POWER LEADER ™

Waveform Analyst

User's Guide
GEH-6516

GE Power Management Control System 6.11a

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Enhanced MicroVersaTrip-C	SR745 Transformer Management Relay	EPM9650Q (Nexus)
Enhanced MicroVersaTrip-D	SR750 Feeder Management Relay	
Universal Relay devices	SR760 Feeder Management Relay	
EPM5350P (DMMS350)	EPM5000P(DMWH300)	

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US Pat Nos 5,768,148; 5,764,155; 5,862,391

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Contents

Overview

Introduction

Waveform Analyst is a powerful graphing and charting software application to view and analyze large quantities of power measurement data in the OPEN database. Waveform Analyst allows a user to quickly identify and evaluate power problems or to generate executive level trend and summary reports.

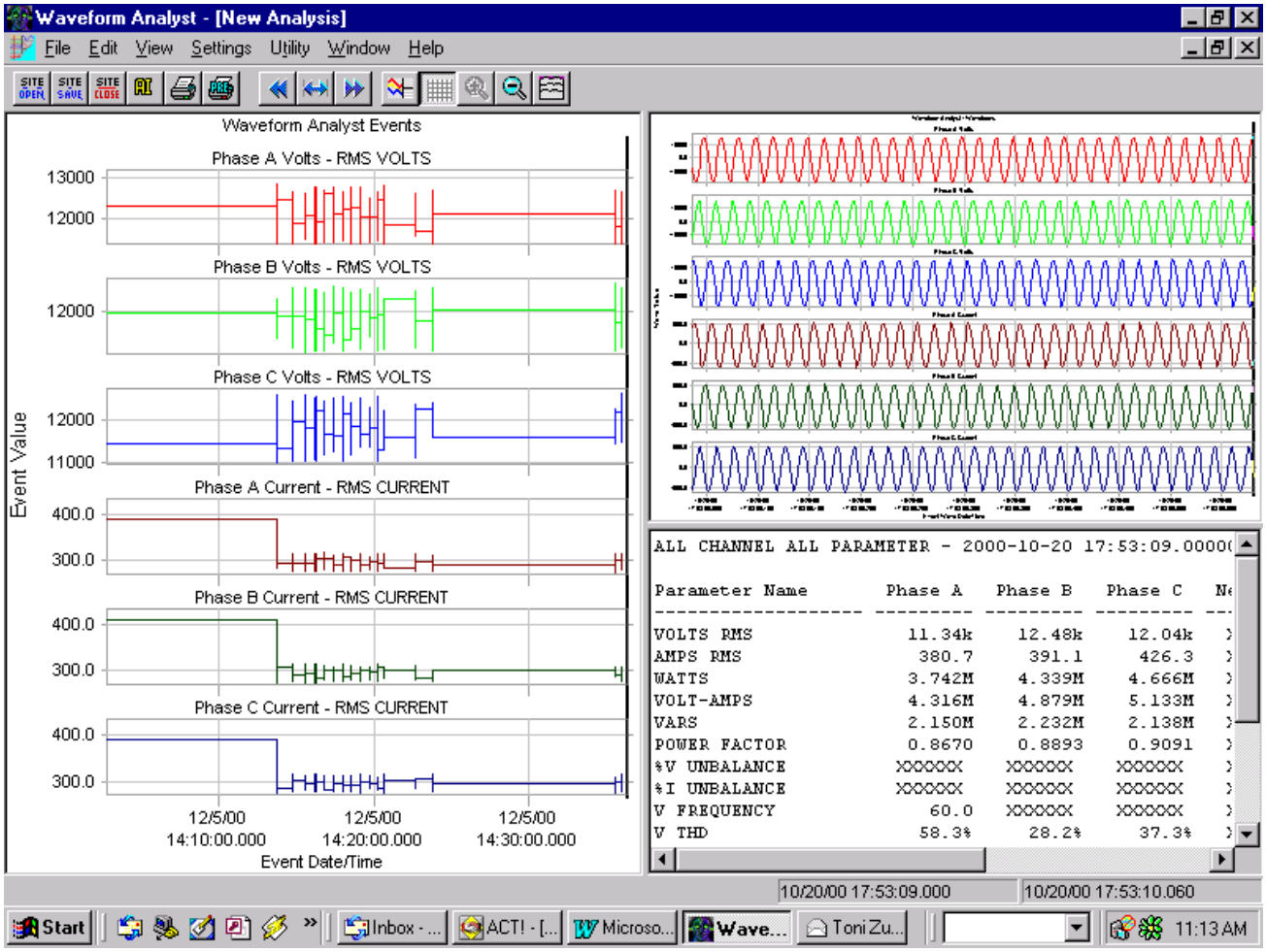
Waveform Analyst can be used to evaluate all channels from a single monitor or selected channels of any group of monitors. Up to any combination of eight channels can be displayed simultaneously. For viewing more channels multiple instances of Waveform Analyst can be launched.

Waveform Analyst has a suite of informative charts and graphs. New charts will be added regularly. Chart types include those for standard time plots, CBEMA, ITIC, sag frequency, harmonic distribution, and energy analysis.

Waveform Analyst is a desktop application. A web-enabled version, Waveform Analyst Server with its corresponding client application, Waveform Analyst Remote, is discussed at the end of this chapter.

A powerful feature of Waveform Analyst is its dynamic interaction of the multi widow interface. The three windows, or PANES, allow a user to quickly identify data of interest and to jump to the associated waveforms or detail that describe the event. Waveforms can be dynamically changed to phasors or harmonics by a click of the mouse.

Once these events of interest have been identified they may be manually analyzed or fed directly into an artificially intelligent sister application, Ai*Power, which will perform additional data filtering, data analysis and report generation. The following is a typical example of how this Three-Pane Browser appears when viewing a RMS time-plot, along with the waveforms associated with it.


Waveform Analyst - [New Analysis]
File Edit View Settings Utility Window Help
Waveform Analyst Events
Phase A Volts - RMS VOLTS
13000
12000
Phase B Volts - RMS VOLTS
12000
Phase C Volts - RMS VOLTS
12000
11000
Phase A Current - RMS CURRENT
400.0
300.0
Phase B Current - RMS CURRENT
400.0
300.0
Phase C Current - RMS CURRENT
400.0
300.0
Event Value
12/5/00 14:10:00.000
12/5/00 14:20:00.000
12/5/00 14:30:00.000
Event Date/Time
ALL CHANNEL ALL PARAMETER - 2000-10-20 17:53:09.0000
Parameter Name Phase A Phase B Phase C
VOLTS RMS 11.34k 12.48k 12.04k
AMPS RMS 380.7 391.1 426.3
WATTS 3.742M 4.339M 4.666M
VOLT-AMPS 4.316M 4.879M 5.133M
VARS 2.150M 2.232M 2.138M
POWER FACTOR 0.8670 0.8893 0.9091
%V UNBALANCE XXXXXX XXXXXX XXXXXX
%I UNBALANCE XXXXXX XXXXXX XXXXXX
V FREQUENCY 60.0 XXXXXX XXXXXX
V THD 58.3% 28.2% 37.3%
10/20/00 17:53:09.000
10/20/00 17:53:10.060
Start
Inbox - ...
ACT! - [...
Microso...
Wave...
Toni Zu...
11:13 AM

Overview - Features

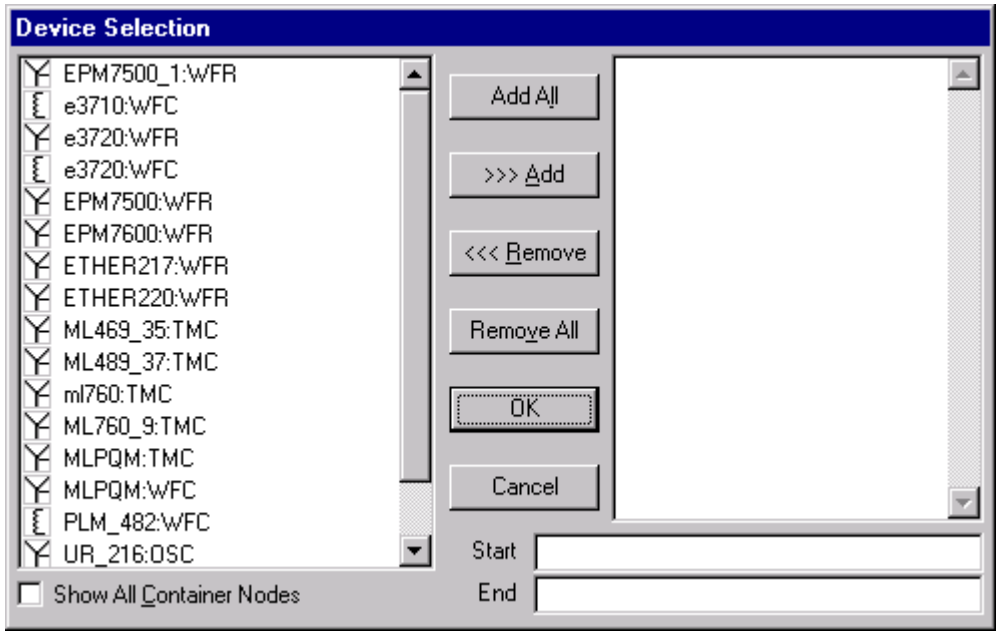
Waveform Analyst offers many features that are designed for ease of use

1. Interactive Windows allow jumping between analysis summaries and individual events
2. Scrolling and Zooming capability
3. Automatic circuit parameter calculations from waveform data
4. Data Filtering
5. Output to Ai*Power for detailed power quality analysis
6. FTF and PQDIF file transfer formats for transferring data
7. ODBC client, compatible with standard database engines
8. RMS Time Plots, CBEMA, ITIC, SAG Frequency, THD Histogram, Unbalance Histogram, Energy, Demand, and Waveform plots.
9. 'All Channel All Parameter' calculations 'on the fly' for any given set of events and/or waveforms.
10. Printing and Exporting of screen output into a number of standard formats, including text files bitmaps, and Windows metafiles.

Operation

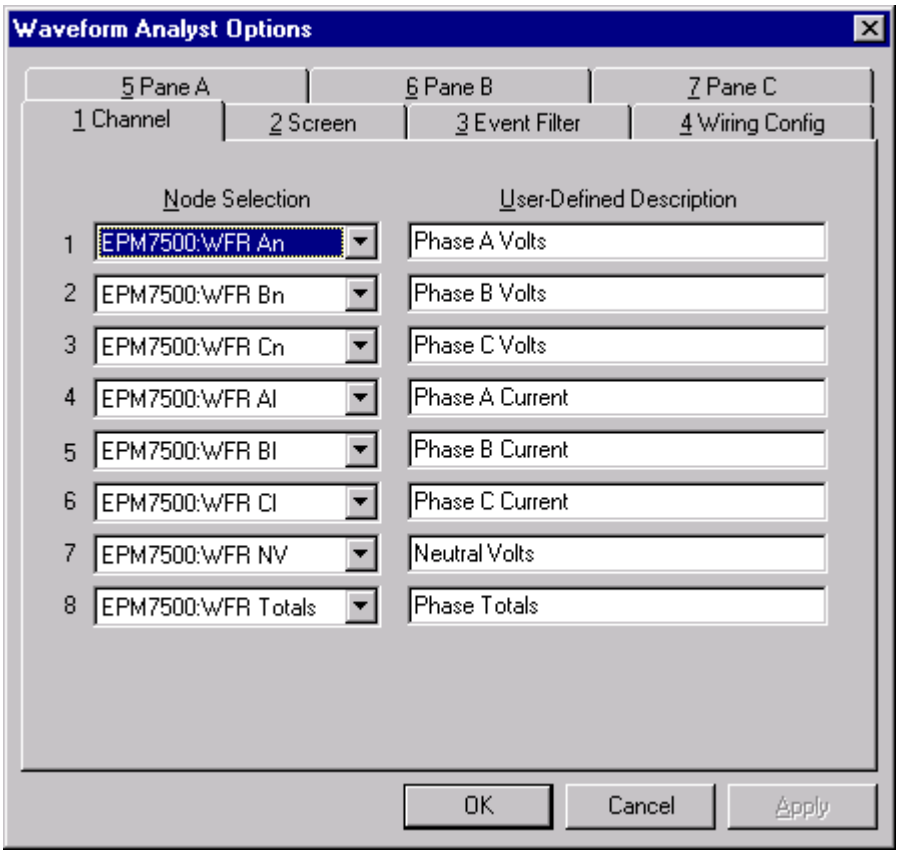
Quick Start (to view data from a single device)

Launch Waveform Analyst. From the File menu select New Analysis. A list of devices should be displayed as shown in Figure X. This group of devices represents those that recorded power waveform data. If a list of devices is not displayed then it may be due to the fact that your PMCS has not collected waveform data since the installation of Waveform Analyst on your PMCS server. Waveform Analyst will create new device locations on the fly as they are added to your PMCS system. The names automatically given are the unique identifiers given by PMCS. Select the device you want and click ADD.

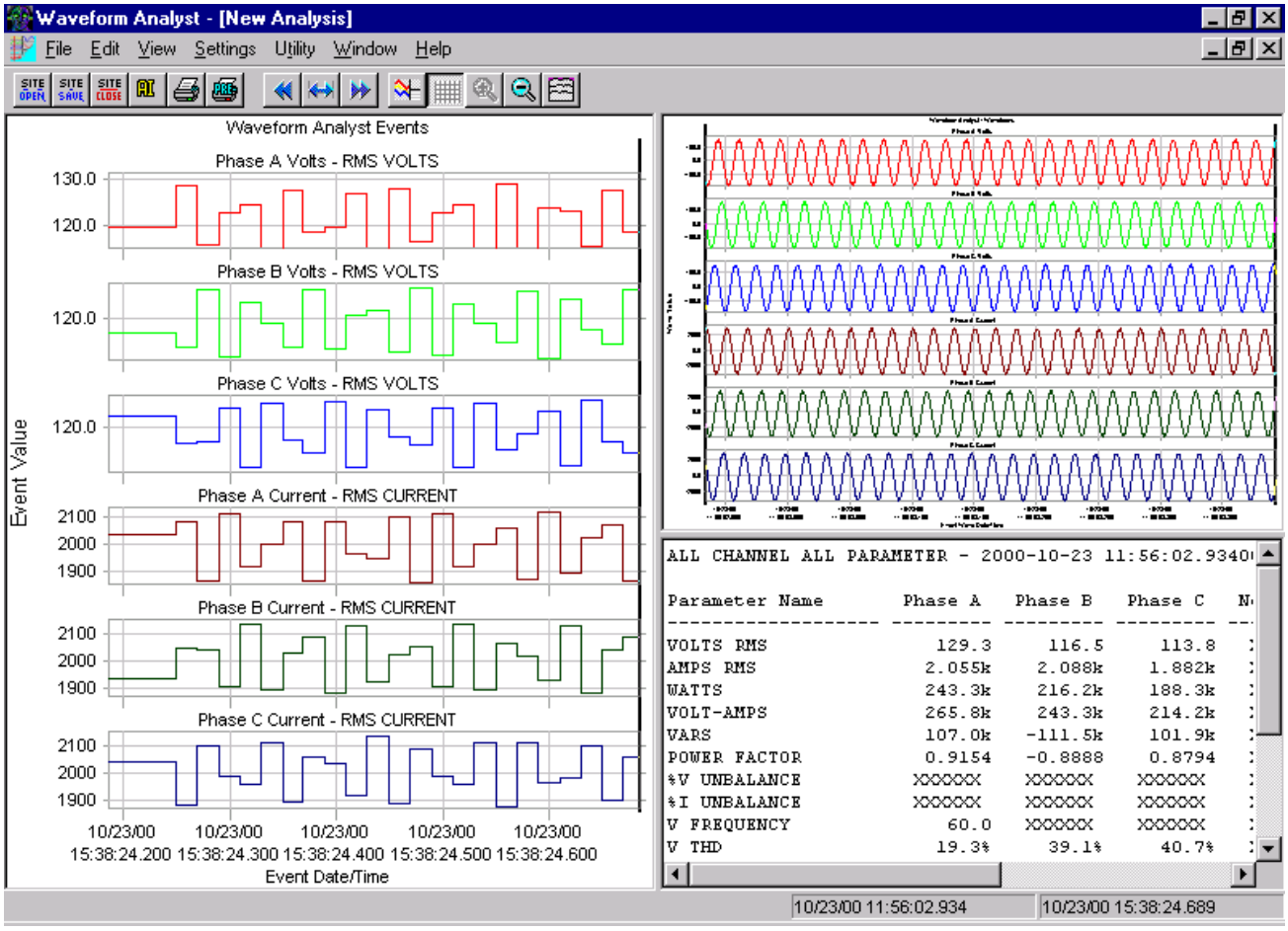


The main setup tabbed dialog box will appear with each channel mapped to a user defined description. You may change the user-defined description to any 32 character alphanumeric string. Click OK.

The Waveform Analyst's 3 Pane Browser will appear showing a time plot of the device's channels in the left most Pane. Follow the instructions described



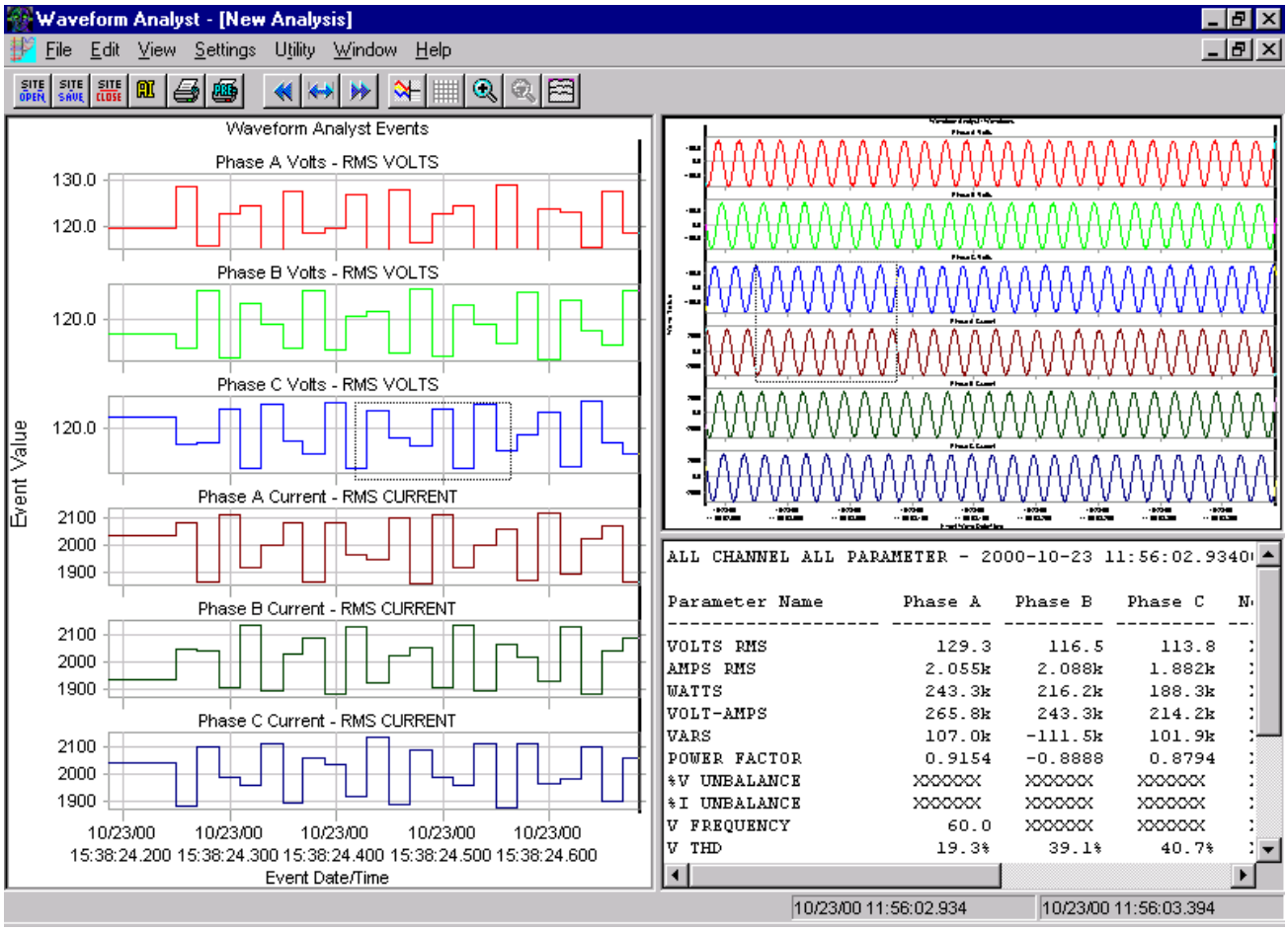
later in this section to change chart types and time date ranges. If you receive a message that there is no data for the time date selected right mouse click anywhere on the screen to display the main setup tabbed dialog box. Select Filter tabbed dialog box and increase the time date range until data is displayed.


Waveform Analyst - [New Analysis]
File Edit View Settings Utility Window Help
Waveform Analyst Events
Phase A Volts - RMS VOLTS
130.0
120.0
Phase B Volts - RMS VOLTS
120.0
Phase C Volts - RMS VOLTS
120.0
Phase A Current - RMS CURRENT
2100
2000
1900
Phase B Current - RMS CURRENT
2100
2000
1900
Phase C Current - RMS CURRENT
2100
2000
1900
Event Value
10/23/00 15:38:24.200
10/23/00 15:38:24.300
10/23/00 15:38:24.400
10/23/00 15:38:24.500
10/23/00 15:38:24.600
Event Date/Time
ALL CHANNEL ALL PARAMETER - 2000-10-23 11:56:02.9340
Parameter Name Phase A Phase B Phase C
VOLTS RMS 129.3 116.5 113.8
AMPS RMS 2.055k 2.088k 1.882k
WATTS 243.3k 216.2k 188.3k
VOLT-AMPS 265.8k 243.3k 214.2k
VARS 107.0k -111.5k 101.9k
POWER FACTOR 0.9154 -0.8888 0.8794
%V UNBALANCE XXXXXX XXXXXX XXXXXX
%I UNBALANCE XXXXXX XXXXXX XXXXXX
V FREQUENCY 60.0 XXXXXX XXXXXX
V THD 19.3% 39.1% 40.7%
10/23/00 11:56:02.934
10/23/00 15:38:24.689

Using three basic actions the user can unleash the power of Waveform Analyst.

1) Zooming

In either Pane A or B, left click and drag the mouse, then click on the Magnifier button to zoom in on the time plot or the waveform.

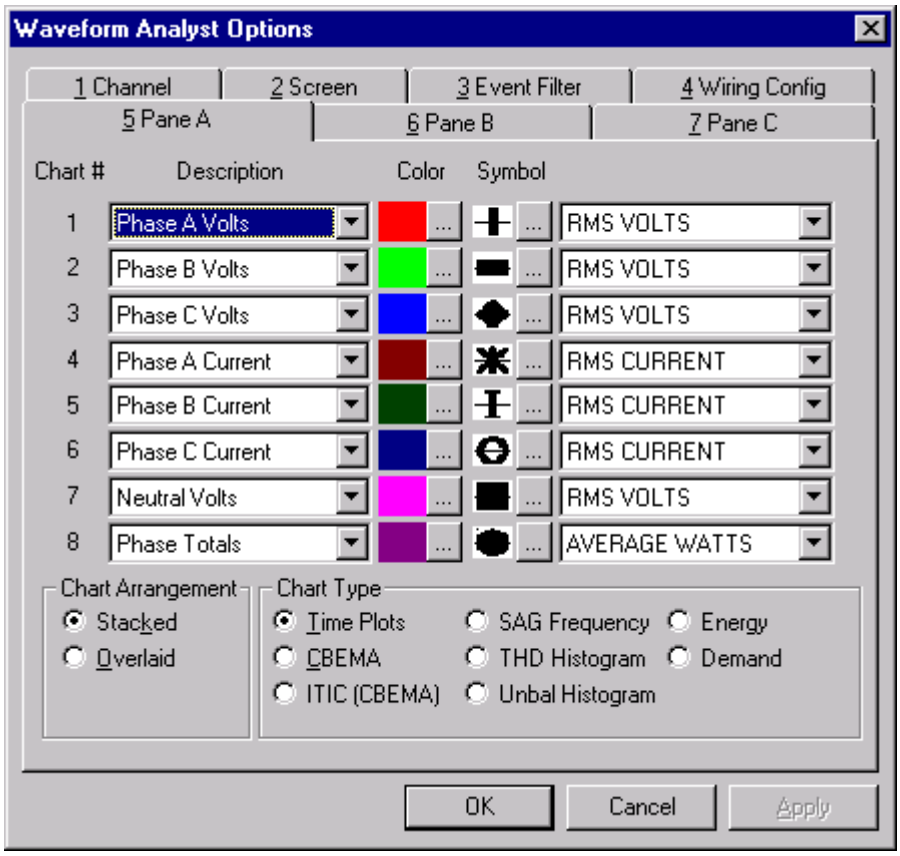


2) Double Click a point in the Pane A Summary Chart

The summary charts normally shown in Pane A are a composite of waveform events that occurred over a period of time. By double clicking a point in the summary chart, the waveform that resulted in that point will be shown in Pane B.

3) Left Mouse Click any Pane To Change the Chart Type

Each Pane can be displayed in a number of charting formats. To change the chart type, left mouse click and make your selection.



Main Menu – Introduction

There are two different menus in WAVEFORM ANALYST. The first menu (no open analysis) is shown whenever there are no analyses open. The second, and full menu, is made available whenever an analysis is open.

The toolbar and menu bar of a program are very important components. They allow the functions of the program to be accessed and used with ease.

The **menu bar** is the fundamental interface for any program and its functions will be explained first.

The **toolbar** allows you to maximize your use of the program with short easy steps and the buttons will be displayed next.

Menu (no open analysis)

Menu (at least one open analysis)

Main Menu (no open analysis)

The following menu choices are displayed when there is currently no analysis open.

File
View
Utility
Help

File Menu (no open analysis)

The File option allows you to create a new database, re-initialize an existing database, create or open an analysis, set the default printer settings, or exit the program.

Related Topics:

Database New

Database Initialize

New Analysis

Open Analysis

Print Setup...

Exit

Database New

Creates a new, empty O.P.E.N. database and initializes it for use by Waveform Analyst.

To create a new database:

1. From the 'File' menu, select 'Database New'.
2. Choose an appropriate '.mdb' file name and press OK.
3. The new database will be created.

Shortcut: Ctrl+N.

Database Initialize

Note: Use this with extreme care. Initializing a database destroys any data stored within that database!

Initializes (or re-initializes) an existing database as an O.P.E.N. database, and initializes it for use by Waveform Analyst.

To initialize (or re-initialize) an existing database:

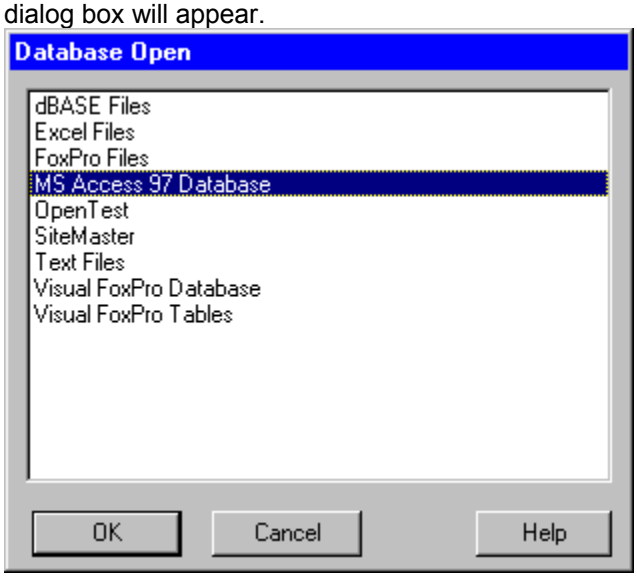
1. From the 'File' menu, select 'Database Initialize'
2. The standard ODBC data source dialog box will appear. Select the desired data source from the list (you can also use the standard ODBC dialog to create a new data source at this time).
3. The database will be initialized (or re-initialized) and any existing O.P.E.N. data will be erased. New tables will be created to support O.P.E.N. and 'master tables' will be filled with the standard values.

New Analysis (no currently open analysis)

Creates a new Analysis in a 3 Pane Browser window.

To create a new analysis:

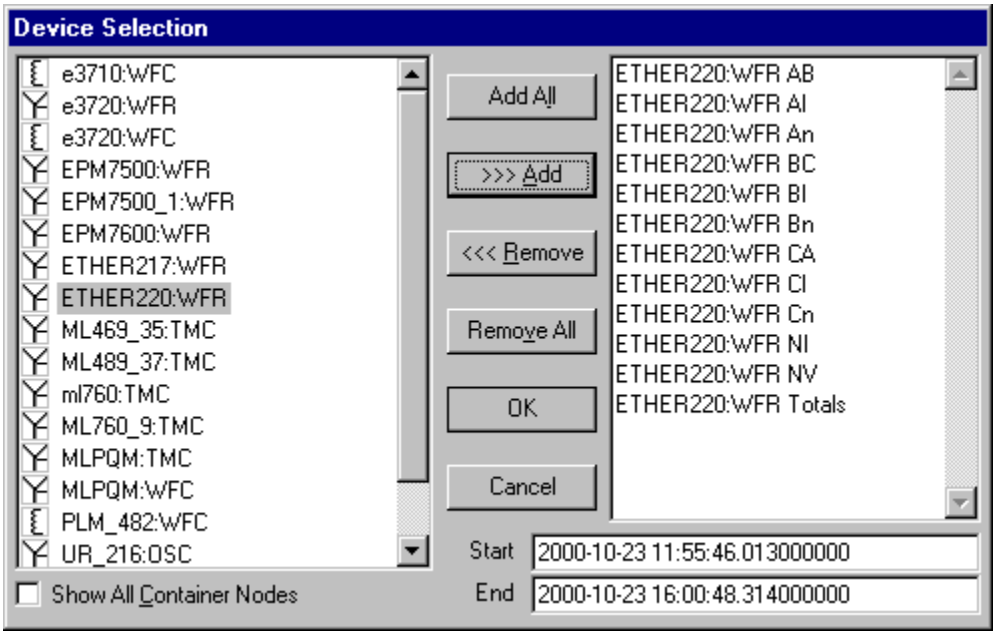
1. From the File menu, select 'New Analysis'. In the stand-alone version, if there is no "PQAnalyst Data" data source defined, the 'Database Open' dialog box will appear.



In the remote version, a similar dialog box will appear only if multiple databases have been assigned to the remote server. Otherwise, the default database will be selected for you, and you will immediately be presented with the 'Node Selection' dialog box (see item 3,below).

2. Select one of the data sources listed in the 'Database Open' dialog box. If the data source needs additional information to open the database, the ODBC driver will prompt you.
NOTE: If you want to open an Access '.mdb' file, use the 'MS Access' data source, and specify the '.mdb' file name when prompted.

3. Once the database has been successfully opened, the 'Node Selection' dialog box will appear.

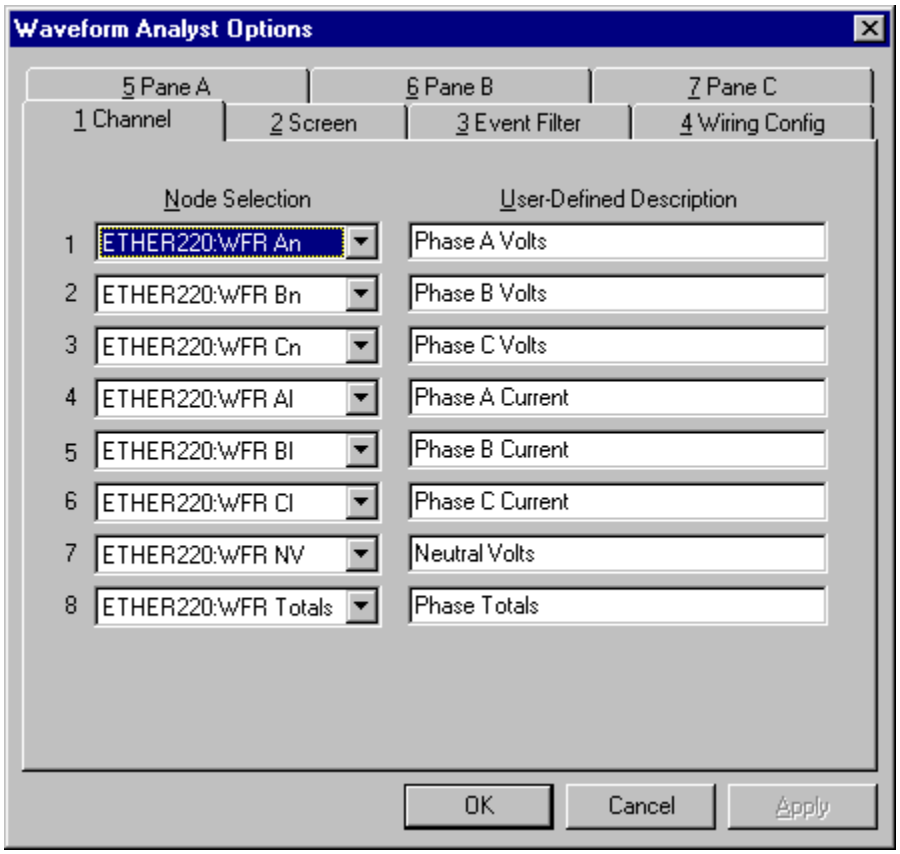


NOTE: In the left-hand section is a list of "top level" circuit descriptor nodes, known as "Measurement Points". Each of these is associated with a particular circuit, or "Measurement Point". Associated with the "Measurement Point" is a set of 'channels' for the monitoring device (or 'analyzer'). On the right hand side is a list of the desired 'measurement nodes' (nodes that collect events) – these will be used to 'filter out' all of the events that you are interested in looking at.

4. Select the desired nodes as follows:
a) highlight the desired circuit in the left-hand list
b) Press the 'Add' button to add all nodes related to this circuit.
You can also select individual nodes from a circuit by first double-clicking the item in the left-hand list to display the individual measurement nodes, then select the nodes you want and press the 'Add' button for each.

5. If desired, you can adjust the date/time range as displayed in the lower right corner. Waveform Analyst automatically assigns them to the maximum range of events stored for the selected nodes. If you want a narrower date/time range, you can assign it at this time.

6. Press ‘OK’ to select the nodes. This will display the ‘Properties’ dialog box, where you can make additional changes before Waveform Analyst queries the database.



7. Pressing ‘OK’ on the ‘Properties’ dialog box will complete the selection process, and Waveform Analyst will collect and display the data. You can then use ‘Site Save’ to save the analysis information in a disk file, so that it can be viewed later.

Open Analysis

Opens an existing analysis file ('.aib' for the stand-alone version, or '.rbr' for the remote version).

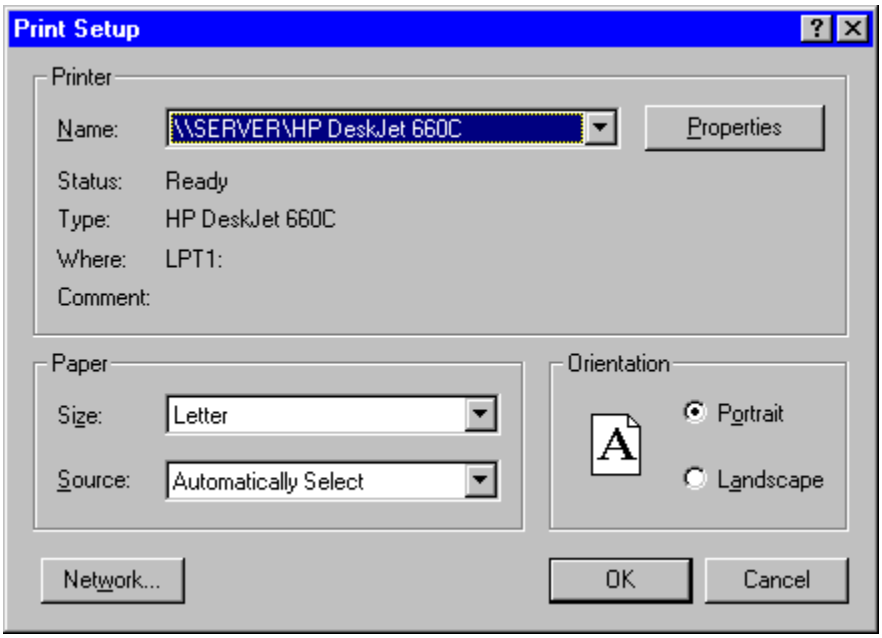
To open an existing analysis:

1. From the 'File' menu, select 'Site Open'.

2. You will be presented with a standard Windows 'File Open' dialog box. The filter will be pre-selected to open files of the proper type. Using this 'File Open' dialog box, select the desired analysis file.

3. Press the OK button.

Print Setup



Shows a listbox with standard Windows printing options. You are able to change the default printer as well as specify options that will affect the layout of the paper and printer.

Exit

Exits *WAVEFORM ANALYST*.

Toolbar button: 

View (no open analysis)

Toolbar

Status bar

Toolbar Options

Toolbar

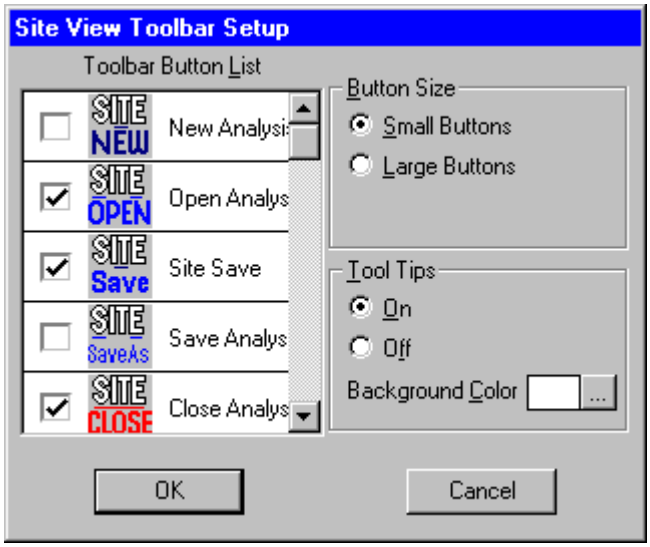
Enables or disables the toolbar. When checked, the toolbar is visible directly under the menu. When unchecked, the toolbar will be hidden from the *WAVEFORM ANALYST* main window.

Status Bar

Enables or disables the status bar. When checked, the status bar is visible at the bottom of the *WAVEFORM ANALYST* main window and status messages will be seen and displayed during the use of the program. When unchecked, the status bar will be hidden and no status messages will be visible from the main window.

Toolbar Options

This menu bar option brings up a dialog box that allows customization of the toolbar.



Please see Configuring the toolbar for information on how to configure the toolbar.

Utility

Import
Export
Re-Index Events
Re-Index Waveforms
Re-Init Master Tables

Import

Waveform Analyst allows you to import data from either 'FTF' (proprietary text file) format, or from PQDIF (Electrotek standard interchange format). Use the 'Utility' 'Import' drop-down menu to select the import type.

For FTF, you can import Waveforms, Events, or 'All'. 'All' includes both Waveform and Event FTF data, and optionally includes the 'configuration' file, which will create a new node configuration if the associated equipment does not already have node and equipment information in the selected database.

For PQDIF, you can select a single PQDIF file. Each PQDIF file imports to the database using the 'Default PQ Nodes'. It is best to begin with an empty database (see 'Database New'), and when prompted to create the default PQ Nodes, select 'Yes'. Then, select 'Import' 'PQDIF', and choose the new database (when prompted), and finally the PQDIF file (which has an extension of '.pqd'). Waveform Analyst will map the PQDIF file's channels as appropriate to the default PQ Nodes.

Once data has been imported, you can use either 'Site New' or 'Site Open' to view the data.

Export

Waveform Analyst allows you to export data into PQDIF format. Export with no site open will export all nodes and event/waveform data from the database without any filtering. This could result in an extremely large PQDIF file that 3rd party software packages might have trouble analyzing.

To filter the data for export, you should create a new analysis (or open an existing one) using either 'Site New' or 'Site Open', then select a date/time range with the cursors and use 'Utility' 'Export' from the open analysis.

Re-Index Events

At times it may become necessary to re-index event data in the O.P.E.N. database. Use this menu option to re-build all of the Event indices. If the database is being imported to frequently, this could correct data-related problems and make queries a lot faster.

Re-Index Waveforms

At times it may become necessary to re-index waveform data in the O.P.E.N. database. Use this menu option to re-build all of the Waveform indices. If

the database is being imported to frequently, this could correct data-related problems and make queries a lot faster.

Re-Init Master Tables

Re-initializing the master tables is usually necessary ONLY if you have upgraded Waveform Analyst with a newer version. By re-initializing the master tables of an existing O.P.E.N. database, you will be refreshing it with the latest event, trigger condition, node type, and similar data. As the product evolves, it may be necessary at times to re-initialize master tables in existing databases in order to take advantage of the new features.

To re-initialize the master tables of an existing database, select 'Utility' 'Re-Init Master Tables', then select the appropriate data source. For an Access '.mdb' file, you can use 'MS Access 97 Database' – the ODBC driver will prompt you for the file name.

Help

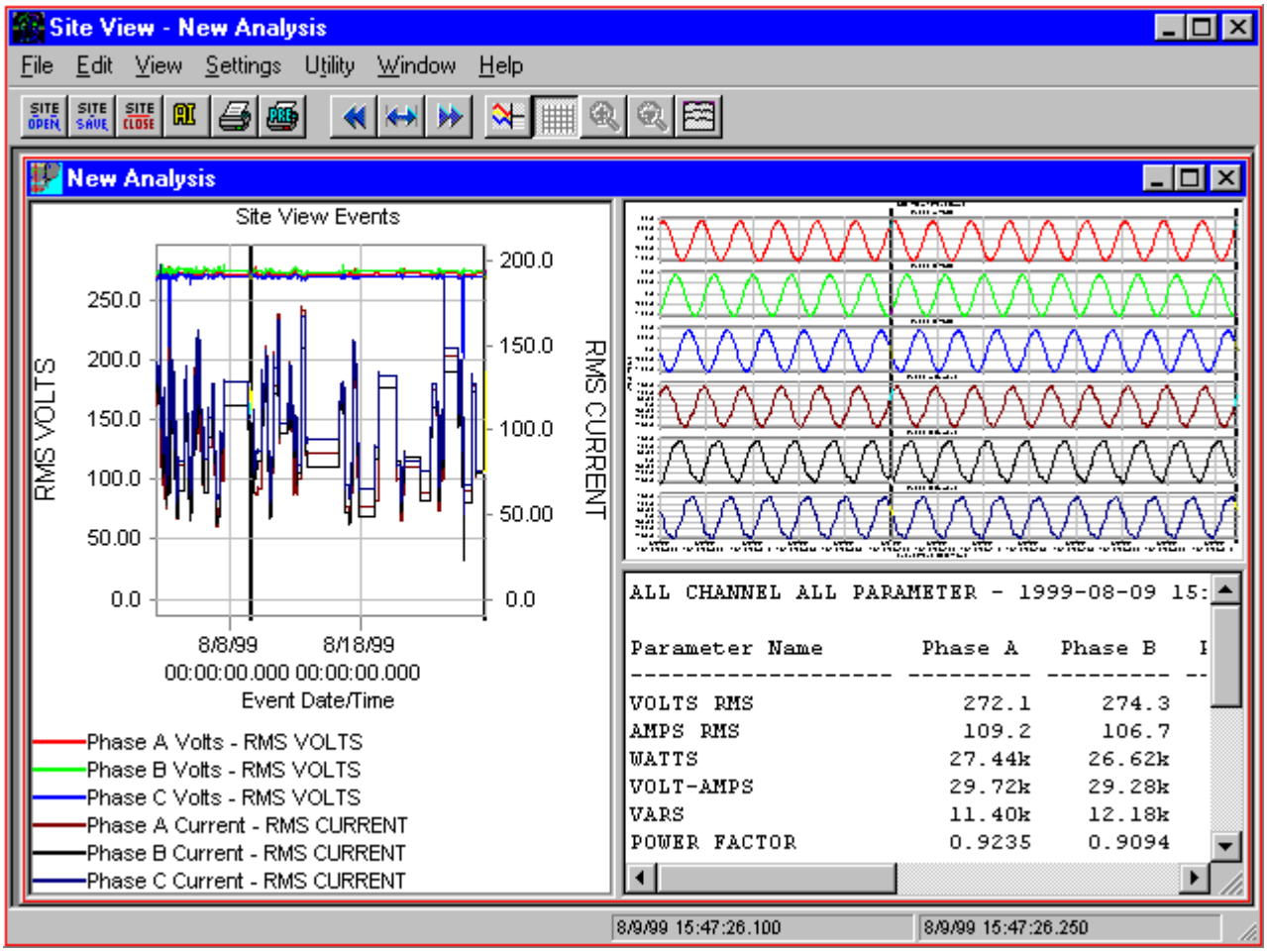
The following menu items are available under ‘Help’:

Contents: Displays the Waveform Analyst help ‘Contents’ (Finder) window
Search for Help On: Context-sensitive help
Index: Displays the Waveform Analyst help index
Using Help: Help on using Windows Help
Technical Support: Provides information on Technical Support.
About Waveform Analyst: Displays a dialog box showing version and copyright information for the Waveform Analyst application.

Main Menu (at least one open analysis)

The following options are for the menu when at least one analysis is open.

File
Edit
View
Settings
Utility
Window
Help



File Menu (at least one open analysis)

New Analysis

Open Analysis

Close Analysis

Print

Print Preview

Print Setup...

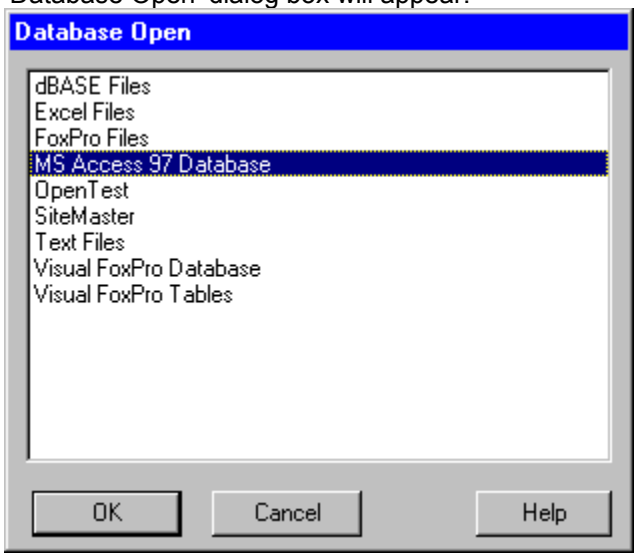
Exit

New Analysis (at least one open analysis)

Creates a new Analysis in a new 3 Pane Browser window.

To create a new analysis:

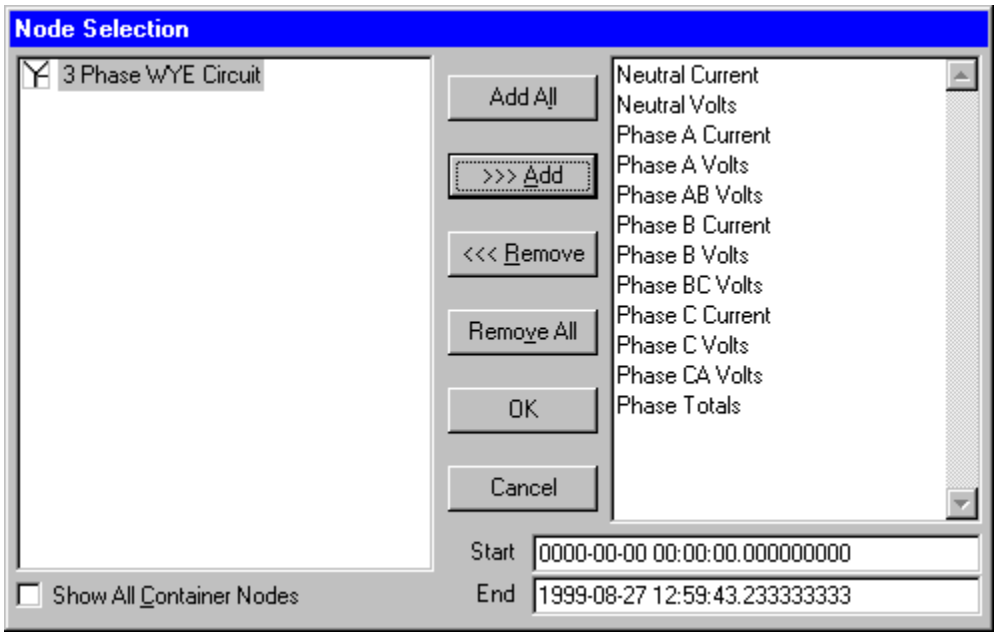
1. From the File menu, select 'New Analysis'. In the stand-alone version, if there is no "PQAnalyst Data" data source defined, the 'Database Open' dialog box will appear.



In the remote version, a similar dialog box will appear only if multiple databases have been assigned to the remote server. Otherwise, the default database will be selected for you, and you will immediately be presented with the 'Node Selection' dialog box (see item 3,below).

2. Select one of the data sources listed in the 'Database Open' dialog box. If the data source needs additional information to open the database, the ODBC driver will prompt you.
   NOTE: If you want to open an Access '.mdb' file, use the 'MS Access 97 Database' data source, and specify the '.mdb' file name when prompted.

3. Once the database has been successfully opened, the 'Node Selection' dialog box will appear.



NOTE: In the left-hand section is a list of "top level" circuit descriptor nodes, known as "Measurement Points". Each of these is associated with a particular circuit, or "Measurement Point". Associated with the "Measurement Point" is a set of 'channels' for the monitoring device (or 'analyzer'). On the right hand side is a list of the desired 'measurement nodes' (nodes that collect events) – these will be used to 'filter out' all of the events that you are interested in looking at.

4. Select the desired nodes as follows:
a) highlight the desired circuit in the left-hand list
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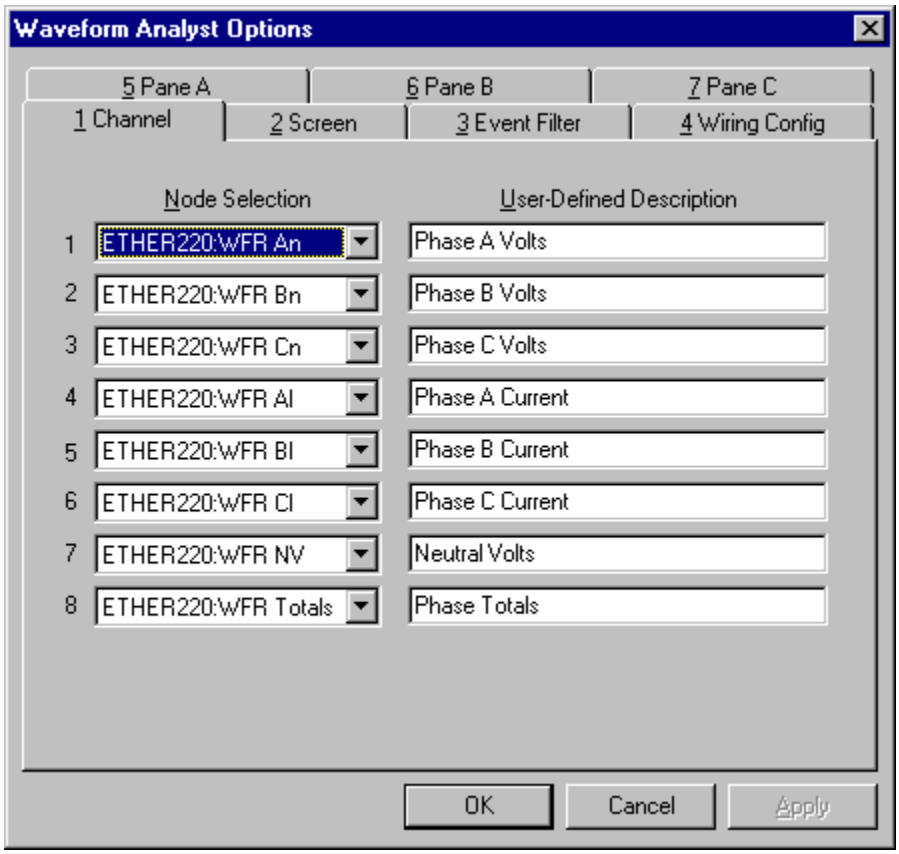
You can also select individual nodes from a circuit by first double-clicking the item in the left-hand list to display the individual measurement nodes, then select the nodes you want and press the 'Add' button for each.

5. If desired, you can adjust the date/time range as displayed in the lower right corner. Waveform Analyst automatically assigns them to the maximum range of events stored for the selected nodes. If you want a narrower date/time range, you can assign it at this time.

6. Press ‘OK’ to select the nodes. This will display the ‘Properties’ dialog box, where you can make additional changes before Waveform Analyst queries the database.



7. Pressing ‘OK’ on the ‘Properties’ dialog box will complete the selection process, and Waveform Analyst will collect and display the data. You can then use ‘Site Save’ to save the analysis information in a disk file, so that it can be viewed later.

Toolbar button: 

Open Analysis (at least one analysis already open)

Opens an existing analysis file ('.aib' for the stand-alone version, or '.rbr' for the remote version).

To open an existing analysis:

1. From the 'File' menu, select 'Site Open'.
2. You will be presented with a standard Windows 'File Open' dialog box. The filter will be pre-selected to open files of the proper type. Using this 'File Open' dialog box, select the desired analysis file.
3. Press the OK button.

Toolbar button: 

Close Analysis

Closes the currently active analysis.

Toolbar button: 

Print

Prints the active view. The active pane will be printed.

Shortcut: Ctrl+P.

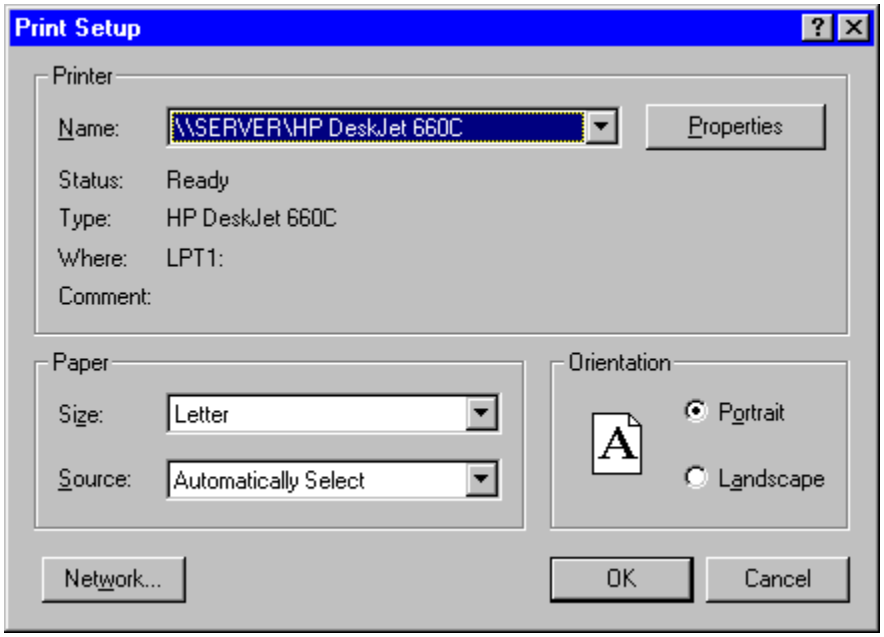
Toolbar button: 

Print Preview

Print previews the active pane. Shows the printed page on screen with margins, headers, footers, and graphics.

Toolbar button: 

Print Setup



Shows a listbox with standard Windows printing options. You are able to change the default printer as well as specify options that will affect the layout of the paper and printer.

Exit

Closes any open analysis and exits Waveform Analyst.

Toolbar button: 

Edit

Copy

Save To File

Edit - Copy

Copies the contents of the selected window to the clipboard. If the data being viewed is in 'listbox' or 'text' form, the data on the clipboard will be ANSI text. Listbox data will be tab-delimited for easy insertion into a spreadsheet or word processor. If the data being viewed is a graph, the data on the clipboard will either be a bitmap with the same dimensions as the current screen resolution, or a metafile, depending on the selection in the Screen Tabbed dialog box. Please see Screen for more information.

Toolbar button: 

Edit - Save To File

Saves the data in the selected pane as either a 256-color bitmap or a tabbed delimited text file depending upon the settings of the pane. Pane "A" is saved as a 256-color bitmap when the pane is in chart mode. If the pane is in list mode, the file is saved as a text file.

Toolbar button: 

NOTE: A 256-color bitmap was chosen in order to preserve color integrity while at the same time ensuring compatibility on a wide variety of platforms.

View (at least one open analysis)

Previous Event

Next Event

Jump Back

Jump Forward

Active Pane as Chart or List

Grid Lines

Zoom In

Zoom Out

Expand to Cursors

Show Detail

Toolbar

Status bar

All Events

View - Previous Event

Steps to the previous event.

Toolbar button: 

View - Next Event

Steps to next event.

Toolbar button: 

View - Jump Back

Jumps back a group of events.

Toolbar button: 

View - Jump Forward

Jumps forward a group of events.

Toolbar button: 

View - Active Pane as Chart or List

This selection allows the user to alternate between list mode and graph mode for a specific pane. When the option is checked, the information in the specific pane is displayed in list mode, which shows all the data with exact values displayed. When the option is unchecked, the information is displayed in graph mode with data points shown in a graphical display.

Note: This option is available in Pane A and Pane B only

Toolbar button: 

View - Grid Lines

This option, when checked, enables the grid lines for the active pane and when unchecked disables the grid lines.

Note: This option is only available if the specific view is in chart mode.

Toolbar button: 

View - Zoom In

When in chart mode it is possible to view a portion of the chart in more detail than the rest of the chart. This enables more detailed readings of some points that may not be clear when viewing the chart as a whole.

Note: This option is only available once a box has been drawn with the cursor.

Toolbar button: 

View - Zoom Out

When in chart mode it is possible to get the whole picture of the chart instead of a small portion. This option expands the chart to its original un-zoomed state.

Note: This option is only available when the chart has been previously zoomed in.

Toolbar button: 

View - Expand to Cursors

When the cursors are used, this option zooms in to whatever is between the cursors.

Toolbar button: 

View - Show Detail

Depending upon the current view, a detail window will be created, containing information about the current selection.

For an event in Pane A, the following dialog box is displayed:

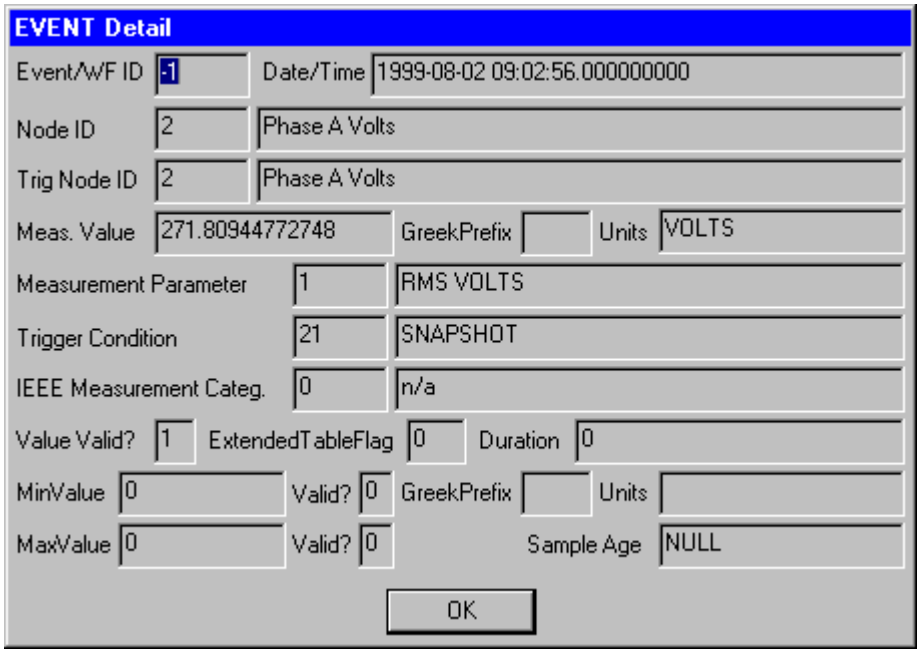


Figure 1

For a waveform in Pane B, the following window is created:

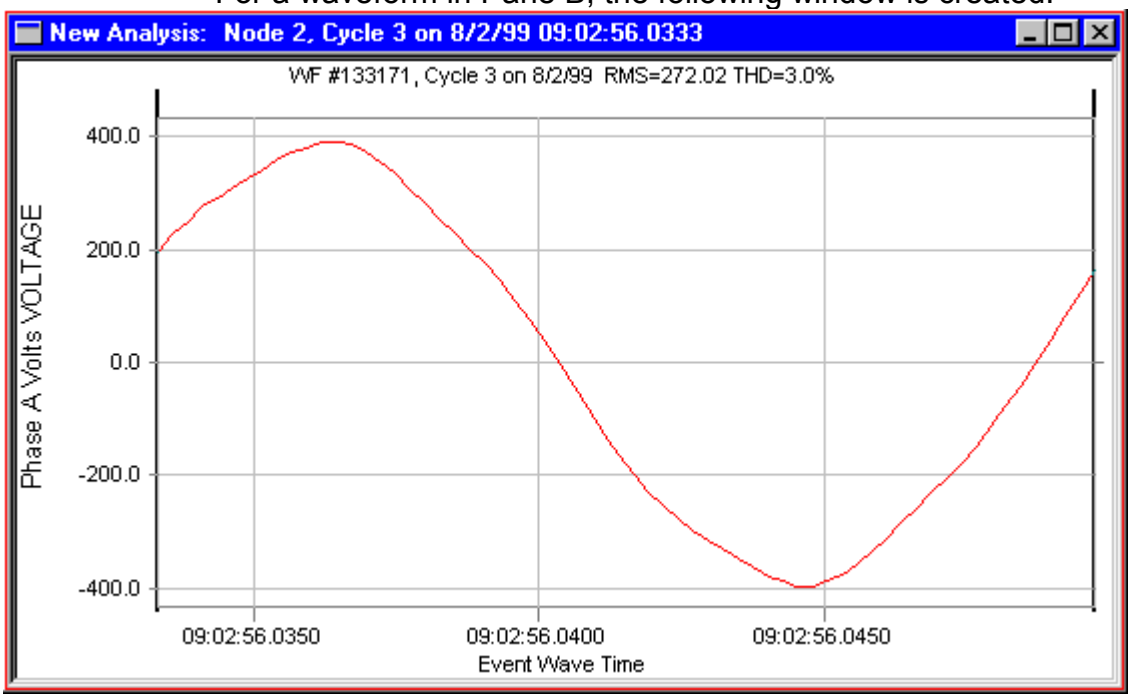


Figure 2

This window also allows you to see individual data points in 'Listbox Mode'.

For 'List of Event' data in Pane C, the following window is created:

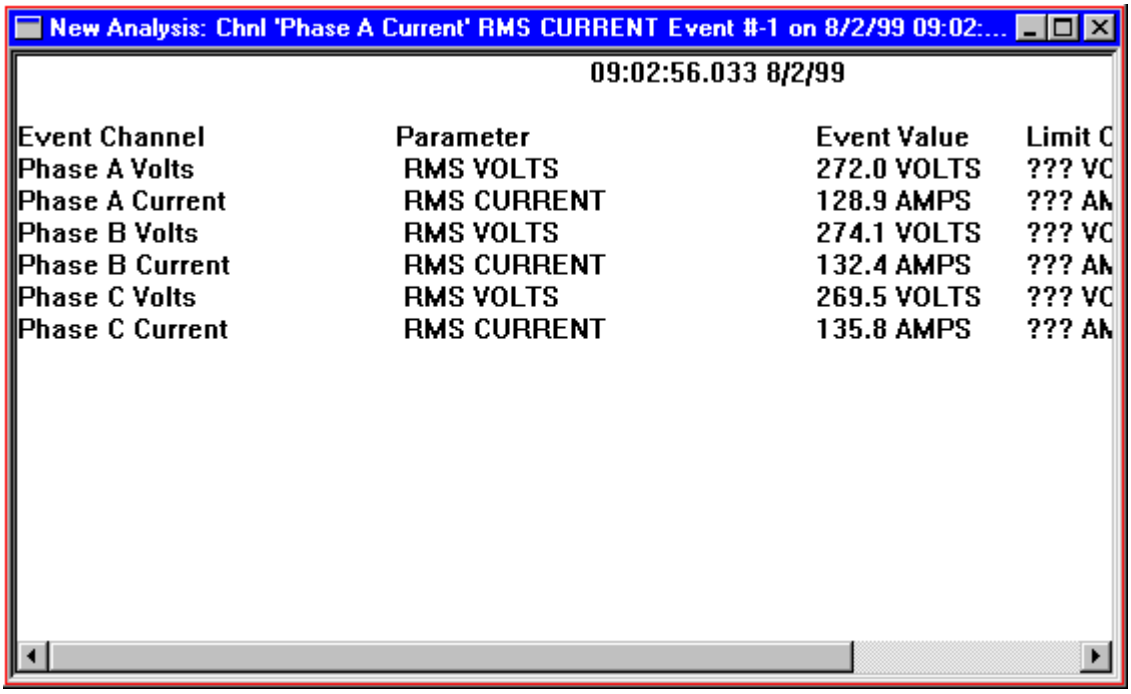


Figure 3

The type and style of report visible in this window depends entirely upon the data currently being displayed in Pane ‘C’. The report attempts to correlate the data from Pane C in a meaningful fashion.

View - Toolbar

Enables or disables the toolbar. This enables the user to add more space to their screen by removing the buttons on the top of their screen. When this option has a check mark next to it, the toolbar is enabled and can be viewed in the WAVEFORM ANALYST main window. When the option is unchecked, the toolbar is hidden, more space for the program is available, and the toolbar may not be used.

View - Status bar

Enables or disables the status bar. When checked, the status bar can be viewed at the bottom of the WAVEFORM ANALYST main window. When the option is unchecked, the status bar is hidden, more space for the program is made available, and no status messages are displayed.

View - All Events

Displays all events within a certain time/date range.

When checked, all events within the range are shown, and when unchecked, only the events that satisfy the current settings in the Tabbed Dialog Boxes will be shown.

To set the time/date range

1. Type the start date and time of the first event you wish to see included in the list.

2. Type the end Date and time of the last event you wish to see included in the list.

Note: All Events will display all the events inclusive of the first and last events.

Settings

Settings - Analysis Options

This opens the **SETTINGS** tabbed dialog box, as seen below:

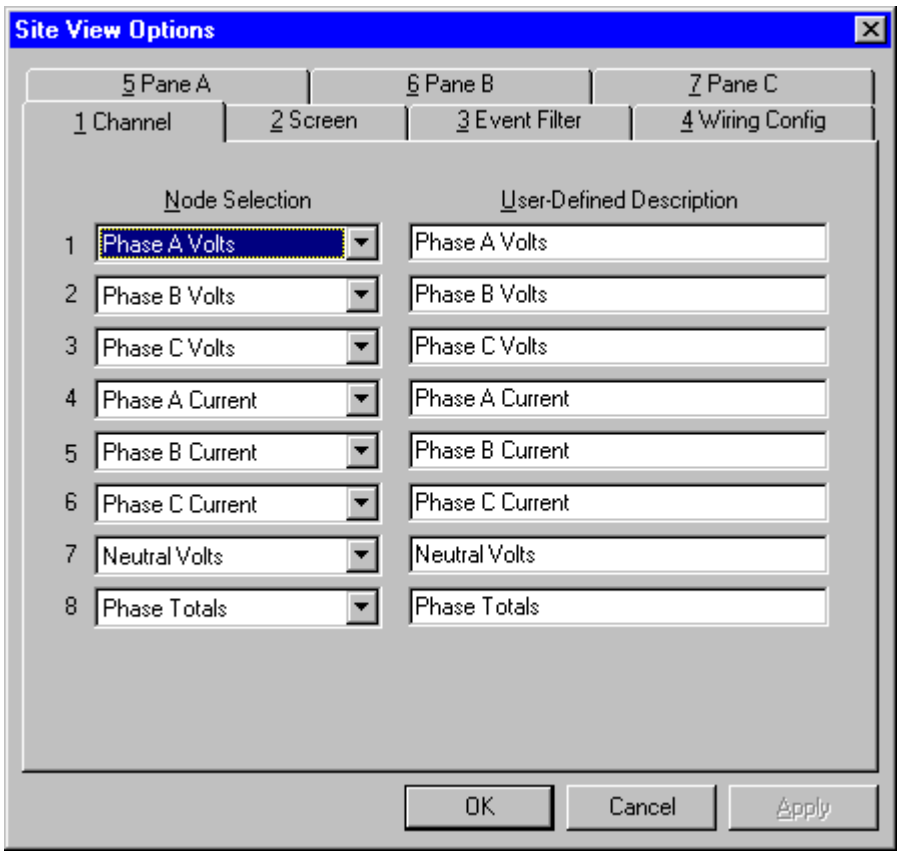
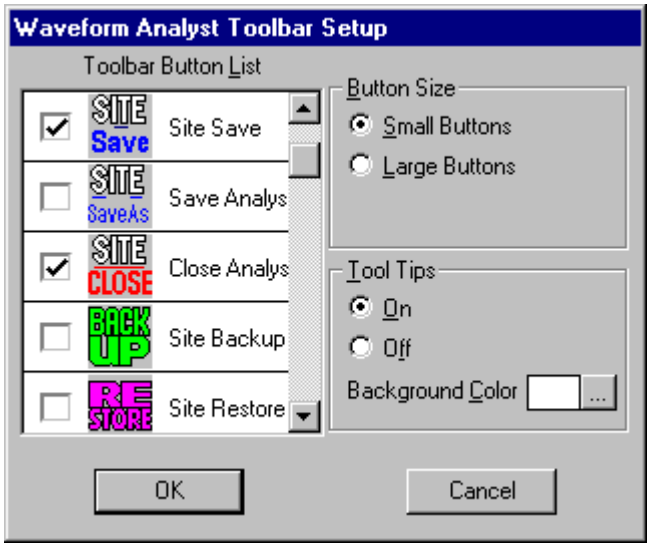


Figure 4

For more information on the settings tabbed dialog box, please see Settings.

Settings - Toolbar Options

This opens the Toolbar Setup dialog box that allows you to customize the toolbar.



For more information on customizing the toolbar, see Configuring the Tool Bar.

Utility

Export

Re-Init Master Tables

Ai*Power

Utility – Export

This allows you to export the data for the current analysis, filtered by the date/time range of the cursors, to a PQDIF file for analysis by 3rd party applications.

To export the data into PQDIF:

1. Enclose your data between the two vertical cursors in Pane A. (For more information on Pane A please see Pane A.)
2. Select 'Utility' 'Export' 'PQDIF' from the main menu
3. When prompted, select an output file (default extension '.pqd')

Waveform Analyst will then create a PQDIF file using the selected nodes, for events and waveforms with date/time values between the cursors in Pane A.

Utility - Re-Init Master Tables

This will re-initialize the standard values for the 'master tables' in the database. For 'legacy' databases that may have outdated information in the master tables, you can update them with the updated values for the most recent version of Waveform Analyst. This may become necessary whenever new trigger conditions, new measurement parameters, new equipment types, and so on are added to Waveform Analyst's capabilities. Legacy databases that have not been updated may not display these new parameters correctly in the listboxes and on the graphs. To correct this problem, you can use 'Re-Init Master Tables' to re-initialize the master tables with the new values.

Any customized 'master table' entries (such as those created by a device driver) that do not fall within the range of 'Reserved' values will not be affected.

Utility - Ai*Power

*Note: If you do not have Ai*Power installed on your system, or you have a version that is not compatible with WAVEFORM ANALYST, this menu option and the button associated with it will be grayed out. This function of WAVEFORM ANALYST allows data to be analyzed by Ai*Power.*

To Analyze Data with Ai*Power

1. Enclose your data between the two vertical cursors in Pane A. (For more information on Pane A please see Pane A.)

2. Click on the Ai*Power icon or choose Ai*Power from the menu.

3. Ai*Power will launch and begin the process of importing the data then Analyzing the data. (Please see the Ai*Power manual for more information.)

Note: The data you will analyze with Ai*Power is located in Pane A. The range of events analyzed in Pane A are those on or between the vertical cursors. You may zoom in on a select group of events in Pane A then have Ai*Power analyze them.

Window

New Window
Cascade
Tile
Arrange Icons
Auto Size Pane
Save Pane Ratio
Toggle Split Method
Window List

New Window

When selected, this option brings up the **SETTINGS** tab in the tabbed dialog box for the purpose of configuring the data to be displayed in the new window. Once the options have been chosen, a new Three Pane Browser will be created based upon the options you select.

In this way you can compare two separate displays for the same analysis by placing them into two different windows (Ex: RMS Plot in one window, CBEMA in the other).

Toolbar button: 

Cascade

Places the currently open windows in the standard overlapping fashion.

Toolbar button: 

Tile

Places the currently open windows in the standard side-by-side fashion.

Toolbar button: 

Arrange Icons

When there are multiple Three Pane Browsers open and they are minimized to the WAVEFORM ANALYST main window, this option arranges the icons in the standard side-by-side fashion.

Auto Size Pane

This option auto sizes the active Three Pane Browser to a standard size where all windows are visible.

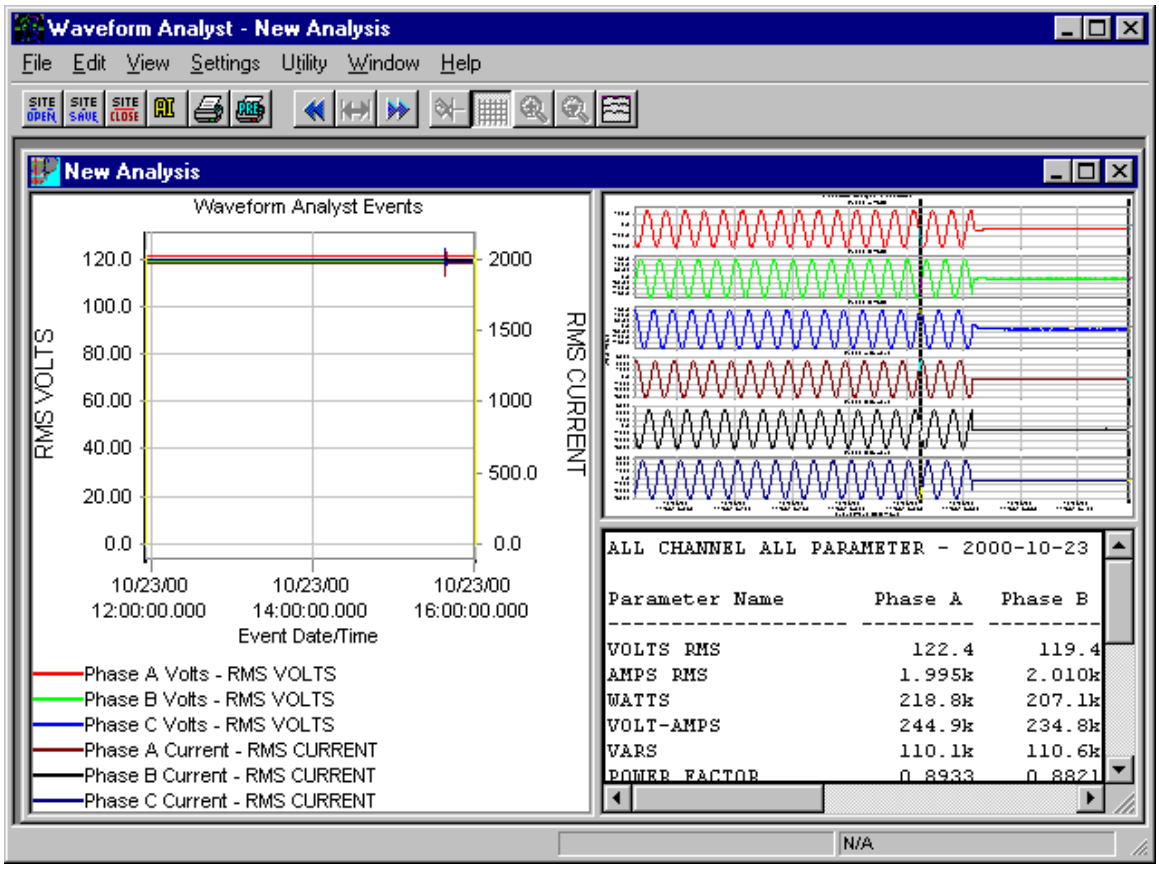
Toolbar options: 

Save Pane Ratio

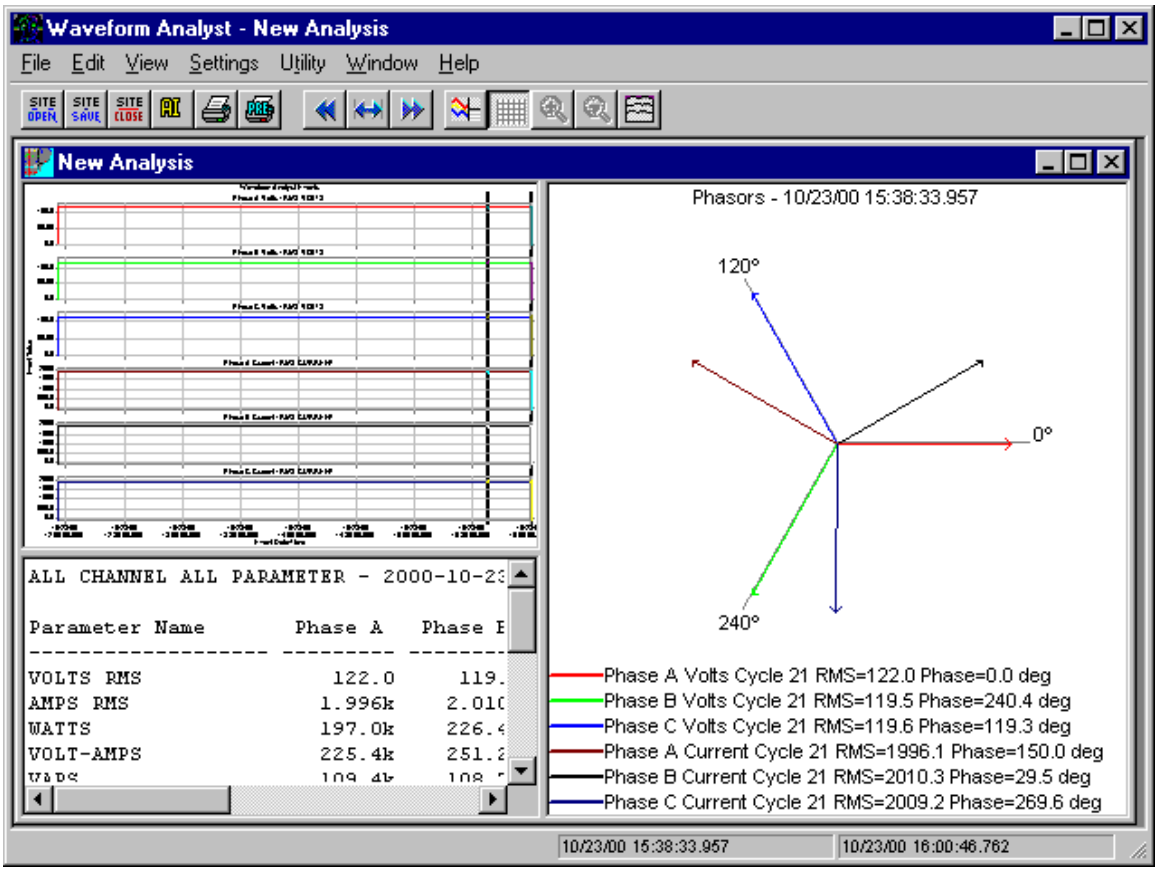
Saves the current state of the pane for the next time Auto Size Panes is used.

Window - Toggle Split Method

By selecting this menu item you instruct the 3 Pane Browser to switch between ‘split methods’. The default ‘split method’ puts Pane A on the left, Pane B in the upper right, and Pane C in the lower right section, as below:



The alternate ‘split method’ places Pane C below Pane A, and Pane B takes up the entire right-hand side, as below:



Window List

The window list (located below the other menu items) shows all active windows and allows them to be selected individually.

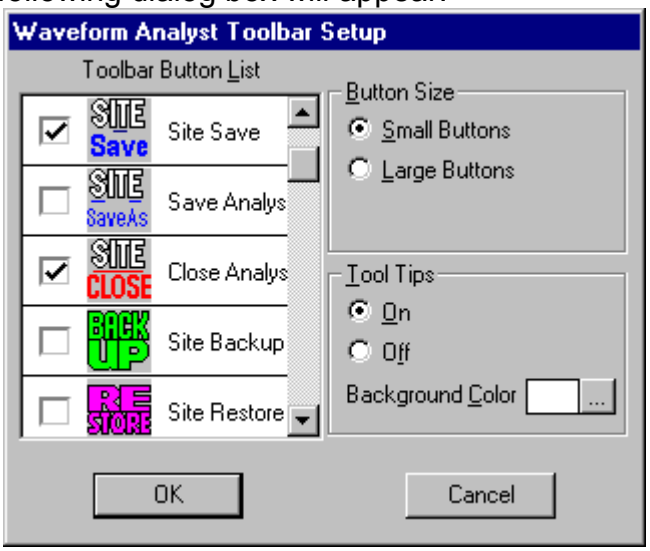
Help Menu

The following menu items are available under 'Help':

Contents: Displays the Waveform Analyst help 'Contents' (Finder) window
Search for Help On: Context-sensitive help
Index: Displays the Waveform Analyst help index
Using Help: Help on using Windows Help
Technical Support: Provides information on Technical Support.
About Waveform Analyst : Displays a dialog box showing version and copyright information for the Waveform Analyst application.

Configuring the Toolbar

To configure the Toolbar, select 'Toolbar Options' from the 'View' menu. The following dialog box will appear:



To display a particular button on the toolbar, check the box next to its bitmap in the list. You may also display large buttons in lieu of small buttons (see 'button size'). The default settings only display a subset of the buttons, to accommodate smaller display sizes. Pressing 'OK' saves your changes to the 'default' settings file located in the same directory as the Waveform Analyst application.

Related Topics:

Toolbar Button List

Button Size

Tool Tips

Toolbar Button List

The Toolbar Button List can be modified to include or exclude any or all toolbar buttons. You may select those that you feel are more helpful to you or those you use most frequently.

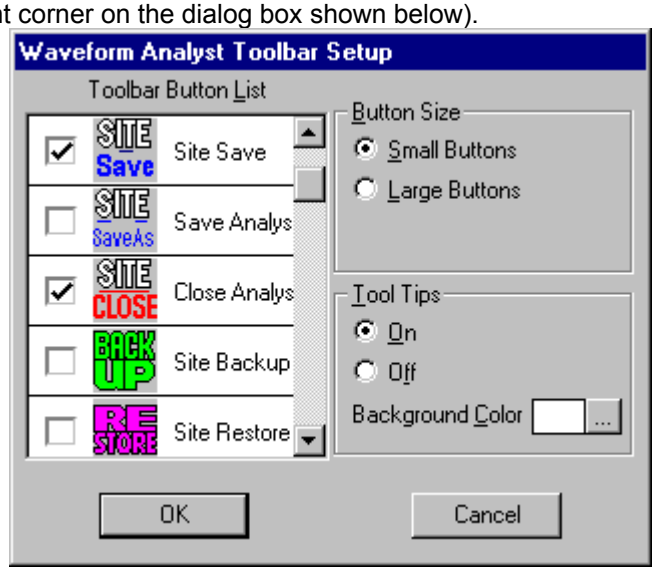
All available buttons are listed below:

Button	Function
	New Analysis
	Open Analysis
	Save Analysis
	Save Analysis As
	Close Analysis
	Ai*Power
	Print
	Print Preview
	Save to file
	Exit
	Undo
	Delete
	Edit Copy
	Jump back multiple events
	Previous Event
	Expand to Cursors
	Next Event
	Jump forward multiple events
	Active Pane as Chart or List

	View Grid Lines
	Zoom in
	Zoom out
	Preferences
	Filter Events
	Window New
	Window Cascade
	Window Tile Horizontal
	Auto Size Panes

Button Size

The button size can be modified to give you larger buttons on your screen. You may choose large or small buttons depending upon your preference by activating either the 'small buttons' or 'large buttons' setting under 'Button Size' (in the upper right corner on the dialog box shown below).



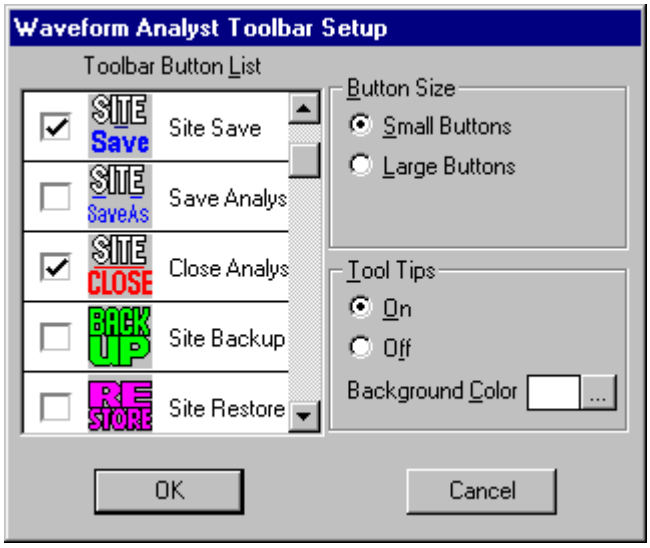
Example:

Small button 

Large Button 

Tool Tips

The Tool Tips are small windows that provide quick help to explain the functions of the toolbars. They may be turned on or off here. Tool Tips activates itself when the mouse cursor is placed over a specific button on the toolbar.


Waveform Analyst Toolbar Setup
Toolbar Button List
Site Save
Save Analys
Close Analys
Site Backup
Site Restore
Button Size
Small Buttons
Large Buttons
Tool Tips
On
Off
Background Color
OK
Cancel

Three Pane Browser

Introduction

The **Three Pane Browser** is used to view the data in WAVEFORM ANALYST. This tool has many functions for viewing the data such as chart mode and list mode, and it also has many shortcuts to let you get things done quickly. These and many other functions of the Three Pane Browser will be introduced in the following sections.

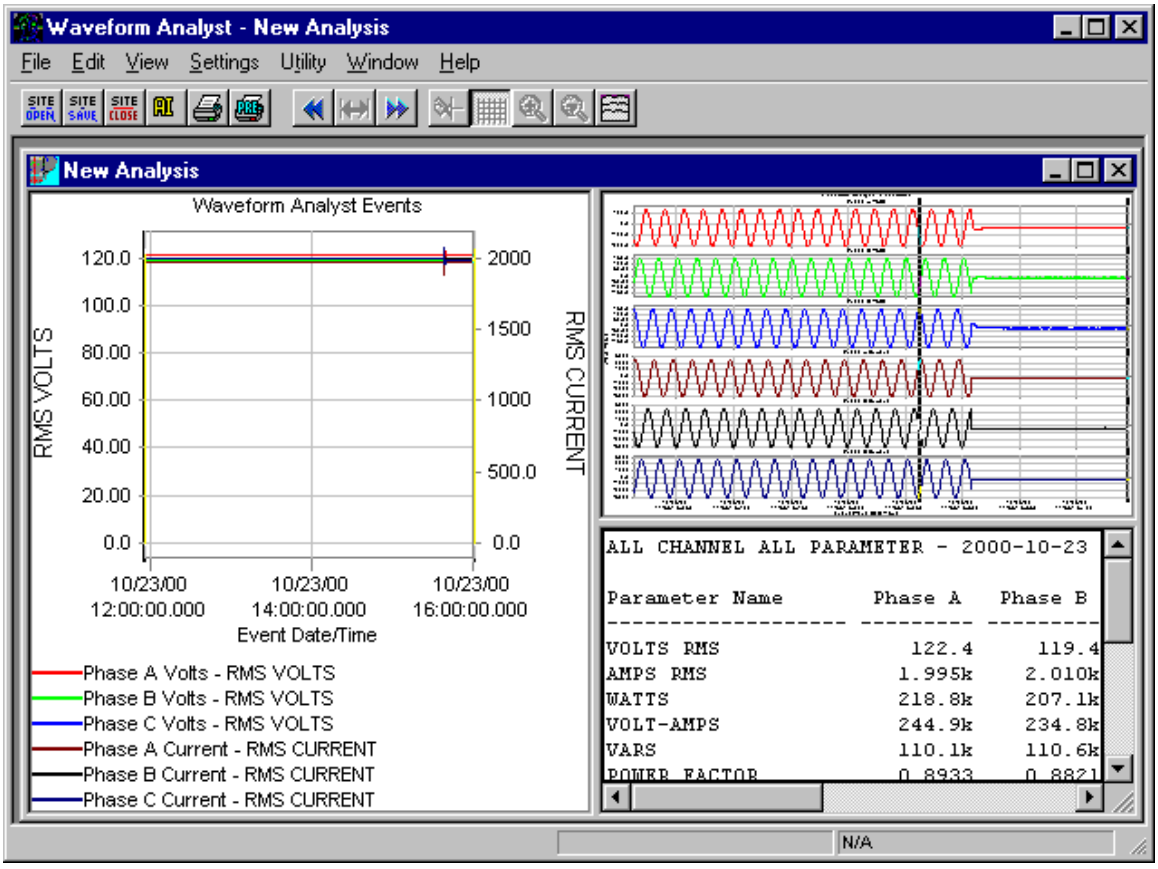
For more information, select one of the links below:

Layout

Pane A

Pane B

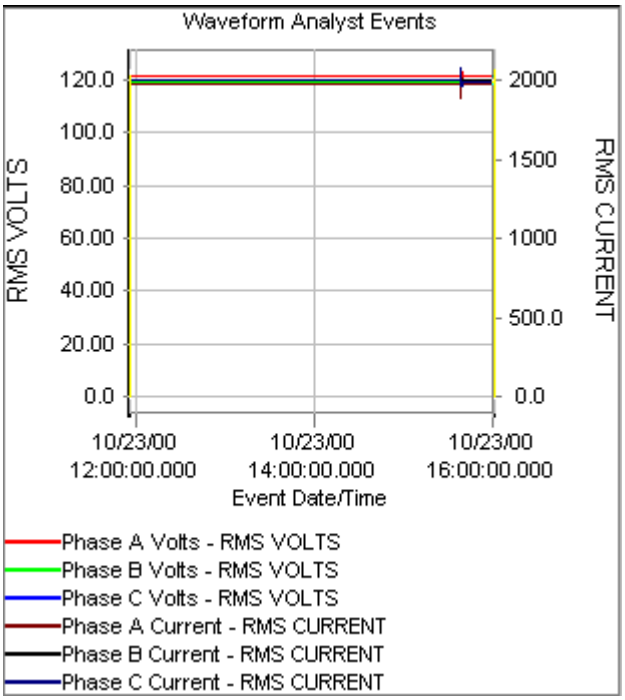
Pane C



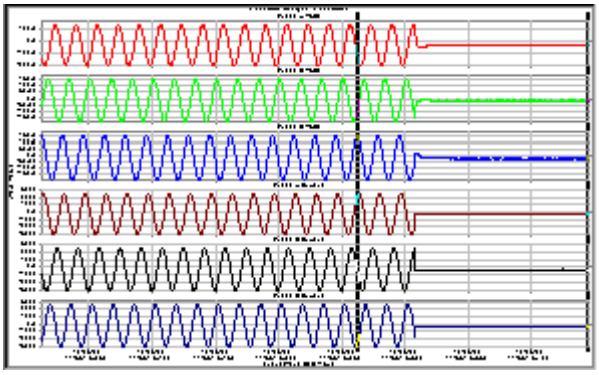
3 Pane Browser - Layout

The Three Pane Browser was given its name because its three main components are window panes and they are used to display and obtain information for the user. In this text, the three panes will be referred to as:

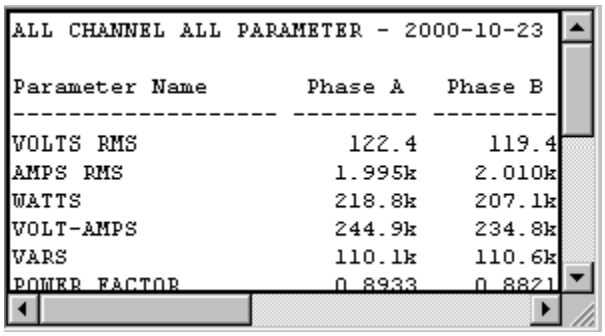
1. Pane A (Left Pane)



2. Pane B (Upper Right Pane)



3. Pane C (Lower Right Pane)



NOTE: In the 'alternate split method' Pane A is the upper left pane, Pane B is the right-hand pane, and Pane C is the lower left pane. You can switch between the 'split methods' using the 'Window' 'Toggle Split Method' menu. For more information on this, see Toggle Split Method.

Each pane has its own functions and personality, and they all work together to allow you to browse the data in three different ways at the same time.

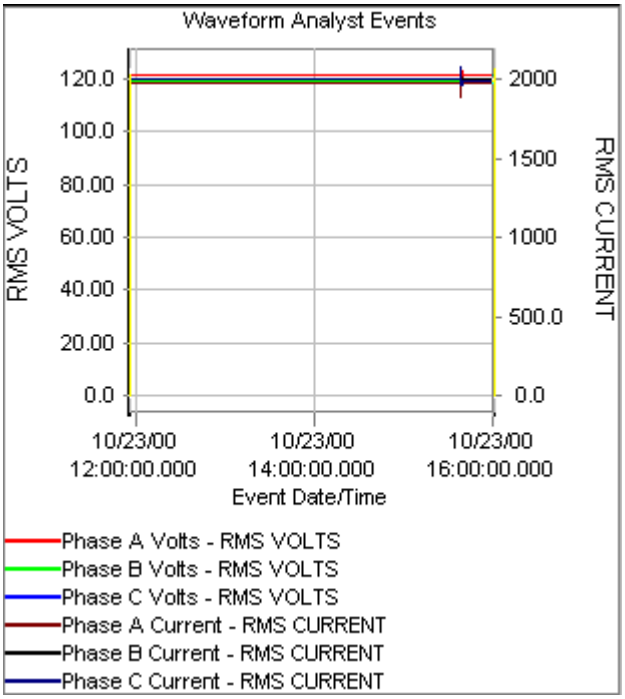
3 Pane Browser - Pane A

Introduction

Chart Mode

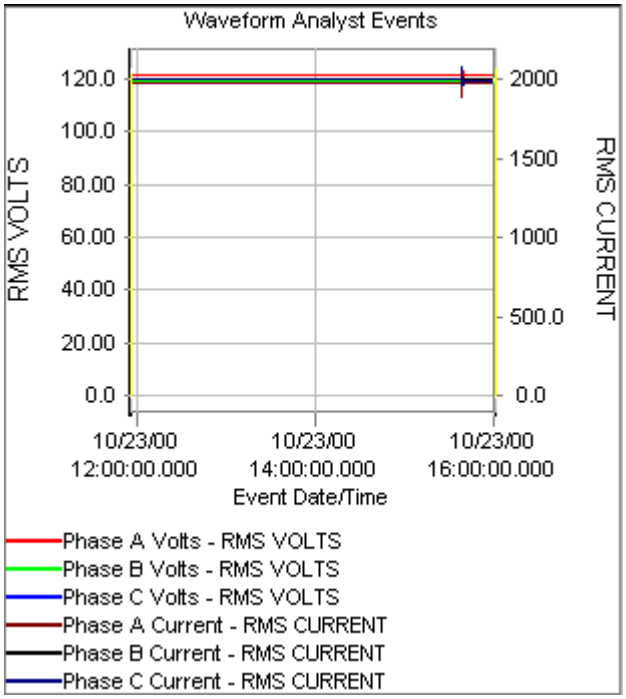
List Mode

Event Detail



Pane A - Introduction

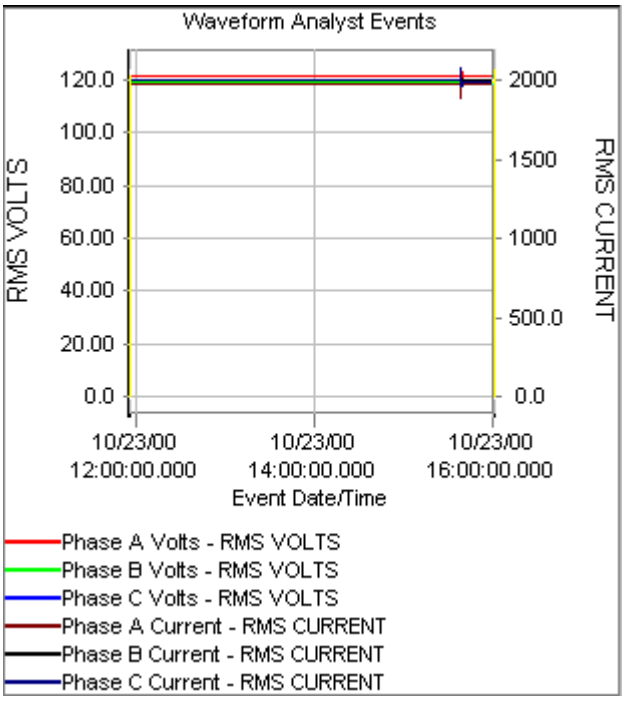
Pane **A** is the main window in the Three-Pane Browser. It not only shows the timeplot of the selected events, but also displays the events over a pre-selected (if desired) period of time. Pane A shows the events in two modes: either chart mode or list mode. Chart mode displays the **graph** of the events where list mode displays the events as stored in the database.



Pane A - Chart Mode

The first notable point in **chart mode** is the chart itself. The chart displays the event value on the left side (corresponding to the Y axis) and the Event date/time on the bottom (corresponding to the X axis).

The figure below shows the plot of the events over time:



Related Topics:

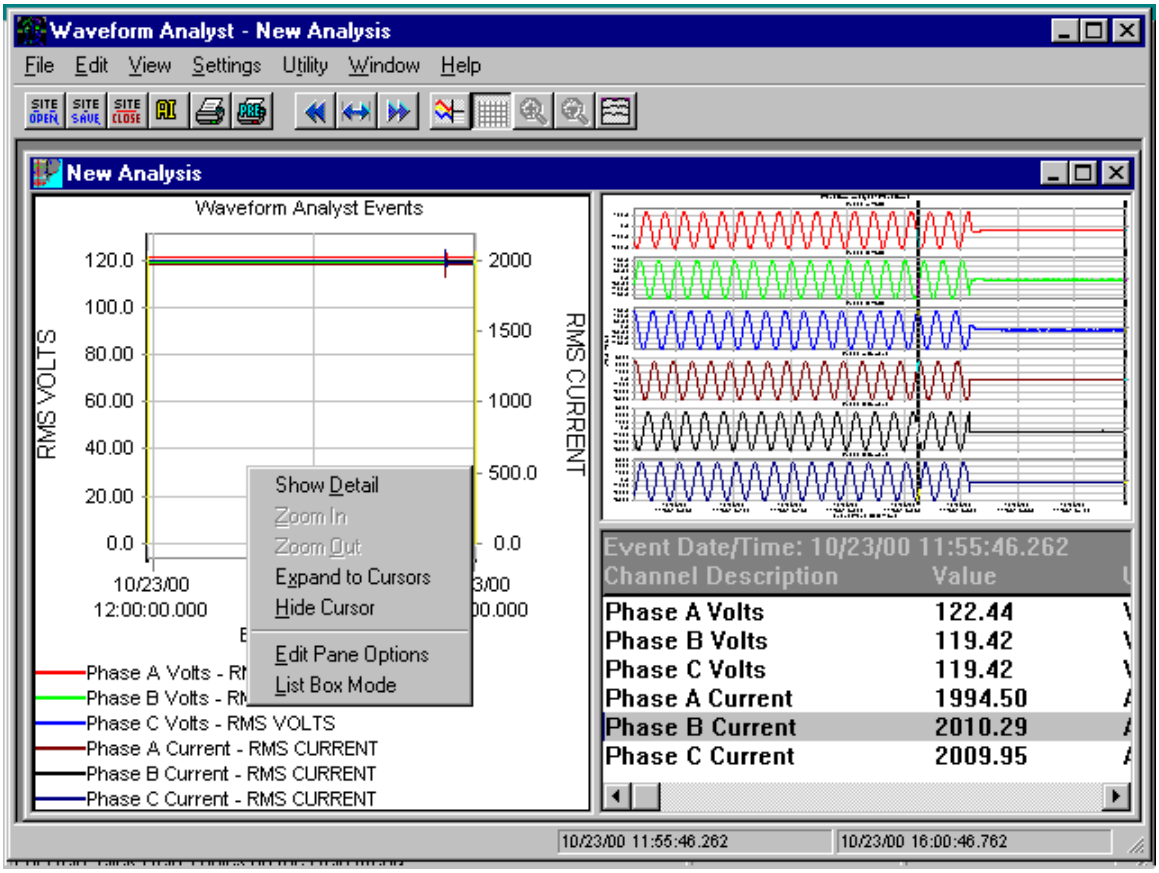
Popup Menu

Zoom

Pane A Chart Mode - Popup Menu

There are many shortcuts in WAVEFORM ANALYST and the popup menu is one of them. This small menu has much of the functionality of the full menu, but it is made for convenience and easy use.

To access the menu, place the cursor anywhere in Pane A and click on the right mouse button. You will see a small menu that is similar to the one located on the figure below:



Show Detail: Clicking on the show detail button brings up the event detail dialog box with specific details about the event located within.

Zoom In: Contracts view of chart

Zoom out: Expands view of chart

Expand To Cursors: When the cursors enclose a portion of the chart and Expand to Cursors is selected, the chart will be expanded in on that portion of the chart that was in-between the cursors

Edit Pane Options: Brings up the tabbed dialog box with Pane 'A' as the tab of choice. This enables options for this specific pane to be chosen. For more information, please see Pane 'A' Config.

List Box Mode: Puts the pane into list box mode. Please see List Mode for more information on list box mode.

Pane A Chart Mode - Zoom

Another feature of WAVEFORM ANALYST is the ability to zoom in on any portion of the chart you select. There are two ways to do this:

Create a box around the portion of the chart you wish to zoom in.

Choose zoom in from the menu, toolbar, or popup menu.

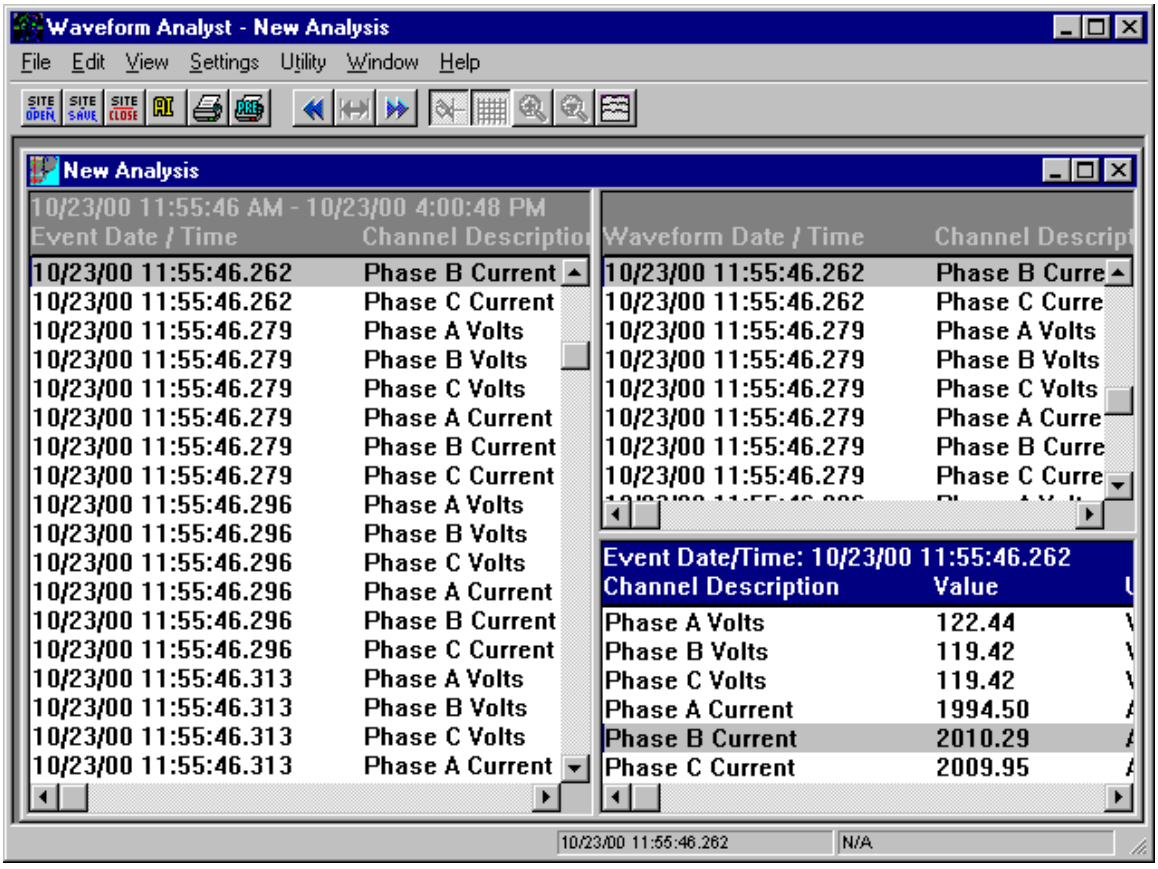
or

Drag the bar on each side of the window to enclose the portion of the chart that you wish to zoom in.

Choose expand to cursors from the menu, toolbar, or popup menu.

Pane A - List Mode

List mode gives detailed information on each event that is displayed in chart mode. Each pane is either a list of events or the details of a specific event.

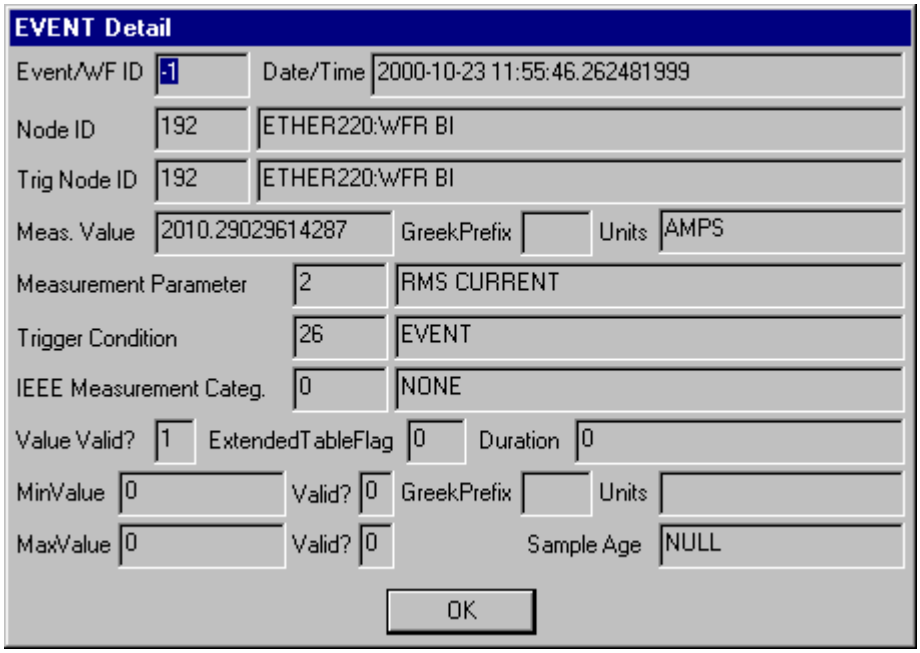


The "Active Pane as List" menu selection presents the list of numerical event information in that pane that was used to create the graph.

In Pane A, the events listed will only be those chosen in the settings menus for Pane A. Detailed information about each event can be easily displayed by double clicking on the event line or by selecting the 'View' 'Show Detail' menu.

Pane A - Event Detail

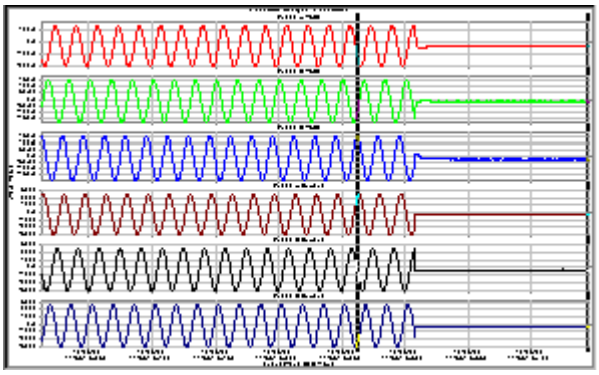
In addition to viewing the event information in Pane A using List Mode, it is possible to double click on any single event and view the information of a single event in a report like form.


EVENT Detail
Event/WF ID
-1
Date/Time
2000-10-23 11:55:46.262481999
Node ID
192
ETHER220:WFR BI
Trig Node ID
192
ETHER220:WFR BI
Meas. Value
2010.29029614287
GreekPrefix
Units
AMPS
Measurement Parameter
2
RMS CURRENT
Trigger Condition
26
EVENT
IEEE Measurement Categ.
0
NONE
Value Valid?
1
ExtendedTableFlag
0
Duration
0
MinValue
0
Valid?
0
GreekPrefix
Units
MaxValue
0
Valid?
0
Sample Age
NULL
OK

3 Pane Browser - Pane B

Introduction

Chart Mode



Pane B - Introduction

Pane **B** shares many of the same functions as Pane A although the data displayed is very different. While Pane A displays event data over a period of time, Pane B displays **waveform** data associated with a particular event or groups of events that were recorded in succession.

Pane B - Chart Mode

Chart mode in Pane B displays the event waveform values on the left side (corresponding to the Y axis) and the event waveform date/time on the bottom (corresponding to the X axis).

Related Topics:

Popup Menu

Zoom

List Mode

Event Detail

Pane B - Chart Mode - Popup Menu

The popup menu in Pane B has the same look and feel of the popup menu in Pane A, but the Edit Pane Options choice is different.

Show Detail: Clicking on the show detail button brings up the event detail dialog box with specific details about the event located within.

Zoom In: Contracts the view of chart.

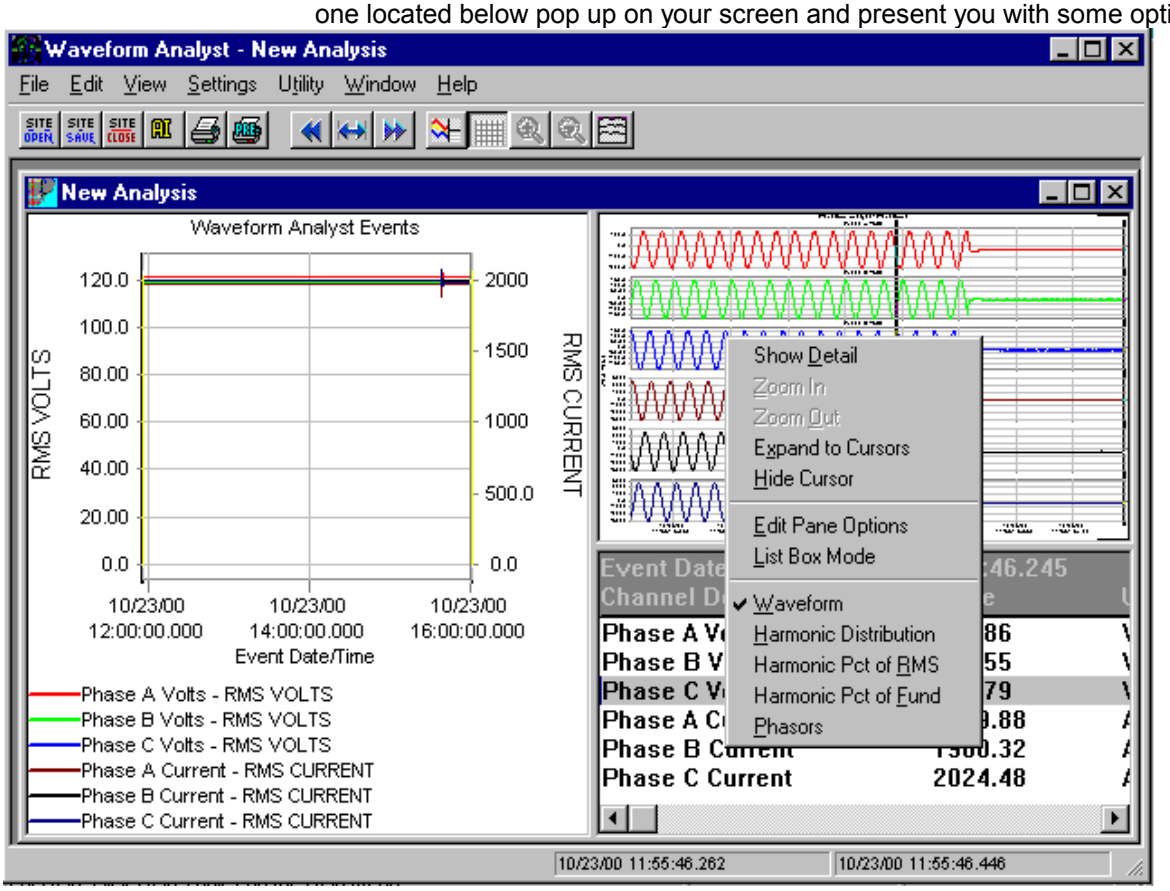
Zoom out: Expands the view of chart.

Expand To Cursors: When the bars enclose a portion of the graph and this is selected, the graph will be zoomed in on that portion of the graph that was in-between the bars.

Edit Pane Options: Brings up the tabbed dialog box with Pane 'B' as the tab of choice. This enables options for this specific pane to be chosen. For more information, please see Pane B.

List Box Mode: Puts the pane into list box mode. For more information on List Box Mode, Please see List Mode.

To access the popup menu, place the cursor anywhere in Pane B and click on the right mouse button. You will see a small menu that is similar to the one located below pop up on your screen and present you with some options:



Pane B Chart Mode - Zoom

Another feature of WAVEFORM ANALYST is the ability to zoom in on any portion of the graph you select. There are two ways to do this:

Create a box around the portion of the graph you wish to zoom in.

Choose zoom in from the menu, toolbar, or popup menu.

or

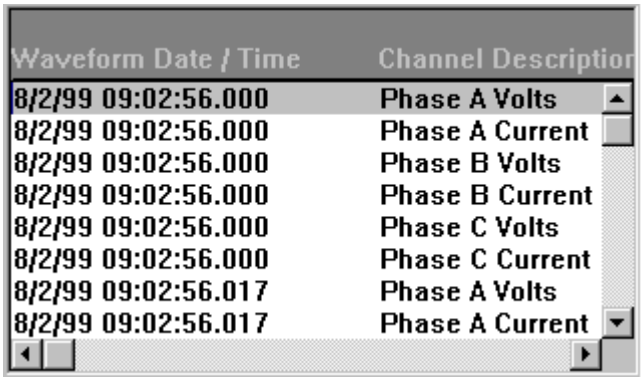
Drag the bar on each side of the window to enclose the portion of the graph that you wish to zoom in.

Choose expand to cursors from the menu, toolbar, or popup menu.

Pane B Chart Mode - List Mode

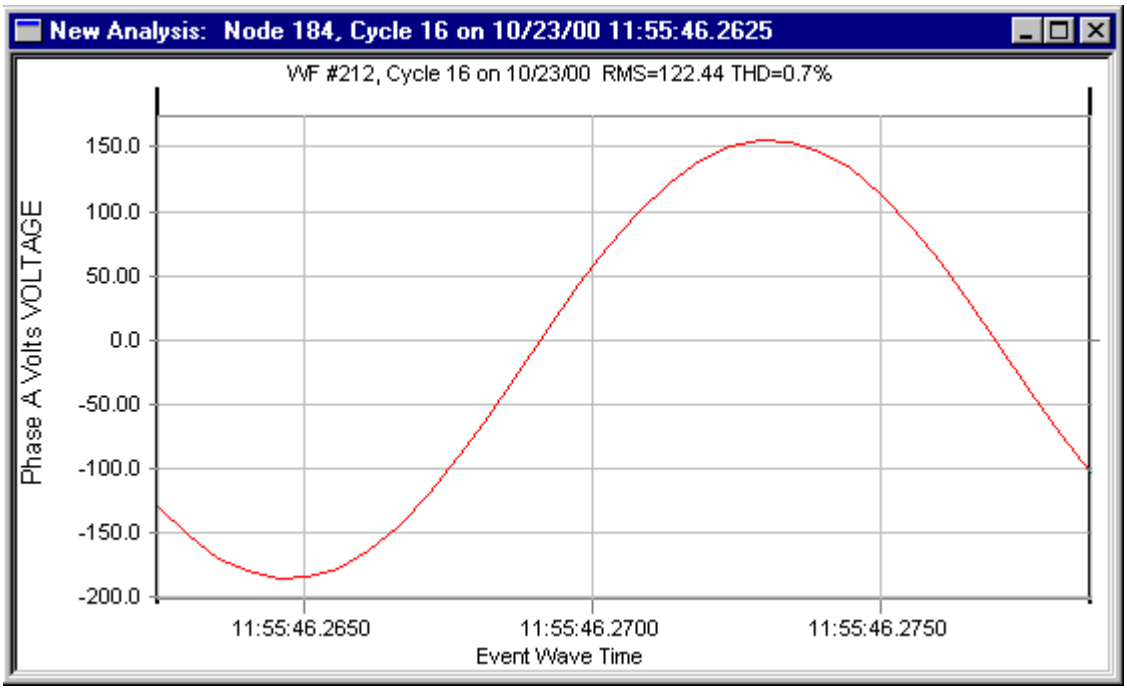
List mode gives detailed information on each waveform that is present in the database. Each pane is either a list of events (from the database) or a list of specific information about a group of events (events that have been filtered).

However, what the user often sees is a graph of the events created by the pane object. The "Active Pane as List" menu selection presents the list of numerical event information in that pane that was used to create the graph.



Pane B Chart Mode - Event Detail

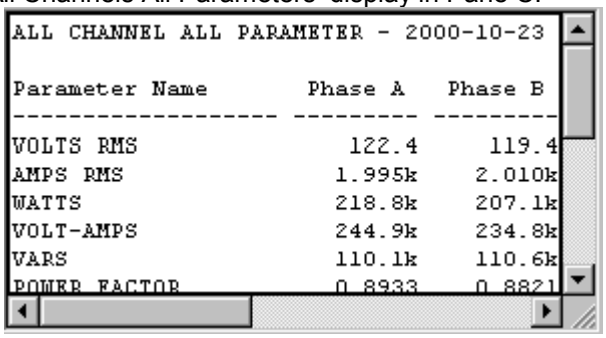
In addition to viewing the event information in Pane B using Chart Mode, it is possible to double click on any single waveform event and view the single cycle corresponding to the selected list entry (or point on the graph).



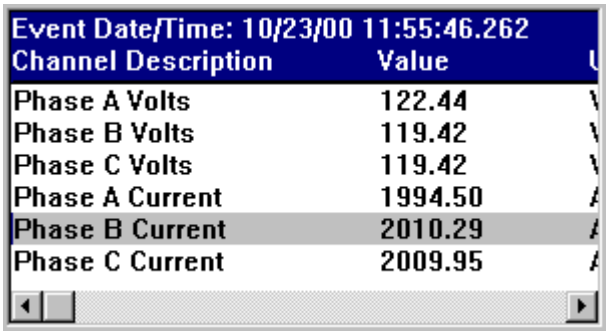
3 Pane Browser - Pane C

Pane C can display ‘All Channels All Parameters’ information, or an ‘Event List’ corresponding to all events for the current date/time selected in Pane A.

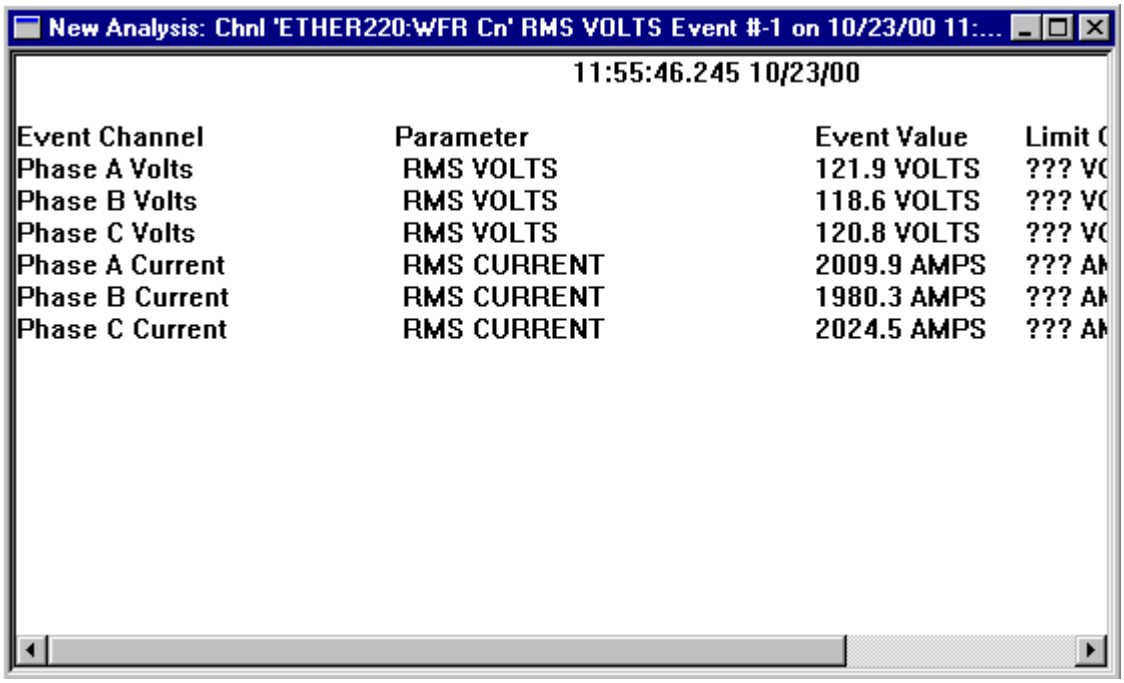
The following shows the ‘All Channels All Parameters’ display in Pane C:



The following shows the ‘Event List’ in Pane C:



Pane C shows a mini report is produced when an event is selected and double clicked in Pane C. The report describes the event with the information that can be seen in the figure below.



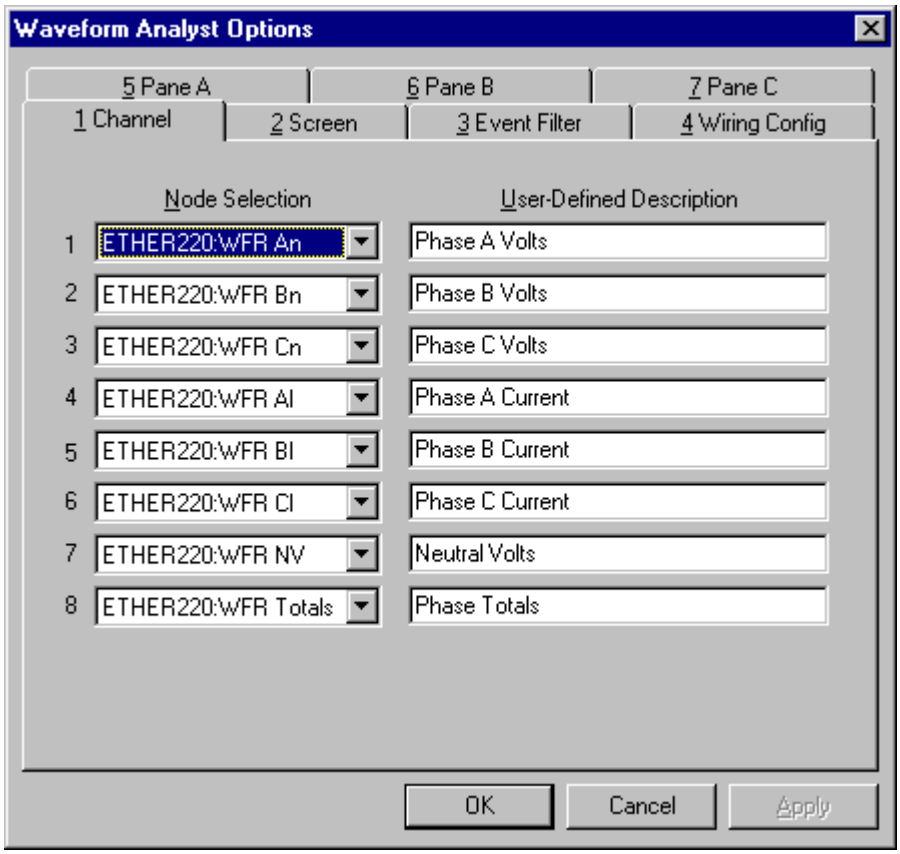
The Settings Tabbed Dialog Box

The **SETTINGS** tabbed dialog box assigns the specific options that relate to the Three Pane Browser, and the data filters for extracting information from the O.P.E.N. database.

There are seven tabs in the settings tabbed dialog box:

1. Channel
2. Screen
3. Event Filter
4. Wiring Config
5. Pane 'A' Config
6. Pane 'B' Config
7. Pane 'C' Config

Settings - Channels



Introduction

The channels tab enables you to select or deselect the channels to display.

Node Selection

This section allows you to select up to 8 nodes from the list of nodes for this analysis.(as defined when the analysis was created) by its description. Each entry must contain a different node.

User-Defined Description

Here you may enter your own description for each node in the 'edit box' to the right of the corresponding node selected in the 'Node Selection' column. The description you enter here will appear on all charts and in all reports and list boxes in Waveform Analyst. This enables you to customize the charts to your own specifications.

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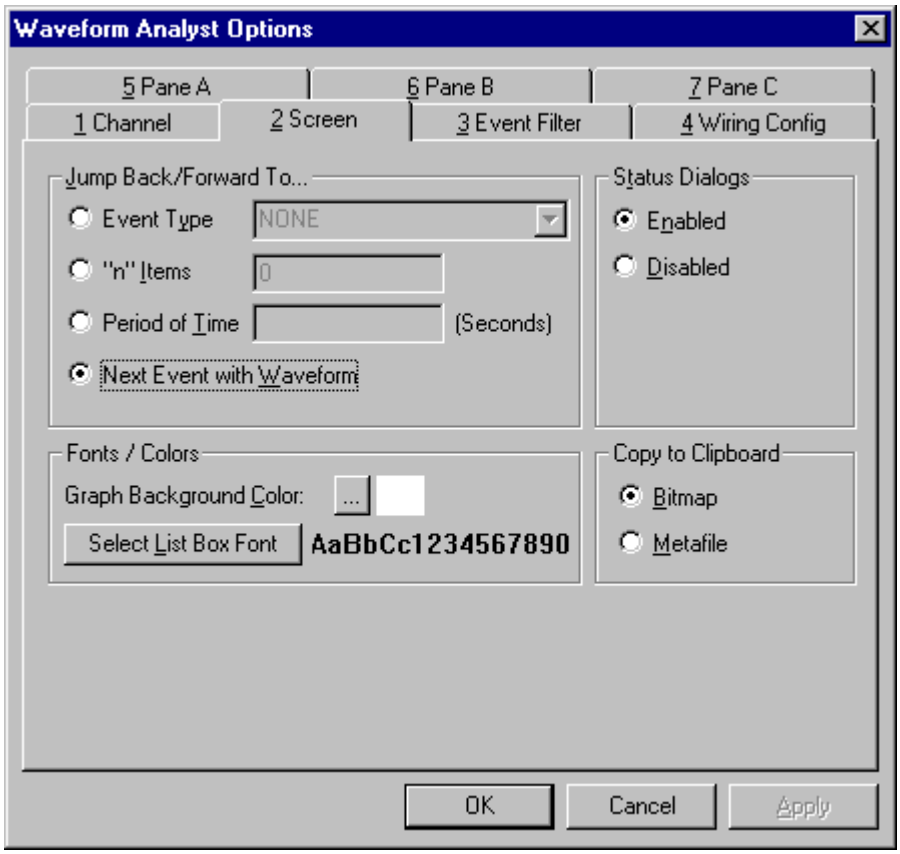
Settings - Screen



Jump Back/Forward To... Group Buttons

Event Type

By choosing event type, the Jump Back/Forward To group buttons will jump to **this** type of event.

The options are:

Crest Factor

Current THD

Demand

Energy

Frequency

Harmonics Current

Harmonics Volts

Harmonics Watts

Peak Current

Power Factor

RMS Current

RMS Volts

Transformer K-Factor

Transients Current

Transients Voltage

Unbalance

Voltage THD

Volts-Amps

Volts-Amps-Reactive

Watts

Ex:

If **RMS CURRENT** was chosen in the "Jump Back/Forward area", and the button is checked, the next time you press either the Jump Back button or the Jump Forward button (see margin), WAVEFORM ANALYST will search for the next RMS current event.

'n' items

Jumps back/forward 'n' events where 'n' is a number from 1 to 1000.

Period of Time (seconds)

By selecting the unit time, the forward and reverse buttons move that amount of time forward or that amount of time backward and brings up the next event at the end of that period of time.

Next Event with Waveform

By selecting the next event with waveform, the forward and reverse (multiple event buttons) will move you to the next event with a waveform.

Status Dialogs

Enables or disables the displaying of informational dialog boxes throughout the program.

- Enabled
- Disabled

Fonts / Colors

Graph Background Color

The Graph Background Color may be selected here by pressing the button to the left of the color (default is white).

Select List Box Font

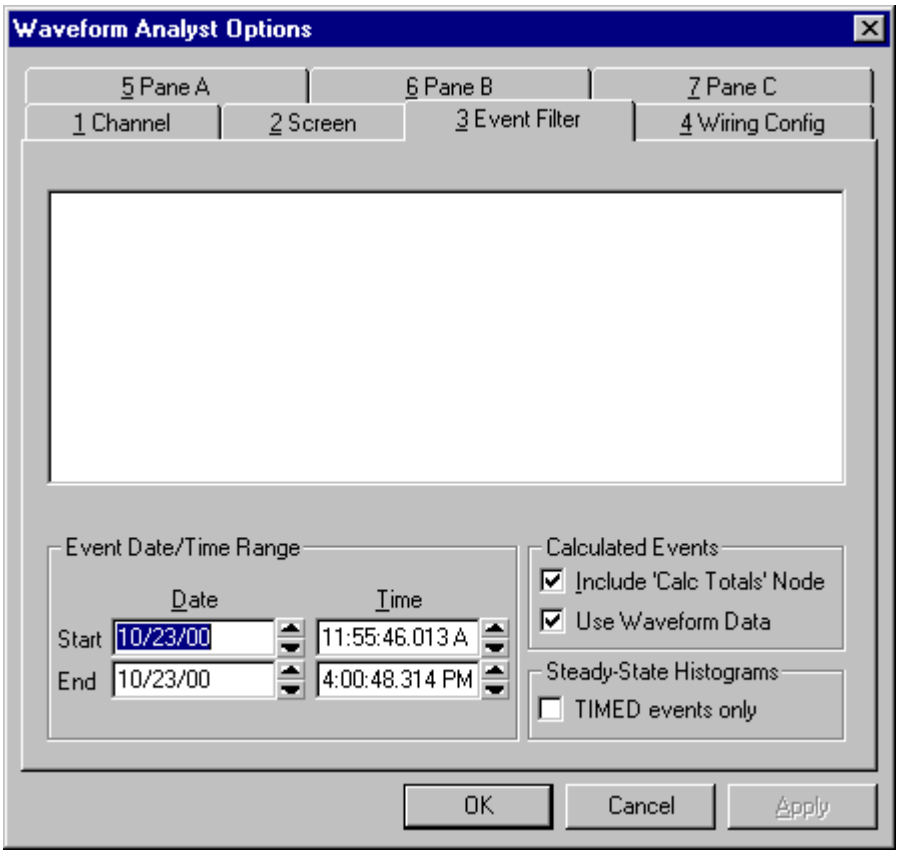
This option brings up the font dialog box that allows you to select the type of font that will be displayed in the List boxes throughout WAVEFORM ANALYST.

Copy to Clipboard

This area allows you to select how the chart will be copied to the clipboard when using the copy function.

- Bitmap
- Metafile

Settings - Event Filter



Event Date/Time Range

This section of the event filter tab allows the user to specify the start and end time/date for the data displayed. The starting dates are in the left columns, and the starting times in the right columns. A value of 'NULL' indicates that no filtering will take place.

Calculated Events

Include 'Calc Totals' Node:
When checked, the "Include 'Calc Totals' Node" checkbox indicates to Waveform Analyst that the 'Calc Totals' node should appear in the list of available nodes for Pane 'A'. Selecting the 'Calc Totals' node allows you to calculate 'Phase Totals' event values using waveform and event data in lieu of using the actual 'Phase Totals' node.

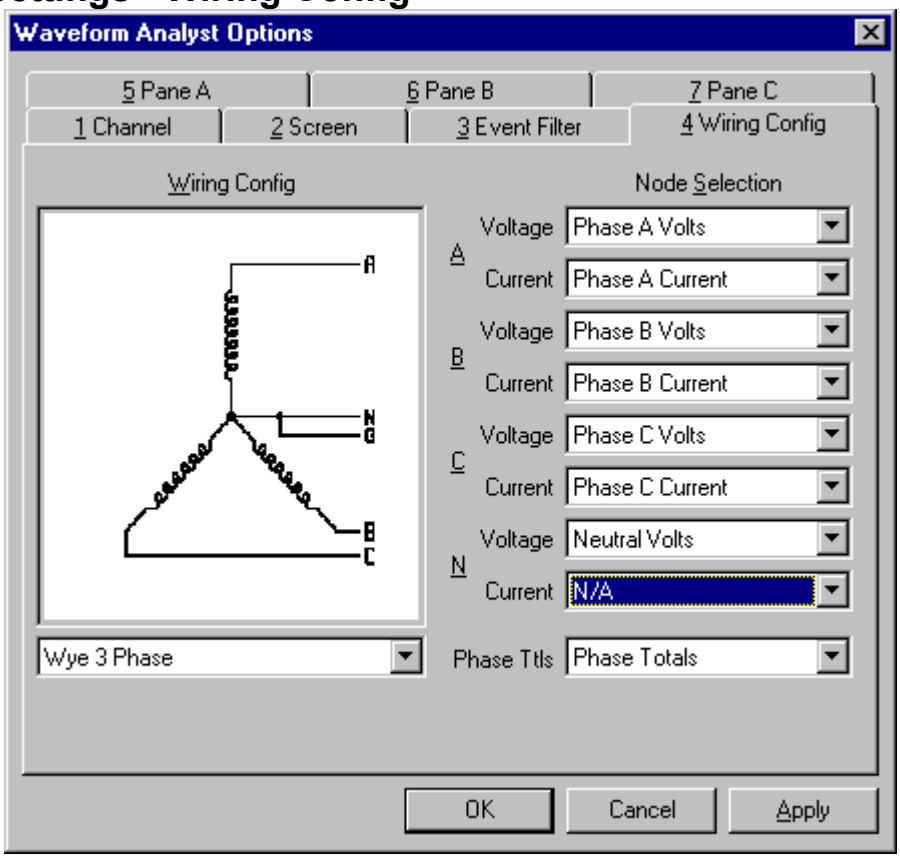
Use Waveform Data:
When checked, any parameter NOT available in the various Event tables for a given date and time can be automatically calculated from Waveform data

by Waveform Analyst. This results in a much slower query, but more complete data.

Steady-State Histograms

Timed Events Only:
When checked, only those events and waveforms with a trigger condition of 'TIMED' will be considered in producing steady-state histograms. Specifically, this affects the THD Histogram and the Unbalance histogram. The purpose of this feature is to allow you to eliminate 'exceedence' events from histograms that are supposed to represent steady-state conditions.

Settings - Wiring Config



Introduction

The Wiring Config tab lets you assign specific nodes to 'phases' within a particular wiring configuration. When the wiring configuration is already known from the relationships between the nodes in the O.P.E.N. database, this information is filled in for you when you first create an analysis. If Waveform Analyst cannot determine the correct node assignments, you can make those assignments here.

Wiring Config

The 'Wiring Config' display, and the corresponding 'combo box' below, allows you to select a wiring configuration and view a visual representation of the circuit. In the example above, a WYE configuration has been selected. Note the visual representation showing phases A, B, and C, and the Neutral (N) and Ground (G) connections to the common (center) connection of the WYE transformers.

Node Selection

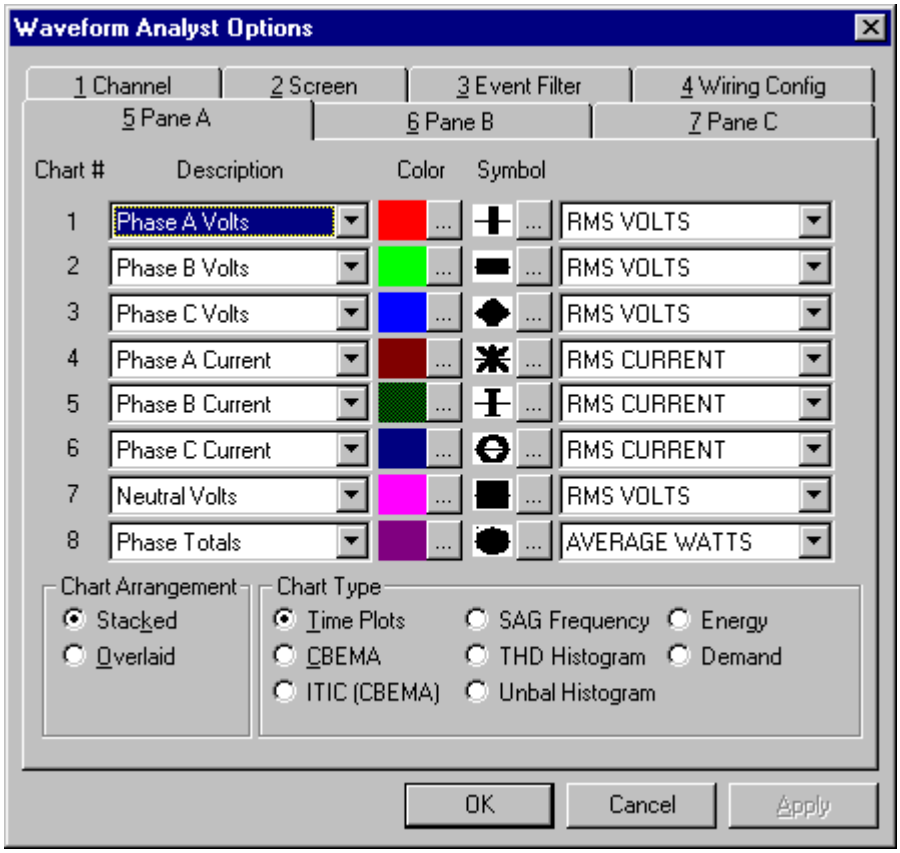
These 8 ‘combo boxes’ allow you to choose a node that corresponds to the Phase values. The ‘Voltage’ and ‘Current’ nodes indicate which nodes will have Voltage events, and which ones will have Current events. For a WYE circuit (as well as SINGLE PHASE and SPLIT PHASE), they can be the same, if the monitoring device records both voltage and current data on the same node. For a DELTA circuit, the ‘Voltage’ node will have phase to phase values, while the ‘Current’ node will have phase values.

Phase Totals

The ‘Phase Ttls’ combo box allows you to select the node that contains “phase total” data (also known as ABC or ‘Circuit Totals’). “Phase Total” data will consist of a summation of all 3 phases, such as “Total Watts” (as with a revenue power meter).

In all cases with node selections, if there is no node that corresponds to that portion of the circuit, you can select ‘N/A’.

Settings - Pane 'A' Config



Introduction

The Pane **'A' Config** tab enables you to select a name for the channels, select a color for the channel, a symbol (if in CBEMA mode) and the type of parameter that you wish assigned to that specific channel.

Description

The description drop down box enables you to select the label for the data that you want to see in Pane A.

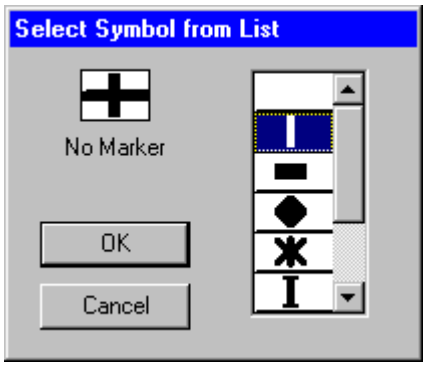
The options for the description are dependent upon what is entered in the Channel Descriptors section of the Channels tab. Please see Channels.

Color

The type of color that you desire to see for that specific channel may be chosen from a standard Windows color dialog box. To select, press the button directly to the right of the color in the Pane A tab.

Symbol

The symbol is used only for CBEMA mode and it marks the location of the data point on the chart. To select a symbol, press the button to the right of the box with a line. This will bring up the following dialog box



Parameter Assignment

This selection is the data type that you will be viewing for the specific chart number.

Chart Arrangement

There are two options in the Chart Arrangement

11. 1. Stacked
12. 2. Overlaid

When Stacked is selected, the charts are stacked one on top of the other which enables you to see multiple charts at once.

When overlaid is selected, each chart overlays the other and they can only be seen one at a time.

Note: The number beside the heading "number of charts" corresponds to the number of **channels** selected in the Channels tab.

Chart Type

Time Plot

Shows a plot of all the data that is in the site. What is shown is dependent upon the date and time ranges that you specify in the site open dialog box or in the Event Filter Tab Dialog Box.

CBEMA

Shows a standard CBEMA plot of the data: number of cycles vs. nominal voltage.

ITIC (CBEMA)

Shows an ITIC CBEMA plot of the data using a different set of limits: number of cycles vs. nominal voltage.

SAG Frequency

This displays the frequency of SAG events over time by severity, using a histogram.

THD Histogram

This displays the frequency of THD by severity, using a histogram. The values are calculated from waveforms if no THD events are present in the event tables.

Unbal Histogram

This displays the frequency of Voltage Unbalance by severity, using a histogram. The values are calculated from waveforms and RMS events if no Unbalance events are present in the event tables.

Energy

This displays an 'Energy Plot' showing averaged 15 minute intervals for energy over time.

Demand

This displays a 'Demand Plot' showing the total demand over time.

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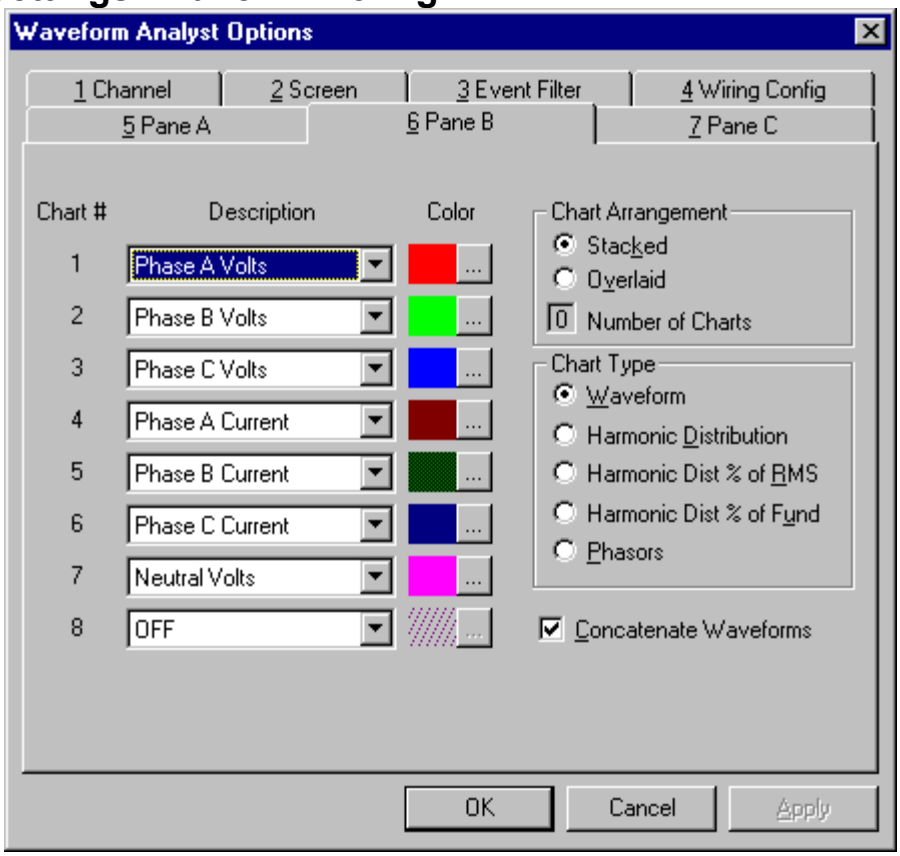
Settings - Pane 'B' Config



Introduction

The Pane 'B' Config tab enables you to select a name for the channels, select a color for the channel, how to arrange the charts, and the type of chart.

Description

The description is where you want to label the type of voltage or current that you wish to see on the chart. These choices correspond to the channels activated in the Channels tab for current.

Color

The type of color that you desire to see for that specific channel may be chosen from the standard Windows color dialog box. This may be selected by pressing the button directly to the right of the color you wish to change.

Chart Arrangement

There are two options in the Chart Arrangement

- Stacked
- Overlaid

When Stacked is selected, the charts are stacked one on top of the other which enables you to see multiple charts at once. This has an advantage of enabling you to see even more data at once.

When overlaid is selected, each chart overlays the other and they can be seen one at a time.

Note: The number beside the heading "number of charts" corresponds to the number of *charts* selected.

Chart Type

Waveform

Displays the waveform associated with the current event (if any).

Harmonic Distribution

Graphically presents a Fourier analysis of the waveform event. The vertical bars represent the value of the 1st to the 50th harmonic. The numeric values, as well as their phase angles may be displayed in Pane C. To access numbers up to the 50th harmonic, double click on an item in Pane C to view the Single Pane Browser (Pane D).

Pane D contains all 50 harmonics as well as their number, value, and phase.

Harmonic Dist % of RMS

Graphically presents the distribution of the harmonics as related to the RMS. The percentile

Harmonic Dist % of Fund

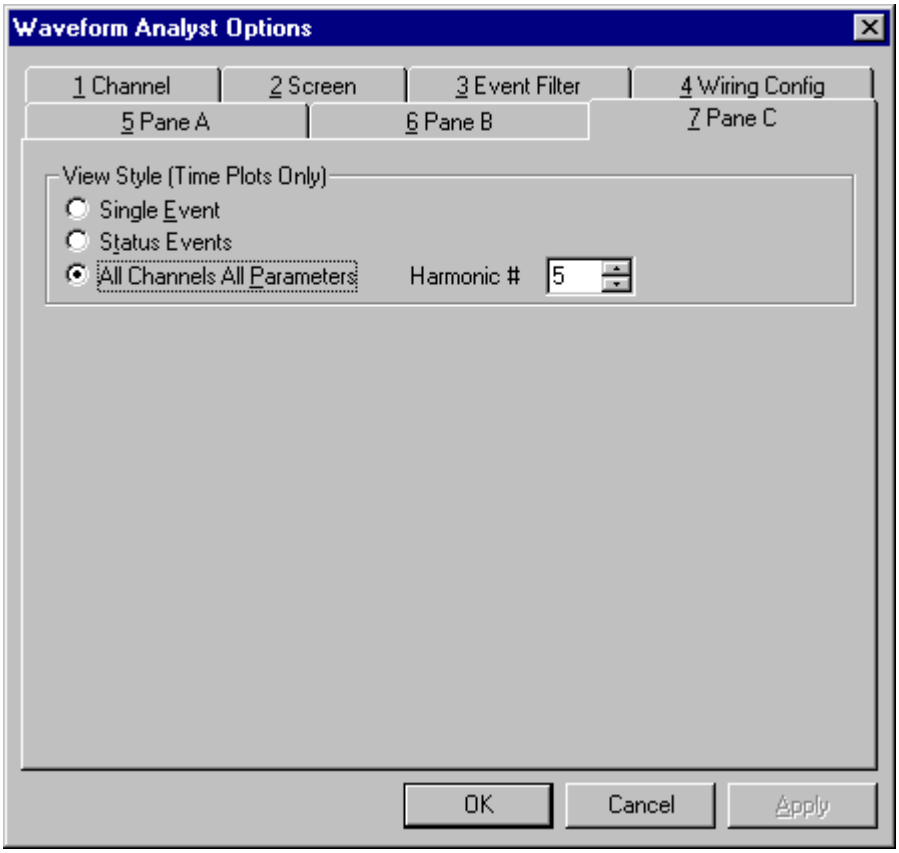
Graphically presents the distribution of the harmonics as related to the fundamental.

Phasors

Graphically presents relationship of the angles at the zero crossing, with respect to each other, on an overlaid chart showing their amplitude and phase angle.

Note: If you wish to view phasors while in scope mode, you need to select phasors before you enter scope mode.

Settings - Pane 'C' Config



View Style

Pane C shows either single events, status events, or an all channel all parameter table depending upon the selection.

- Selecting Single Event shows all events occurring for the time/date of the cursor position in Pane A.
- Selecting the second option (Status Events) allows you to see status events for that site beginning with the left cursor in Pane A and ending with the right cursor.

- Selecting All Channels All Parameters allows you to view a table of a series of event parameters for each active channel including totals. Table values are taken directly from the database or computed from waveforms if they are available. This table is generated for values that occurred at the time/date of the left cursor in Pane A.

For 'All Channel All Parameters' the 'harmonic #' determines which harmonic will be used for harmonic voltage and other related calculations where a harmonic number is required.

Waveform Analyst Server

The Waveform Analyst Server can be used in conjunction with the Waveform Analyst Remote application to provide the full suite of Waveform Analyst functions to users who are on a network external to where the waveform data is stored. Waveform Analyst Server is installed with every installation, but must be configured via the Windows Service Control Manager if the user wishes for the service to start with Windows.

Configuring Waveform Analyst Server

Waveform Analyst Server is automatically configured when it is installed.

The startup property for the service is set to ‘manual’. In order to run Waveform Analyst server every time Windows boots, use the Windows Service Control Manager and set the startup property to ‘automatic’. To run Waveform Analyst Server for a single session of Windows, use the start menu selection ‘Start Waveform Analyst Server’.

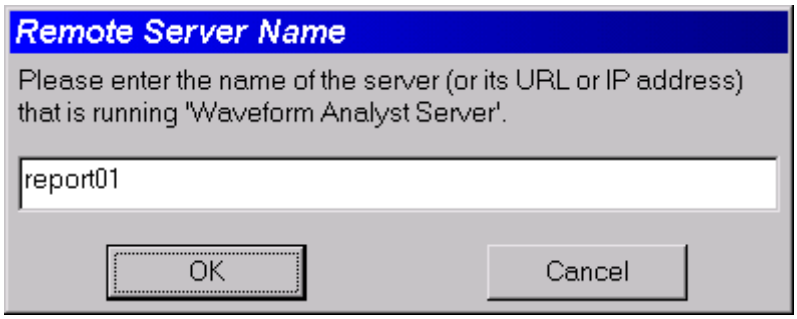
Waveform Analyst Server gets its data from the ‘PQAnalyst Data’ DSN created by either the PQAnalyst or Waveform Analyst setup program.

Waveform Analyst Remote

Waveform Analyst Remote is the client side of Waveform Analyst Server. Its interface is identical to that of Waveform Analyst, save for the method by which the user accesses the data.

Browsing Data with Waveform Analyst Remote

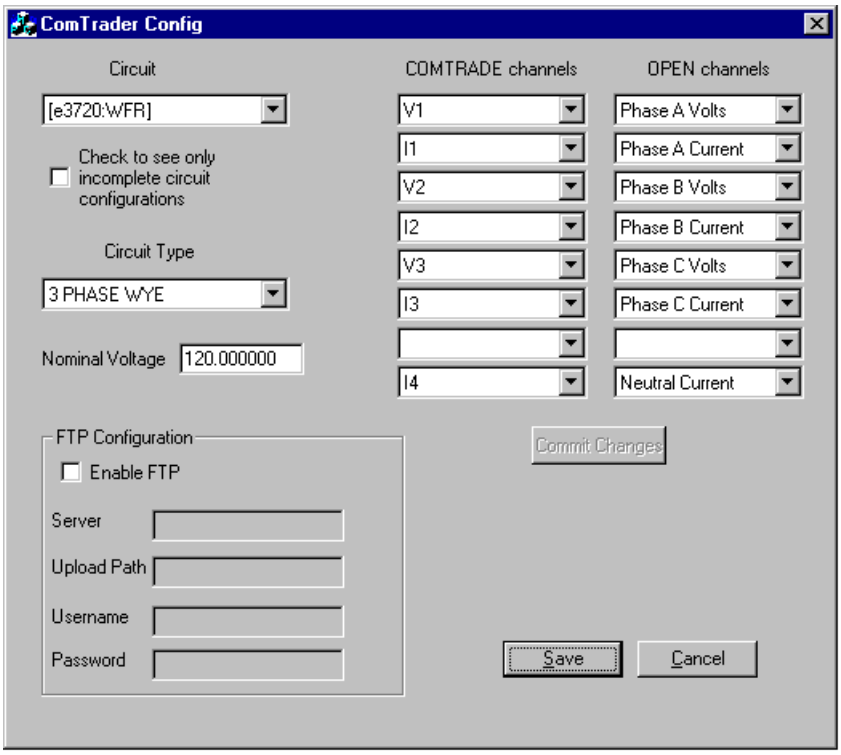
From the **File** menu, choose **New Analysis**. The **Remote Server Name** dialog should appear:



Enter the IP address, URL, or in the case of a LAN, the network name of the computer running Waveform Analyst Server and click **[OK]**. The **Device Selection** dialog should appear. From this point, the interface is the same as the standalone version of Waveform Analyst. Consult the Waveform Analyst documentation for instructions.

Manual Mapping Application - CTRADCFG.EXE

CTRADCFG.EXE allows the user to configure two aspects of the PMCS2FTF translation service. The first is to configure the FTP function that allows the service to automatically transfer translated files to a remote server. The second is to manually map the circuit type and channel designations of a new PMCS device where the device's Comtrade files cannot be automatically deciphered by the service. This mapping information is stored in the services cache file.



Configuring FTP

To enable or disable PMCS2FTF's FTP functionality, check or uncheck the ***Enable FTP*** checkbox in the *FTP Configuration* section of the CTRADCFG.EXE dialog. If FTP is enabled, the corresponding textboxes will become active, allowing for user input. Enter the server's IP address or DNS in the ***Server*** field. Enter the entire upload path (starting at the root) in the ***Upload Path*** field. Enter the account login in the ***Username*** field, and the corresponding password in the ***Password*** field. FTP is disabled by default.

Editing Device Mapping

PMCS2FTF should be able to automatically determine most Comtrade file's circuit configuration and channel designations. However, in some cases a new device's Comtrade file will not supply sufficient information to allow the service, PMCS2FTF, to decipher the configuration. In these cases, the user must use CTRADCFG.EXE to manually select the circuit type and channel designations. CTRADCFG.EXE will then update the service's cache file and will cause all existing Comtrade files of that device to be immediately translated.

In order to edit a device's entry in PMCS2FTF's device cache file; first select the device from the ***Device Name*** list box. Use the checkbox below the ***Device Name*** list box to toggle whether or not all devices should be visible for editing, or just devices that the service has not been able to decipher. In the former case, undeciphered devices are marked with an '*', whereas deciphered devices have no such denotation.

Once a device has been selected, any information that PMCS2FTF has determined regarding the device is displayed in the fields and list boxes outside of the ***FTP Configuration*** box.

For a device to be considered valid it's circuit type (WYE, DELTA, etc.), nominal voltage, and at least one COMTRADE channel to one OPEN channel must be mapped.

The circuit type can be selected via the ***Circuit Type*** list box. Numeric circuit information such as nominal values and limit values can be entered in the appropriate textboxes ***Nominal Voltage***, ***Nominal Current***, ***Max Current*** and ***Min Power Factor***.

Mapping COMTRADE channels to OPEN channels can be accomplished using the two columns of list boxes on the dialog, labeled ***COMTRADE Channels*** and ***OPEN Channels***. Simply select the COMTRADE channel one wishes to map, and select the appropriate OPEN channel in the list box across from it. There must be a one-to-one correspondence in the mapping of COMTRADE to OPEN channels. CTRADCFG.EXE will alert the user if an entry has been omitted or if an illegal mapping has been entered.

When a device has been satisfactorily mapped, click the **[Commit]** button to update the device map in memory. If **[Commit]** is not clicked, and another device is selected for editing, the changes made to the previous device will not persist. When all devices have been satisfactorily edited and had their changes committed, click the **[Save]** button to save the changes to PMCS2FTF's device cache file. Click **[Exit]** to exit the application without saving the changes to the device's mapping in the service's cache file.

Appendix A: Technical Support

Start-up difficulties

Operating Difficulties

For additional technical support, please contact GE Industrial Systems. Please refer to the GE PMCS documentation for customer support contact information.

Start-up difficulties

If you are experiencing START-UP difficulties with WAVEFORM ANALYST please have the following available when calling technical support:

1. Type and speed of Computer (Ex: Dell or IBM or 'generic PC', Pentium II, Pentium III, or Cyrix, etc.) and the total number of CPU's (typically, only one).
2. The operating system you are using (Ex: Windows '98, Windows 2000 SP2, Windows ME) and any applicable 'service pack' that has been installed (service pack 2 is recommended for Windows 2000).
3. The total amount of RAM installed on the computer
4. The total amount of hard disk space, the file systems installed on each partition (Ex: FAT16, FAT32, NTFS) and the total amount of free space on all hard drives.
5. The type of network connections (if any) and whether you are using a domain or a workgroup (for Microsoft Networks).
6. Any 3rd party programs that run continuously (such as FAX monitoring software, or an internet client application such as ICQ), and any legacy or non-standard devices that still require entries in either 'CONFIG.SYS" or 'AUTOEXEC.BAT' to function.
7. A printout of AUTOEXEC.BAT and CONFIG.SYS (when applicable – see above)

NOTE: You can determine the current version and 'service pack' of a Windows operating system, as well as RAM and CPU information, by running 'Explorer' and clicking 'Help' 'About Windows' – the 'About' dialog box will display useful system information that can aid in troubleshooting problems installing and running Waveform Analyst. Disk space and partition information can be obtained by opening 'My Computer' and viewing the 'properties' dialog box for each disk drive on the computer.

Operating Difficulties

If you are experiencing difficulties in operating WAVEFORM ANALYST, please have the following available when calling technical support:

1. Configuration setup of Analyzer
2. Serial Number and Model Number of Analyzer
3. The circuit configuration of the device (Ex: WYE/DELTA)
4. The type of database that the O.P.E.N. data is stored in (Ex: MS Access '.mdb' file, SQL Server).
5. The name (and version) of the application that loads the data into the 'O.P.E.N.' database.

Glossary of Terms

Database

Dialog Box

Event

Waveform

ODBC Compliant Database

Pane

Site

Analysis

Node

Circuit

Database: A set of tables that stores information applicable to Waveform Analyst. The database format used by Waveform Analyst is called 'O.P.E.N.' and stores 'node' and 'equipment' configuration information, as well as time-based 'event' and 'waveform' information on a per-node basis.

Dialog Box: A view that enables user interaction. The Dialog box sends and receives information to the user via buttons, and controls.

Event: A measurement associated with a single date and time, that has a value, a *Measurement Parameter* (such as RMS VOLTS or AVERAGE CURRENT), a *Trigger Condition* (such as TIMED or NORMAL TO LOW), and optional values (such as min/max and duration).

Waveform: A cyclic measurement associated with a starting date and time that has multiple values, a *Measurement Category* (such as VOLTAGE or CURRENT), a *Trigger Condition* (such as TIMED or NORMAL TO LOW), a frequency, a cycle count, and a duration.

ODBC Compliant Database: A database that conforms to the ODBC standard.

Pane: Another word for a section of a window. Data is displayed in a pane which isolates that type of data. For more information on panes please see Three Pane Browser.

Site: A collection of Nodes associated with a specific circuit that includes the *Monitoring Device* as well as its *recording channels*. Where a *Measurement Point* is normally associated with the circuit being monitored, a *Site* is normally associated with the monitoring device itself.

Analysis: A power quality survey that is associated with a specific circuit, or a set of Nodes from one or more circuits.

Node: A unique identifier that is usually associated with waveform and event data being collected from a monitoring device. A node has *properties* that include its location, its relationship to other nodes, the type of equipment associated with it, and the type of data that is expected to be collected (if any).
Each piece of equipment in the O.P.E.N. database has a node associated with it. There is a node associated with the monitoring device itself, the circuit that the data is being collected for, and each phase of the circuit.

Circuit: Also called a ***Measurement Point***, a *circuit* refers to the points that the monitoring device is collecting data for, and the wiring configuration associated with it. Typically it will be a WYE or DELTA, with voltage and current data being collected from the individual phases.

GE Industrial Systems

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