OVERVIEW

OPERATION

ADMINISTRATION

HARDWARE

DEVELOPMENT

QUALIFICATION

SyCOS Trend Display User's Manual

sycos
PROCESS CONTROL SYSTEM

Version: 1.2
Date: July 2000
Author: Sahar Sala-Mansour

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1. Preface

Contents

This document is both a user and a reference manual to the ***SyCOS Trend Display Application*** for the SyCOS Operator Consoles. It provides an overview, general reference information, detailed 'how to do' instructions, and trouble-shooting instructions.

Audience

Intended users of this manual are plant operators, plant engineers and system managers.

Minimal knowledge and experience with Window concepts and tools is required.

Version

This manual applies to SyCOS Trend Display Application

Related Documents

SyCOS Automation Engineers Manual, Version 1.0 of July 1999.

SyCOS Global Glossary, Version 1.0 of July 1999.

Extol Reference Manual, Version 1.0 of July 1999.

Request for comment

If you have any questions about the manual text or the software it describes, or if you wish to make suggestions for improvements, please contact the SyCOS Product Support Group:

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CH-4153 Reinach, Switzerland

Please include the documents' full name and version number as stated on the front page.

•

The original information for this document was provided by Marcel Baumann. This version was written by S. Mansour-Sala.

Typographical Conventions

The **bold Times New Roman** font is used to highlight key words, phrases or concepts.

The ***cursive bold Times New Roman*** font is used to list items available under a heading.

The *cursive Times New Roman* font is used to emphasize the importance of a point, statement or action.

The **bold courier** font is used to highlight user inputs, file and directory names, the names of system utilities that are invoked from the operating system command line, and printed outputs from the system.

References

References to related documents are made using the ***bold cursive courier*** font.

*

This signal indicates that performing some action may lead to consequences that are unwanted or undefined.

2. Concepts

Purpose

The purpose of the Trend Display application is to provide the operators and the plant engineers with visual graphic interpretations of information data available to the SyCOS system.

Presentation

The manual is divided into eight (8) sections. Each section is intended to address a specific functionality and audience.

Section 3. 'Introduction' discusses the application and data collection techniques in a summary form. It is applicable to all users.

Section 4. 'General Functionality' defines terms and explains in general the application and basic navigation tools. This section targets plant operators and engineers.

Section 5. 'Detailed Functionality' describes in detail the trend application display utilities and supported functions. This section is a guide for plant operators and engineers.

Section 6. 'Operating the Trend Application' provides a step by step trend application operating procedures for using the system. It is most useful for the plant operators and engineers.

Section 7. 'Exceptions' lists various methods of correcting possible problems. This section targets the system manager.

Appendix A lists all Error, Warning and information messages text.

Navigation

The Trend Display Application requires the use of a mouse.

- Only the left mouse button is used. The right and middle (if any) perform no function.
- A **Click** means placing the cursor on a desired location then pressing the left mouse button once.
- **Double Click** means placing the cursor on a desired location then pressing the left mouse button twice in rapid succession.
- **Shift & Click** means placing the cursor on a desired symbol or location, pressing and holding down the shift key on the keyboard and simultaneously pressing and holding down the left mouse button then moving the mouse in any direction desired. This action highlights the area between the start point and the current cursor position. When required area is highlighted, release all the buttons.
- **Click & Drag** means placing the cursor on a desired symbol, pushing and holding down the left mouse button (this highlights the symbol and 'picks it up') then moving the mouse cursor and object in any direction as desired. When the symbol is where it is required, release the mouse button.

The user can also use the keyboard to perform limited functions. When applicable, the keyboard keys are listed in a table format.

3. Introduction

The SyCOS Trend Display application is a window application which is embedded into the SyCOS system as part of the operator console. It operates in a window oriented UNIX environment (OSF/Motif based on X-11) on an X terminal. The terminal has its own processor and memory for processing data and is connected directly to the network. This connection enables the operator(s) to interact with parts of the plant that are on the network.

The SyCOS Trend Display application main function is to provide the operator with visual data information in the form of graphically trended lines.

A trend line is a plot of measurement values of a specific process element obtained over a defined period of time. The plot is represented on a X/Y matrix where the X-axis represents the time range and the Y-axis the process element range.

The main feature of this system is its powerful flexibility and advanced tools. The use of window like features, tool bars, menus and ' mouse ' capabilities insures simplicity and ease of use.

User interaction is through bar menus, short cut keys and pop-up dialog boxes using a mouse or a keyboard. Most commands can be executed by highlighting a menu selection with the mouse or keyboard then clicking with the mouse or pressing the 'Return' key.

The application trending capacity is theoretically unlimited. However, as data load is increased, the performance rate is lowered. Additionally, the performance is affected by other parts of the SyCOS system accessing the operator console.

The application architecture is loose and flexible. Any combination of data can be trended on a single display. The number of points per display is limited by a default variable easily modified, data value is also unlimited (10**120 in either direction), and all time activities are limited to a time minimum of January 1st, 1970 and maximum of January 1st, 2036 (a span of 66 years). The current minimum default for the trend sampling interval time is eight (8) seconds.

The SyCOS Trend Display application can store, retrieve, manipulate, display, plot and customize raw information data originating from process batches and instruments. It allows the user to trend data in groups and/or individually, to view and/or retrieve trend values both graphically and numerically and to save data to external formats for portability (i.e. text and DADiSP files).

The application display can be customized by altering time and data ranges, line colours, line type, enabling or disabling text and information messages, scrolling and using the zoom in/out capabilities.

In addition, the application accesses and exhibits SyCOS system messages that occur during data collection (Batch History File). This feature informs the user of system status or alarms that occurred during trend data collection. This is specifically useful when viewing historical data.

Trend data is collected by either the Batch Trend or the Adhoc Trend mechanisms and passed to the Trend Display application via the Batch Trend Server. The mechanisms are described in Section 3.1. 'Batch Trend Mechanism' and Section 3.2. 'Adhoc Trend Mechanism'.

3.1. Batch Trend Mechanism

SyCOS application software programming employs a language called *Ext*ended *O*perations *L*anguage (EXTOL). One of the functions of this language is to provide data interchange between SyCOS applications.

The batch trend mechanism consists of a series of functions passing specified data from the MFC database to the Trend Display Application.

Basically, the Batch Trend Server is told what to collect from the MFC database at the programming level using EXTOL. Once the required data is collected by the Batch Trend Server, it is passed to the File Server via the alarm system. The data is then sorted into batch trend files and batch event files. These files are accessed by the Trend Display Application.

The batch trend data collection mechanism is illustrated in Figure 1: 'Batch Trend Data Collection Mechanism'.

The EXTOL instruction that requests the process of trend data collection has the following syntax:

trend <db_field> with deadband <expr> [and cycle <expr1>] [and confirm in <operand>]

For Example:
trend T12:0.MEAS with deadband 0.2 and cycle 10

This instruction tells the Batch Trend Server on the MFC to poll the T12:0.MEAS field every 10 seconds. If the current measurement value has changed by more than 0.2 (dead band) in either direction the batch trend server sends a batch trend sample over the network (alarm system) to the batch trend file. If the cycle time is not given the fastest cycle time is taken (currently 8 seconds).

The raw data from the external devices is polled every 0.5 seconds into the database input fields. Within these 0.5 seconds the database is processed once and the output values are sent back to the device.

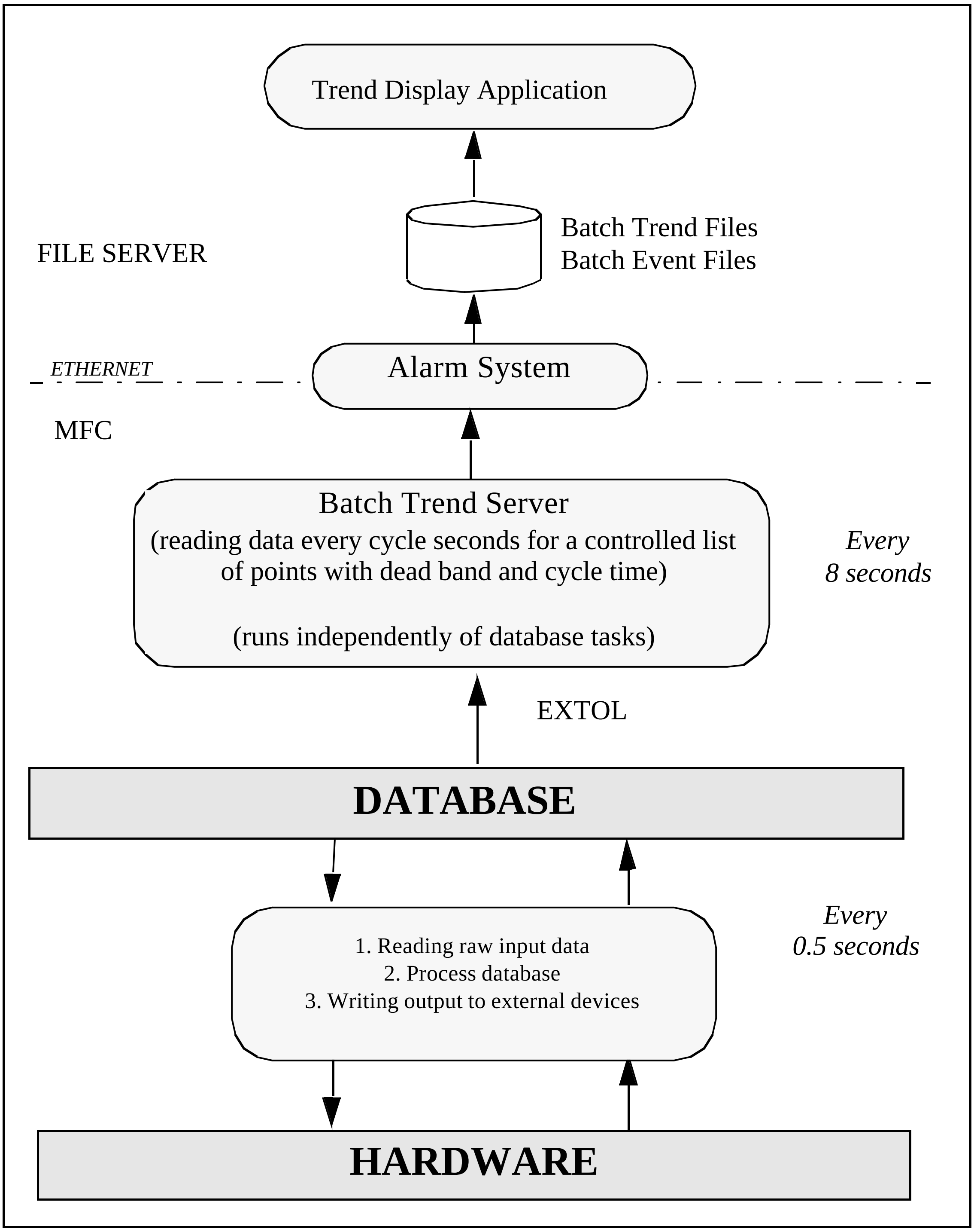

Figure 1: Batch Trend Data Collection Mechanism

3.2. Adhoc Trend Mechanism

The Adhoc trend mechanism is similar in function to the Batch trend mechanism. Both collect specified data and pass it to the Trend Display Application (See Section 3.1. 'Batch Trend Mechanism'). The difference is in how the raw data is collected and transported to the Trend Display Application.

The Adhoc trend mechanism consists of the Adhoc Trend Application, Adhoc Trend Server and a Central Server for data exchange.

The Adhoc trend application provides configuration dialog boxs to configure data points for collection. The user is requested to supply the point type, point name, dead band and collection time duration. The Adhoc Trend Application menus are illustrated in Figure 3: 'Adhoc Trend Application Menus'.

When data configuration for Adhoc trending is completed and collection is started, the application transfers required data from the MFC database via the Central Server and creates Adhoc trend data files. The system keeps track of the Adhoc trend file names and locations using the Adhoc Trend Server.

When the user requests Adhoc data trending from the Trend Display Application, the system locates the data using the Adhoc Trend Server.

The relationship is illustrated in Figure 2: 'Adhoc Trend Data Collection Mechanism'.

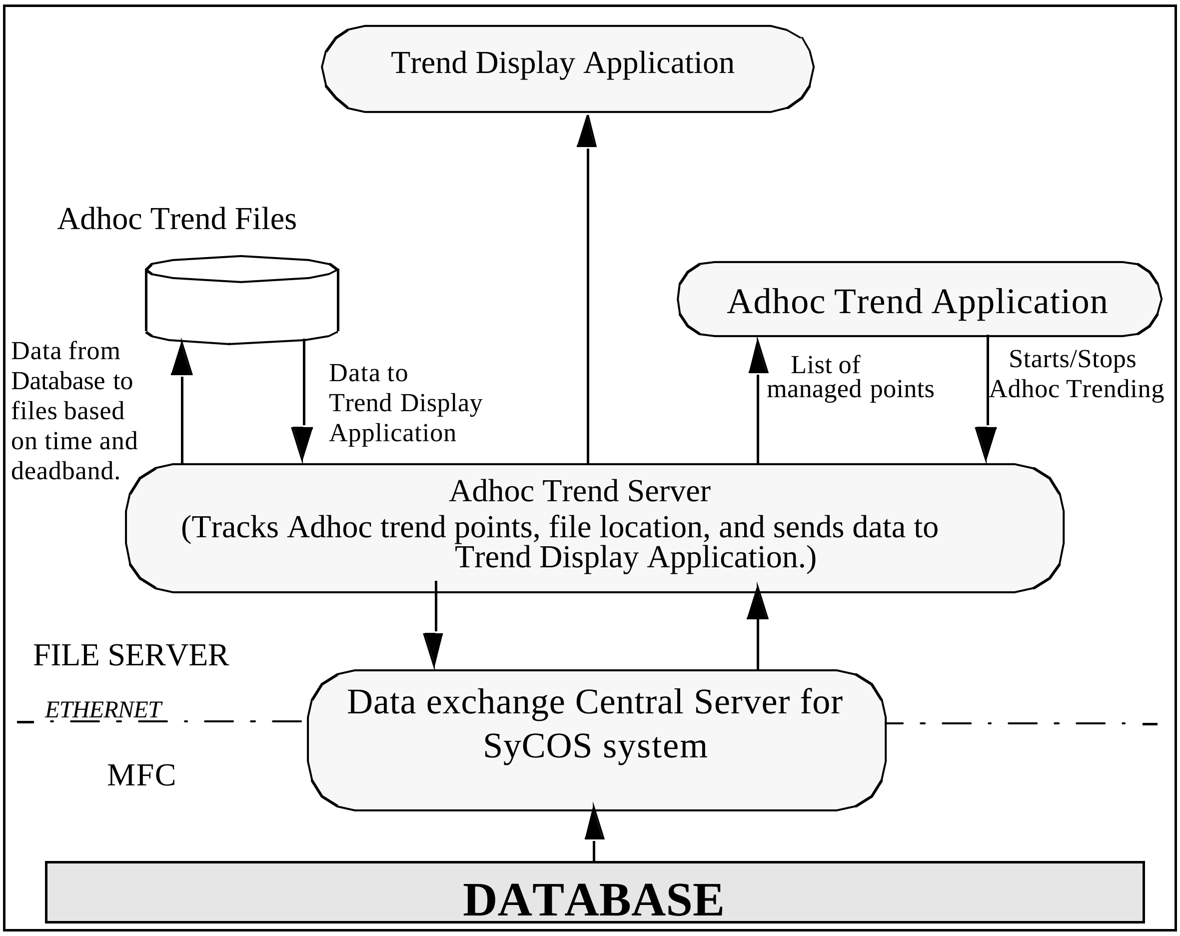

Figure 2: Adhoc Trend Data Collection Mechanism

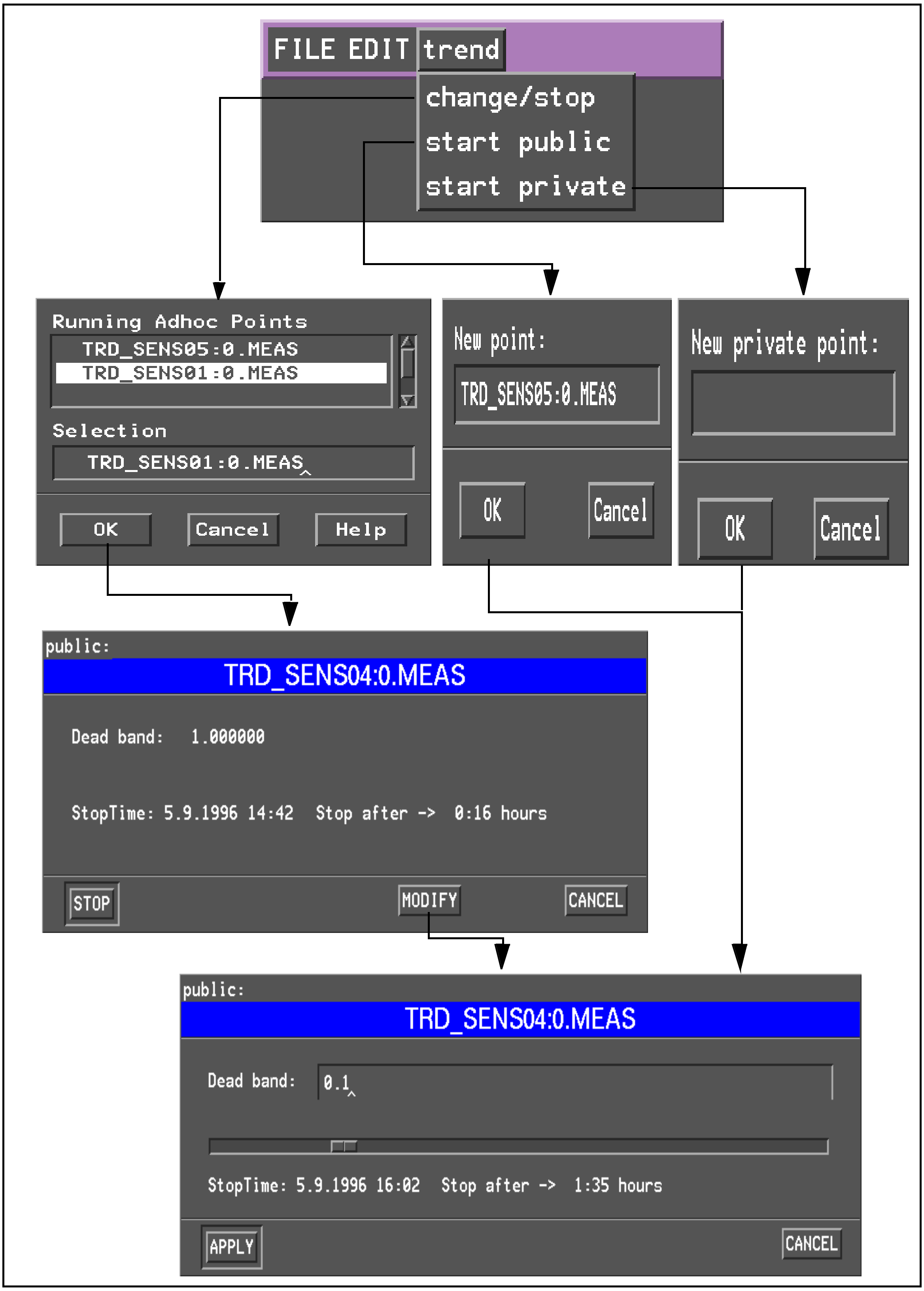

Figure 3: Adhoc Trend Application Menus

3.3. Information Lost Due To Sampling

The amount of data lost depends on the change frequency of the collected data. In general, the higher the data change frequency the lesser the trend line accuracy.

Because system sampling time is 8 seconds, an input signal of lower than 1/16 Hertz produces a trend line that is exact, whereas, a signal with a frequency higher than 1/16 Hertz produces a reduced data trend line.

Data reduction is illustrated in Figure 4: 'Trend data line sampling for frequency greater than 1/16 Hertz'

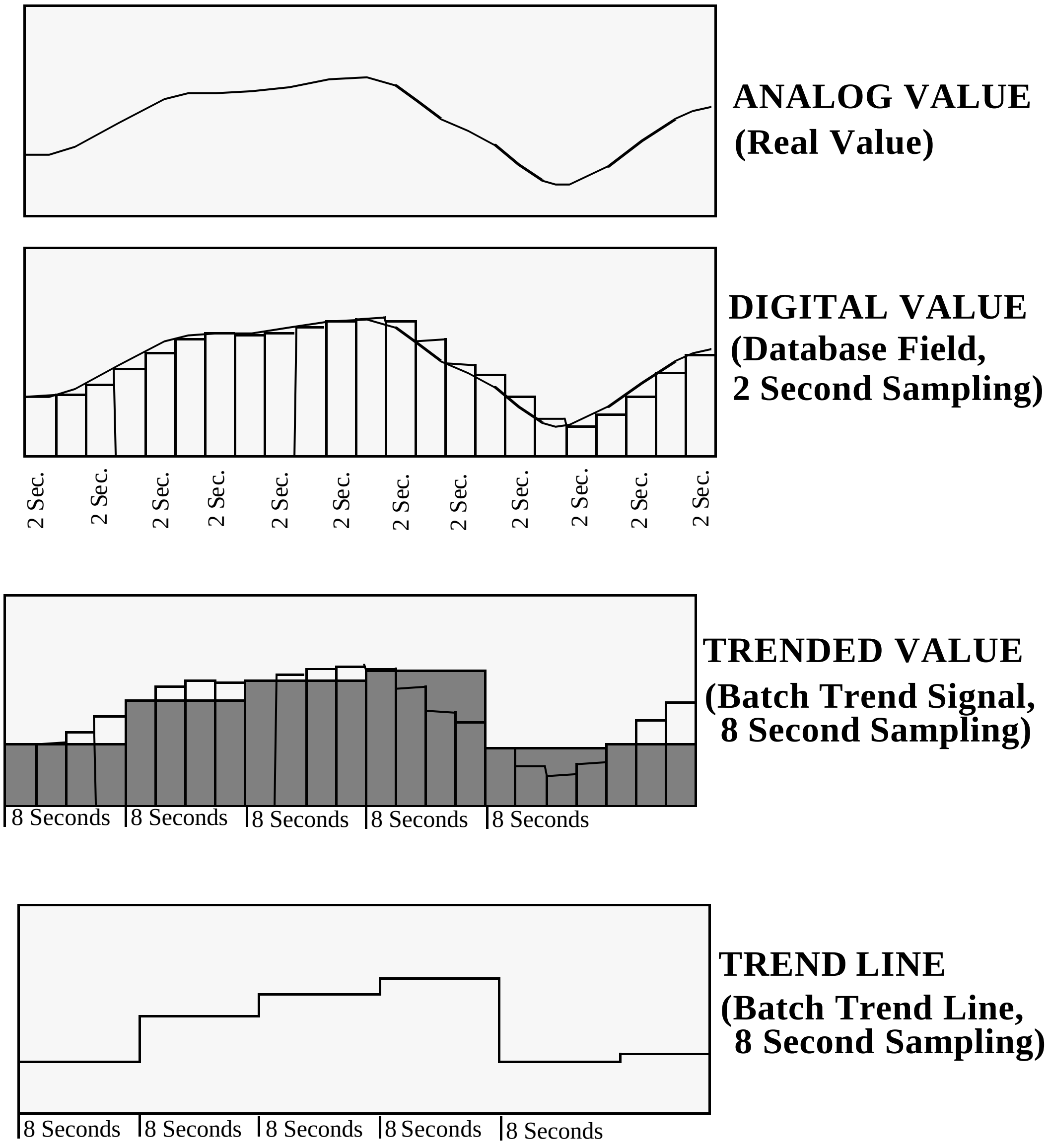

Figure 4: Trend data line sampling for frequency greater than 1/16 Hertz

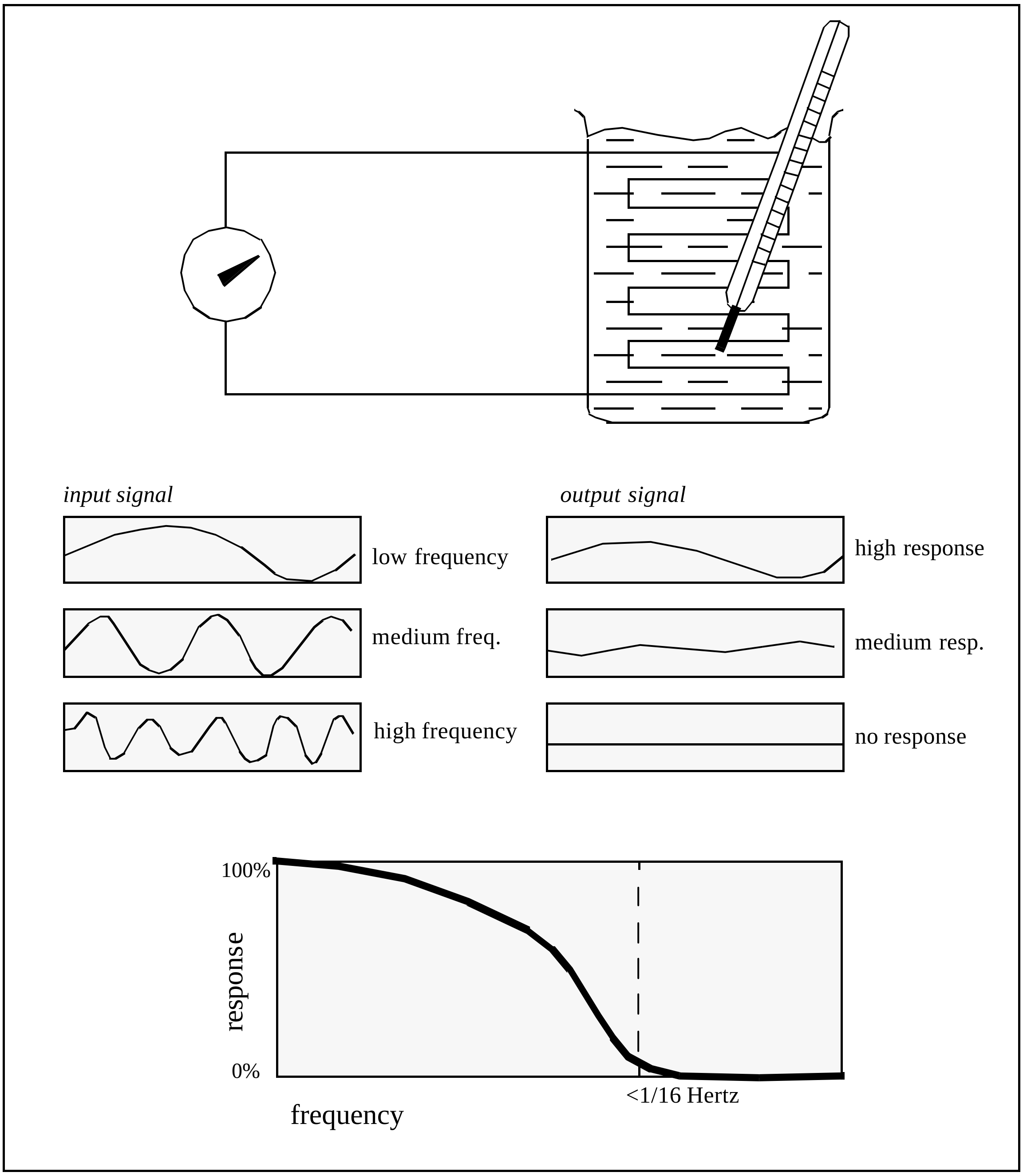

Figure 5: Physical System Frequency Response

4. General Functionality

This section provides general information on the trend display application. It primarily describes display organization, data types and basic navigation concepts for invoking and terminating the application. It is intended to familiarize the plant operator, plant engineer and the system manager with basic system concepts.

The subjects covered in this section are:

- Trend Application Window Description; covers the three (3) main parts of the display: Trend Control Menu, Master Trend Display, Configuration/Secondary Function Trend Display.
- Trend Point Types; lists and describes the two (2) types of data and three (3) types of file formats.
- Invoking the Trend Application Window; starting the Trend Application.
- Selecting a Window Display; activating the Trend Application.
- Terminating The Trend Application Window; leaving the application and closing the Trend Application window.

Recommendation: It is recommended to the reader to review the navigation concepts in Section 2. 'Concepts' before proceeding.

4.1. Trend Application Window Description

The upper most part of the trend application window contains the display utilities and controls (Trend Control Menu), followed by the main trend area (Master Trend Display), and finally a configuration and secondary display area (Configuration/Secondary Function Display).

The three areas are illustrated in Figure 6: 'Trend Application Display Window' and briefly described below.

Trend Control Menu The Trend Control Menu is located at the top of the window display. It is a combination of a responsive **Trend Bar Menu** and **Short Cut Keys**. The Trend Bar Menu consists of key elements that respond by displaying a menu of functions when activated. The functions when invoked perform an activity. Short Cut Keys are push buttons that directly invoke functions. The functions provide all utilities to create, select, display and customize trend data, display and graphics.

Section 5.1. 'Trend Control Menu' lists and explains the trend bar menu, all its' key elements and their function, as well as the short cut keys.

Master Trend Display The Master Trend Display is located in the upper half of the window application. The display size may vary depending on the resize button use.

It is the only area where more than one trend point can be displayed at the same time when requested.

The user may select a trend point to become the **Master Trend Point (MTP)**. The MTP is a reference point for all Master Trend Display activities such as: scrolling, zooming and linking trends (time and range). The MTP name, value, and color are displayed in a horizontal bar at the bottom of the Master Trend display called the Master Configuration Bar.

The **Master Configuration Bar** consists of a **select button**, the trend point name, current cursor value, date and time of current value and an ‘UP’ button. The ‘**UP**’ button function is to trend all configured points on the Master Trend Display.

The **Master Trend Display cursor line** movement is controlled by the mouse only. The system automatically assigns it to the mouse when the mouse cursor is placed any where in the trend display viewing area. Any horizontal mouse movement is translated into trend display cursor line scrolling movement.

The trend display cursor line displays range values and collection times for each trend graph line as it passes across it. These numbers represent the actual sample value and its collection time.

The collection time is based on the window time definition. For example if the window display is hourly then the hour and minute only can be seen, and if the window time is in years, then the year and month are seen.

The number of trended points, colours, value range, resolution, as well as the time collection definitions configuration is explained in Section 6. ’Operating the Trend Application’.

A **Batch History File Line** (**BHF Line**) is located above the Master Configuration bar. It exhibits system messages such as warning, alarm, or information that occurred on or before the time the trend sample was collected. Message viewing can be turned on or off by the user.

Section 5.2. ’Master Trend Display’ lists all display elements and options available in more detail.

Configuration/ Secondary Function (CSF) Trend Display

The Configuration/Secondary Function (CSF) Trend Display is located below the resize button. Normally in the bottom half of the display. It contains the individual trend point inputs that maybe displayed on the Master Trend Display.

Each defined point is shown in a horizontal bar arrangement called **CSF Configuration Bar**. The bar contains a select button, the trend tagname, assigned color, current cursor line value, date, and time and an ‘**UP**’ button. It is similar in appearance to the Master Configuration Bar, but with a slightly different functionality. Clicking on the ‘UP’ key at the end of the bar causes a trended point on the Master Trend display to be trended locally and individually on the CSF display. Clicking on the ‘UP’ key again will cause the trend point to close the CSF display and move the trend line back up to the Master Trend Display.

By pressing the **Select Button** on a bar, the user selects a trend point. The trend point may then be redefined or altered in appearance such as changing color, range, sample collection time.

There also maybe available unconfigured bar(s) marked **empty**.

Section 5.3. ’Configuration/Secondary Function (CSF) Trend Display’ details the configuration bar functions and all options available for the CSF trend display.

Resize Button

The trend application window display which contains the Master and CSF displays is not affected by their size. It remains the same size even though the Master and CSF display sizes can be changed using the resize button (located on the right edge between the two displays). When the Master is increased in size, the CSF is automatically decreased and vice versa. It is possible to resize as to exclude one of the display areas completely.

Other Features

Both the Master and the CSF displays have **Zoom bars** and two types of scroll bars; **Trend Display scroll bar** and **Motif scroll bars**.

The Zoom bars are used to increase or decrease data resolution on the Master or CSF trend displays.

The Master or CSF trend display scroll bars are used to move across time (X-axis) inside the trend displays.

The Motif scroll bars scroll information available in the trend application window that maybe hidden due to Master, CSF or trend application window size.

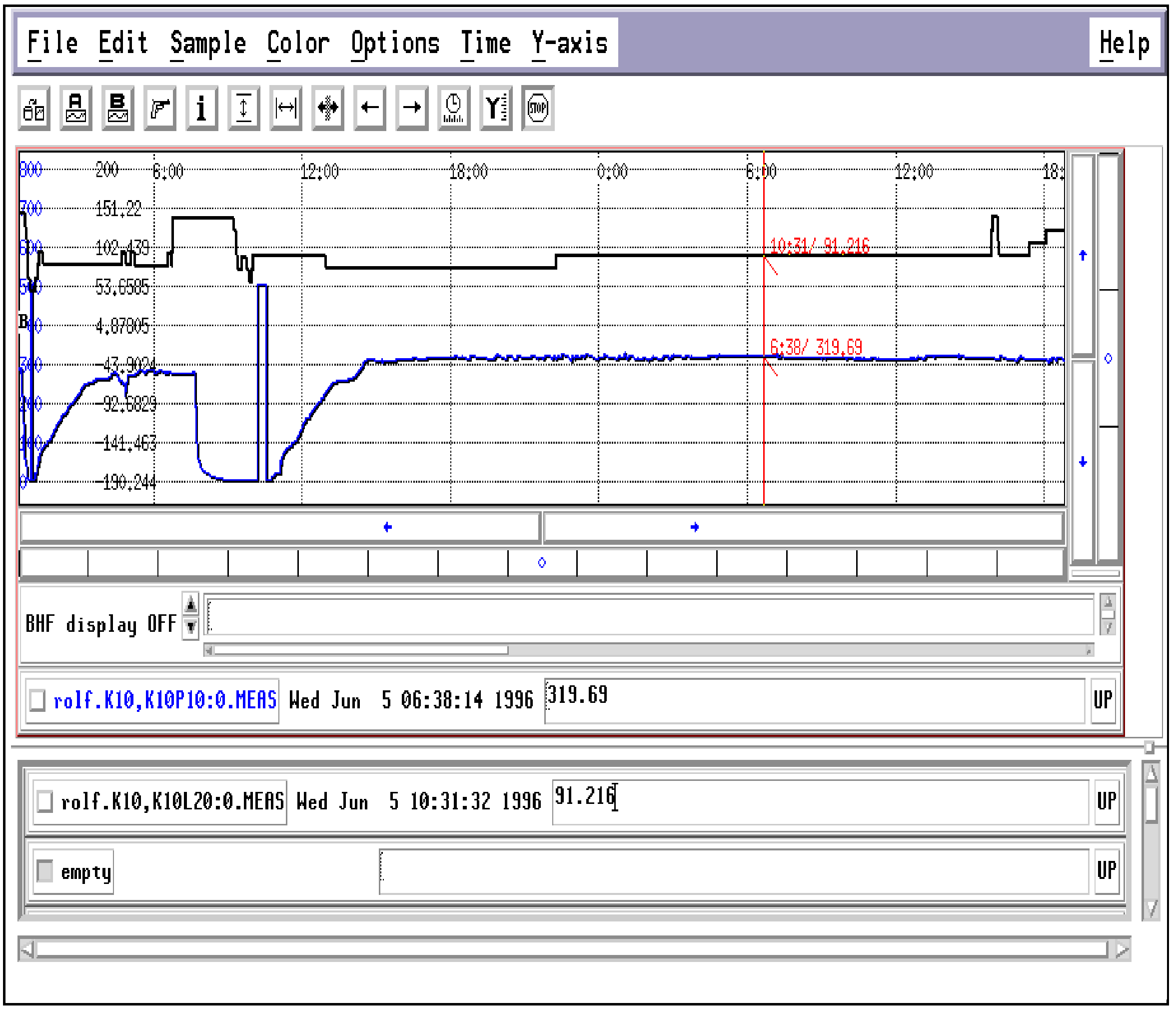

Figure 6: Trend Application Display Window

4.2. Trend Point Types

The trend application is capable of trending two (2) types of trend data inputs: **Batch Trend Points** and **Adhoc Trend Points**. It can save trend data in three (3) types of file formats.

Batch Trend Points

Batch Trend points are defined at the programming level for trend collection and are automatically collected every time the process is run. Operator interaction is not required. The **Multi Function Controller (MFC)** forwards the trended data information as well as system events with a time stamp to the **Process Information Center (PIC).** The PIC saves the trending raw data under a file extension of **.trend** and system events under the file extension of **.event** The file names are site specific and unique to each installation but normally include unit/batch name, time and date. The user has access to all previous batch trending information as well as the current running batch.

The programming commands used to generate the batch trend points are **trend** and **batchlog into**. Refer to the ***Extol Reference Manual*** for programming command syntax.

For additional information refer to Section 3.1. 'Batch Trend Mechanism'

Adhoc Trend Points

Adhoc trend points are points that a user has decided to trend. They have not been defined at the programming level. This is done using the ***Adhoc Trend Application***. With this application, the system simply accesses information forwarded to the **PIC** from the **MFC** and builds the trend information as the data is acquired. The user may then view the data using this application.

For additional information refer to Section 3.2. 'Adhoc Trend Mechanism'

Trend File Formats

The trend application can save data files or portions of data files in a format that can be accessed by file editors or other trend packages.

The three (3) file formats that the SyCOS system can create are: **ASCII**, **DADiSP** and system specific **Internal SyCOS format**:

- ASCII format is a basic file format. Almost all word editors can access or create an ASCII file. It is most useful for file transfer from the SyCOS system to other systems or packages.
- DADiSP format is a specific text file format used by the ***DADiSP*** trending package. It is used when exporting trend data to this package.
- Internal SyCOS text file format is specific to this system. It is the only format the system can read and is the default format for saving.

The trend application itself can read Internal SyCOS format only.

4.3. Invoking the Trend Application Window

To invoke the trend display application the user must execute one of the following procedures:

- Double click on the trend icon located on SyCOS Console. Though most icons are site customized, it should be similar in appearance to Figure 7: 'Trend Icon Symbol'..

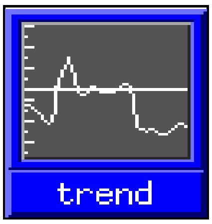

Figure 7: Trend Icon Symbol

- At the SyCOS console, invoke the **Trend Application Menu** by clicking on the mouse's right button once (because mouse configurations are site independent, the user may need to subsitute the left button). Though most SyCOS console and application menus are site customized, they should be similar in appearance to the illustration in Figure 8: 'SyCOS Console and Mouse Application Menu'. Click on the **'Restart Trend'** from the mouse application menu to select it.

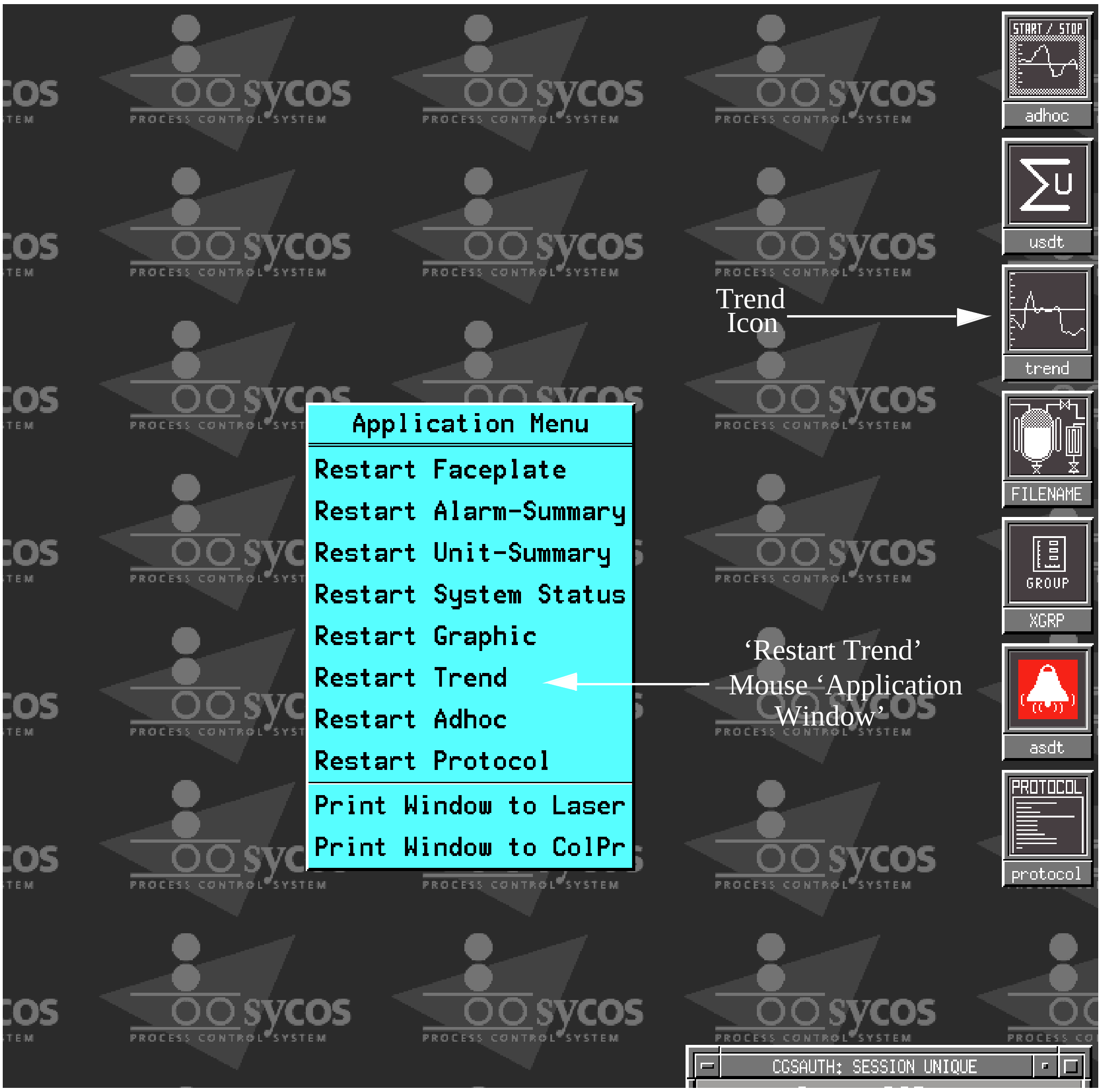

Figure 8: SyCOS Console and Mouse Application Menu

If an application window as described in 4.1. 'Trend Application Window Description' and illustrated in Figure 6: 'Trend Application Display Window' does not appear, see Section 7. 'Exceptions'.

4.4. Selecting a Window Display

A window display is selected by clicking inside the display anywhere. The system indicates that the display has been selected by framing it with a thin red frame.

4.5. Terminating The Trend Application Window

To exit from the trend application window, the user must close the trend application:

1. From the Trend Bar Menu select the **File** key element by either clicking on the word **File** or by pressing the **ALT** (Extended Char key on older HP keyboards) and **'F'** keys on the keyboard simultaneously.

2. From the **File** key element select **Exit** function by either clicking on the word **Exit** or by pressing the '**E**' key on the keyboard.

5. Detailed Functionality

This section presents a comprehensive description and explanation for the trend window application utilities and display areas including graphic illustrations. It is intended to familiarize the user with all the application functions, details and uses.

This section can be considered a reference source for the application.

Thorough familiarization is recommended for the plant operator(s) and engineer(s).

The four major subjects of this section are:

- Trend Control Menu; the utility services area.
- Master Trend Display; the main and only multi-trend display.
- Configuration/Secondary Function (CSF) Trend Display; the configuration and single trend display area.
- Resize Button; the sizing control button.

Recommendation: It is recommended to the reader to review the navigation concepts in Section 2. 'Concepts' before proceeding.

5.1. Trend Control Menu

The Trend Control Menu is a combination of a **Trend Bar Menu** and **Short Cut Keys**. The trend bar menu provides all utilities for loading, running and handling the trend application. The short cut keys provide quick access to a subset of the utilities. Both are located at the top of the trend application window and are illustrated in Figure 9: 'The Trend Control Menu; Trend Bar Menu and Short Cut Keys'.

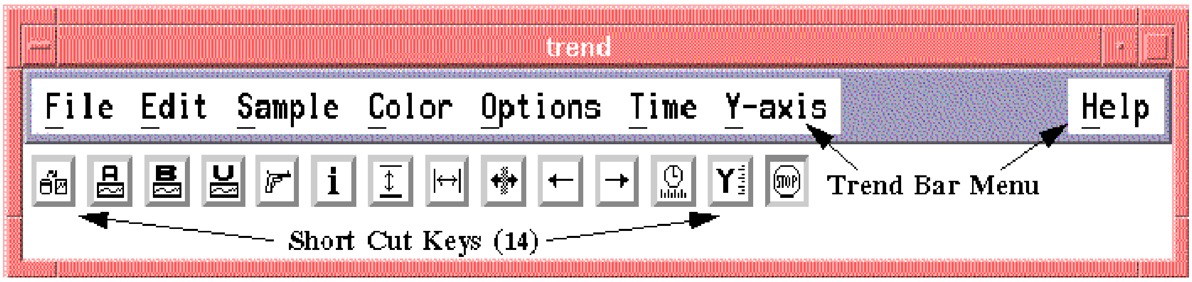

Figure 9: The Trend Control Menu; Trend Bar Menu and Short Cut Keys

5.1.1. Trend Bar Menu

The trend bar menu contains all commands needed to define, change and use both Master and CSF trend displays. It consists of eight (8) active **key elements**. Each key element when selected, displays a list of **functions** in a menu format.

Choosing functions from the pulled down menu will cause either an **action** to occur, **submenu** or **dialog pop-up** to appear. Actions such as toggling (switching on/off) are performed immediately, submenus display further options for the user to select from and dialog boxes are areas where the application prompts the user for information.

Trend Bar Navigation

The user may access the trend bar menu using the keyboard or mouse:

- Mouse: Place the mouse cursor on the key element or function desired then click.
- Keyboard: Selecting key elements and functions differs:

  Key Element: Press and hold down the **ALT** (Extended Char key on older HP keyboards) then press the underlined letter of the chosen key element then let go of both together. All such actions will be represented as **ALT-F**irst key letter. For example, to select **Sample**, press the **ALT** and **S** keys (**ALT-S**).
  Function: After activating the key element, press the underlined key letter of the desired function option to activate it. For example, to select **Open**, press the **O** key.

Key Elements/Functions

1. FILE

This key element provides data file access, trend display initialization, save and print capabilities.

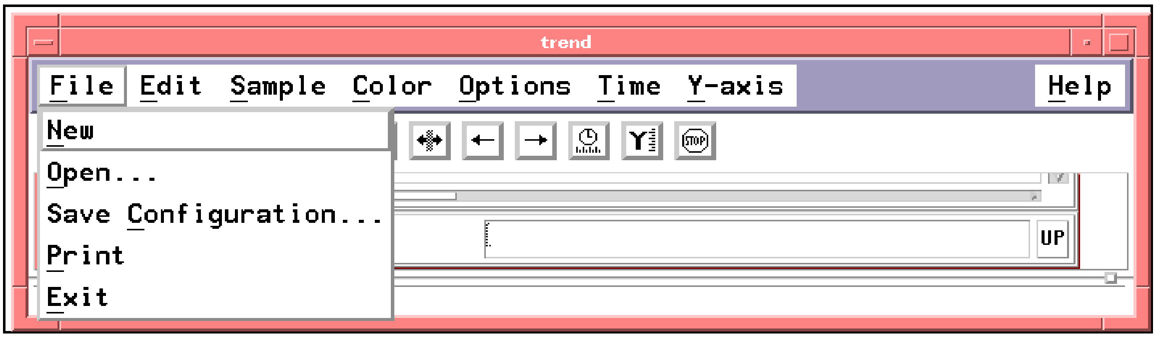

Figure 10: Menu Bar - File key element

- *New: Removes without saving* currently displayed trend data from both Master and CSF Trend Displays (i.e. initializes the displays). This allows the user to open another trend batch file or define new trend data using the **File/Open** or **Sample** key element and functions
- ***Open:*** Permits the user to *select and open an existing Configuration file or a previously saved trend (See Sample/Store as)* for viewing and manipulation. The file can be selected from a specific directory and subdirectory and displayed on the Master and CSF Trend Displays.

  On activation, the **fileDialog** pop-up provides several options that enable searching, filtering and locating a specific file.

The dialog pop-up key word **'Filter'** lists all files matching the text characters entered by the user in that field. The astericks (*) character means list all files. The **'Directories'** key word enables moving forward (by clicking on the desired subdirectory) and back across directories and subdirectories (by double clicking on the double period '**..**' directory line). The **'Files'** key word field contains all files in the selected directory and subdirectories according to the filter.

Alternatively, the user may opt to type the whole directory and file name in the **'Open'** key word field then clicking on the **'OK'** key word button.

Figure 11: 'Menu Bar - File key element; Open Function' is a typical dialog pop-up.

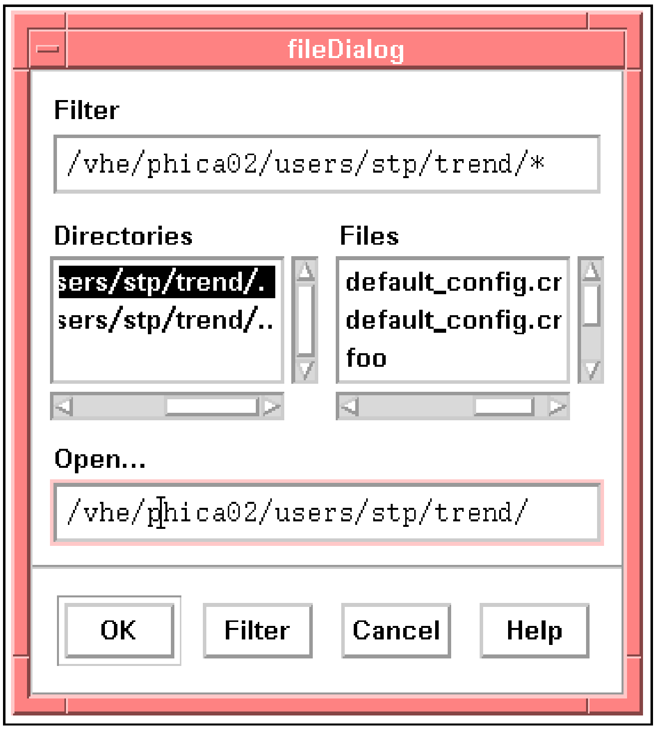

Figure 11: Menu Bar - File key element; Open Function

- ***Save Configuration:*** Allows the user to save data currently appearing on the Master and CSF Trend Displays under a user defined name and including the order, color and placement of each data point. The data maybe any combination of data types (Adhoc or Batch).

  The dialog pop-up for this function is similar in action and appearance to that of the **Open** function.

  The dialog pop-up **'Directories'** key word enables the user to select the file save location by allowing movement forward (by clicking on the desired subdirectory) and backward across directories and subdirectories (by double clicking on the double period '**..**' directory line). The key word **'Filter'** lists all files matching the text characters entered by the user. The astericks (*) character means list all. Filtering enables the user to view existing file names before deciding on one. The user enters the selected file name in the field provided by the pop-up key word **'Save as...'** or if overwriting an existing file, by clicking on the file name in the **'Files'** key word selection.

Alternatively, the user may opt to type the whole directory and file name in the **'Save as...'** key word field

Clicking on the **'OK'** button confirms and executes the save function.

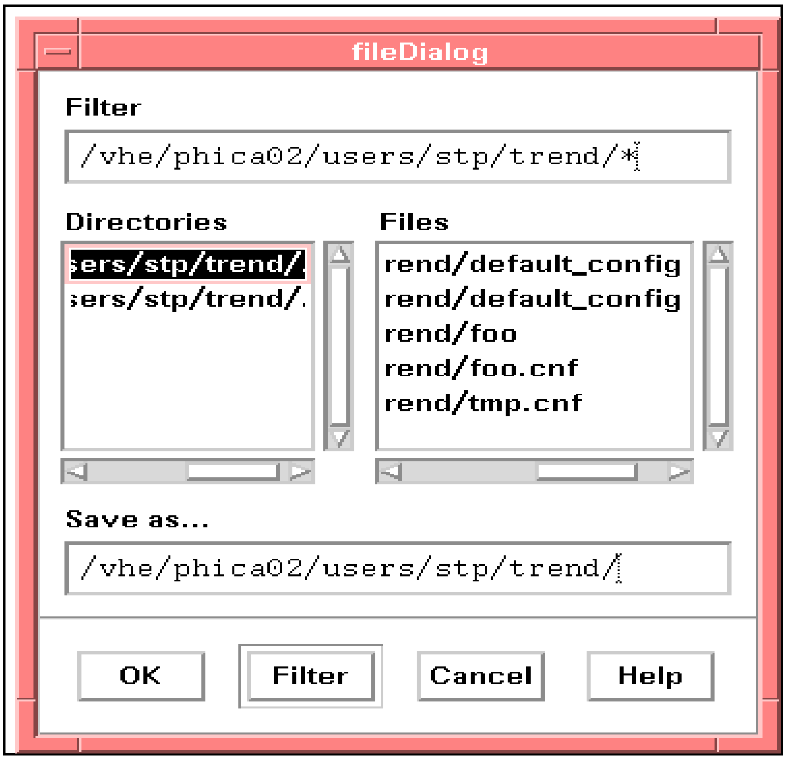

Figure 12: Menu Bar - File key element; Save Configuration Function

- ***Print:*** Prints the current trend window display including all trended data on both the Master and CSF Trend Displays.
- ***Exit:*** *Terminates without saving* the trend application window and invokes the trend icon.

2. EDIT

This key element allows selection of MTP and deletion of data points.

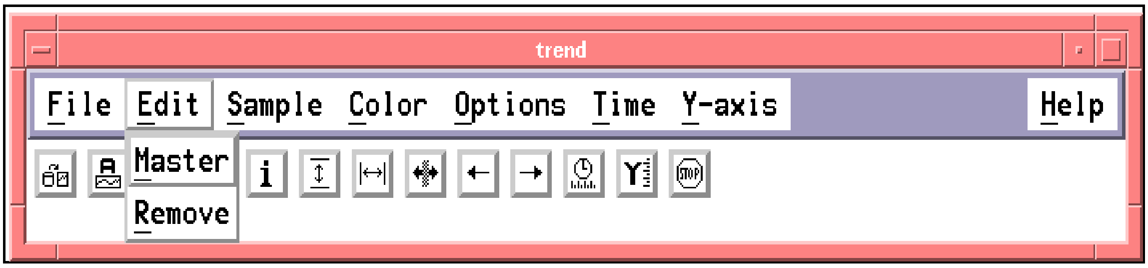

Figure 13: Menu Bar - Edit key element

- ***Master:*** Designates a selected point on the CSF trend display as the MTP and moves it to the master trend display configuration bar. If an MTP existed before, the new MTP replaces the old by swapping configuration bar positions. The MTP is the reference for all Master Trend Display activities.
- ***Remove:*** *Deletes a selected trend point* from both the Master and CSF trend displays.

3. SAMPLE

This key element enables loading of trend information and saving of a selected portion of data in a user specified format and name.

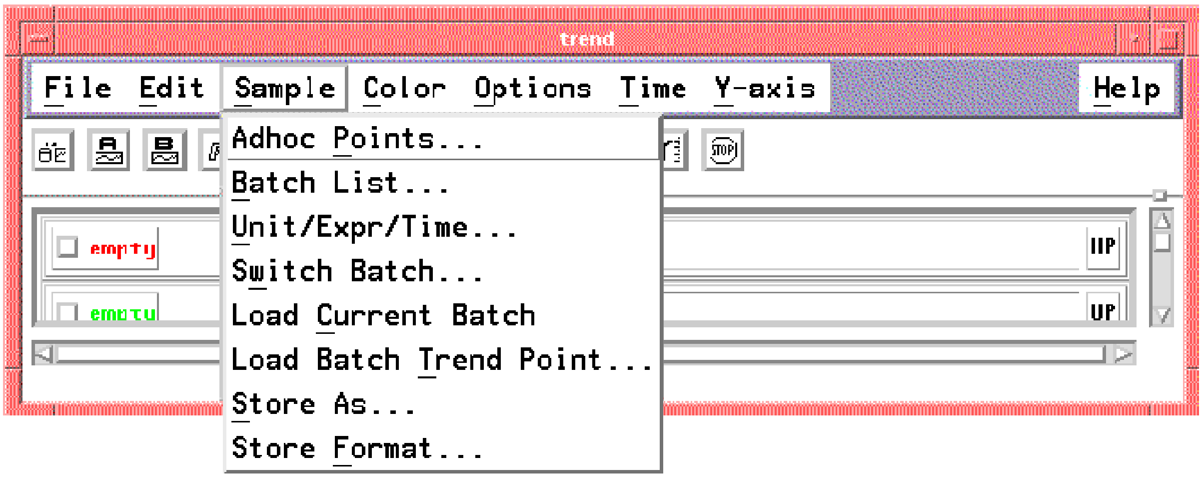

Figure 14: Menu Bar - Sample key element

- ***Adhoc Points:*** Allows the user to select adhoc points for viewing from a pop-up dialog list of available adhoc trend points. The list itself is built using the **Adhoc Trend Application**.

  To add an Adhoc point to either the Master or CSF trend display, the user must first select the configuration bar by clicking on its' select button.

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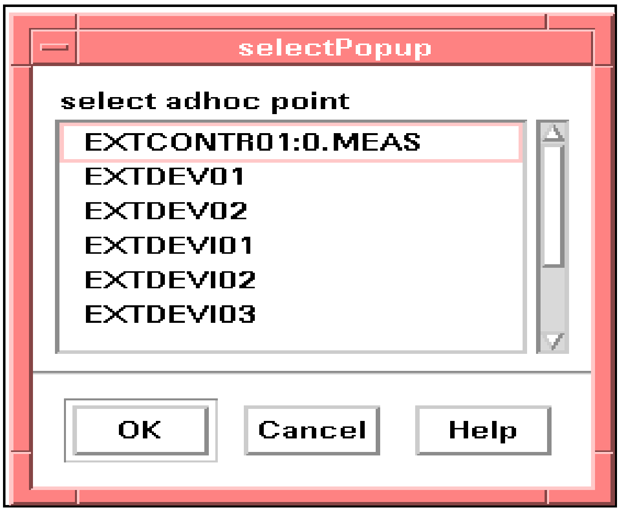


Figure 15: Menu Bar - Sample key element; Adhoc Points Function

- ***Batch List:*** Enables the user to select and load a specific batch trend file from a list of available batch data files. The selection is made using a 'Select Batch Trend File_popup' dialog box.

  The user is able to search for and locate the batch lists by clicking on double period (double click '**..**' to move backward) in the file box in the dialog pop-up.
  To move forward in directories, click on the desired directory once.
  The key word **'Filter'** lists all files matching the text characters entered by the user. The astericks (*) character means list all files.

  The **Rescan** button and the single period ('**.**') in the dialog pop-up cause the system to recheck the current directory for any new files that the system deposited since the user selected the directory.

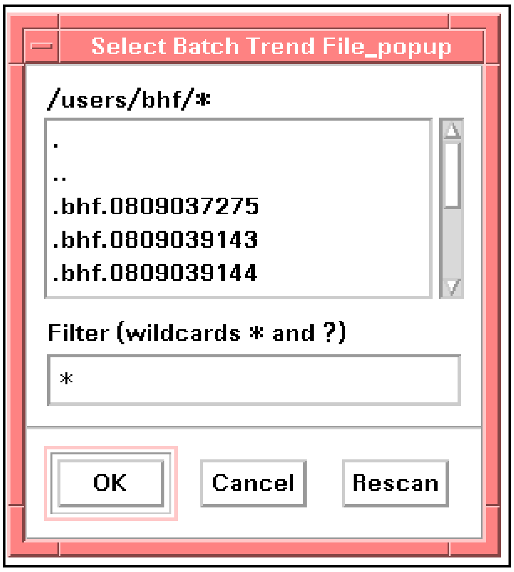


Figure 16: Menu Bar - Sample key element; Batch List Function

- ***Unit/Expr/Time***: Permits the user to select some trend points independently from the batch files where they are stored.
  The user must first select a PIC, he must then choose a unit from a list of all defined units in the batch trend files. After selecting a unit, the user can choose which batch trend points he wants to see. Finally, the user can enter the desired time range. In a list, the user sees which time ranges are covered by all the batch trend files.
- ***Switch Batch***: When a configuration has been saved using a specific batch file, this function allows the user to change read the same batch trend data from another batch file.
- ***Load Current Batch:*** Accesses and loads batch trend data from the currently executing/running batch based on already loaded points.

  Before invoking this option, the user must already have loaded a data file using any combination of **File/Open**, **Sample/Batch list** *or* **Sample/ Adhoc Points**.
  When this function is invoked, the system notes all the points currently appearing in the trend application window (from either the Master or CSF trend display and of type Batch or Adhoc) and checks if any of these points are part of a currently running batch. If they are part of a currently executing batch, their data is updated with the current batch data, otherwise they remain as is.
- ***Load Batch Trend Point:*** Permits the user to select *a single point* in the trend application window (from either the Master or CSF trend display and of type Batch or Adhoc) and updates it with data from a currently executing batch if it is associated with any.

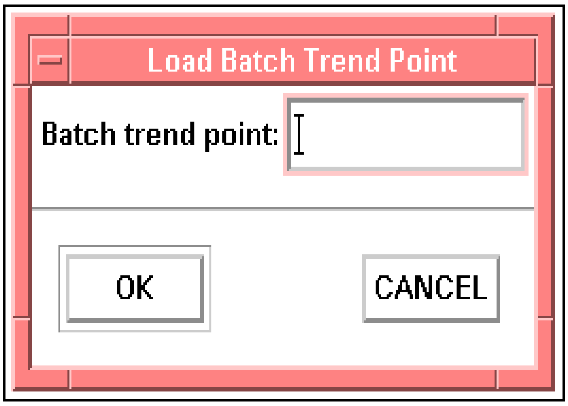


Figure 17: Menu Bar - Sample key element; Load Batch Trend Point Function

- ***Store as:*** The user may store a *single* or a *portion of a single* trend point data under a user chosen name in a format specified in the **Store Format** function.

  If a point is not selected using the select button or a portion of trend point is not highlighted, the system assumes the MTP as the default. The point maybe located on either the Master or CSF trend display and of type Batch or Adhoc.
  To highlight a portion of a trend point, see Section 6.14. 'Highlighting Part of a Trend'.

To store the data under a different format that the default SyCOS internal format, the user must first invoke the **Sample/Store Format** function and choose the desired format before invoking this function.

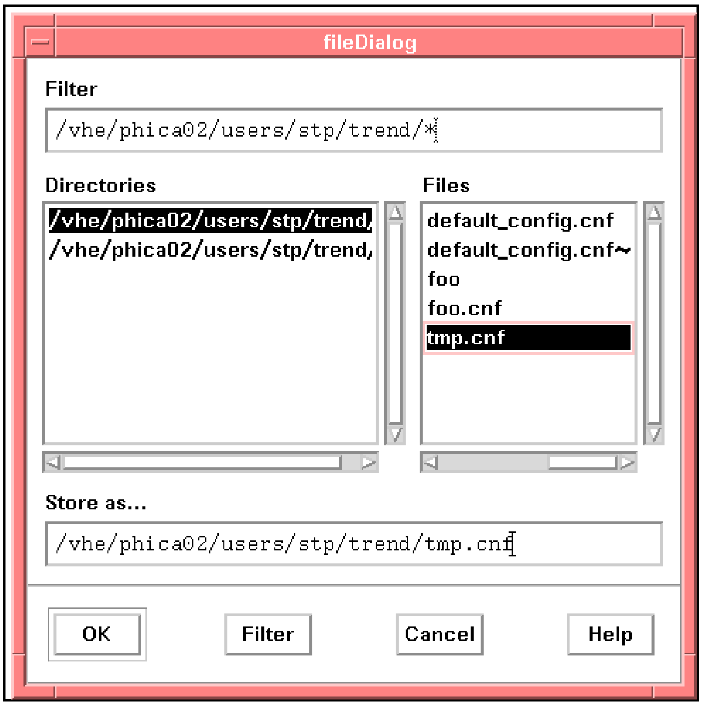


Figure 18: Menu Bar - Sample key element, Store as Function

- ***Store Format:*** Allows the user to select the file format for storing data under the function **Store as**. One of three formats can be selected in the dialog pop-up; internal SyCOS format (default), DADiSP and ASCII. Section 4.2. 'Trend Point Types' provides further information on the different formats.

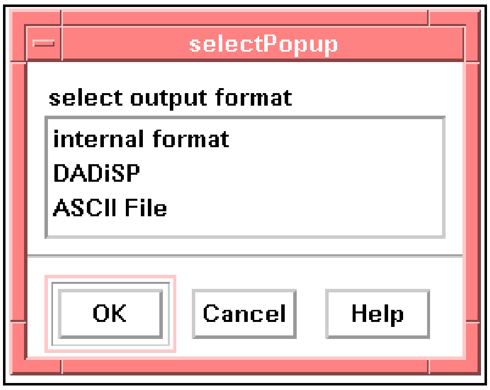


Figure 19: Menu Bar - Sample key element, Store Format Function

4. COLOR

This key element provides a color menu for the trend lines. Trend line colors can be changed by selecting the trend point then clicking on the chosen color. There are eight (8) permanently defined colors and four (4) user defined.

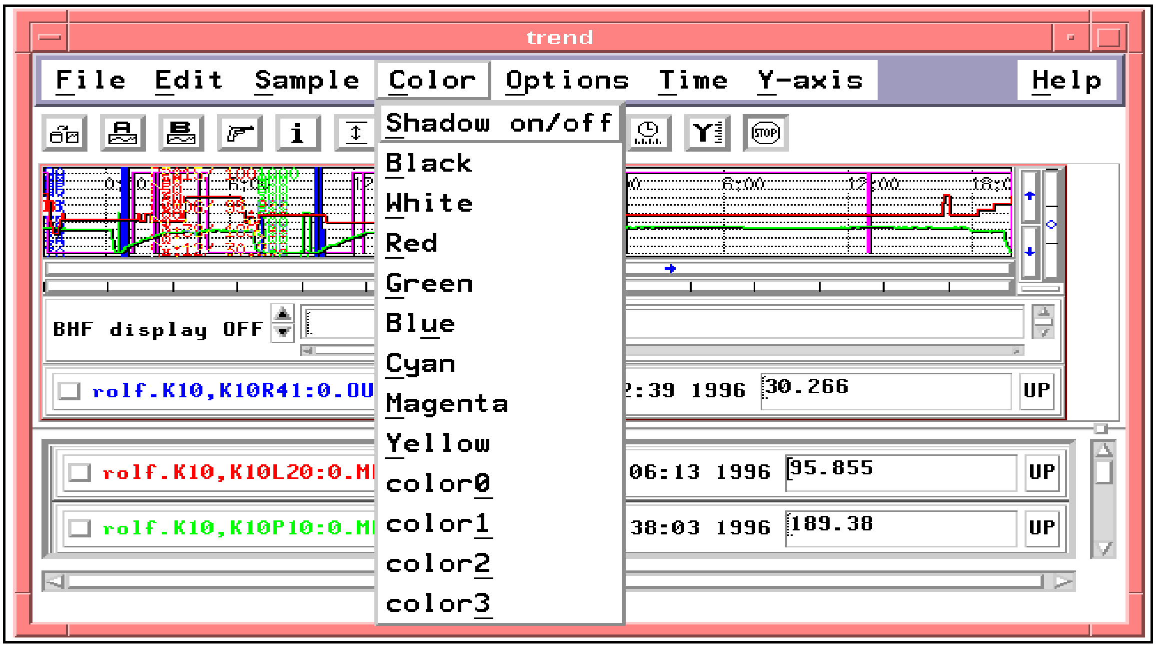


Figure 20: Menu Bar - Color key element

- ***Shadow on/off (toggle):*** Draws or deletes a shadow for the selected trend line. Shadow gives a deeper and more prominent line appearance.
- ***Black:*** Selects the color black for the selected trend line.
- ***White:*** Selects the color white for the selected trend line.
- ***Red:*** Selects the color red for the selected trend line.
- ***Green:*** Selects the color green for the selected trend line.
- ***Blue:*** Selects the color blue for the selected trend line.
- ***Cyan:*** Selects the color cyan for the selected trend line.
- ***Magenta:*** Selects the color magenta for the selected trend line.
- ***Yellow:*** Selects the color yellow for the selected trend line.
- ***Color0:*** Selects a user defined color for the selected trend line.
- ***Color1:*** Selects a user defined color for the selected trend line.
- ***Color2:*** Selects a user defined color for the selected trend line.
- ***Color3:*** Selects a user defined color for the selected trend line.

5. OPTIONS

This key element permits customizing of Master and CSF trend displays by allowing control of the grid, information and data appearance. It also provides an option for the user to display detailed information about a selected data point.

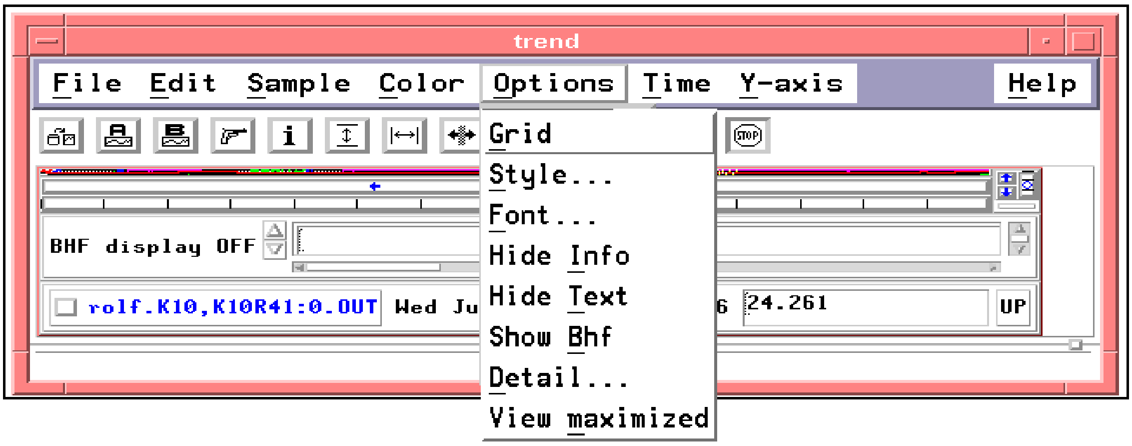


Figure 21: Menu Bar - Options key element

- ***Grid (toggle):*** Turns on/off grid lines on the master and CSF trend displays. The user selects the display to be altered by either selecting a trend point appearing in the display by clicking on the select button or by clicking on the display itself before invoking Grid. If the grid is active in the selected display then it is deactivated and vice versa.
- ***Style:*** Allows the user to select and customize the trend point graphic line appearance style. The line is composed of three (3) dashes that can be separated or connected depending on the in between gap definition. Line continuity and width can be manipulated by moving their respective size cursors on the dialog pop-up.

  The user must select the trend point before clicking and dragging on the appropriate dash, gap, or width cursor until the desired line style appears.

  A typical of the trend line as the user is creating is displayed at the bottom of the dialog pop-up.

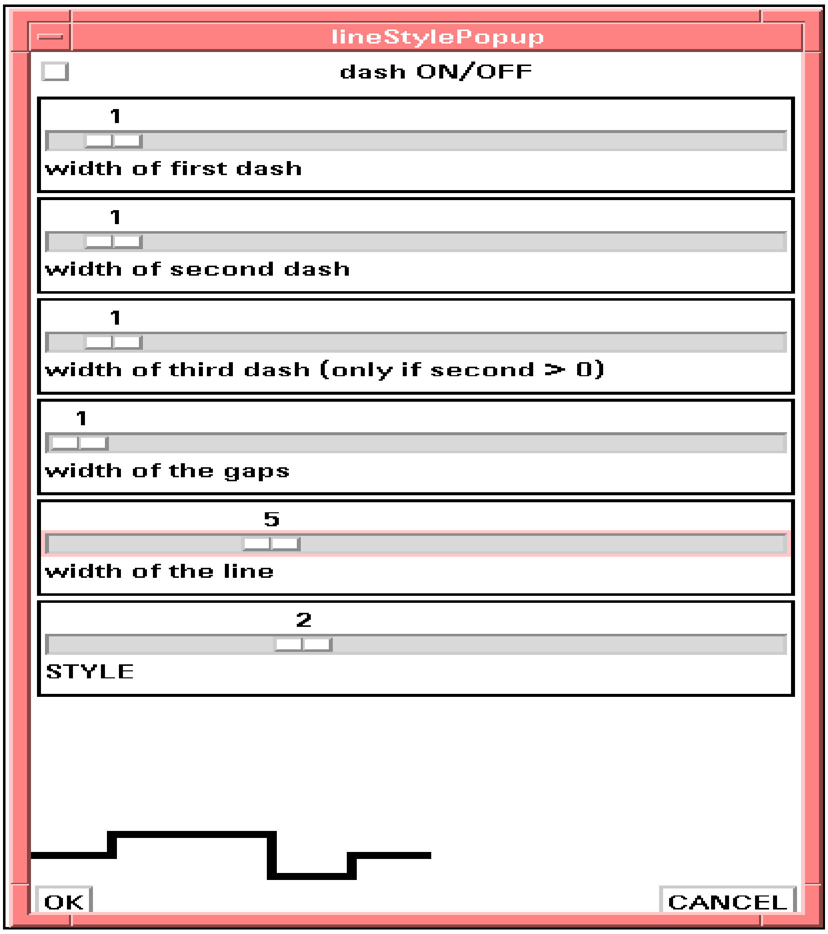


Figure 22: Menu Bar - Options key element; Style Function

- ***Font:*** Allows the user to select the font to be used on the trend graphics from a pop-up dialog box.

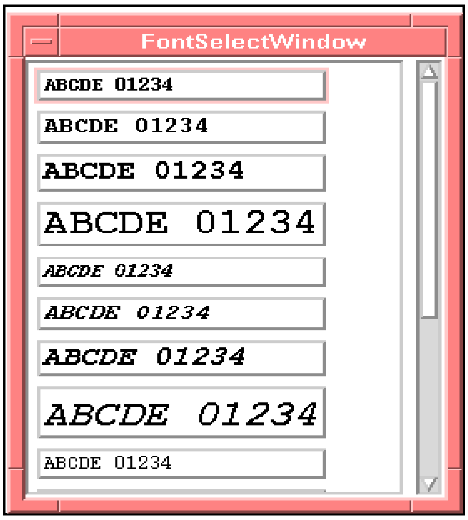


Figure 23: Menu Bar - Options key element; Font Function

- ***Hide/Show info (toggle):*** Suppresses or displays the Configuration/Secondary Function (CSF) Trend Display.
- ***Hide/Show Text (toggle):*** Suppresses or reveals text on the Master and CSF trend displays. Text includes any data information that may appear on the displays such as sample dead bands and trend start/stop messages.
- ***Hide/Show BHF(toggle):*** toggles on/off the BHF (Batch History File) message line on the Master Trend Display.
- ***Detail:*** Provides detailed information on a selected trend tag. The details are: signal name, signal ID number, total signal recording time, signal display time, number of samples taken, minimum and maximum measurement value in all the sample, minimum and maximum measurement value visible on the display.

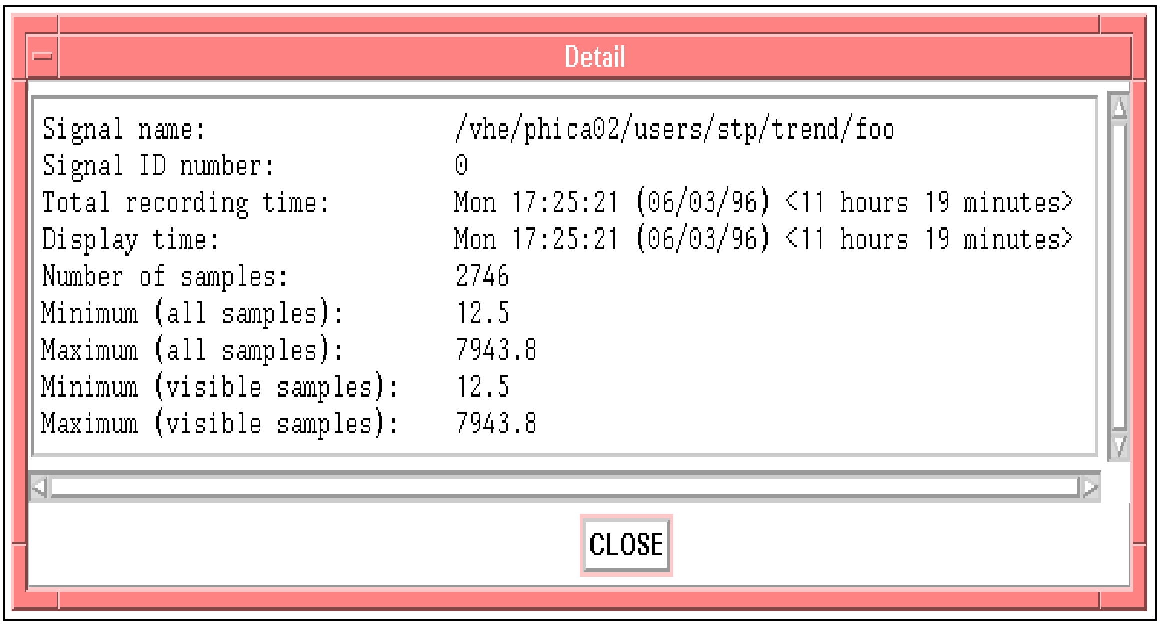


Figure 24: .Menu Bar - Options key element; Detail Function

- ***View maximized***: changes the size of the trend display application window to cover the whole screen. An "UP" is done on all the secondary trend displays and it is not possible anymore to resize the master trend display. Use this to be able to print and always have the same output size.

6. TIME

This key element permits the X-axis (time) variable manipulation.

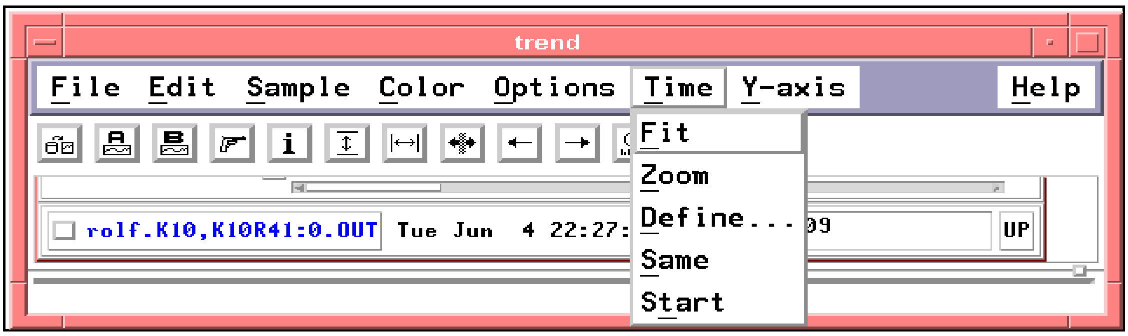


Figure 25: Menu Bar - Time key element

- ***Fit:*** Locates (when not visible) the MTP graphic trend line, and centers it in the Master Trend display according to its' X-axis range definition. This refocuses the display on the MTP for the duration of its' time range definition.
- ***Zoom:*** Zooms (increase resolution) in a *highlighted* trend area. This allows the user to magnify both the data and trend line. See Section 6.14. 'Highlighting Part of a Trend'.
- ***Define:*** Allows the user to change the selected trend display (Master or individual CSF) time range (X-axis) and the maximum amount of batch trend data loaded for display.

  The define function affects the display and the amount of data shown but not the actual size or collection time of the batch. The collection time and consequently the actual batch file size are defined in the system at the programming level. The user may only choose the amount of time and data to view from the batch trending file by changing the time definition window of the trend point.

  The Define function dialog pop-up contains time display information in the form of: **begin year, month, day, hour and min** fields which indicate the display start time, the **duration day, hour and min** indicating the length of the time display range.

  The **max load time (batch trending)** is the amount of data loaded from end of the batch **.trend** and **.event** file backwards for each data point. In effect, data is loaded starting at the end of the file towards the beginning of the file until the requested period is satisfied. It is possible to load less data (i.e. load 5 minutes) or more data than would fit on the trend display (i.e. load data for 2 days with a display configured for 24 hours. The user will have to scroll to see the second day data.). When modified, the new max load time is applicable to ***future*** file open and load.
  In the example below Figure 26: 'Menu Bar - Time key element; Define Function' the *display time range (X-axis)* begins on Kuly 7, 2000 at 8:42:00 hr. for the duration of 12 hours and the *amount of data loaded for display* is 2 days from the end of the trend point data file.
  Note: the max load time field is only visible when the editMaxLoadTime resource is set to TRUE in the X resource file (this is the default).

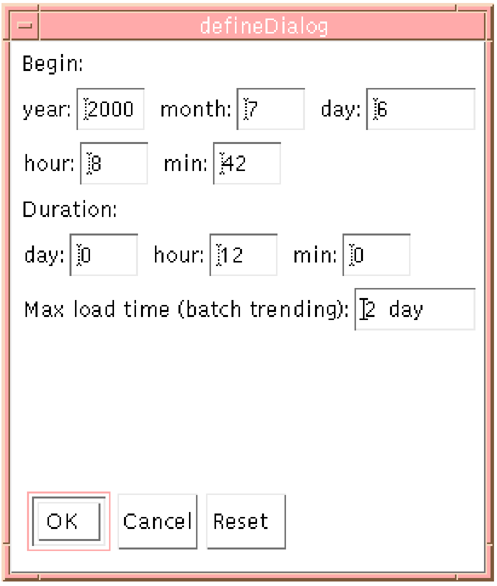


Figure 26: Menu Bar - Time key element; Define Function

- ***Same/Individual (toggle):*** Connects or breaks a time link between the Master and CSF Trend Displays.

  Selecting the ***SAME*** function forces the same time range definition on both Master and CSF trend displays. The user may change the CSF trend display time range definition separately but any time the Master trend display time definition is changed it is forcibly reapplied to the CSF trend display (time range is defined using **Time/Define)**.

  The ***INDIVIDUAL*** function breaks the **Same** connection if activated and enables the CSF Trend Displays to have different time ranges from the Master trend display. No change at the Master trend display will affect the CSF trend display.

- ***Stop/Start (toggle):*** This functions affects only currently executing batches. It stops/starts new batch data appending to *display buffer.* The trend display buffer is updated approximately every 10 seconds from the trend batch file and all new data is plotted as it is acquired on the display. To plot new data, the display trend lines are moved back (or the display is moved forward in time) to allow room for the new time and data on the display. This makes scrolling backward in time slow and resource taxing. As the user moves the display backward to view old data, the display jumps forward to current time to update with the newest data. The 'jumps' occur because the system must update the display buffer and any activated trend displays as data is received. Stopping prevents new data from appending to the display buffer. In effect, it freezes the amount of data available for display which allows access to previously plotted data fast and with no display access conflict.

  The **Stop** function does not prevent data collection or data appending to batch file, it just suspends updating the display buffer until a **Start** function is issued.

7. Y-AXIS

This key element permits manipulation of the Y-axis (range) variable related items.

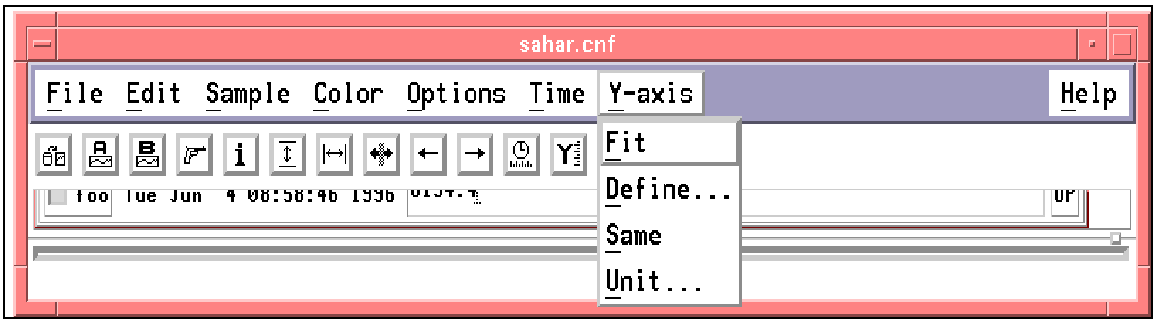


Figure 27: Menu Bar - Y-axis key element

- ***Fit:*** Locates (when not visible) the MTP graphic trend line, and centers it in the Master Trend Display according to its' Y-axis range definition. Additionally, the minimum and maximum of the point trend line within the define display time range are used to adjust the Y-axis range on the display to include them.

  This refocuses the display on the MTP within its' engineering unit range definition.

- ***Define:*** Allows the user to define Y-axis (engineering unit) range on display. The dialog pop-up accepts least and most value for the trend point as shown below.

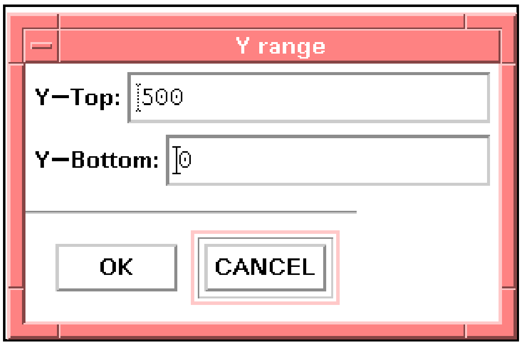


Figure 28: Menu Bar - Y-axis key element, Define Function

- ***Same/Individual (toggle):*** Connects or breaks a range link between all trend points appearing on the Master Trend Display only.

  Selecting the ***SAME*** function forces the same Y-axis range definition on all master trend lines. The trend line plots are adjusted according to the new range scale.

  The ***INDIVIDUAL*** function releases the trend lines on the Master Trend Display from the Y-axis range link but does not return them to their previous Y-range definition. This function also permits the Master Trend Display trend points to have their Y-axis ranges changed using the **Define** function.

- ***Unit:*** Supplies several engineering units for user selection as the Y-axis engineering unit.

  The unit can be made visible on the both the Master and CSF Trend Displays by selecting the display then activating the Grid function from the Options key element.
  More engineering and state units can be added as described in Section 7.3.1. 'Engineering Unit Addition'.

8. HELP

This key element offers an on-line help menu on all other seven (7) key elements. Most pop-up dialog boxes offer one or two lines explanation of the functions associated with the key element. Figure 30: 'Menu Bar - Help key element; File Function' is an example of the File key element.

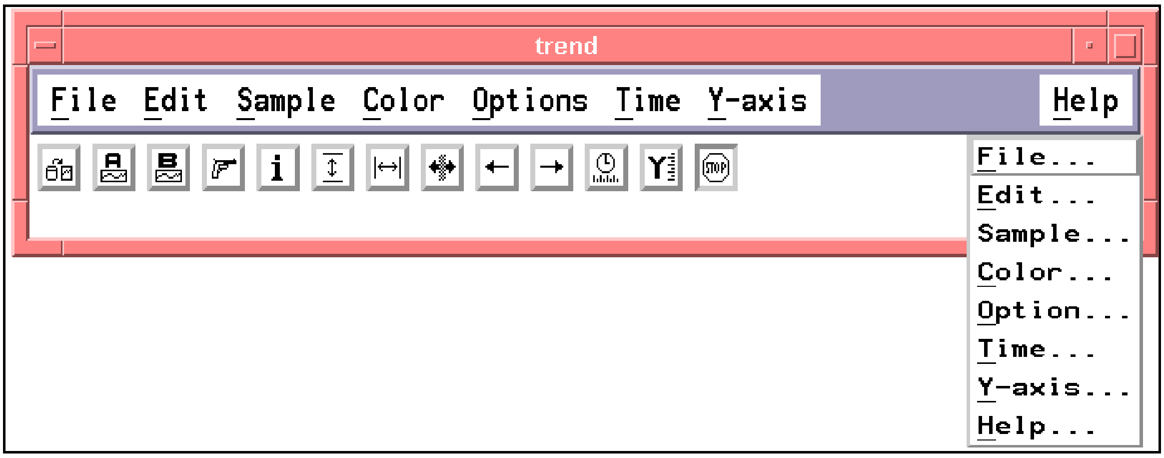


Figure 29: Menu Bar - Help key element

- ***File:*** Displays on-line explanation for the key element File and associated functions.

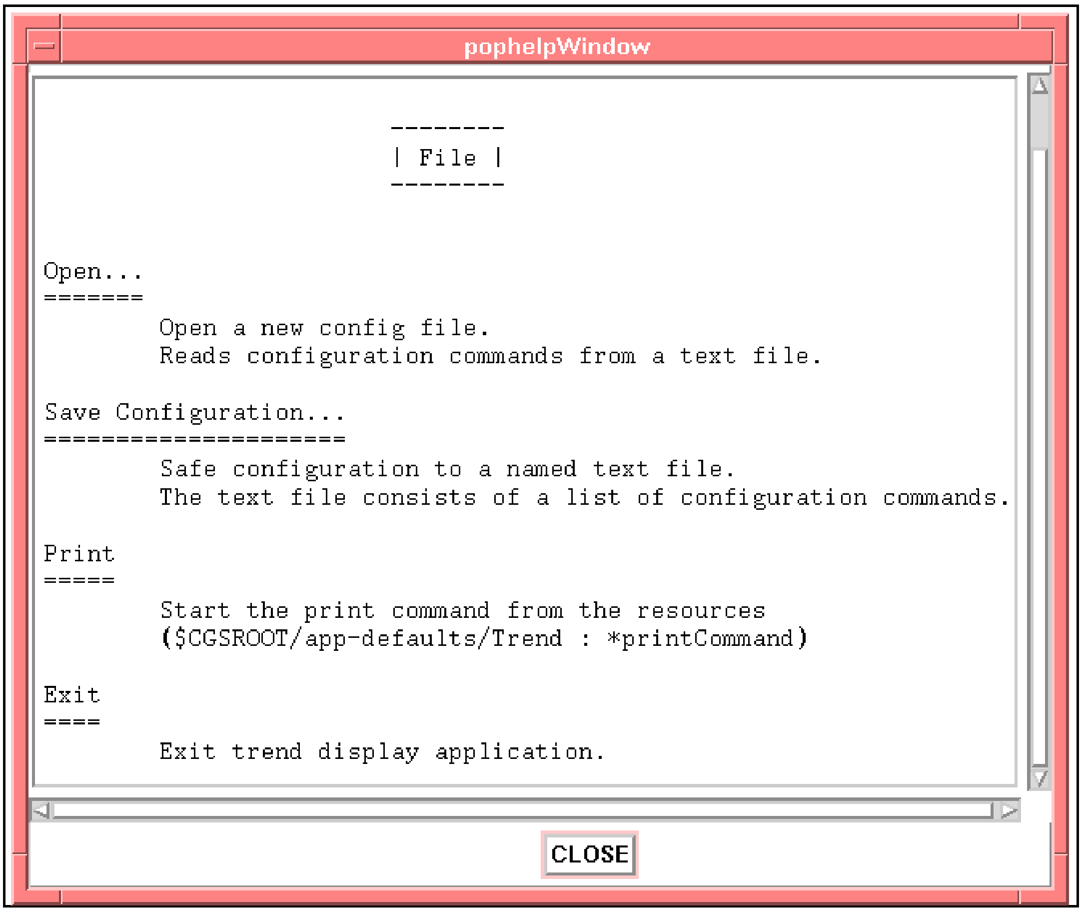


Figure 30: Menu Bar - Help key element; File Function

- ***Edit:*** Displays on-line explanation for the key element Edit and associated functions.
- ***Sample:*** Displays on-line explanation for the key element Sample and associated functions.
- ***Color:*** Displays on-line explanation for the key element Color and associated functions.
- ***Option:*** Displays on-line explanation for the key element Option and associated functions.
- ***Time:*** Displays on-line explanation for the key element Time and associated functions.
- ***Y-axis:*** Displays on-line explanation for the key element Y-axis and associated functions.
- ***Help:*** Displays on-line explanation for how to use the help menu.

5.1.2. Short Cut Keys

There are forteen (14) Short Cut Keys. These keys allows the user to execute the most commonly used functions quickly that otherwise the user must choose from the Trend Bar Menu.

When applicable, references to short cut keys are provided with the side line heading of **'Short Cut:'**.

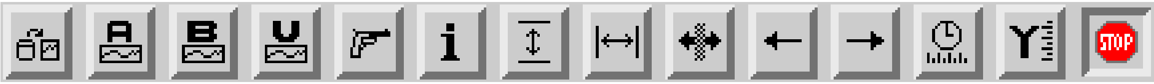
Short Cut Navigation

The user may access the short cut keys using the mouse only.

- Mouse: Place the mouse cursor on the short cut key and click.

The Keys graphic representations imitate their function. This facilitates recognition and use. For example, detail function is represented by an 'i' meaning information.

In Figure 31: 'Trend Control Menu - Short Cut Keys', the keys are numbered for easy listing and description.



(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14)

Figure 31: Trend Control Menu - Short Cut Keys

1. ***File Open:*** Opens a previously defined trend group. *Same as File/Open selection in the bar menu.*

2. ***Select Adhoc point:*** Enables the user to select Adhoc point for trending. *Same as Sample/Adhoc Points selection from the bar menu*.

3. ***Select Batch Trend file:*** Enables the user to select batch point for trending. *Same as Sample/Batch list selection from the bar menu*.

4. ***Select Batch Point:*** Enables the user to select a batch point for trending by giving its unit, name and a time range. *Same as Sample/Unit/Expr/ Time selection from the bar menu.*

5. ***Delete Trend From Configuration:*** Deletes a trend from both the master and configuration menu. *Same as Edit/Remove selection from the bar menu.*

6. ***Detail Trend:*** Supplies detailed information on a trend tag selected in the configuration display. *Same as Options/Detail selection in the bar menu.*

7. ***Time Fit Y-Axis:*** Locates (when not visible) the master point graphic line, and centers it based on the range (Y-axis) on the Master Trend display. *Same as Y-axis/Fit selection in the bar menu.*

8. ***Time Fit X-Axis:*** Locates (when not visible) the master point graphic line, and centers it based on time (X-axis) on the Master Trend display. *Same as Time/Fit selection in the bar menu.*

9. ***Zoom:*** Permits the user to zoom in the selected area.

10. ***Left Arrow Scroll:*** Scrolls /moves in the left direction on the selected trend graphic.

11. ***Right Arrow Scroll:*** Scrolls /moves in the right direction on the selected trend graphic.

12. ***Time:*** Displays the trend time min. & max. and allows the user to edit or accept the values. *Same as Time/Define selection in the bar menu.*

13. ***Y-Range:*** Displays the trend Y-axis min. & max. and allows the user to edit or accept the values. *Same as Y-axis/Define selection in the bar menu.*

14. ***Stop/Start (pressed in button /pushed out button):*** Stops/starts on-line data sampling and locks indicator line and trend display in place. *Same as Time/Start & Stop toggle selection in the bar menu.*

5.2. Master Trend Display

The Master Trend Display is an area where more than one trend line can be shown (the user can move any number of trends from the configuration display to the master by pressing the **'UP'** button on the selected trend point in the CSF display). It is also normally the area most used and viewed, therefore the Master.

By definition default, the master trend display displays trends. Trends are an expression of a variable value over time. Therefore one of the essential responsibilities of the display is to express this relationship by indicating the time and range of what is viewed. On both the Master and CSF trend displays, the time range is displayed at the top of the trend display and the point range(s) is(are) located on the left hand side of the display, in the same color used for the trend line graph. Both display time and point value ranges are defined using the Trend Control Menu (refer to Section 5.1. 'Trend Control Menu').

Each trend line has a start and an end point. the start point is marked with a **'B'** (Begin) and the end point is marked with an **'E'** (End). As the display cursor is moved across the trend line between these two points, a sample collection time and value is displayed.

The display also contains a Batch History File Line that can be toggled on or off to display system messages (alarm or information) that occurred just before or at the time each data point sample was collected.

The last area in the display is the Master Configuration Bar. This bar contains a select button, the Master Trend Point (MTP) name, time and date of current MTP value based on cursor position and an 'UP' button. Additionally, it indicates the MTP trend line color.

The select button allows the user to designate the MTP as the focus of activities. That is any action requested or performed will directly impact the MTP. Essentially it selects the MTP to be the reference for all master trend display activities such as selecting line style, font, scroll, zoom, or loading a point.

The **'UP'** button trends all defined trend points on the Master Trend Display from the CSF display.

Master Trend Display Navigation

The user may access the Master Trend Display using the mouse and some functions using the keyboard:

- Mouse: The mouse is used for selecting and browsing the Master Trend Display and activating buttons on the Master Configuration Bar by clicking and highlighting portions of trend lines by shift and click.
- Keyboard: Can be used for performing zooming activities. Detailed later in this section.

The Master trend display area consists of 10 major items. They are illustrated in Figure 32: 'Elements of a Master Trend display' and explained below:

View Area

1. A viewing area where the trends and grid lines are displayed.

Zoom Bars

2. Four (4) zoom half bars that control data resolution in both the X & Y-axis. The two (2) Y-axis halfbars are illustrated as item 2 in '*Elements of a Master Trend display*. The two (2) X-axis zoom halfbars are located just above item 3.

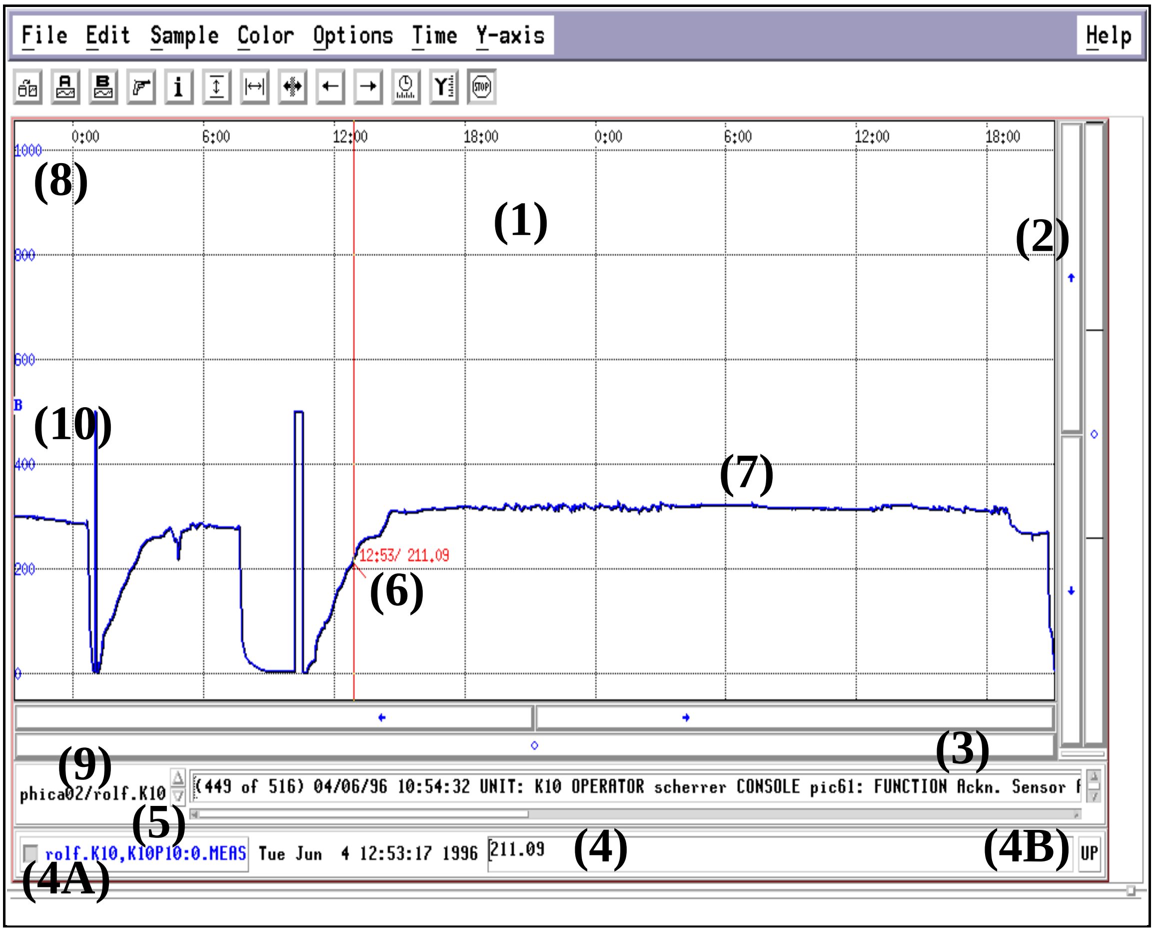


Figure 32: Elements of a Master Trend display

Each zoom halfbar represents the axis and half of the display it is parallel to (the half is also indicated by the direction of the arrow key inside the halfbar). The division is illustrated in Figure 33: 'The Four Zoom Half-Bars'. Each half bar affects only the half of the display it is related to and is capable of both zooming in and out *that part of the display* using the halfbar arrow keys.

Zoom Bars - Zoom Out Function

The *Zoom out* function decreases resolution, that is increases the time (X-axis) and compresses data (Y-axis) quantity displayed on the viewing area. The user can examine the condensed data using the cursor.

Zoom Bars - Zoom In Function

The *Zoom in* function increases resolution, that is decreases the time (X-axis) and intensifies data (Y-axis) quantity displayed on the viewing area. The user can scroll the magnified data using the cursor.

For all halfbars, the arrow key is located in a neutral position that generates no zoom activity. Moving the halfbar arrow outward away from the display causes a *zoom out* action and moving the arrow inward towards the middle point of the display causes a *zoom in* action for all halfbars. When the arrow key is released, it returns to the neutral position.
For example the halfbar on the leftmost of the screen on the X-axis (half-bar 1 on Figure 33: 'The Four Zoom Half-Bars') affects the X-axis and

the leftmost half portion of the screen. Moving the arrow to the left causes that half of the display to be zoomed out. Moving the arrow in the right direction causes that half of the display to zoom in.

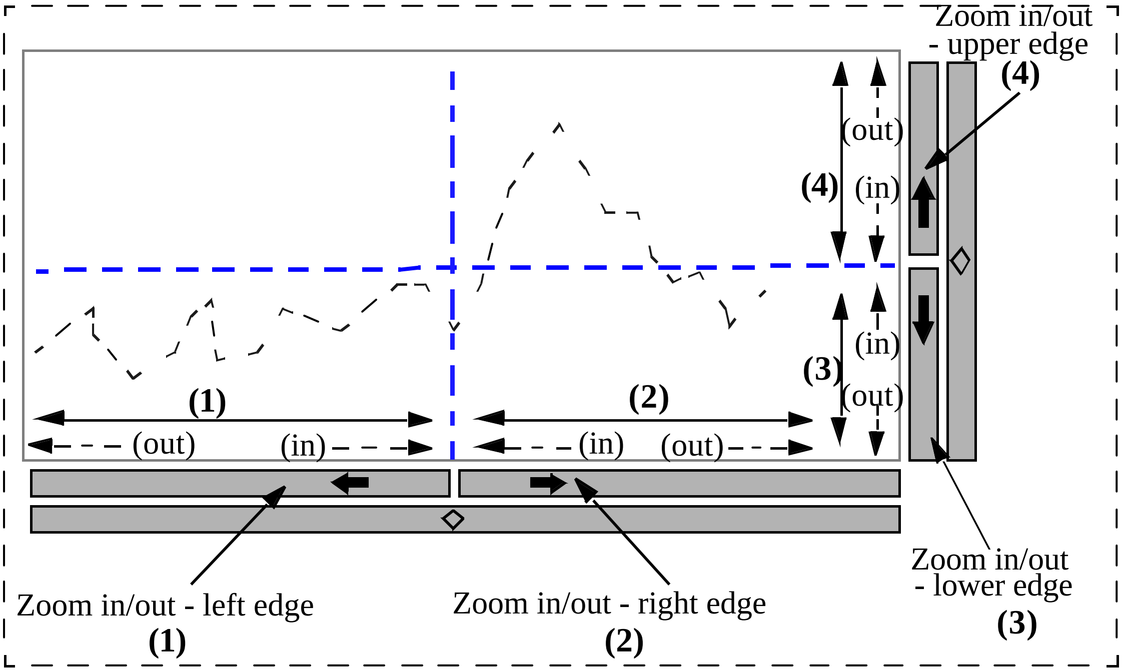


Figure 33: The Four Zoom Half-Bars

All bars can also be operated in steps by using the arrow keys located on the keyboard.

Zooming with Arrow Keys

The arrow keys from the keyboard may also be used to define a new time display range or y-axis range. Pressing the arrow keys on the display performs the following action:

Note: The mouse pointer must be placed over the relevant scrollbar.

up arrow: The display fits its time and y-axis range to the trend display (similar to **Y-axis/Fit** and **Time/Fit** key elements and functions in the trend bar menu).

down arrow: The y-axis is zoomed in to display all points of the current time window (similar to the **Y-axis/Fit** option in the bar menu).

left arrow: The time window is zoomed in to the current selection (similar to the **Time/Zoom** key element and function in the trend bar menu).

right arrow: The time window is zoomed to the defined time range of the trend (similar to the **Time/Fit** key element and function in the trend bar menu).

Zooming with Keyboards Without Arrow Keys

Some keyboards have no arrow keys. Instead of the arrow keys the following keys are available.

arrow key	key on the numerical key pad	character key
up	8	u or U
down	2	d or D
left	4	l or L
right	6	r or R

Table 1: Zoom Alphanumerical Keys (arrow keys replacement)

Trend Scroll Bars

3. The X-axis trend scroll bar is to view data across time. This bar allows the user to go forward and backward in time to view plotted data. *It does not change resolution nor does it affect the data in any way.* The Y-axis trend scroll bar is located just right to item 2.

Master Configuration Bar

4. The Master Configuration Bar consisting of the MTP, date, time and value of current cursor position, the select button (item 4A) and the 'UP' button (item 4B) which plots all configured trend point on the master trend graphics display.

Motif Scroll Bars

5. The small up/down and left/right application window X and Y-axis scroll bars are located just above and to the right of the number (5). Both permit scrolling information available in the trend application window that maybe hidden due to Master, CSF or trend application window size. The movement is identical as to the Trend Scroll Bars.

Cursor Line

6. The cursor line and text. Cursor line movement is controlled with the mouse. As the cursor line moves across time, the exact time and sample value are indicated on the graphic. Note that the time and value of the cursor line matches exactly the Master Configuration Bar.

Graphic Trend Line

7. The graphic trend line is a plot expression of values over time in a X/Y matrix. Trend scroll bars allow the user to move the viewing area across time (X-axis) or value (Y-axis).

X & Y-axis Range

8. The time and range values. The X-axis range representing the time aspect is displayed on the top of the graphic area. The Y-axis expresses the point range in engineering units.

Batch History File Line

9. The BHF line when active (as it is in this example) displays system messages collected before or at displayed time. The messages maybe system information, warning, error or alarm messages related to the SyCOS controlled plant area.

Trend Line 'Begin', 'End' & 'OUT'

10. The '**B**' indicates Beginning of data for this point. The End of data, '**E**', is not shown on this graphic. They indicate the beginning and ending of data in the *internal buffer* for the point. There maybe additional configuration file data available depending on the setup of the point time definition. The user may also see **'OUT'** displayed indicating that the cursor is outside the begin data range.

5.3. Configuration/Secondary Function (CSF) Trend Display

The Configuration/Secondary Function (CSF) Trend Display is where trend points are loaded and manipulated. Each trend point is individually displayed in a horizontal bar called CSF Configuration Bar.

The CSF configuration bar displays all essential information; point name, point line color, date and time of currently displayed value. In addition, the user may modify the points' attributes such as color, range or engineering unit by selecting the point CSF configuration bar then executing the desired function.

The CSF configuration bar also provides the user with the capability of trending a single trend a point individually on the CSF trend display or moving it to the master trend display. Any or all defined trend points maybe trended individually on the CSF trend display or moved to the Master trend display.

CSF Display Navigation

The user may access the CSF display using the mouse only:

- Mouse: The user may click on the select button to select the trend point configuration bar or the 'UP' button to move the trend line.

Each CSF configuration bar consists of the following 6 major fields as explained below and illustrated in Figure 34: 'Configuration/Secondary Function (CSF) Trend Display':

Select Button

1. A select button. Clicking on the select button selects the point for handling. The shading in the select button maybe light (not selected, item 1B) or dark (selected, item 1A). When selected, the user may change point attributes such as color, format of trend line, time/range display fit or load another point to that location.

Trend Point Name

2. Trend point name. The name is unique and normally reflects the point type and origin. The trend name color indicates the color of the trend line graphic.

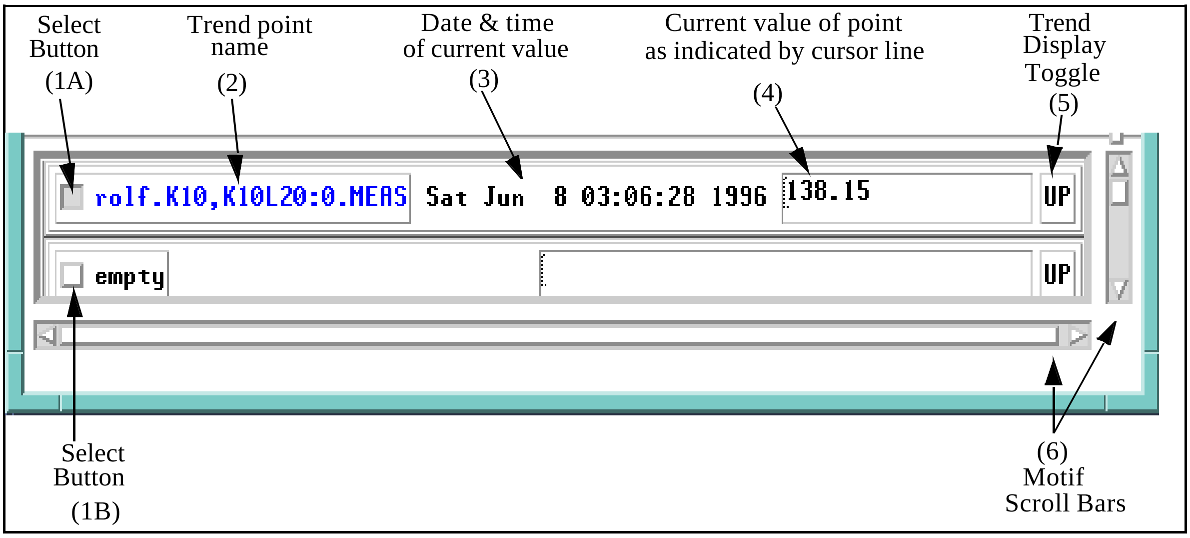


Figure 34: Configuration/Secondary Function (CSF) Trend Display

Date And Time

3. The date and time of the trend point value measurement currently displayed. Both reflect the current cursor position on either the Master Trend Display or CSF Trend Display depending on the location of the cursor.

Trend Point Value

4. The trend point value. The value may:

- reflect the trend point measurement value for the cursor position on the Master or CSF trend display.
- contain the words **'B'** , **'E'** or **'OUT'**. This indicates that the cursor has been moved to the **B**eginning, **E**nd or **OUT**side the begin time range where samples are loaded from the *internal buffer*.

The user may redefine the data time range loaded in the internal buffer using the **TIME/DEFINE** option.

'UP' Button

5. The **'UP'** button moves the trend graphic from the CSF display to the Master trend display and vice versa. Trending on CSF display permits the user to view the point trend line individually, whereas, on the Master trend display it maybe one of several trended values. For both displays, the range of the trend line is displayed on the leftmost of the display in the same color as the trend point name and graph line.

This illustrated in Figure 35: 'CSF Configuration Bar 'UP' key - Trend local on CSF display' and Figure 36: 'CSF Configuration Bar 'UP' key - Trend on Master display'. In the first figure, the 'UP' key was clicked once to invoke the local CSF trend. In the second figure, the 'UP' key was clicked again inorder to move the trend line to the Master Trend display.

Motif Scroll Bars

6. The Motif X and Y-axis scroll bars permit scrolling information available in the trend application window that maybe hidden due to CSF or Trend Application Window size.

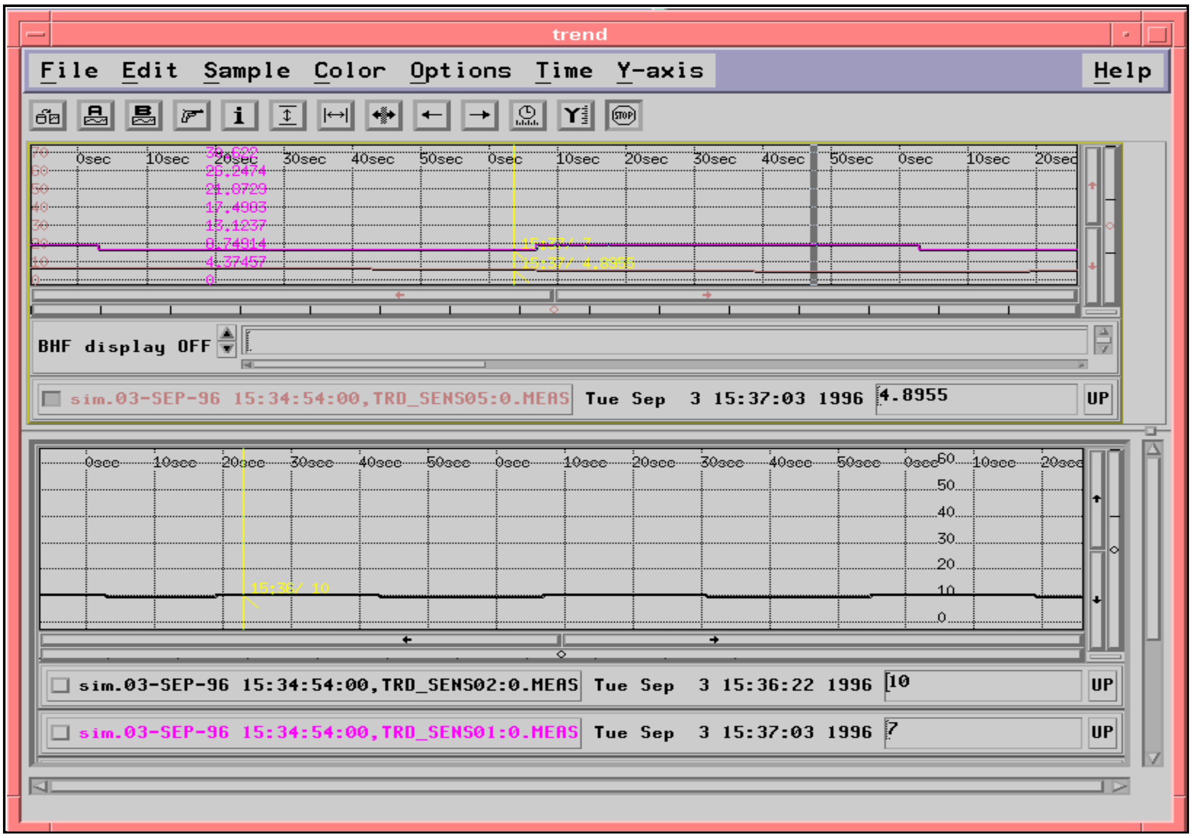


Figure 35: CSF Configuration Bar 'UP' key - Trend local on CSF display

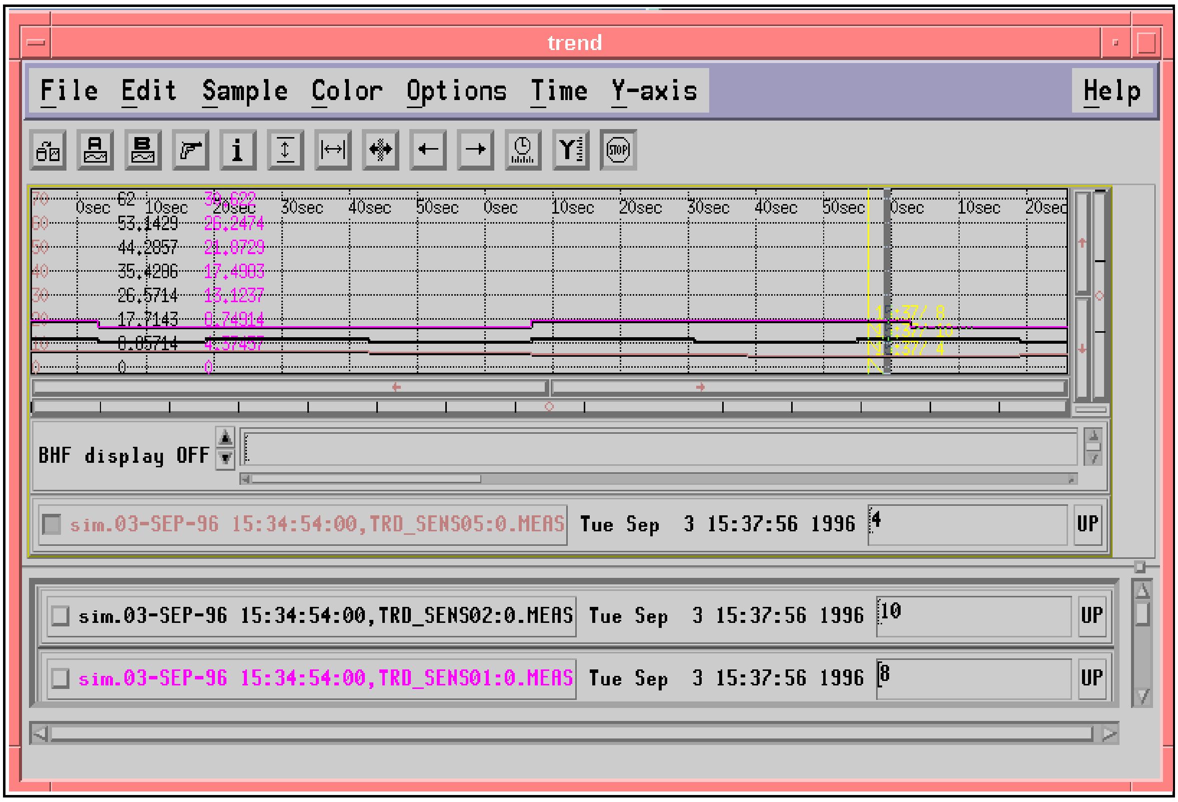


Figure 36: CSF Configuration Bar 'UP' key - Trend on Master display

5.4. Resize Button

The resize button is located on the right edge of the display between the Master and CSF trend displays.

It is used to change the size of the display area of the Master and CSF trend displays.

CSF Display Navigation

The user may change trend displays size using the mouse only:

- Mouse: The user clicks and drags the resize button either up or down.

Moving in the up direction, increases CSF display size while decreasing the Master Trend Display size. Moving in the down direction causes the reverse to occur.

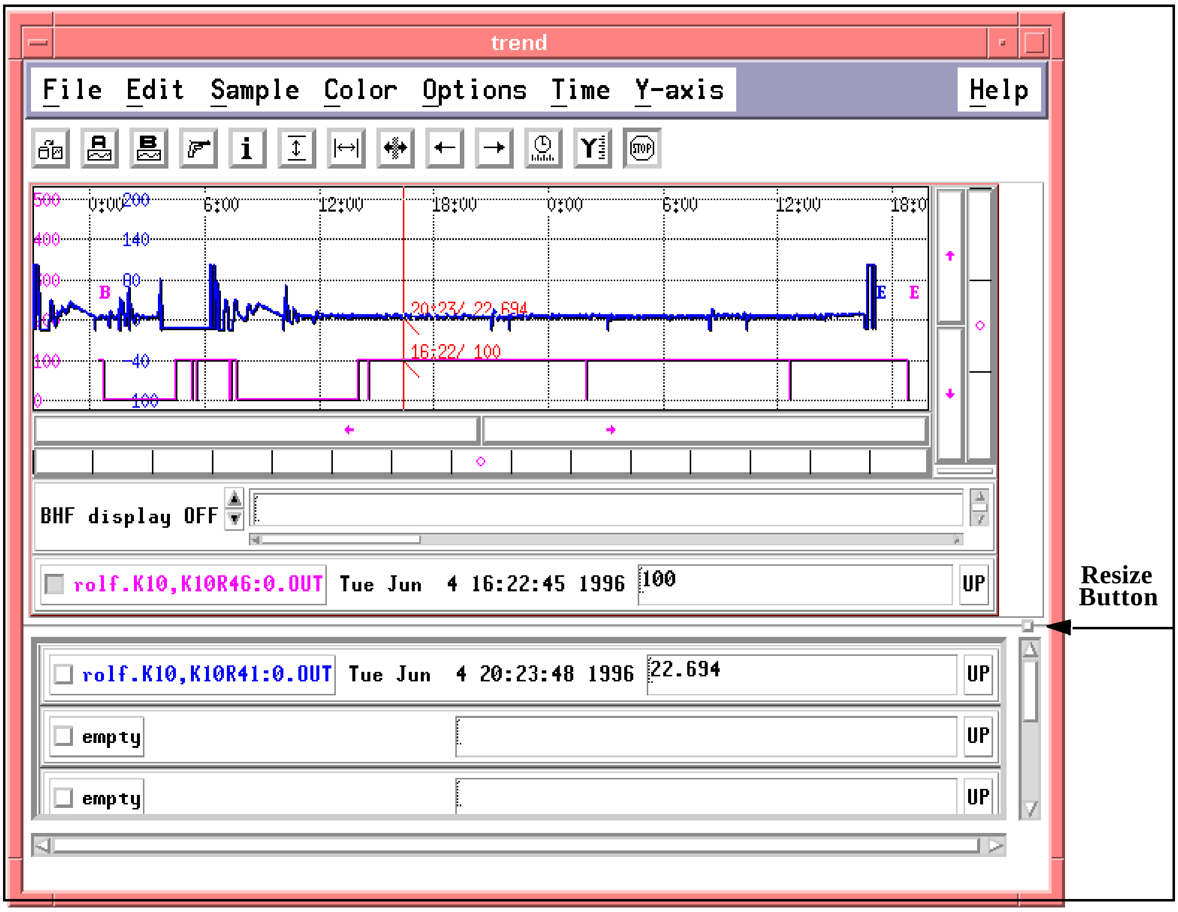


Figure 37: .Resize Button

It is possible to resize as to exclude one of the display areas completely.

The size of the Trend Application window does not change, no matter which display is maximized as illustrated in Figure 38: 'Resize Button - Maximized CSF Display' and Figure 39: 'Resize Button - Master Trend Display Maximized'.

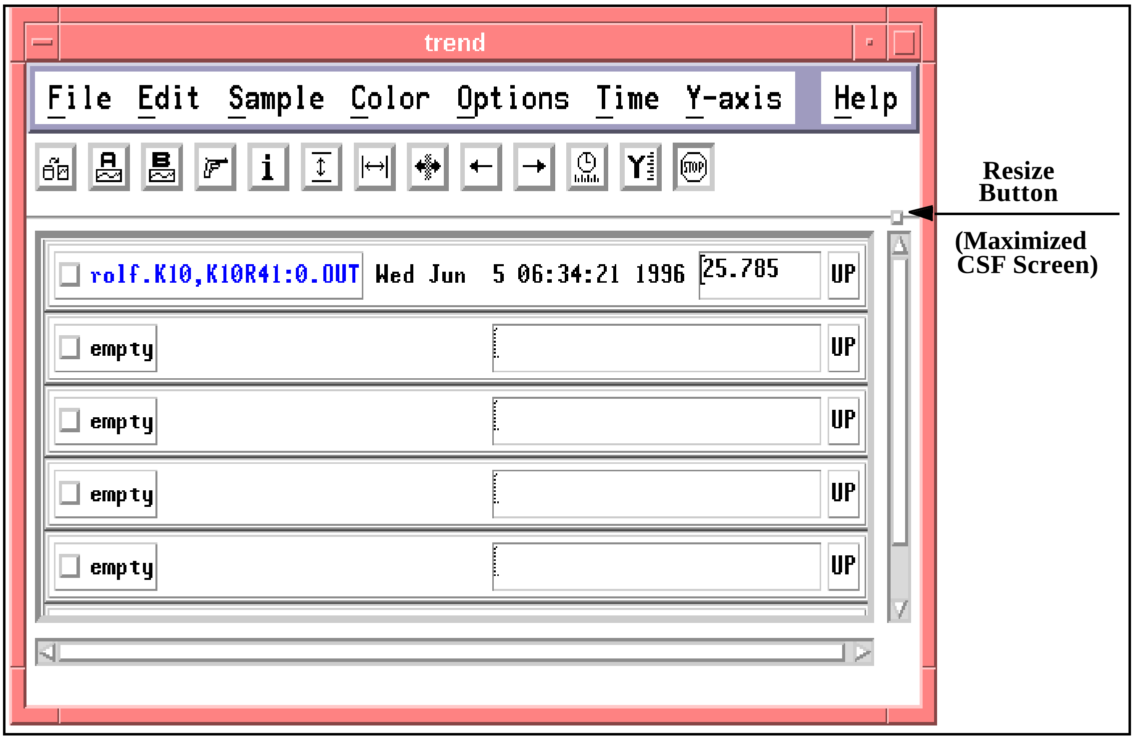


Figure 38: Resize Button - Maximized CSF Display

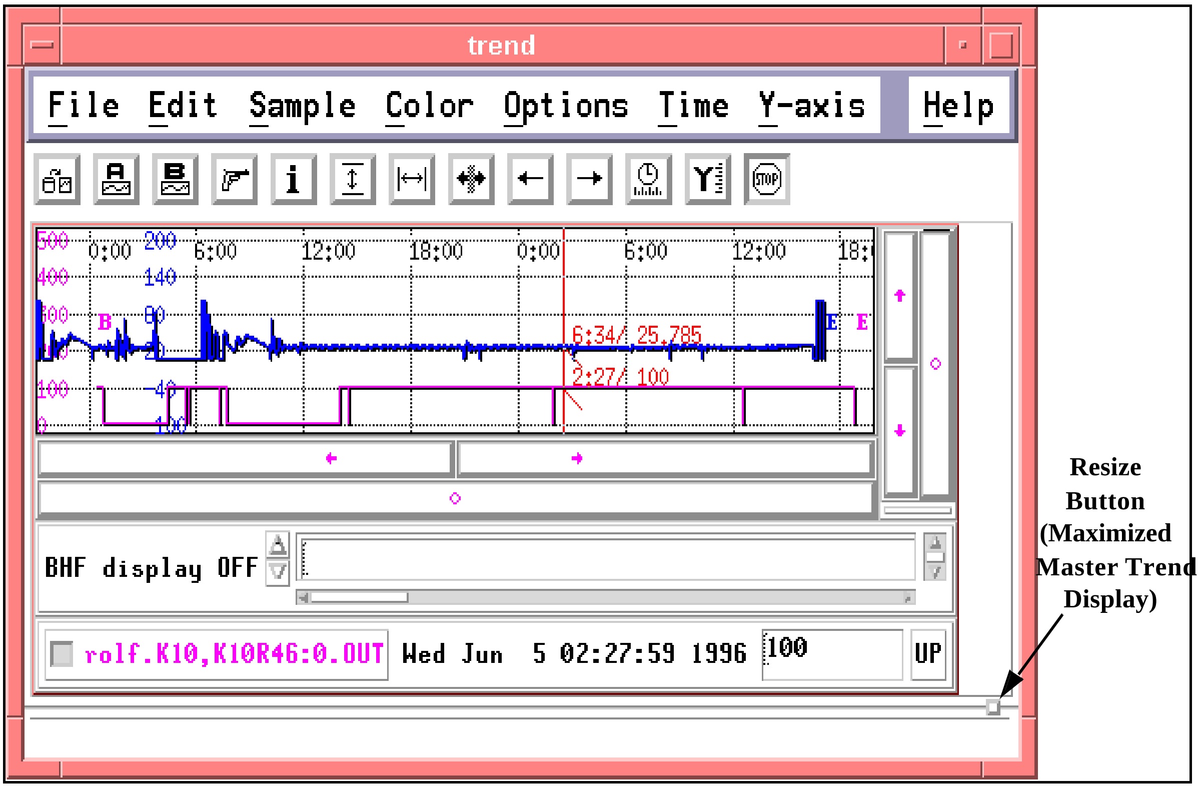


Figure 39: Resize Button - Master Trend Display Maximized

6. Operating the Trend Application

This section lists and provides 'how to do' procedures for the Trend Window Applications' most basic and commonly used operations.

This section is recommended to all users including the plant operator and plant engineer.

Navigation

The user may access all described procedures using the mouse or keyboard as described in Section 5. 'Detailed Functionality'.

In general:

- Mouse: User can access the Key Element/Function selections from the Trend Menu Bar and Short Cut keys by clicking on them.
- Keyboard: User can access the Key Element/Function by pressing the **ALT** (Extended Char key on older HP keyboards) and underlined letter of key element simultaneously. To select the function, the user must press the key of the underlined letter.

The Trend Control Menu selections are listed in a Key Element/Function format. Short cuts when available are listed below the affected line with a '**Short Cut:'** leading header.

6.1. Loading a Configuration

Loading a configuration is the act of locating then moving data from storage (i.e. file) to the Trend Window Application for display and use. Configuration files contain data point sample information in a specific format that can be interpreted by the Trend Window Application to create visual trend lines and information data.

There are three (3) different types of data that the SyCOS system can access and interpret: Adhoc trend points, batch trend points, and configuration files (trending batch and/or adhoc information previously saved into files).

The application can access old data (Existing Batch or Adhoc points File) or data of a process that is occurring in plant now (Current Batch or Adhoc points).

6.1.1. Loading an Existing Configuration Trend File

There are two ways to restore an existing configuration or trend file:

1. **Optional:** Select **FILE/NEW** from the Trend Bar Menu to clear any residual data.
2. Select **FILE/OPEN** from the trend bar menu. A dialog pop-up should appear.

Short Cut: Select **File Open** from the Short cut menu (1st key from the left)

3. Select the directory and file from the file dialog pop-up listing available directories and files.

4. click the mouse cursor on the file name then on the **‘OK’** button.

or

1. **Optional:** Select **FILE/NEW** from the Trend Bar Menu to clear any residual data.
2. Select **SAMPLE/BATCH LIST** from the bar menu. The pop-up lists all available BHFs on the different hosts which have trending information to display.

Short Cut: Choose **Select Batch Trend File** from the Short cut menu (3rd key from the left)

3. Select the host name from the Select Batch Trend file_popup dialog pop-up.
4. Select a batch by clicking the mouse on the batch file name then on the **‘OK’** button.

6.1.2. Loading Batch Points

The user may display a single or many Adhoc trend points simultaneously.

6.1.2.1. Loading a single Batch Point

To sample an Adhoc point, select the following from the bar menu:

1. **Optional:** Select **FILE/NEW** from the Trend Bar Menu to clear any residual data.
2. Select an empty CSF configuration bar by clicking on the select button (The user can select preconfigured CSF configuration bar is overwriting).
3. Select **SAMPLE/Batch List** from the Trend Bar Menu.

Short Cut: Choose **Select Batch Point** from the Short cut menu (3rd key from the left)

4. Select a batch file from the pop-up dialog list by clicking on the file then the ‘**OK**’ button.

5. Choose the batch point from the batch file by clicking on the point then the ‘**OK**’ button.

6.1.2.2. Loading Several Batch Points

Repeat the process described in Section 6.1.2.1. ’Loading a single Batch Point’ for each selected point, each time starting at step two (2) of selecting a new empty CSF configuration bar.

6.1.3. Loading Adhoc Points

The user may display a single or many Adhoc trend points simultaneously.

6.1.3.1.Loading a single Adhoc Point

To sample an Adhoc point, select the following from the bar menu:

1. **Optional:** Select **FILE/NEW** from the Trend Bar Menu to clear any residual data.
2. Select an empty CSF configuration bar by clicking on the select button. (The user can select preconfigured CSF configuration bar is overwriting).
3. Select **SAMPLE/ADHOC POINTS** from the Trend Bar Menu.

Short Cut: Choose **Select Adhoc Point** from the Short cut menu (2nd key from the left)

4. click the mouse cursor on the point name to be displayed followed by the 'OK' button in the SelectPop dialog pop-up.

All database points which are trended through the ***Adhoc Trend Application*** tool are listed in a scrollable list.

Points which were written into a private (only on one host) file system are displayed with an asterisk.

A gap (breaks) in trend graphic line indicates that the point was not recorded for that time.

6.1.3.2.Loading Several Adhoc Points

Repeat the process described in Section 6.1.3.1. 'Loading a single Adhoc Point' for each selected point, each time starting at step two (2) of selecting a new empty CSF configuration bar.

6.1.4. Loading a Current Batch File (Currently Running Batch Data)

6.1.4.1.Loading All Trended Points of a Current Batch

To view trend points from a currently running process batch, the user must first select the trend points before loading their current batch status.

1. Load an existing batch file for the area currently running (see Section 6.1.1. 'Loading an Existing Configuration Trend File').
2. Select **SAMPLE/LOAD CURRENT BATCH** from the Trend Bar Menu.

6.1.4.2.Loading a Single Point Trend from a Current Batch

To view a single current process batch trend point, select the following from the Trend Bar Menu:

1. **SAMPLE/LOAD BATCH TREND POINT**.
2. Enter the trend point name in the dialog pop-up provided field before

clicking on the **'OK'** button.

3. **SAMPLE/LOAD CURRENT BATCH**.

6.2. Creating A New Configuration

A configuration can be a one or more points of type Batch or Adhoc or a combination of both. To create a new configuration:

1. Select **FILE/NEW** from the Trend Bar Menu to clear any residual data.
2. To add several batch points:
   Load desired points to desired location by loading Batch or Adhoc points as indicated in Section 6.1.2. 'Loading Batch Points' and Section 6.1.3. 'Loading Adhoc Points'.
   Delete or remove the unwanted points (see Section 6.4. 'Removing (Deleting) a Trend point from the Display').
   Go to step five (5).

3. Select an empty CSF configuration bar on either the Master or CSF displays by clicking on the Select button.
4. To add:

- One/Several Adhoc Point(s):

  Choose **SAMPLE/ADHOC POINTS** from the Trend Bar Menu.

Short Cut:

  Choose **Select Adhoc Point** from the Short cut menu (2nd key from the left)
  Select the point by clicking on it then the pop-up **'OK'** button.

- A single Batch Point:

  Select **SAMPLE/LOAD BATCH TREND POINT** from the Trend Bar Menu.
  Enter the trend point name in the dialog pop-up provided field before clicking on the **'OK'** button.

Repeat steps three (3) and four (4) until all points are selected.

5. Adjust colors and ranges as described in Section 6.7. 'Changing Display Time (X-axis) Range', Section 6.8. 'Changing Trend (Y-axis) Range' and Section 6.12. 'Selecting/Changing Trend Point Color'.

6.3. Saving A Trend Display

The following details the data saving procedure:

6.3.1. Saving A New Configuration

To save a new configuration (Batch, Adhoc or a mix) to a new file:

1. Select **File/Save Configuration** from the Trend Bar Menu. A dialog pop-up should appear.
2. Select the directory, subdirectory and file from the file dialog pop-up if overwriting an existing file or enter a new file name in the **'Save as...'** field.
3. click on the **'OK'** button on the bottom of the pop-up box.

6.3.2. Saving A Portion of a Trend line

To save a portion of a trend line (Batch or Adhoc) to a text, DADiSP or SyCOS format file:

1. Select the trend point by clicking on its' select button located in the configuration bar.
2. Highlight the portion of the trend line as described in Section 6.14. 'Highlighting Part of a Trend'.

Short Cut: Click and drag mouse over selected portion of the trend line.

3. Select the appropriate file format:
   Internal*:* If file is to remain on the SyCOS system.
   DADiSP: It transporting to a trend package that reads this format.
   ASCII: If transporting the file to unknown format utility.

NOTE: ASCII Text file is a list of commands which may be edited by any text editor.

4. From the Trend Menu Bar select **SAMPLE/STORE AS**.
5. Select the appropriate directory then enter a file name and an extension before pressing the **'OK'** button in the file_dialog pop-up.

6.3.3. Saving A Trend Point to a Specific File Format

To save a selected point (Batch or Adhoc) to a text, DADiSP or SyCOS format file:

1. Select the trend point by clicking on its' select button located in the configuration bar.
2. Select the output format by invoking **SAMPLE/STORE FORMAT** from the Trend Menu Bar.
3. Select the appropriate file format:
   Internal*:* If file is to remain on the SyCOS system.
   DADiSP: It transporting to a trend package that reads this format.
   ASCII: If transporting the file to unknown format utility.

NOTE: ASCII Text file is a list of commands which may be edited by any text editor.

4. From the Trend Menu Bar select **SAMPLE/STORE AS**.
5. Select the appropriate directory then enter a file name and an extension before pressing the **'OK'** button in the file_dialog pop-up.

6.3.4. Saving a Trend Point using trendExport

Description

The trendExport utility can be used to automaticaly export data to different formats. trendExport is a command line utility which has the same functionality as the **SAMPLE/STORE AS** menu entry of the Trend Display application.

Synopsis

trendExport [-in trendfile (-query | -out outputfile -point expr [-format (ascii | dadisp | internal)]) | -help | -?]

Options

trendExport accepts following arguments:

- -in trendfile
  specifies the name of the trend file to use (without the .trend extension)
- -query
  for the given trend file, print on stdout all points which are present in the trend file. Example:

$ trendExport -in 98WO47.B11 -query
B11F40:0.MEAS
B11F40Q:0.MEAS
B11F41:0.MEAS
B11F41Q:0.MEAS
B11F45A:0.OUT
B11F45E:0.MEAS

- -point expr
  specifies the trend point which should be saved. It is only possible to export one (1) trend point at a time. The -query option can be used to determine all the available points of a trend file.
- -out outputfile
  specifies the name of the output file
- -format (ascii | dadisp | internal)
  the output will be saved in the given format (ascii is the default). See Section 6.3.3. ’Saving A Trend Point to a Specific File Format’ for a description of the supported formats.
- -help | -?
  prints usage information

Return values

The trendExport utility returns 0 (zero) on success, otherwise an error code.

Limitations

Although the trendExport is a command line oriented tool, it shares the same X resource file as the Trend Display application. To be able to use this resource file, a connection to a X server is needed. Therefore the $DISPLAY environment variable must be set when running trendExport.

6.4. Removing (Deleting) a Trend point from the Display

To delete a trend point from the display:

1. Select the trend point by clicking on the select button on the CSF or Master Configuration Bar.
2. Select **Edit/Remove** from the bar menu.

Short Cut:

Select **Delete Trend from Configuration** from the Short cut menu (5th key from the left)

6.5. Selecting A Master Trend Point (MTP)

The MTP is the base point for time and range 'fits', scrolling, and trend part selection.

To establish a trend point as the MTP on the Master trend display, the user must do the following:

1. Choose a trend point by clicking on the Select button in the CSF Configuration bar.
2. Select **Edit/Master** from the Trend Menu Bar.

If before performing the above procedure, a MTP existed, it will now swap locations with the new master point.

6.6. Swapping Trends between Master and CSF displays

The user can display a single trend point line independently or in combination with several others. To view individually and independently, the user must 'move' the point to the CSF Trend Display for trending. To view with others, the user must 'move' the point to be trended on the Master Trend Display.

6.6.1. Swapping a Trend from the Master Trend to the CSF Trend

To move a trend from the Master to the CSF Trend Display:

1. Locate the trend point to be 'moved' on the Master Trend Display.
2. Click on the selected points 'UP' button located at the end of the CSF Configuration Bar.

6.6.2. Swapping a Trend from the CSF Trend to the Master Trend

To move a trend from the CSF to the Master Trend Display:

1. Locate the trend point to be 'moved' on the CSF Trend Display.
2. Click on the selected points 'UP' button located at the end of the horizontal bar in the CSF menu.

6.7. Changing Display Time (X-axis) Range

Time range is defined once for each trend point whether on the Master or CSF display:

1. Choose the trend point by clicking on the select button on the CSF display. If the user does not select a trend point, the system automatically select the master trend point.
2. Select **TIME/DEFINE** from the bar menu.

Short Cut: Select **Time** from the Short cut menu (12th key from the left)

3. Only the 'Duration' field in the dialog pop-up affects the range of the X-axis. The user may enter any floating number and a time unit such as 'Minute', 'Hour', 'Day' or 'Year'.
   The remaining fields 'Time Start' and 'Max Load Time (batch trending)' affect data loading and batch collection time.

6.8. Changing Trend (Y-axis) Range

Each trend point must have a range defined individually. The range for a trend point is displayed on both the Master and CSF displays.

1. Choose the trend point to be defined by clicking on the Select button on the CSF display.
2. Select **Y-AXIS/DEFINE** from the bar menu.

Short Cut: Select **Y-RANGE** from the Short cut menu (13th key from the left)

3. The Y-range dialog pop-up lists the 'y-top' (upper limit) and 'y-bottom' (lower limit) values if any. The user may change either value by entering new numbers then pressing the **'OK'** key.

6.9. Start and Stop On-line Trending

The trend display normally moves forward in time revealing the latest data as it is acquired. This makes scrolling backward in time slow and taxing for the system. To facilitate access to previous data, the user can stop on-line batch data from reaching the internal buffer by stopping on-line trending.

Stopping does not prevent data collection, just blocks new data from appending to the internal display buffer until a **Start** is reissued or the batch file is closed.

6.9.1. Start On-line Trending

The user can start on-line display data trending (Batch Or Adhoc) by either the bar menu or the short cut keys:

1. Select **TIME/START** *(toggle).*

Short Cut: Click on the last (13th) short cut key; **Stop/Start** *(toggle)*.

6.9.2. Stop On-line Trending

The user can stop on-line display data trending (Batch Or Adhoc) by either the bar menu or the short cut keys:

1. Select **TIME/STOP** *(toggle).*

Short Cut: Click on the last (13th) short cut key; **Stop/Start** *(toggle)*.

6.10. Modifying Display Time Start and Duration

Collection time and duration is defined for each trend point displayed:

1. Select **TIME/DEFINE** from the bar menu.

Short Cut: Select **Time** from the Short cut menu (12th key from the left)

2. The fields 'Time Start' and 'Max Load Time (batch trending)' affects data loading time start and duration of batch collection respectively. The user may edit either by entering new numbers then clicking on the **'OK'** button.

   The 'Duration' field in the dialog pop-up affects the time range (X-axis). It sizes the trend displayed window time width.

6.11. Scrolling Master and Configuration Trend displays

The Master and CSF trend displays maybe scrolled separately or together. Because the Master display has the same time and individual point range definition as the CSF, the user may link them together based on time, range or both.

6.11.1. Time Linked Scrolling

This command gives the Master display time scrollbar the control of all displayed trends. It synchronizes all trend points to show value recorded at precisely the same time.

The time link remains in control until it is unlinked. Control remains even when the master display is redefined with option **TIME/ZOOM** or **TIME/FIT**.

The user can force a time link by:

1. Selecting **TIME/SAME** *(toggle)* from the bar menu.

6.11.2. Range Linked Scrolling

This command applies the range of one trend point to all others displayed on the Master display.

The master remains in control until it is unlinked. Control remains even when the master display is redefined with option **TIME/ZOOM** or **TIME/FIT**.

The user can force a range link by:

bar Menu:

1. Selecting **Y-AXIS/SAME** *(toggle)* from the bar menu.

   When scrolling at the Master Trend Display, all CSF displays are scrolled. However, scrolling on the CSF display does not cause the Master Trend Display to be scrolled.

6.11.3. Turning Off Linked Scrolling

The user can unlink the Master and CSF display scrolling by:

bar Menu:

If time & range are linked:

1. Select **TIME/INDIVIDUAL** *(toggle).*
2. Select **Y-AXIS/INDIVIDUAL** *(toggle).*

If Time only: select step 1 only.

If Range only: select step 2 only.

or

1. Select **TIME/STOP**.
2. Select **TIME/START** .

Short Cut: Double click on the last (13th) short cut key; **Stop/Start** toggle.

6.12. Selecting/Changing Trend Point Color

The user can select or change a trend point color. The change is effective for the trend point name on the CSF, the trend line graph whether on the Master or CSF display, and the range display.

From the bar menu

1. Choose the trend point by clicking on the CSF select button.
2. Select the option **color** from the bar menu.
3. Click on one of the colours listed.

6.13. Selecting/Changing Trend Point Engineering Unit

The user can select or change a trend point engineering unit (EU). The EU change is effective immediately and can be seen near the trend point range scale on the rightmost side of the display.

There are two types of units: the engineering units (e.g. kg, l, mbar) or a list of states with a related value and a meaning (0 for OPEN, 1 for CLOSED, 2 for ERROR).

From the bar menu

1. Choose the trend point by clicking on the CSF select button.
2. Select the options **Y-AXIS/UNIT** from the bar menu.
3. Click with mouse cursor on the chosen unit.

6.14. Highlighting Part of a Trend

Each trend line has a starting and an end point. the start point is marked with a 'B' (begin) the end point is marked with an 'E'.

Inside of this range the mouse operates in the following way:

- A mouse click defines a new start point for the selected part.
- A mouse drag moves the end of the selected part.
- A selection can be extended or reduced by holding down the shift key before the mouse button is pressed. Extension or reduction takes place at the selection area border closest to the mouse position.
- Outside of the starting and end point any mouse click results in a selection to the edge of the trend line range .

6.15. Resizing Master and CSF Trend Display Areas

The resize button is located on the right edge of the display between the Master and CSF trend displays. It is used to change their size.

To resize:

1. Click and hold down the mouse button any where inside the resize button area.
2. Move up to reduce the Master trend display or down to increase the Master trend display as needed.
3. Release the mouse button.

7. Exceptions

This section lists various system problems that may occur and their solution. This is intended to help the system manager or engineer in solving some simple problems.

The user must have access to the system prompt and be familiar with operator console and its' components.

If other problems occur, please call or contact your local SyCOS representative or:

Mr. Rolf Breitenstein
Syte GmbH
Seewenweg 5
CH-4153 Reinach, Switzerland
support@syte.ch

7.1. Trend display does not appear / or is incorrect

Before starting the program as described in Section 4.3. 'Invoking the Trend Application Window', enter the following at the system prompt:

- Set the display environment variable by exporting the correct display. (e.g. export DISPLAY=myhost:0.0)
- Set the resource directory environment variable to the location of the resource file (e.g. export XAPPLRESDIR=$COSROOT/app-defaults).
- If you want to display adhoc trend points or batch trend points then the adhoc trend server must be running on your host (This server manages nfs mounts of the trending directories on remote hosts so you have access to all trending files in your network from every host.)

7.2. Trend display color is incorrect

If the Trend Display Application Window shows incorrect or inconsistent colors then the color manager program must be invoked. Enter the following at the system prompt:

- colormgr &

7.3. Adding Engineering Units

A list of configured engineering units is available using the menu bar (**Y-axis/ Unit**). It can be easily expanded with new measurements whether engineering units or unit states.

The list is a text file residing in system directory **$COSAPPL/trend/unit**.

The system differentiates between engineering and state units. The commands to add units differs depending on the type. For both the first two lines (Unit and Version 1) are required (fixed header) to identify the file type.

7.3.1. Engineering Unit Addition

The syntax for engineering unit addition is:

(Example to add: kg)

Unit

Version 1

UNIT "kg"

7.3.2. Engineering State Addition

The syntax to add a set of states is:

(Example, to add the following states: OPEN at the bottom, CLOSE in the middle and ERROR at the top of a display)

Unit

Version 1

STATE

0 "OPEN"

1 "CLOSE"

7 "ERROR"

ENDSTATE

The values zero one and seven are recalculated to be displayed on one of the three lines (one for each OPEN CLOSE or ERROR). All the other values are displayed at an undefined location.

Note: Zooming in/out the Y-axis is not possible if a unit of type state is active.

A. System Messages

The Trend application window generates three (3) types of system messages to inform the user of what is occurring in the system.

The system messages types are:

- Information: This type of message informs the user of what the system is performing or attempting to perform.
- Warning: This type of message informs the user that the system can not perform an activity it has been requested to do. Messages generated
- Error: This type of message indicates a system related error has occurred. The error may occur as a result of user interaction or a system fault.

A.1. Information System Messages

The following table lists all information messages that may occur and the reason they occur. The purpose of this message is to inform the user of the system status while attempting to perform functions.

Message Text	Meaning/Reason
ERROR: Can't load bhf while batch base directory is not defined	User trying to load bhf while the batch base directory was not defined (UNIX environment variable $COSLOGS).
Load adhoc expression: [expression]	informs the user that the system is loading an adhoc point.
Load batch: [batch file name]|[expression]	informs the user that the system is loading a batch point.
Load batch trend expression [expression]	informs the user that the system is loading a batch trend expression.
Load config file: [file name]	informs the user that the system is loading a config file.
Load current batch	informs the user that the system is loading the current batch.
Loading [N] Samples	appears during the loading of a file to inform the user of the number of samples loading.
Load file: [file name]	appears when loading a file with samples.
[N] Samples From [Signal Name]	appears after loading of all samples for a point.

Table 2: Information Messages

Message Text	Meaning/Reason
Saving configuration to [file name]	informs the user that the system is saving the current configuration to a file
Saving [signal name] to [file name]	informs the user that the system is saving samples to a file.
WARNING: Can't get current unit and bhf of [expression]	informs the user that the system unit and bhf of the expression are not available.
WARNING: In [signal name] only [N] samples read (due to max load time from: Time->Define)	informs the user that the system loading is interrupted because a limitation was set by the user at configuration or definition time.
WARNING: In [signal name] only [1-4] samples read	informs the user that the system was able to read only 1 to 4 samples.
WARNING: In [signal name] 0 samples read	informs the user that the system has no samples to read.
WARNING: In [signal name] [N] samples read (the buffer holds only the last [M] samples)	informs the user that the signal is bigger than the configured buffer size.
WARNING: No adhoc trend expression selected	User clicked ‘OK’ before selecting an adhoc trend expression from the list.
WARNING: No more curve to remove	Informs the user that system unable to remove/delete a trend where there is none

Table 2: Information Messages

A.2. Warning System Messages

The following table lists all warning messages that may appear and the reason they occur. Warning messages are system response to prevent the user from activating or performing a function that maybe unreliable or erroneous.

Message Text	Meaning/Reason
adhoc trending not active	Warns that the trend server is not configured (resource useTrendServer is False) and a user chooses Load Adhoc.
Can't connect to adhoc trend server	Warns that the adhoc trend server is not running
Can't open [file name]	Warns the user that system can not load file because it is unreadable file.
Can't open [file name] for write	Warns the user that system can not write a signal into a named file.
Can't open file for read	Warns that system can not load a configuration file because it is unreadable.
Can't read header of [file name]	Warns the user that system is loading a file that has no header information.
Could not open trend stream for [expression]	Warns the user that system loading of an adhoc point fails.
File version number differs from program version	Warning message for loading a configuration file with a different version number. That is configuration file was not created using this software.
FPE in MCurve::Stretch!	A system floating point error occurred while zooming out (View/Zoom).
No batch file specified	Indicates that system is loading a point from a batch file "".
No master curve defined	Warns that no point was selected as MTP before attempting a Time/Same from Trend Menu Bar.
No selection to zoom to	User did not select a trend point or trend line portion for zooming (View/Zoom) before invoking the zoom command.
No version number	Warns user that the system is loading a config file without version number
Warning: There is no header in [expression]	Warns user that the file loaded does not contains proper header. This occurs when user is loading a non .cnf file using File->Open, or a non batch file using batch loading facilities..

Table 3: Warning Messages

A.3. Error System Messages

The following table lists all system error messages and the reason they may occur. Error messages are results of the application detecting a fault in the system or in the use of the system.

Message Text	Meaning/Reason
Can't get current unit and bhf (no batch trend point)	Occurs when user attempts to load current batch information based on a specific trend point which does not exist in current batch. (Calling Load Current Batch on a trend which is not a batch trend)
Can't get current unit and bhf of [expression]	Occurs when attempting to Load Current Batch for a trend point which is not defined in any MFC
Can't get current unit and bhf when trend server is not active	Occurs when user attempts to load current batch information while system parameter permitting access to information is turned off. (Calling Load Current Batch and the resource userendServer is set to False)
Can't open [engineering unit file name]	Occurs when attempting to load engineering units and engineering unit file is unreadable or does not exist.
Can't open [configuration file name] for write	System has determined that the configuration file can not be overwritten (possibly file is write protected).
Can't open help file	System can not find or read the help file.
Can't stat help file	System can not determine the size of the helpfile.
Could not open trend stream	Occurs when attempting to load an Adhoc point when the adhoc trend server is not running
Existing [configuration file name] is no config file	Occurs when trying to load a configuration from a file which is not a configuration file
Input file is no unit file	Happens when attempting to load engineering units and engineering unit file is corrupted.
No bhf file name defined for unit [unit name]	A result if invoking Load Current Batch while the parent unit of the specified point has no BHF file specified or configured.
No adhoc points found (server down?)	Trend application can not reach or retrieve data on adhoc trend points. May indicate that the server is down.
No expressions in batch trend file	System trying to load a batch trend expression but batch trend file is empty.

Table 4: Error Messages

Message Text	Meaning/Reason
Top and bottom values are equal	Occurs when user enters the same value for minimum and maximum point Y range.

Table 4: Error Messages

B. Glossary

ASCII format One of the three (3) formats that Trend Display Application is capable of writing. This format is the most basic of all formats and is easily transported to most other packages.

Adhoc Trend mechanism The method used to collect Adhoc trend data. The Adhoc data is collected by the Adhoc Trend Application and forwarded to the Trend Batch Server which in turn supplies it to the Trend Display Application for display.

Adhoc Trend Data One of two types of trend data inputs. Adhoc trend points are data point that the user requires to be trended but were not programmed at the SyCOS system level for collecting. The data is collected using the Adhoc Trend Application.

BHF or Batch History File System messages collected by the Batch Trend Server and saved under the file extension of '.Event'.

BHF line A message line that appears on the Master Trend Display. It can be turned on or off. When it is on, it displays system messages that appeared before or at the time the trend sample indicated by the cursor line was collected.

Batch Trend mechanism The method used to collect batch trend data. The batch data is collected by the SyCOS system when programmed by an EXTOL trend command. The data is forwarded to the Trend Batch Server which in turn supplies it to the Trend Display Application for display.

Batch Trend Data One of two types of trend data inputs. Batch trend points are defined at the programming level in the SyCOS system as points to be collected for trending. The data is saved in a file extension'.Trend'

Batch Trend Server An application that runs independently of other SyCOS system tasks. Its purpose is to continuously update a list of trend points according to cycle time and deadband.

SyCOS format One of the three (3) formats that Trend Display Application is capable of writing. It is the only format the application can read.

Configuration Bar A bar that contains a trend data point. It is located on the CSF Trend display. It contains the trend point name, value, data and time of the value and indicates the colour of the point trend line.

CSF Display cursor line See Cursor Line.

Configuration/ Secondary Function or CSF Trend Display The CSF Trend Display is located below the resize button. It contains all currently available trend points in a individual bar configurations.

Cursor Line A line that functions as an indicator. For both the Master and CSF trend displays the cursor line indicates the trend value and time for each graphics trend line on view.

Cycle Time — The update interval of a measurement value. That is the measurement value is updated every cycle time seconds.

DADiSP format — One of the three (3) formats that Trend Display Application is capable of writing. This format is used when exporting data to the DADiSP trend package.

Dead band — A limit by which a measurement value may vary without being considered a changed value.

EXTOL or EXTended Operations Language — A flexible high-level sequential control language provided with the SyCOS system. One of its functions is to provide data interchange between SyCOS applications.

Functions — Tasks that cause either an action to occur, a submenu or dialog-pop to appear. Functions appear in pulled down menus when a key element is invoked.

Graphic Trend Line — A plot of measurement values of a specified variable over a defined period of time on an X/Y matrix. The application plots are located in the viewing areas of both the Master and CSF trend displays.

Key Elements — A high level list of actions available on Trend Bar Menu that the user can select from to perform an activity. Each key element when invoked displays a list of functions in a menu format.

Master Configuration Bar — Located on the Master Trend display, this bar contains a trend data point called the MTP. It lists the trend point name, value, data and time of the value and indicates the colour of the point trend line.

Master Trend Display — The Master Trend Display is located above the resize button. It contains a MTP currently available trend points in a individual bar configurations.

Master Trend Display cursor line — See Cursor Line.

MTP or Master Trend Point — The MTP is the trend point appearing in the Master configuration bar. It functions as the reference point for all master trend display activities.

Max Load Time (Batch Trending) — A variable that indicates the amout of data loaded for trending.

Motif scroll bars — Motif scroll bars allow the user to view information available in the viewing area but not visible due to the size of application window.

MFC or Multi Function Controller — The processing unit that is directly connected to the process and instruments in the field. It provides the basic data acquisition and control functions.

PIC or Process Information Center — The PIC is a computer in the SyCOS system. Its primary duty is to function as the operator control station. It also controls and provides access to the primary operator interfaces including process definition, process modification and information logging.

Resize Button — A button located between the master and CSF trend displays. This button is used to resize the displays. When one display is increased in size the second is automatically decreased by the same amount. It is possible to resize one display as to exclude the other from being displayed.

Select Button — A small square located on the left handside in both the Master and CSF configuration bars. The button can be toggled on or off to select the trend point contained in the bar. Once a point is selected the user can manipulate it.

Short Cut Keys — Keys that when invoked provide quick access to specific utility functions. The thirteen (13) short cut keys are a subset of the utilities available in the application.

Trend Bar Menu — Lists all utilities available to user for using and handling the Trend Display Application. It consists of eight (8) responsive key elements. Each key element when invoked lists a menu of activities the user can select from.

Trend Control Menu — A bar menu located at the top of the Trend Display Application. It contains **Trend Bar Menu** and **Short Cut Keys**.

Trend Line — See Graphic Trend Line.

Trend Scroll Bars — Trend scroll bars allow the user to move the viewing area across time (X-axis) or value (Y-axis).

View Area — An area on the Master Trend Display where the trend line graphs, cursor line with its value and time indications can be seen.

Zoom; in/out — Functions that increase (in) or decrease (out) view area resolution. The user zooms using the **Zoom bars**.

Zoom bars — There are 4 zoom bars that allow the user to zoom in or out the viewing area. Two are located on X-axis and two on the Y-axis. Each zoom 'half'bar zooms in or out its half of the viewing area.

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