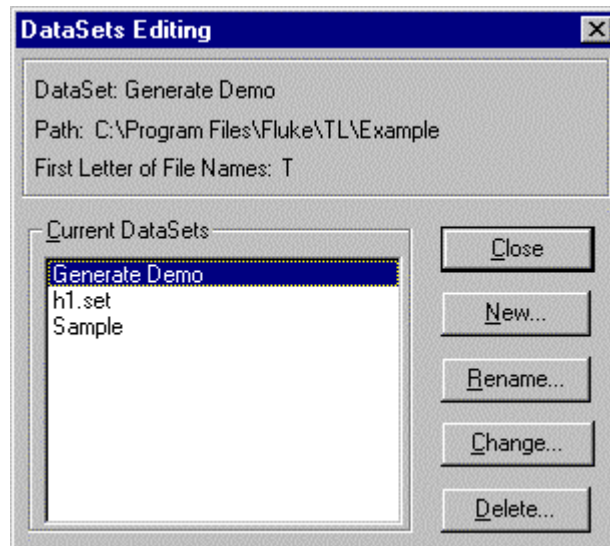
The top section of this dialog box displays information about the Data Set that is highlighted. The bottom left of the dialog box contains a list box showing all of the Data Sets that are currently defined. For a complete description of Data Sets, see the Data Sets section of the Advanced Concepts chapter in this manual.

The lower right side of this dialog box contains a column of buttons that may be used to create, rename, change, or delete Data Sets.

To create a new Data Set, simply click on the **New...** button and a pop up dialog box will appear. Enter the name of the new Data Set, the letter that files belonging to this Data Set should begin with, and the directory that files for this Data Set should be placed in. Once the information for the new Data Set is completed, click on the OK button, and the pop up dialog will disappear and the new Data Set will appear in the Current Data Sets list box of the Data Set's Editing window.

To rename a Data Set, first highlight the name of the Data Set that you wish to rename, then click on the **Rename...** button. A dialog box will appear showing the current name of the Data Set and a test box where the new name for the Data Set should be entered. Type in the new name for the Data Set and click on the OK button. The dialog box will disappear and the Current Data Set's list box will be updated with the new information.

To Change the attributes of a Data Set, first highlight the name of the Data Set and then click on the **Change...** button. A dialog box will appear allowing you to change the first letter of the file names belonging to the Data Set and the directory that the files for the Data Set will be placed in. Once the Data Set information has been updated, click on the OK button, and the Configurator will make the changes to the Data Set.

To delete a Data Set, highlight the name of the Data Set that is to be deleted, and click on the **Delete...** button. A dialog box will appear asking if you are sure you wish to delete the Data Set. This dialog box contains a check box that indicates whether or not to delete the data associated with the Data Set. Check this box if appropriate, and then click on the OK button. Configurator will then proceed to delete the indicated Data Set.

The delete operation does not delete a chart file (CHT) file if one exists in the Data Set directory. Use the Windows File Manager or Explorer program to delete the chart file if necessary.

For a complete description of Data Sets please see the Data Sets section of the Advanced Concepts section in this manual.

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