

WAVEWIN

ANALYSIS HELP

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C H A P T E R 1

Fields & Features

This chapter describes all of the fields and features available in the software. They are listed alphabetically for your convenience.

ACTIVE TOPIC - HELP

Location: All child windows

Description: Display the active window's Help file.

Activation: *Direct:* F1
Menu: Alt-(H) Help, (T) Active Topic...
Ribbon, Button Bar: 

ADJUST FILES TIME

Location: Analysis

Description: The Adjust Files Time allows for adjusting the date and time of the open file. To open the Adjust File Time dialog select the Adjust Files Time option under the Data tab. You can specify to add or subtract a given date and/or time increment from the files current date and time. Enter the desired time increment for the year, month, day, hour, minutes, seconds and milliseconds. If there is no adjustment needed on a specific field enter 0.

Activation: *Menu:* Alt-(D) Data, (J) Adjust Files Time...



Ribbon, Data Tab:

Comments: To always have the file's date/time automatically adjusted when that specific driver is used to open a file check the Adjust Open Time check box. To show the file's original date and time click on the Restore Original button  Original under the Data tab.

See Also: [D&T](#)
[Start Date Field](#)
[Start Time Field](#)

ALIGN CHANNEL DATA

Location: Analysis

Description: The Align Channel Data option allows for aligning the channel data using the Thiran 3rd Order All-Pass Fractional filter. To open the Align Channel Data dialog select the Align option under the Channel tab. Enter the phase shift for each analog channel. If the filter does not apply to a specific analog channel, enter 0 or leave the field blank. Click the Run Thiran Filter to apply the filter.

Activation: *Menu:* Alt-(C) Channels, (T) Align Channel Data...

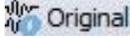
Ribbon, Channel Tab: 

Fields:

| | |
|----------------------|---|
| <i>Phase Shift:</i> | The phase shift angle for each analog channel. |
| <i>A0:</i> | The Thiran A0 coefficient for each analog channel. |
| <i>A1:</i> | The Thiran A1 coefficient for each analog channel. |
| <i>A2:</i> | The Thiran A2 coefficient for each analog channel. |
| <i>A3:</i> | The Thiran A3 coefficient for each analog channel. |
| <i>Always Apply:</i> | Always apply the filter when opening files for the active driver. |
| <i>Coefficients:</i> | Calculate coefficients at run or use the entered coefficients. |

Options:

| | |
|--------------------------------|--|
| <i>Calculate Coefficients:</i> | Calculate the Thiran coefficients for each analog channel. |
| <i>Run Thiran Filter:</i> | Run the Thiran filter. |
| <i>Esc/Cancel:</i> | Exit the dialog without executing the command. |

Comments: To always have the filter automatically applied when that specific driver is used to open a file check the Always Apply check box. To show the file's original values click on the Restore Original option under the Data tab .

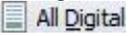
See Also: [Software Analog Channels](#)

ALL DIGITAL CHANNELS

Location: Analysis

Description: View all the digital channels in the file.

Activation:

| | |
|------------------------------|---|
| <i>Direct:</i> | F9 |
| <i>Menu:</i> | Alt-(V) View, (D) All Digital Channels |
| <i>Ribbon, Waveform Tab:</i> |  |

Comments: When a waveform file is displayed only the triggered digital channels are displayed. The All Digital Channels option toggles between showing all the digital channels and showing just the triggered channels. When the button is highlighted all digital channel are displayed, and when it is not highlighted just the triggered digital channels are displayed.

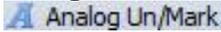
See Also: [Show All Digital Channels](#)
[Show Channel Information](#)

ANALOG MARK/UNMARK ALL

Location: Analysis

Description: Mark all analog channels if there are no analog channels marked otherwise unmark all the marked channels.

Activation:

| | |
|----------------------------------|---|
| <i>Menu:</i> | Alt-(C) Channels, (N) Analog Mark/Unmark All |
| <i>Ribbon Menu, Channel Tab:</i> |  |

Comments: The channels ID and titles are displayed in light red when marked. Press F8 to mark or unmark all the analog and digital channels.

ANALOG TABLE FONT SIZE

Location: File Manager

Description: Change the size of the font for the text displayed in the Analog Table.

Activation: *Menu:* Alt-(O) Options, (D) Display Dialog...



Ribbon, Options Tab:  , Data Plotting Tab

Fields: *Analog Table Font Size:* Change the size of the font in the Analysis Window's analog table.

Comments: Select the size of the font from the fields drop down list. The options are 8, 9, 10, 11, 12, 14 and 16.

See Also: [Analog Table View](#)

ANALOG TABLE VIEW

Location: Analysis

Description: Displays the channel titles, scale, units, and associated data values.

Comments: Use the  button or the shift-right/left arrow keys to scroll the columns in the table. This button is located to the right of the analog table headers. To show / hide the Analog table click on the Analog Table option under the Waveform tab,  [Analog Table](#).

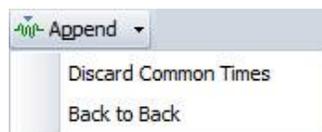
See Also: [Show Hide Channels](#)
[Data Bar](#)
[Reference Bar](#)
[Combined View](#)

APPEND OPEN FILES

Location: Analysis

Description: Combine a number of open files of the same type (the analog/digital channel titles must match) in time. All of the currently open waveform files will be appended into a new analysis window.

Activation: *Menu:* Alt-(F) Files, (F) Append Open Files, (D) Discarding Common times
Menu: Alt-(F) Files, (F) Append Open Files, (B) Back-to-Back



Ribbon, Waveform Tab:

Comments: The files must be of the same type (the analog/digital channel titles must match). The results in the new analysis window can be saved in a Comtrade file for archiving. If the files

have matching times then select the Discard Common Times option otherwise select the Back to Back option.

See Also: [Append Waveform Files](#)

AS STATUS FIELD

Location: Analysis (Status Bar)

Description: Displays the current state of the Auto Scale mode (ON, OFF, ++ or Units).

Comments: To toggle through the Auto Scaling options (ON, OFF, ++ or Units), press F6 or select the Auto Scale option from the Options tab. When auto scale is set to ON, the channel data is scaled to the maximum value allocated for display from the zero reference line. When auto scaling is set to the ++ state the signals are plotted using the maximum space allocated for display, ignoring the zero reference line. The highest value is plotted at the maximum position and the smallest value is plotted at the lowest position. This feature shows the full profile of frequency, Vdc and load channels. In OFF mode all channels are scaled according to maximum and minimum values in all of the analog channels. In Units mode all channels are scaled according to the maximum and minimum values for each group of channels with the same units.

See Also: [Auto Scaling](#)
[Increase Amplitude](#)
[Decrease Amplitude](#)
[Trace Scale Multiplier](#)

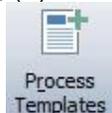
AUTO PROCESS TEMPLATES

Location: Analysis

Description: The Auto Process Templates dialog allows for automatically extracting key information out of waveform files located in the active file manager path and saving the extracted information to a comma separated ASCII file with a .DIG extension. The DIG file can then be imported into a database.

The template files to be processed contain script commands that will perform calculations on the voltage and current channels. For the calculations to work properly the analog channels must be in the right position. For this, line groups are created. The line groups ensure that the voltage channels (VA, VB, VC) are the first 3 channels displayed and the next 4 are the current channels (IA, IB, IC, IN). Line groups work for DFR and Relay files and are associated with Comtrade files. For more information on the line groups refer to the Auto Process Templates in the File Manager & Analysis Quick Start.

Activation: *Menu:* Alt-(O) Options, (P) Auto Process Templates



Ribbon, Options Tab:

Fields:

| | |
|--------------------|--|
| <i>Template 1:</i> | The path and filename of the first template to process. |
| <i>Template 2:</i> | The path and filename of the second template to process. |
| <i>Template 3:</i> | The path and filename of the third template to process. |
| <i>Template 4:</i> | The path and filename of the fourth template to process. |
| <i>Template 5:</i> | The path and filename of the fifth template to process. |

Report Path: The path where the final report is saved.

Process Files: The type of files to process. When a file is processed the system will add ,WWD to the end of the file to indicate the file has been processed. Select process New Files or All Files.

Process only the marked File in the Active Path: Process only the marked file in the file manager's active path.

Include All Sub-Folders: Process all files included in the sub-folders under the file manager's active path.

Options: **Run:** Start the processing of the defined templates.
Cancel: Exit the dialog without executing the command.

Comments: Once the line groups are defined then template files can be built to extract key information from the files.

Available Template Commands:

Window Commands

| | |
|--------------|--|
| <Station> | Writes the full Station name. |
| <Station:12> | Writes the first 12 characters of the Station name. |
| <Device> | Writes the full Device name. |
| <Device:6> | Writes the first 6 characters of the Device name. |
| <Date:F> | Writes the Date at the data bar in the following format mm/dd/yyyy. |
| <Time:F> | Writes the Time at the data bar in the following format hh:mm:ss.zzzzzz. |
| <Date:U> | Writes the Date at the data bar in the following format yyyymmdd. |
| <Time:U> | Writes the Time at the data bar in the following format hhmmsszzz. |
| <Cycles> | Writes the number of Cycles between the data bar and the reference bar. |
| <DeltaX> | Writes the time difference between the data bar and the reference bar. |
| <Line> | Writes the active Line name. |
| <Remote> | If a Line is selected then it writes the Remote Feeder Name as defined in the Line Group as REMOTENAME=. |
| <Rdme> | If a Line is selected then it writes the Remote Station Name as defined in the Line Group as REMOTEDME=. |
| <Filename> | Writes the Filename displayed in the data plotting window. |
| <Triggers> | Writes the number of triggers for the script commands. |
| <Cktnum> | If a Line is selected then it writes the Circuit Name as defined in the Line Group as CKTNUM=. |
| <Tobus> | If a Line is selected then it writes the To Bus Name as defined in the Line Group as TOBUS=. |
| <Frombus> | If a Line is selected then it writes the From Bus Name as defined in the Line Group as FROMBUS=. |

Analog Commands

| | |
|---------|---|
| <> | Write the analog data at the data bar, |
| [] | Write the analog data at the reference bar, |
| Number | Writes the visible analog column data at the date bar separated by commas for specified Channel number. |
| ^Number | Writes the visible analog column data separated by commas for the Channel in position 1. |
| :R | Writes the RMS value. |
| :T | Writes the Channel Title. |
| :U | Writes the Channel Unit. |
| :P | Writes the Phase value. |
| :I | Writes the Instantaneous value. |

| | |
|--------------------------------------|---|
| :F | Writes the DFT magnitude for the specified Harmonic. For example, ^6:F0 writes the DFT Magnitude of the DC Offset for channel 6 and ^6:F2 writes the DFT Magnitude of the 2 nd Harmonic for channel 6. |
| :D | Writes the Duration of the Fault. |
| :% | Write the Percentage of Nominal from the Prefault bar to the Fault bar. |
| :%v | Measures voltage sag immunity. |
| :Number | Specifies the width of the analog data values. Will only be applied if the defined width is greater than the length of the data values. Spaces are padded to the beginning of the written values. This is used to right justify values. |
| :S | The skew of the 3 analog channels using the angles. The S command is used with 3 analog channels <1,2,3:S>. This command adds the 3 angles at the cursor. One of the channels must be marked as a reference channel. |
| :B | The Unbalanced Value for 3 Channels. The B command is used with 3 analog channels <1,2,3:B>. This command finds the highest and lowest DFT magnitude of the 3 channels. The result is the highest – lowest. |
| :N | The Negative Sequence for 3 Channels. The N command is used with 3 analog channels <^1,^2,^3:N>. This command computes the negative sequence for the 3 current or voltage channels is position 1, 2 and 3 on the screen. The magnitude for the negative sequence result is displayed. |
| :M | The M command is used for an entire channel. It calculates the maximum value of the channel minus the minimum value of the channel divided by 2 ((max-min)/2), <^1:M>. Since the command is not sample based both types of brackets can be used (<>,[]). |
| :SG100 :BL50 :NG5000 :ML700 | The letter G or L followed by a number after the :S, :B, :M or :N defines a trigger. The letter G stands for greater than and L is less than. If the result is true than Alarm is displayed else Normal is displayed. |

When a carat ^ is specified before the channel number it indicates the channel position in the display.

The < > characters saves the analog data at the data bar and the [] characters saves the analog data at the reference bar. To open the Auto Process Template dialog select the Process Templates icon under the Options tab.

The dialog allows for 5 templates to be processed at one time. Enter or select the template files in the template fields. Enter or select the report path where the report files are saved. Select the type of files to process. The All Files option will process all the files in the active path and included sub folder if the option is specified. After a file is processed a WWD is added to the last field in the long filename. This tags the file as processed. To only process new files select the New Files option.

If files are marked in the active path the Process Only Marked Files check box will be enabled. Click this option to process only the marked files. To include all the sub folders under the active path, click the Include Sub Folder check box.

To start the process, click the Run button. When the Run button is activated the fields in the dialog will be saved and the dialog will be closed. Each specified file will be opened in the analysis window, the Mark and Save window will be opened and each line group will be selected in the file. The template fields will be processed for each line group and saved to the appropriate report file. The report files are saved to the specified report path and each report file will have the same name as the template file with a .DIG extension.

To view the report files navigate to the report path and double click on the .DIG files. The report will be displayed in a table format. To plot the file with the specified line group double click on the desired row.

Restrictions: The processed files must be a supported oscillography file.

See Also: [Associating File Types](#)
[IEEE Long File Naming Format](#)
[Save As Comtrade](#)

AUTO SCALING

Location: Analysis

Description: Changes the state of amplitude auto scaling to On, Off, ++ or Units for all the visible analog channels.

Activation: *Direct:* F6 
Menu: Alt-(D) Data, (A) Auto Scale, (F) Off, (O) On, (P) Plus and (U) Units



Ribbon, Data Tab:

Comments: The AS field displayed in the status bar indicates the auto scale's current mode, ON, OFF, ++ or Units. When auto scale is set to ON, the channel data is scaled to the maximum value allocated for display from the zero reference line. When auto scale is set to ++ mode the signals are plotted using the maximum and minimum values allocated for display, ignoring the zero reference line. The highest value is plotted at the maximum position and the smallest value is plotted at the lowest position. This feature shows the full profile of frequency, Vdc and load channels. In OFF mode scale all channels according to maximum and minimum values in all of the analog channels. In Units mode all channels are scaled according to the maximum and minimum values for each group of channels with the same units.

See Also: [Increase Amplitude](#)
[Decrease Amplitude](#)
[AS Status Field](#)
[Trace Scale Multiplier](#)

AUTO SET DATA BAR

Location: Analysis

Description: Defines where the data bar is positioned when the file is first opened. The data bar is the solid black line. If the auto set data bar is turned on the data bar is positioned 2 cycles from the trigger position. If it is off the data bar is positioned one cycle from the first sample.

Activation: *Menu:* Alt-(V) View, (U) Auto Set Data Bar
Ribbon, Waveform Tab:  Set Data Bar

Comments: The auto set data bar is an on/off feature. The ribbon option is highlighted when on and the data bar is positioned 2 cycles from the trigger position. When off, the ribbon option is not highlighted, and the data bar is positioned one cycle from the first sample.

See Also: [Data Bar](#)

CHANGE ANALOG COLORS

Location: Analysis

Description: Change the analog channel colors.

Activation: *Popup Menu:* Opposite Click on the Channel ID number

Comments: To change the color of an analog channel opposite click on the channel ID number and select the color listed in the popup menu or select the More Colors option to select a color from the palette.

See Also: [Clear Analog Colors](#)
[Window Properties](#)

CHANGE FREQUENCY

Location: Analysis

Description: Change the current sampling frequency of the active file.

Activation: *Menu:* Alt-(D) Data, (F) Change Sampling Frequency...
Ribbon, Data Tab:  Sampling

Fields:

| | |
|--|---|
| <i>Current Sampling Frequency:</i> | The current sampling frequency. |
| <i>Enter the New Sampling Frequency:</i> | The new sampling frequency. |
| <i>Open Frequency:</i> | Sets the driver to open with the new frequency. |

Options:

| | |
|--------------------|---|
| <i>Enter/Ok:</i> | Exit the dialog and change the frequency.. |
| <i>Esc/Cancel:</i> | Exits the dialog without executing the command. |

Comments: The Open Frequency field will set the current display driver to always convert the files to the new frequency before displaying.

See Also: [Restore Original](#)

CHANNEL BACKGROUND COLOR

Location: Analysis

Description: Change the background colors for the analysis window. The background colors fields are listed in the Window Properties dialog under the Colors tab.

Activation: *Menu:* Alt-(F) Files, (T) Window Properties..., Color's Tab



Ribbon, Waveform Tab: **Properties**

See Also: [Window Properties](#)

CHANNEL INFORMATION (OPEN/CLOSE)

Location: Analysis

Description: Show or hide the channel information table displayed to the right of the analog and digital traces.

Activation: *Direct:* Analog table close button , Mouse Position the mouse over the table separators and drag left or right to close or open
Menu: Alt-(V) View, (C) Channel Information
Ribbon, Waveform Tab:  **Analog Table**

Comments: The channel information frame can be resized by selecting the vertical separator bars and dragging them to the right or left. The cursor changes to the vertical resize cursor when the mouse is positioned over the separator bars.

See Also: [Analog Table View](#)
[Combined View](#)
[Window Properties](#)

CLEAR ANALOG COLORS

Location: Analysis

Description: Set the analog channel colors to the default color, black.

Activation: *Menu:* Alt-(C) Channels, (C) Clear Analog Colors



Ribbon, Channels Tab: **Clear Analog Colors**

Comments: To change the color of an analog channel opposite click on the channel ID number.

See Also: [Change Analog Channel Colors](#)
[Window Properties](#)

CLEAR MARKS

Location: Analysis

Description: Clear all the Marked Scans in the active window.

Activation: *Menu:* Alt-(A) Values, (C) Clear Marked Scans

Ribbon, Channels Tab:  **Clear Marks**

Comments: Marked scans have a red upside down T above each marked scan. Scans are marked either in the Mark and Save dialog or by clicking on the Mark Scan option under the Waveform tab. Each marked scan can have a comment associated with the scan. When the cursor is placed over the scan the comment is displayed in a hint window. To add a comment to a scan use the Edit Marks option under Waveform tab.

See Also: [Edit Marks](#)
[Mark & Save](#)
[Mark Scan](#)
[Next Marked Scan](#)

COMBINED VIEW

Location: Analysis

Description: Display all the selected information contained in the analog table in a condensed form.

Activation: *Direct:* F4
Menu: Alt-(V) View, (A) Analog Combined View
Ribbon, Waveform Tab:  Combined View

Comments: Use the F4 key to toggle between the tabular view and the combination view. The combination view is only available if there is enough space between the analog channels to display three lines of text. To change the position of the data values select the Window Properties option under the Files tab, then click on the Analog Combination tab.

See Also: [Analog Table View](#)
[Show Channel Information](#)
[Windows Properties](#)

COMPLEX CALCULATOR

Location: File manager and Analysis

Description: The complex calculator is used to perform complex mathematical operations. Operations can be performed in Polar or Rectangular form..

Activation: *Menu:* File Manager: Alt-(O) Options, (O) Complex Calculator
Menu: Analysis: Alt-(D) Data, (X) Complex Calculator
Ribbon, Files Tab: File Manager:  Complex
Ribbon, Data Tab: Analysis:

Fields: *Magnitude:* Magnitude Value.
Angle: Angle Value.
Memory I: Saved magnitude or real value [1..4].
Memory II: Saved angle or imaginary value [1..4].
Type: The type of values stored in the memory location, Polar or Rectangular.

Options: *Recall:* Recall the selected memory location to the calculate fields.
Clear All: Clear all fields.
Close: Close the dialog.

Comments: The calculator operates as an HP calculator. After each entry click the Enter button to record the values in the Accumulator.

CONDENSE TIME

Location: Analysis**Description:** Condense the time scale for all visible channels.**Activation:** *Direct:* Ctrl-Page Down or the Condense menu button *Menu:* Alt-(D) Data, (C) Condense Time*Ribbon, Data Tab:*  Condense**See Also:** [Expand Time](#)**CYCLE HOP**

Location: Analysis**Description:** Move the data bar (vertical black solid line) one cycle forward or backward in time for the first displayed channel or the first marked channel.**Activation:** *Direct:* Shift-Ctrl-Left arrow and Shift-Ctrl-Right arrow**Comments:** Use the shift+ctrl left/right keys to move one cycle in time for the first displayed channel or the first marked channel. The number of cycles from the data bar to the reference bar is displayed in the Delta X status bar.**See Also:** [Data Bar](#)
[Peak Hop](#)
[Reference Bar](#)**D&T**

Location: Analysis (Status Field)**Description:** Displays the data and time of the sample at the data bar.**See Also:** [Delta X Field](#)**DATA BAR**

Location: Analysis**Description:** Displays the channel's instantaneous sample value. The data bar is the solid black line that runs vertically across the analog and digital channels.**Comments:** The data bar is used to view channel information (such as analog sample values, RMS values, digital information, data and time...). The information is displayed in the analog channel table and in the status bar. The Ctrl-Left/Right keys moves the data bar peak to peak and the Shift-Ctrl-Left/Right keys moves the data bar one cycle in time. When a file is first open the data bar is positioned one cycle from the first sample. To have the data bar positioned 2 cycles from the fault position click on the Set Data Bar option under the Waveform tab. The Set Data Bar option is highlighted when active.**See Also:** [Auto Set Data Bar](#)

[Cycle Hop](#)
[Fault Bar](#)
[Fault Bar](#)
[Peak Hop](#)
[Reference bar](#)
[RMS bar](#)

DECREASE AMPLITUDE

Location: Analysis

Description: Decrease the amplitude of all or marked analog channels.

Activation: *Direct:* Ctrl-Down Arrow or the AmpDn menu button 

Menu: Alt-(D) Data, (D) Decrease Amplitude

Ribbon, Data Tab:  Decrease

Comments: When the channels' amplitude is decreased the Scale column in the analog table is updated with the new scale. The Trace Scale Multiplier field inside the properties dialog determines the amount the signal is increased or decreased. To change the Trace Scale Multiplier field, select the Window Properties option under the Waveform tab then select the Display Settings tab.

See Also: [Increase Amplitude](#)
[Trace Scale Multiplier](#)

DELTA X

Location: Analysis (Status Field)

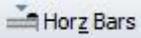
Description: Displays the time in microseconds, milliseconds, or seconds between the RMS bar and the data bar. The number of cycles is also displayed if the samples in the file are microseconds or milliseconds apart.

See Also: [D&T Field](#)
[Data Bar](#)
[RMS bar](#)

DELTA Y

Location: Analysis (Status Field)

Description: Displays the difference between the data horizontal bar and the reference horizontal bar.

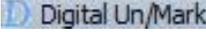
Comments: To activate the horizontal data bars select the  Horz Bars option under the Waveform tab.

See Also: [Delta X](#)

DIGITAL MARK/UNMARK ALL

Location: Analysis

Description: Mark all digital channels. If there are no digital channels marked then unmark all the marked digital channels.

Activation: *Direct:* F8
Menu: Alt-(C) Channel, (I) Digital Mark/UnMark All
Ribbon, Channels Tab: 

Comments: The channels ID and titles are displayed in red when marked. Press F8 to mark or unmark all the analog and digital channels.

See Also: [Analog Mark/Unmark All](#)

DISPLAY DIALOG

Location: All Tables

Description: Reposition the columns in the table.

Activation: *Menu:* Alt-(O) Options, (I) Display...



Ribbon, Options Tab:

| | |
|----------------|---|
| Fields: | <p><i>File Column List:</i> A list of all the columns in the table. Use the Move Up and Move Down Buttons to rearrange the columns. Use the checked boxes to show/hide the analog columns.</p> <p><i>Table Font Size:</i> A list of the font sizes for the table. Select the Font size from the drop down list.</p> <p><i>File Marking:</i> A list of the 2 types of marking for files in the file manager.</p> <p><i>Default Path:</i> The path the file manager is opened with when first displayed.</p> <p><i>Open View:</i> Open the first view in the line group file when opening a new analysis window. This will only work if a line group is associated with the file.</p> <p><i>Analog Table Font Size:</i> Select the desired font from the drop down list.</p> <p><i>Digital Toggled Channels:</i> Only display the toggled digital channels when opening files.</p> <p><i>Open Files w/Primary Values</i> If the files values are in secondary quantities and the ratio values are defined in the file then convert the secondary quantities to primary values.</p> <p><i>Batch Files:</i> When processing batch template files process all the files or just the new files. Processed files have a WWD added to the end of the file name.</p> <p><i>Versioning:</i> If a file has a line group create a version of the line group with the same name as the file's name with a .LGP extension.</p> <p><i>Duration Calculation:</i> There are two calculations used when determining the fault duration and sag duration of a channel. This section allows for modifying these calculations. When a file is open an RMS value is calculated at each sample using a running RMS equation. After the first full cycle the duration equations are run on each sample using the RMS values.</p> <p><i>Append ComName Files:</i> Append all like ComNames files within the selected time frame.</p> |
|----------------|---|

Help Files: Select to display the help files in PDF format or ASCII text.

Options:

- Move Up:* File Columns Tab. Move the highlighted column up one position.
- Move Down:* File Columns Tab. Move the highlighted column down one position.
- Reset:* File Columns Tab. Default the order of the columns to how they were when the software was first installed.
- Short Cuts:* Displays the Short Cuts keys dialog.
- OK:* Change the order of the columns and redraw the device table and save all modified settings.
- Cancel:* Exit the dialog without saving the settings.

Comments: To resize the table columns place the mouse over the column separator and drag the mouse to the left or the right or double click on the column separator to expand to the maximum area for that column.

See Also: [Resize Columns](#)

DOUBLE ENDED FAULT LOCATION

Location: Analysis

Description: Display the double ended fault location dialog. The double ended fault location dialog calculates the percent of line from the near end to the far end. A graphical display of the near end and far end is displayed above the Line Data box.



Activation: *Menu:* Alt-(D) Data, (U) Fault Calculators, (D) Double Ended...



Ribbon, Data Tab:

Fields:

- Z2:** Magnitude and angle of Z2.
-  Change the Z2 fields from secondary values to primary values or from primary to secondary.
- LL:** Length of the line and the units for the line length (% , Miles, Km).
- Neg Seq:** Select the type of double ended calculation to use (Negative, Positive or Zero Sequence).
- Pos Seq:** Select the type of double ended calculation to use (Negative, Positive or Zero Sequence).
- Zero Seq:** Select the type of double ended calculation to use (Negative, Positive or Zero Sequence).
- nsAng:** Display the angle for the near side DE calculation.
- fsAng:** Display the angle for the far side DE calculation.
- Z2VF:** Voltage Fault Resistance magnitude and angle.
- Z2IF:** Current Fault Resistance magnitude and angle.
- Z2RF:** Residual Fault Resistance magnitude and angle.
- Chan:** Select the channel numbers for VA, VB, VC, IA, IB and IC.
- VA:** Magnitude and Angle of Channel VA from the Near and Far End.
- VB:** Magnitude and Angle of Channel VB from the Near and Far End.
- VC:** Magnitude and Angle of Channel VC from the Near and Far End.
- IA:** Magnitude and Angle of Channel IA from the Near and Far End.

IB: Magnitude and Angle of Channel IB from the Near and Far End.
IC: Magnitude and Angle of Channel IC from the Near and Far End.
V0: Zero Sequence Voltage Magnitude and Angle.
V1: Positive Sequence Voltage Magnitude and Angle.
V2: Negative Sequence Voltage Magnitude and Angle.
I0: Zero Sequence Current Magnitude and Angle.
I1: Positive Sequence Current Magnitude and Angle.
I2: Negative Sequence Current Magnitude and Angle.
Values: Select the type of values for the calculation.
Angle Rotation: Increment the voltage and current angles for the near and far end.
Vectors: Select the vectors to display.

Options:

- Refresh:* Refresh VA, VB, VC, IA, IB and IC from the data bar locations.
- Calculate:* Calculate the fault location % of line.
- Plot:* Plot the double ended fault location in the data plotting window.
- Report* Display a textual report of the double ended fault location.
- Close:* Close the dialog.
- Show Details:* Open the dialog to show the sequence components.

Composite Doubles the Z2 magnitude and line length.

 Displays the near end and far end line impedance value in an information window. If the magnitude and angles are different between the near end and far end then a red ! will be displayed next to the button.

 Turns auto scale on or off for displayed vectors.

 Increase the displayed vectors.

 Decrease the displayed vectors.

Rotate: Increment the voltage and current angles for the near and far end.

Comments: The double ended calculator requires two open fault records (near and far ends). The near end is the top left window displayed. To reorganize the windows use the Tile buttons.

The channels in each record must be organized as follows: The first 3 visible channels are the Voltage channels, VA, VB and VC. The next 3 visible channels are the Current channels, IA, IB and IC. To reposition the analog channels first mark the channels then use the plus key to move the channels up one position and the minus key to move the channels down one position or drag them to the desired location. To change the order of the channels in the dialog, click on the Show Details button then select the channel numbers from the Chan drop down lists.

The values populated in the dialog are read at the data bar positions from both open records. The double ended dialog is a stay on top window. This allows for repositioning the data bars without closing the dialog. To refresh the Voltage and Current values in the dialog use the Refresh button

To plot the fault location in the data plotting window as a new channel, click on the drop down arrow in the plot button. The two options available are plot the fault location between bars or plot the fault location for the entire record. The default option of the plot button is plot between bars. Between bars plots the fault location between the data bar and the reference bar.

See Also: [Single Ended Fault Location](#)

DRAG DROP CHANNELS

Location: Analysis

Description: Drag marked analog channels to a specific location.

Activation: *Direct:* Mark and Drag

Comments: To drag analog channels first mark the channels. Channels can be marked using the mouse or the space bar. Drag the channels to the desired location.

See Also: [Shift Marks Up](#)
[Shift Marks Down](#)
[Reorder Channels](#)

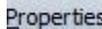
DRIVER DATA TYPE

Location: Analysis

Description: Set the active display driver's data type, RMS or PEAK.

Activation: *Direct:* Window Properties menu button 
Menu: Alt-(F) File, (T) Window Properties, Driver Data Type Tab



Ribbon, Waveform Tab:  Properties, Driver Data Type Tab

Comments: The data stored in the displayed file can be peak values or RMS values. The default setting for all drivers is peak values. If the display device saves the sample values as RMS calibrated then select the RMS Type from the drop down list. If the data values are RMS and the data type is not set to RMS type then the analog column data will be displayed incorrectly. To always have the files displayed as RMS values when the files are opened then open the Driver Configuration dialog in the File Manager and set that drivers data type field to RMS Calibrated. The Driver Configuration dialog is located in the File Manager's Options tab.

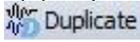
See Also: [Data Bar](#)

DUPLICATE CYCLES

Location: Analysis

Description: Duplicate the cycle between the Data bar and the RMS bar.

Activation: *Menu:* Alt-(D) Data, (L) Duplicate Cycles...

Ribbon, Data Tab:  Duplicate

Fields: # Cycles: Enter the number of times to duplicate the highlighted cycle(s).

Options: *Enter/Ok:* Duplicate the highlighted cycle(s).
Esc/Cancel: Exit the dialog without executing the command.

Comments: This feature is useful for creating test set files or for creating files to play back into simulation or modeling applications.

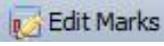
See Also: [Truncate Cycles](#)

EDIT MARKS

Location: Analysis

Description: Associate a comment with each marked scan in the active window.

Activation: *Menu:* Alt-(A) Values, (E) Edit Marked Scans

Ribbon, Channels Tab: 

Comments: The edit marked scans dialog lists all the marked scans in a table. The first column lists the sample number where the scan is marked. The second column lists the date and time of the scan. And the third column lists the comment associated with the scan. To add a comment double click in the comment section for the scan. Marked scans have a red upside down T above each marked scan. Scans are marked either in the Mark and Save dialog or by clicking on the Mark Scan option under the Waveform tab. When the cursor is placed over the scan the comment is displayed in a hint window.

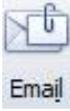
See Also: [Clear Marks](#)
[Mark & Save](#)
[Mark Scan](#)
[Next Marked Scan](#)

EMAIL FILES

Location: File Manager and Analysis

Description: Email a group of files or a single file using the users default email application. All support files needed to display the selected files will be automatically attached. Support files include Comtrade configuration (*.CFG), header (*.HDR) & information (*.INF) files, DFR's analog and digital information files such as: Hathaway DAU files, Rochester preamble and header files, Faxtrax/Director CTL files, Transcan SCF and TCF files.

Activation: *Menu:* File Manager: Alt-(F) Files, (L) Email Marked Files – Analysis: Alt-(F) File, (E) Email

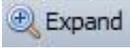
Ribbon: File Manager: Files Tab  , Analysis: Waveform Tab 

Fields:

| | |
|--------------------|--|
| <i>To:</i> | Recipient of the email, initially empty. |
| <i>From:</i> | Sender, automatically defaulted. |
| <i>Subject:</i> | Empty. |
| <i>Attachment:</i> | All selected files and their support files automatically attached. |

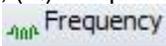
Comments: Files can be emailed either in the file table or in the analysis window. To email a set of files, mark the desired files in the file table and select the Email option under the Files tab or right click on the file table and select the Email  Email option from the pop-up menu. To email a file from the analysis window select the Email option under the Waveform tab. All support files needed to display the file(s) are automatically attached.

EXPAND TIME

Location: Analysis**Description:** Expand the time scale of all visible analog channels.**Activation:** *Direct:* Ctrl-Page Up or the Expand menu button *Menu:* Alt-(D) Data, (E) Expand Time*Ribbon, Data Tab:* **See Also:** [Condense Time](#)**FAULT BAR**

Location: Analysis**Description:** The Fault bar is the red dotted line that runs vertically across the analog and digital channels.**Comments:** The fault bar is fixed and positioned at the fault time defined in the file. The fault bar can be shown or hidden by selecting Yes or No for the Show Vertical Fault Bar field in the properties dialog under the Display Settings tab.**See Also:** [Data bar](#)
[RMS Bar](#)
[Reference Bar](#)**FAULT REFERENCE TIME BAR**

Location: Analysis**Description:** Displays the time difference from the fault time defined in the displayed file. The units are displayed in the Delta X status field.**Comments:** The fault reference time bar is displayed between the analog channels and the digital channels. To show or hide the fault reference time bar open the Window Properties  dialog under the Waveform tab. Click the Display Settings tab and toggle the Show Reference Time Bar field.**See Also:** [Fault Bar](#)**FREQUENCY CALCULATOR**

Location: Analysis**Description:** The frequency calculator is used to measure the frequency between the reference bar and the data bar. The calculator is displayed in the upper right corner of the data plotting window.**Activation:** *Menu:* Alt-(D) Data, (Q) Frequency Calculator...*Ribbon, Data Tab:* 

Fields:

| | |
|-------------------|---|
| <i>Cycles:</i> | Enter the number of cycles between the data bar and the reference bar. |
| <i>Delta X:</i> | Delta X is automatically populated from the Delta X status bar field in the data plotting window. |
| <i>Frequency:</i> | Displays the frequency calculated between the reference bar and data bar. |

Options:

| | |
|-------------------------|--------------------------|
| <i>Enter/Calculate:</i> | Calculate the Frequency. |
| <i>Esc/Close:</i> | Close the dialog. |

Comments: The frequency dialog is a stay on top dialog allowing for the data bar to be moved in the data window while the dialog is open. When using the cursor keys to move the data bar make sure the data window is the active window. The Delta X values will be automatically updated when the data bar is moved in the data plotting window. Enter the number of cycles between the reference bar and data bar then click the Calculate button to show the frequency value. The number of cycles is displayed in the status bar in the Delta X section.

See Also: [Software Analog Channels](#)

Fs

Location: Analysis (Status Field)

Description: Displays the sampling frequency of the sample at the data bar.

See Also: [Data Bar](#)

FST

Location: Waveform Summary (Events/Sensors Activity Summary)

Description: Displays the status of the first digital samples in the file. Fst is the first column in the Events/Sensors Activity Summary. A=Alarm, N=Normal.

Comments: This data is also displayed in the second column of the digital information table view.

See Also: [Waveform Summary](#)

FST-CHANGE

Location: Waveform Summary (Events/Sensors Activity Summary)

Description: Displays the date and time the channel first changed state. Fst-Change is the third column in the Events/Sensors Activity Summary.

Comments: This data is also displayed in the fourth column of the digital information table view.

See Also: [Waveform Summary](#)

GROUP MARKED ANALOG CHANNELS

Location: Analysis

Description: Group all the marked analog channels and move them to the top of the display area.

Activation: *Menu:* Alt-(C) Channels, (G) Group Marked Analog Channels

Ribbon, Channels Tab:  Group Marks

See Also: [Mark/Unmark Channels](#)

HARMONICS ANALYSIS REPORT

Location: Analysis

Description: The harmonic analysis report runs the harmonic calculation on each channel from harmonics 0 (dc-offset) to the maximum harmonic (samples per cycle/2).

Activation: *Menu:* Alt-(D) Data, (H) Harmonic Analysis Report...

Ribbon, Data Tab:  Harm Analysis

Fields:

| | |
|-----------------------------------|---|
| <i>Report Harmonics Above:</i> | Report all Harmonics above a specified % above the fundamental. |
| <i>Ignore DFT Currents Below:</i> | Ignore current values below the enter value. |
| <i>Ignore DFT Voltages Below:</i> | Ignore voltage values below the enter value. |

Options:

| | |
|--------------------------|--|
| <i>Enter/Run Report:</i> | Exit the dialog and run the harmonics report. |
| <i>Esc/Cancel:</i> | Exit the dialog without executing the command. |

Comments: The final report is an ASCII text file. The top section list the summary information for the file. The analysis report is in a table format and lists the following columns:

- Harmonic number,
- Date and Time the harmonic was first detected,
- Sample number the harmonic first detected,
- Magnitude at the Sample number (DFTPeak),
- Fundamental,
- Percentage of the fundamental,
- Duration how long the harmonics was detected.

See Also: [Harmonics Table](#)

HARMONICS TABLE

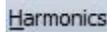
Location: Analysis

Description: View the harmonics table.

Activation: *Direct:* F11, Opposite click on phasor diagram or information header

Menu: Alt-(V) View, (T) Harmonics Table



Ribbon, Waveform Tab:  Harmonics

Comments: The harmonics table displays the number of harmonics according to the file's sampling frequency with a maximum of 512 harmonics supported. The table displays one channel at a time. It will display the first marked analog channel, or if no channels are marked then the

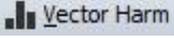
first visible channel. The harmonic calculation runs from the RMS bar to the data bar. The display values include DFT Peak, DFT RMS, DFT Angles, % of fundamental and % of TrueRMS. When the data bar is moved in the data plotting window the harmonics values will be automatically updated. To view the harmonics in a histogram click on the harmonics toggle  button located next to the channel name.

See Also: [Harmonics Analysis Report](#)
[Harmonics Vectors](#)
[Histogram](#)

HARMONIC VECTORS

Location: Analysis

Description: View the harmonics vectors in the phasor diagram.

Activation: *Menu:* Alt-(V) View, (H) Vector Harmonics
Ribbon, Waveform Tab: 

Comments: The harmonics of the first marked analog channel, or if no channels are marked then the first visible analog channel, is displayed in a vector format in the phasor diagram. The harmonic calculation is performed on one cycle of data. It starts at the RMS bar and goes forward one cycle. To hide/show the harmonic vectors toggle the Vector Harm option under the Waveform tab from ON=highlighted to OFF=not highlighted.

See Also: [Harmonics Analysis Report](#)
[Harmonics Table](#)
[Histogram](#)

HELP

Location: All Child Windows.

Description: Displays the help file for the active child window.

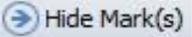
Activation: *Direct:* F1
Menu: Alt-(H) Help, (T) Active Topic...
System Tool bar: 

Comments: The help file is a PDF document with search capabilities.

HIDE MARK(S)

Location: Analysis

Description: Hide all the marked analog channels and re-space the unmarked channels.

Activation: *Direct:* Delete
Menu: Alt-(C) Channels, (H) Hide Mark(s)
Ribbon, Channels Tab: 

Comments: To mark/unmark an analog channel, click the channel ID number or the channel table data or use the spacebar. Press Esc key to restore the hidden channels or click on the Restore Mark(s) option under the Channels tab.

See Also: [View Mark\(s\)](#)
[Show All Hidden](#)
[Restore Mark\(s\)](#)

HISTOGRAM

Location: Analysis

Description: View the harmonics histogram.

Activation: *Direct:* F11, Opposite click on phasor diagram or information header
Menu: Alt-(V) View, (T) Harmonics Table



Ribbon, Waveform Tab:

Harmonics

Comments: The histogram displays the number of harmonics according to the file's sampling frequency with a maximum of 512 harmonics supported. The histogram displays one channel at a time. It will display the first marked analog channel, or if no channels are marked then the first visible channel. The harmonic calculation starts at the RMS bar and runs to the data bar. The display values can be DFT Peak, DFT RMS, DFT Angles, % of fundamental and % of TrueRMS. The default view is % of fundamental. To change the data displayed click on



the drop down menu button and select from the list. When the data bar is moved in the data plotting window the harmonics values will be automatically updated. To view the harmonics in a table click on the harmonics toggle  button located next to the channel name.

See Also: [Harmonics Analysis Report](#)
[Harmonics Table](#)
[Harmonics Vectors](#)

HORIZONTAL BARS

Location: Analysis

Description: Displays a solid black horizontal line that follows the data bar and display a dotted blue horizontal line that follows the reference bar.

Activation: *Menu:* Alt-(V) View, (B) Horizontal Bars

Ribbon, Waveform Tab:  Horz Bars

Comments: The bars will be positioned at the first marked analog channel (displayed in red). If no channels are marked then they are positioned at the first displayed channel. The Delta Y field in the status bar shows the difference between the two bars. The black line follows the data bar and the blue bar follows the reference bar.

See Also: [RMS bar](#)
[Data Bar](#)

[Reference Bar](#)**IEEE LONG FILE NAMING FORMAT**

Location: IEEE Long File Name**Description:** The File Manager supports the IEEE long file naming format. The IEEE long file naming format is a PSRC format used to name time sequenced data files. The file table columns are used to display the contents of the long file name. The file name contains the six required fields stored in a comma-delimited fashion. The remaining fields are optional. The file table lists four optional columns at the end of the table to support user defined fields. The ComNames properties dialog allows for user input for the first two optional fields.

Fields:

Date: The Date field defines the start date of the file. The date fields are defined as the first two characters are the year, the next two are the month and the last two are the day. (required)

Time: The time field defines the start time of the file. The Time fields are defined as the first two characters are the hour, the next two are the minutes, the next two are the seconds and the last two or three are the milliseconds. (required)

Tcode: The TCode field is the time offset from GMT time. If the start time is expressed in UT, this field is coded 0z, Note: GMT is the international abbreviation Greenwich Mean Time. (required) .

Substation: The substation name or code where the originating device is located. (required)

Device: The device name or code that generated the file. (required)

Company: The company of the specified substation. (required)

See Also: [ComName\(s\) Properties](#)
[ComName Rename](#)**INCREASE AMPLITUDE**

Location: Analysis**Description:** Increase the amplitude of all or marked analog channels.

Activation: *Direct:* Ctrl-Up arrow or the AmpUp menu button 

Menu: Alt-(D) Data, (I) Increase Amplitude

Ribbon, Data Tab:  Increase

Comments: When the channels' amplitude is increased the Scale column in the analog table is updated with the new scale. The Trace Scale Multiplier field inside the properties dialog determines the amount the signal is increased or decreased. To change the Trace Scale Multiplier field, select the Properties option under the Waveform tab then select the Display Settings tab.**See Also:** [Decrease Amplitude](#)**INSTPEAK COLUMN**

Location: Analysis (Analog Table)**Description:** The highest absolute value of all of the samples between the two zero reference crossings surrounding the data bar (black solid line).

Comments: The value is displayed as Peak type. If the data type for the loaded driver is set to RMS type then the value is multiplied by the square root of 2.

See Also: [InstVal Column](#)
[RMS Column](#)

INSTVAL COLUMN

Location: Analysis (Analog Table)

Description: Displays the instantaneous sample value at the data bar.

Comments: This value is multiplied by the square root of 2 if the driver's data type is set to RMS type.

See Also: [InstPeak Column](#)
[Data Bar](#)

LST

Location: Waveform Summary (Events/Sensors Activity Summary)

Description: Displays the status of the last digital samples in the file. Lst is the second column in the Events/Sensors Activity Summary. A=Alarm, N=Normal.

Comments: This data is also displayed in the third column of the digital information table view.

See Also: [Waveform Summary](#)

LST-CHANGE

Location: Waveform Summary (Events/Sensors Activity Summary)

Description: Displays the date and time the digital channel last changed state. Lst-Change is the fourth column in the Events/Sensors Activity Summary.

Comments: This data is also displayed in the fifth column of the digital information table view.

See Also: [Waveform Summary](#)

MARK & SAVE

Location: Analysis

Description: The Mark and Save window saves selected analog data to a user defined ASCII file using the selected template file. To open the Mark and Save window select the Mark Save option under the Waveform tab. The window is divided into two sections. The top section displays the contents of the selected template file in a notepad editor and contains a drop down list to select the template file. The list is initially populated with all the files that have a *.FMT extension that are located in the Wavewin directory. A browse button is available to add template files to the list that located other directories. The bottom section displays the contents of the values file in a notepad editor and the location and name of the file.

Activation: *Menu:* Alt-(A) Values, (W) Mark & Save Window



Ribbon, Waveform Tab:

- Fields:**
- Template File:* The template path and filename.
 - Use Default:* Use default will save all the analog table columns as they are displayed.
 - Template Contents:* List all the commands in the template file.
 - Values Files:* The values file path and filename.
 - Values Contents:* Displays the contents of the values file.

- Options:**
- Mark:* Save the values at the data bar to the values file.
 - Clear:* Clear the values note pad data.
 - Save:* Save the template file and the values file.
 - Help:* Display the help window for the mark and save dialog.
 - Close:* Close the mark and save dialog.

Comments: The Apply Unit Prefix will multiply all analog values by 1000 if the values are in kilo. The truncate Values will save only integer values.

The Use Default checkbox will write the visible analog columns to the Values notepad with a header for each column.

Window Commands

- <Station> Writes the full Station name.
- <Station:12> Writes the first 12 characters of the Station name.
- <Device> Writes the full Device name.
- <Device:6> Writes the first 6 characters of the Device name.
- <Date:F> Writes the Date at the data bar in the following format mm/dd/yyyy.
- <Time:F> Writes the Time at the data bar in the following format hh:mm:ss.zzzzzz.
- <Date:U> Writes the Date at the data bar in the following format yyymmdd.
- <Time:U> Writes the Time at the data bar in the following format hhmmsszzz.
- <Cycles> Writes the number of Cycles between the data bar and the reference bar.
- <DeltaX> Writes the time difference between the data bar and the reference bar.
- <Line> Writes the active Line name.

Analog Commands

- <> Write the analog data at the data bar,
- [] Write the analog data at the reference bar,
- Number Writes the visible analog column data at the date bar separated by commas for specified Channel number.
- ^Number Writes the visible analog column data separated by commas for the Channel in position 1.
- :R Writes the RMS value.
- :T Writes the Channel Title.
- :U Writes the Channel Unit.
- :P Writes the Phase value.
- :I Writes the Instantaneous value.
- :F Writes the DFT magnitude for the specified Harmonic. For example, ^6:F0 writes the DFT Magnitude of the DC Offset for channel 6 and ^6:F2 writes the DFT Magnitude of the 2nd Harmonic for channel 6.

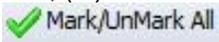
| | |
|---------|---|
| :D | Writes the Duration of the Fault. |
| :% | Write the Percentage of Nominal from the Prefault bar to the Fault bar. |
| %v | Writes the <i>measured voltage sag</i> immunity. |
| :Number | Specifies the width of the analog data values. Will only be applied if the defined width is greater than the length of the data values. Spaces are padded to the beginning of the written values. This is used to right justify values. |
| :S | The skew of the 3 analog channels using the angles. The S command is used with 3 analog channels <1,2,3:S>. This command adds the 3 angles at the cursor. One of the channels must be marked as a reference channel. |
| :B | The Unbalanced Value for 3 Channels. The B command is used with 3 analog channels <1,2,3:B>. This command finds the highest and lowest DFT magnitude of the 3 channels. The result is the highest – lowest. |
| :N | The Negative Sequence for 3 Channels. The N command is used with 3 analog channels <^1,^2,^3:N>. This command computes the negative sequence for the 3 current or voltage channels is position 1, 2 and 3 on the screen. The magnitude for the negative sequence result is displayed. |
| :M | The M command is used for an entire channel. It calculates the maximum value of the channel minus the minimum value of the channel divided by 2 ((max-min)/2), <^1:M>. Since the command is not sample based both types of brackets can be used (<>, []). |
| :SG100 | The letter G or L followed by a number after the :S, :B, :M or :N defines a trigger. The letter G stands for greater than and L is less than. If the result is true than Alarm is displayed else Normal is displayed. |
| :BL50 | |
| :NG5000 | |
| :ML700 | |

See Also: [Edit Marks](#)
[Clear Marks](#)
[Mark Scan](#)
[Next Marked Scan](#)

MARK/UNMARK ALL CHANNELS

Location: Analysis

Description: If channels are marked then unmark all analog & digital channels otherwise mark all the channels.

Activation: *Direct:* F8
Menu: Alt-(C) Channels, (M) Mark/UnMark All
Ribbon, Files Tab: 

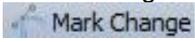
Comments: When an analog channel is marked the ID, title, Scale, and units are displayed in red. When a digital channel is marked the ID and titles are displayed in red. To mark or unmark a channel click the channel's corresponding ID number or title or use the space bar.

See Also: [Analog Mark/Unmark All](#)
[Digital Mark/Unmark All](#)

MARK CHANGE IN SIGN

Location: Analysis

Description: Mark all positions in the analog channels where the waveform changed in sign.

Activation: *Menu:* Alt-(A) Values, (H) Mark Change in Sign Values
Ribbon, Waveform Tab:  Mark Change

Comments: A small gray triangle marks the change in sign position. The Mark Change option is an On/Off feature. When the option is highlighted the feature is ON, and when not highlighted it is OFF.

See Also: [Mark Raw Values](#)
[Mark Peak Values](#)

MARK PEAK VALUES

Location: Analysis

Description: Mark all positive and negative peaks on the analog channels.

Activation: *Menu:* Alt-(A) Values, (H) Mark Peak Values
Ribbon, Waveform Tab:  Mark Peaks

Comments: A small gray square marks the positive and negative peaks. The Mark Peak Values option is an On/Off feature. When the option is highlighted the feature is ON, and when not highlighted it is OFF.

See Also: [Mark Change in Sign](#)
[Mark Raw Values](#)

MARK RAW VALUES

Location: Analysis

Description: Mark all the raw samples read from the active waveform file.

Activation: *Menu:* Alt-(A) Values, (M) Mark Raw Values
Ribbon, Waveform Tab:  Mark Raw

Comments: A small hollow blue circle is placed at the raw samples read from the file. The Mark Raw Values option is an On/Off feature. When the option is highlighted the feature is ON, and when not highlighted it is OFF.

See Also: [Mark Change in Sign](#)
[Mark Peak Values](#)

MARK SCAN

Location: Analysis

Description: Mark a scan in the active window.

Activation: *Direct:* Ctrl-S
Menu: Alt-(A) Values, (S) Mark Scan



Ribbon, Channels Tab:

Comments: Use the Mark Scan option to mark a scan in the active window. Marked scans have a red upside down T above each marked scan. Scans are marked either in the Mark and Save dialog or by clicking on the Mark Scan option under the Waveform tab. When the cursor is placed over the scan the comment is displayed in a hint window.

See Also: [Clear Marks](#)
[Edit Marks](#)
[Mark & Save](#)
[Next Marked Scan](#)

MAXPEAK COLUMN

Location: Analysis (Analog Table)

Description: Displays the maximum peak value of the channel.

Comments: If the active driver's data type is set to RMS calibrated then the files MaxPeak value is multiplied by Root 2.

See Also: [MinPeak Column](#)

MAXVAL COLUMN

Location: Analysis (Analog Table)

Description: Displays the maximum value of the channel.

Comments: This column is displayed if the active driver's data type is set to Non-Sinusoidal-Log Files.

See Also: [MinVal Column](#)

MAXWIN COLUMN

Location: Analysis (Analog Table)

Description: Displays the absolute maximum value between the RMS bar (black dotted line) and the data bar (black solid line).

Comments: This column is displayed if the active driver's data type is set to Non-Sinusoidal-Log Files.

See Also: [Data Bar](#)
[RMS Bar](#)

MEDIUM DISPLAY

Location: Analysis

Description: Displays the analog channel using the maximum pixels allowed with no zero reference point. The medium display is activated through the Auto Scale feature.

Activation: *Direct:* F6, - Auto Scale button 
Menu: Alt-(D) Data, (A) Auto Scale, (P) Plus



Ribbon, Data Tab:

Comments: The Auto Scale toggles between (Off, On, ++ and Units). Plus (++) plots the signal using the number of maximum pixels allowed for the channel. The highest value is plotted at the maximum position allowed and the smallest value is plotted at the lowest position allowed. This feature was added to clearly show the profile of frequency, Vdc and load data channels.

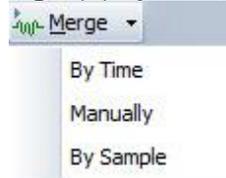
See Also: [AS Status Field](#)
[Auto Scaling](#)

MERGE OPEN FILES

Location: Analysis

Description: Merge the visible or marked channels from all the open analysis windows into a new data window. There are three Merge options available. Merge files By Time will merge only the common times in the open files. Merge files Manually will merge the data according to the positions of the data bars in each open window. Merge files By Sample will merge the files by lining up the samples in each open window.

Activation: *Menu:* Alt-(F) File, (G) Merge, (B) By Time, (M) Manually, (S) By Sample



Ribbon, Waveform Tab:

Comments: To distinguish between the merged channels the station name is placed before each merged channel. To deactivate this feature open the Window Properties dialog, select the Append/Merge tab and click the Merge Files option. If the files have different sampling frequencies a dialog will be displayed to select the frequency for the new window.

See Also: [Change Frequency](#)
[Merge Waveform Files](#)

MINPEAK COLUMN

Location: Analysis (Analog Table)

Description: MinPeak is the column that displays the minimum peak value of the channel.

Comments: If the active driver's data type is set to RMS calibrated then the files minpeak value is multiplied by Root 2.

See Also: [MaxPeak Column](#)

MINVAL COLUMN

Location: Analysis (Analog Table)

Description: Displays the minimum value of the channel.

Comments: This column is displayed if the active driver's data type is set to Non-Sinusoidal-Log Files.

See Also: [MaxVal Column](#)

MOVE ANALOG CHANNELS

Location: Analysis

Description: Move the marked analog channels.

Activation: *Direct:* + key: Move the marked analog channels up one channel.
 - key: Move the marked analog channels down one channel.
 Drag and Drop, Mark the Channels then Drag the channels to a specific location.
Menu: Alt-(C) Channels, (U) Shift Marks Up
 Alt-(C) Channels, (W) Shift Marks Down

Ribbon, Channels Tab: Shift Channels Up 

Ribbon, Channels Tab: Shift Channels Down 

Comments: Individual channels can be marked or unmarked by clicking the channels corresponding display ID number or the channel table data, or by pressing the spacebar. Marked channels are displayed in red. To restore the channels back to their original position select the Reorder Channels option under the Channels tab.

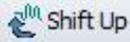
See Also: [Drag Drop Channels](#)
[Shift Marks Up](#)
[Shift Marks Down](#)
[Reorder Channels](#)

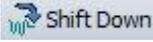
MOVE DIGITAL CHANNELS

Location: Analysis

Description: Move the marked digital channels.

Activation: *Direct:* + key: Move the marked digital channels up one channel.
 - key: Move the marked digital channels down one channel.
Menu: Alt-(C) Channels, (U) Shift Marks Up
 Alt-(C) Channels, (W) Shift Marks Down

Ribbon, Channels Tab: Shift Channels Up 

Ribbon, Channels Tab: Shift Channels Down 

Comments: Individual digital channels can be marked or unmarked by clicking the channels corresponding display ID number or channel table data, or by pressing the spacebar.

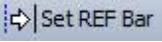
Marked channels are displayed in red. Use the + and – keys to rearrange the marked digital channels. To toggle between the analog channels and the digital channels use the tab key.

See Also: [Shift Marks Up](#)
[Shift Marks Down](#)

MOVE REFERENCE BAR TO DATA BAR

Location: Analysis

Description: Move the Reference bar (blue dotted line) to the sample at the Data bar position (black solid line).

Activation: *Direct:* Ctrl-A
Menu: Alt-(V) View, (M) Move Reference Bar to Data Bar
Ribbon, Waveform Tab: 

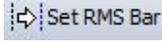
Comments: The Delta time field (Delta X) in the status bar at the bottom of the screen displays the time difference between the reference bar and the data bar. If the time difference between the samples is in milliseconds or microseconds then the number of cycles between the two bars is also displayed.

See Also: [Data Bar](#)
[Delta X](#)
[Reference Bar](#)

MOVE RMS BAR TO REFERENCE BAR

Location: Analysis

Description: Move the RMS bar (black dotted line) to the sample at the Reference bar position (blue dotted line).

Activation: *Direct:* Ctrl-Z
Menu: Alt-(V) View, (R) Move RMS Bar to Reference Bar
Ribbon, Waveform Tab: 

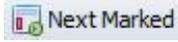
Comments: The RMS and Data bars define the RMS sliding window.

See Also: [Data Bar](#)
[Reference Bar](#)
[RMS Bar](#)

NEXT MARKED SCAN

Location: Analysis

Description: Move to the next marked scan in the active window.

Activation: *Direct:* Ctrl-X
Menu: Alt-(A) Values, (N) Next Marked Scan
Ribbon, Channels Tab: 

Comments: Use the Next Marked Scan option to navigate between each marked scan in the active window. Marked scans have a red upside down T above each marked scan. Scans are marked either in the Mark and Save dialog or by clicking on the Mark Scan option under the Waveform tab. Each marked scan can have a comment associated with it. To add a comment to each scan use the Edit Marks option under the Waveform tab. When the cursor is placed over the scan the comment is displayed in a hint window.

See Also: [Edit Marks](#)
[Clear Marks](#)
[Mark & Save](#)
[Mark Scan](#)

ONEBIT

Location: Waveform Summary

Description: Displays the analog channel's full-scale value divide by the channel's resolution.

Comments: The OneBit value is the channel's full scale value.

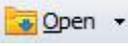
See Also: [Waveform Summary](#)

OPEN WAVEFORM FILE

Location: Analysis

Description: Open a waveform file. The selected file will be displayed in a new analysis window.

Activation: *Menu:* Alt-(F) File, (O) Open...

Ribbon, Waveform Tab: 

Comments: To open a previously opened file click on the drop down list and select the file. To open a new file click on the button. The Window's Open File dialog is displayed. Navigate to the file, click on the file then click the Open button.

See Also: [Reopen Waveform File](#)

OPTIONAL COLUMNS

Location: File Manager

Description: The IEEE long file naming format allows for user defined fields appended at the end of the filename. The file table reserves 4 columns for the first 4 user defined fields. The columns are named Optional-1 to Optional-4.

See Also: [IEEE Long File Naming Format](#)

PATH/FILENAME (NO EXT.)

Location: Save as COMTRADE Dialog (ASCII/Binary)

Description: Displays the destination path and filename of the new COMTRADE file.

Comments: The oscillography file at the cursor position is saved in COMTRADE format to the specified filename. When specifying a filename do not enter an extension, the “.CFF” or “.CFG” and “.DAT” files are automatically created. If a path is not specified the files are saved to the active directory. Select the Comtrade format from the Save As Type drop down list.

Restrictions: The filename cannot contain an extension.

See Also: [Save As Comtrade](#)

PEAK HOP

Location: Analysis

Description: Move the data bar (vertical black solid line) to the next or previous peak for the first channel or the first marked channel.

Activation: *Direct:* Ctrl-Left arrow and Ctrl-Right arrow

Comments: Use the ctrl left/right keys to move the data bar to the next or previous peak for the first displayed channel or the first marked channel. The number of cycles from the data bar to the reference bar is displayed in the Delta X status bar.

See Also: [Cycle Hop](#)
[Data Bar](#)
[Delta X](#)
[Reference Bar](#)

PHASOR/CIRCULAR CHART SCALE MULTIPLIER (ASM)

Location: Analysis (Window Properties Dialog)

Description: Used as a multiplier to increase/decrease the length of a vector in the phasor diagram or to increase/decrease the circular chart data.

Activation: *Menu:* Alt-(F) File, (T) Window Properties..., Display Settings Tab



Ribbon, Waveform Tab: [Properties](#), Display Settings Tab

Range: Greater Than 1.00

Default: 1.75

Comments: When a channel's amplitude is increased, the phasor/circular chart scale value is multiplied with the scale multiplier value, and when the channel's amplitude is decreased the phasor/circular chart scale value is divided by the scale multiplier value .

See Also: [Window Properties](#)

PLAY CHANNELS AUDIO

Location: Analysis

Description: Plays the audio of the first marked analog channel. If no channels are marked then it plays the audio of the first displayed channel.

Activation: *Menu:* Alt-(D) Data, (P) Play Channels Audio

Ribbon, Channels Tab: 

Fields:

| | |
|------------------------|---|
| <i>Analog Channel:</i> | Title of the active analog channel. |
| <i>Save Audio:</i> | Save the analog channel data to the windows “.WAV” format. |
| <i>Audio Filename:</i> | The path and name of the saved “.WAV” file. |
| <i>Folder Button:</i> | A list of folders. Select the desired drive/folder and enter the file name. |

Options:

| | |
|----------------|---|
| <i>Play:</i> | Play the active analog channels data. |
| <i>Volume:</i> | Decrease/Increase the volume of the output. |

Comments: Marked channels are displayed in red. The Active Channel section displays the active analog channel in the analysis window. The Audio Controls section allows for playing the active analog channel’s data through the computers speakers and for increasing/decreasing the volume of the output. The Save “.WAV” File section allows for saving the analog channel data in the Window’s “.WAV” format. Click the folder button  to select a destination Folder and enter a new “.WAV” file or select an existing “.WAV” file. The selected file path and name will be updated in the Audio Filename field.

See Also: [Analog Mark/Unmark All](#)

PRIMARY VALUES

Location: Analysis (Analog Table)

Description: The values displayed in the analog table are either in primary or secondary quantities. If the file defines the type of values saved then the type is displayed in the window header. Also, if the CT and PT ratios are defined in the configuration file then the values can be changed from primary to secondary and vice versa. To change the values open the properties dialog and click on the Driver Data Type tab, select the Primary or Secondary radio button to switch between values.

Activation: *Direct:* Window Properties Menu button  Driver Data Type Tab
Menu: Alt-(F) File, (T) Window Properties..., Driver Data Type Tab

Ribbon, Waveform Tab:  , Driver Data Type Tab

Comments: The CT and PT ratio values can also be changed using the Edit Ratio Values button located in the Driver Data Type tab.

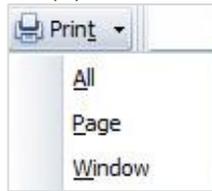
See Also: [Ratio Values](#)
[Secondary Values](#)

PRINT ALL DATA

Location: Analysis

Description: Print all the data for the visible analog and digital channels.

Activation: *Menu:* Alt-(F) File, (P) Print, (A) All



Ribbon, Waveform Tab:

Comments: The printed pages include the page number and the date/time of the first sample in the page. The channel information is printed at the end of the data. Use the print page option to print only the contents of the data window.

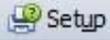
See Also: [Printer Setup](#)

PRINTER SETUP

Location: All child windows.

Description: Change the printer type and setup the current printer.

Activation: *Menu:* Alt-(F) File, (S) Printer Setup

Ribbon, Files Tab:  Setup
Ribbon Waveform Tab:

RATIO VALUES

Location: Analysis

Description: Edit the CT and PT ratio values.

Activation: *Direct:* Windows Properties menu button , Data Type Tab, Edit Ratio Values Button
Menu: Alt-(F) File, (T) Window Properties..., Driver Data Type Tab, Edit Ratio Values



Ribbon, Waveform Tab: , Driver Data Type Tab, Edit Ratio Values Button

Fields:

| | |
|-------------------|----------------------------|
| <i>Channel:</i> | Channel Number and Title. |
| <i>Primary:</i> | Channel's primary value. |
| <i>Secondary:</i> | Channel's secondary value. |

Options:

| | |
|--------------------|---------------------------------|
| <i>Enter/OK:</i> | Save and close the dialog. |
| <i>Esc/Cancel:</i> | Exit the dialog without saving. |

Comments: The values are listed in a table format for each analog channel. The modified ratio values are not saved to the original file. To save the edited ratio values use the Save As option under the Waveform Tab.

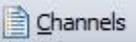
See Also: [Primary Values](#)
[Secondary Values](#)

RECORDED CHANNELS

Location: Analysis

Description: Display the following information for the active oscillography file:

| | | |
|-----------|------------------------|-----------------------|
| Channel # | Analog Channel Titles | Full Scale Values |
| SAC # | SAC Titles | Full Scale Values |
| Channel # | Digital Channel Titles | Original State Values |
| SDC # | SDC Titles | Original State Values |

Activation: *Direct:* F2 - Channel menu button 
Menu: Alt-(F) Files, (R) Recorded Channels...
Ribbon, Waveform Tab: 

Comments: Triggered digital channel titles are displayed in red. All valid and invalid channels are displayed.

REFERENCE BAR

Location: Analysis

Description: The reference bar is displayed as a blue dotted line. The reference bar is defaulted to the second cycle in the file.

Comments: To move the reference bar to the position of the data bar use the Move Reference Bar to Data Bar option under the Waveform tab or press Ctrl-A. Click the opposite mouse button to move the reference bar to any position in the trace area. The status field Delta X in the status bar at the bottom of the screen shows the time difference (in milliseconds or seconds) between the reference bar and the data bar. It also shows how many cycles are between the two bars.

The default position of the reference bar is two cycles from the first sample.

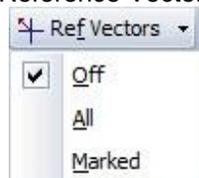
See Also: [Data Bar](#)
[Delta X](#)
[Fault Bar](#)
[RefVal](#)

REFERENCE VECTOR

Location: Analysis

Description: Display a vector for the reference bar in the phasor window. The reference bar is the blue dotted line.

Activation: *Menu:* Alt-(V) View, (F) Reference Vectors (Off, All & Marked)



Ribbon, Waveform Tab:

Comments: The reference bar is positioned at the second cycle in the file. To move the reference bar right click in the trace window. The vector at the reference bar is displayed for all the channels or just the marked channels.

The reference vector is used to measure phase shifts. The reference vector drop down list options are off, all or marked channels.

See Also: [Reference Bar](#)
[RefVal Column](#)

REFVAL COLUMN

Location: Analysis (Analog Table)

Description: Displays the sample value at the Reference bar (blue dotted line).

Comments: If the active driver's data type is set to RMS type, the sample value at the reference bar position is multiplied by the square root of 2.

See Also: [Reference Bar](#)
[Reference Vector](#)

REOPEN A WAVEFORM FILE

Location: Analysis

Description: Reopen a file that was previously viewed.

Activation: Menu *Button Bar*: Open File drop down menu button 
Ribbon, Waveform Tab: 

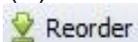
Comments: A list of the last 14 open files is displayed in a drop down menu. Click the on the file to reopen. To open a new file click on the button to display the Window's Open File dialog.

See Also: [Open Waveform File](#)

REORDER CHANNELS

Location: Analysis

Description: Reorder all the analog channels to their original position when the file was first opened.

Activation: *Menu*: Alt-(C) Channels, (O) Reorder Channels
Ribbon, Channels Tab: 

Comments: After moving channels or after selecting views the channels can be position back to their original position by selecting this option.

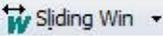
See Also: [Shift Marks Up](#)
[Shift Marks Down](#)
[Drag Drop Channels](#)

RESIZE SLIDING WINDOW

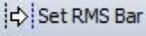
Location: Analysis

Description: Resize the RMS sliding window.

Activation: *Menu:* Alt-(V) View, (W) Set Sliding Window Size...

Ribbon, Waveform Tab:  Sliding Win ▾

Comments: To automatically resize the RMS sliding window click on the Sliding Win drop list and select a size from the list or click on Sliding Win button to display the resize sliding window dialog. To manually resize the RMS sliding window click the right mouse button to set the reference

position. Then click the  Set RMS Bar option. The RMS bar is moved to the reference position. The Delta time (Delta X) field displayed in the status bar at the bottom of the screen shows the time difference (in milliseconds or seconds) and the number of cycles between the reference and data bars. Use the left, right, ctrl+left, and ctrl+right keys or the horizontal scroll bar to move the sliding window.

See Also: [Data Bar](#)
[Move RMS bar to Reference Bar](#)
[Reference Bar](#)
[RMS Bar](#)

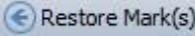
RESTORE MARK(S)

Location: Analysis

Description: Restore all the hidden analog channels. The delete key removes the marked analog channels and the insert key restores the channels.

Activation: *Direct:* Insert

Menu: Alt-(C) Channels, (R) Restore Mark(s)

Ribbon, Channels Tab: 

Comments: To hide channels first mark the channels then press the delete key. Marked channels are displayed in red. To mark channels click on the channel ID number or title or use the spacebar.

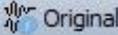
See Also: [Hide Mark\(s\)](#)
[Show All Hidden](#)
[View Mark\(s\)](#)

RESTORE ORIGINAL

Location: Analysis

Description: Restore the displayed file to the original samples stored in the file. This feature will undo all changes made using the change frequency, duplicate cycles and truncate cycles features.

Activation: *Menu:* Alt-(D) Data, (R) Restore Original Data

Ribbon, Data Tab:  Original

Comments: If the Open Frequency option is checked in the Change Frequency dialog the Restore Original is not available.

See Also: [Duplicate Cycles](#)
[Truncate Cycles](#)
[Change Frequency](#)

RMS COLUMN

Location: Analysis (Analog Table)

Description: Displays the RMS value for all samples positioned between the RMS bar (black dotted line) and the data bar (black solid line). If the data is RMS type, each sample value is multiplied by the square root of 2 before it is squared.

See Also: [Data Bar](#)
[RMS Bar](#)

RMS BAR

Location: Analysis

Description: The RMS bar is the black dotted line that runs vertically across the analog and digital channels. The RMS bar and data bar define the RMS sliding window.

Comments: When the analysis window is initially opened the sliding window is defaulted to one cycle. The sliding window is used to calculate the RMS value for all samples positioned between the data bar and the RMS bar. This value is displayed in the Analog View.

To resize the sliding window, click the right mouse button to set the reference bar position and the left mouse button to set the data bar position then select the Set RMS Bar option under the Waveform tab. The button will move the RMS bar to the reference bar.

See Also: [Data Bar](#)
[Fault Bar](#)
[RMS Column](#)

ROSE PLOTS

Location: Analysis

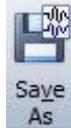
Description: The Rose plots feature plots the waveform signal using the circular charts. To plot a rose chart, first mark the channels to plot then hit enter to isolate the channels. Next, click on the C button above the phasor diagram. The rose charts displays a small circle the same color as the signal color if the value is a negative value. To return to the phasor display click on the  button above the rose chart.

Activation: *Menu & Ribbon:* 

See Also: [Three-D Plots](#)

SAMPLE BASED DISPLAY

Location: Analysis**Description:** The sample base display plots the channel data with 1 pixel distance between each displayed sample. Sample based displays are useful for showing changes in the sampling frequency.**Comments:** To change the trace display settings open the Properties dialog under the Waveform tab. Click the Display Settings tab and change the Trace Display Type field to time based or sample based.**See Also:** [Time Based Display](#)**SAVE AS COMTRADE (ASCII/BINARY)**

Location: File Manager and Analysis**Description:** Save the waveform file at the cursor position or the displayed analog/digital channels to the COMTRADE ASCII or Binary format.**Activation: File Manager***Menu:* Alt-(O) Options, (V) Save As Comtrade, (A) ASCII...*Menu:* Alt-(O) Options, (V) Save As Comtrade, (B) Binary...**Analysis***Menu:* Alt-(F) File, (A) Save As, (C) Comtrade, (A) ASCII...*Menu:* Alt-(F) File, (A) Save As, (C) Comtrade, (B) Binary...**File Manager:** *Ribbon, Files Tab:***Analysis:** *Ribbon, Waveform Tab:*

Fields:

| | |
|--|---|
| <i>Path:</i> | The destination path. |
| <i>Filename:</i> | The filename with no extension. |
| <i>Use the ComNames Naming Convention:</i> | Check this box to have the file automatically named using the IEEE long file naming format. |
| <i>Save As Type:</i> | Select the Comtrade format from the drop down list. |

Options:

| | |
|--------------------|--|
| <i>Enter/Ok:</i> | Read the file contents and save it in COMTRADE format. |
| <i>Esc/Cancel:</i> | Exit the dialog without executing the command. |

Comments: Do not enter a filename extension. The COMTRADE configuration (.CFG) and data (.DAT) or the single file (.CFF) files are automatically created. If a path is not defined, the files are saved in the active directory.

There are three Comtrade versions supported: the older 1991 format and the 1999 format and the new 2013 format. The Comtrade format is selected from the Save As Type drop down list.

If the sample values in the selected file are RMS calibrated and the outcome Comtrade file must have instantaneous values then set the Comtrade Settings fields to automatically convert the RMS data to instantaneous values. To set the Comtrade Settings fields open

the Properties dialog in the analysis window. Select the Comtrade tab then select “Yes” for the Convert RMS Calibrated Data to Peak Data field.

To automatically save the Comtrade file using the IEEE long file naming convention check the Use the ComNames Naming Convention to Name the Comtrade File(s) field in the Save as Comtrade Dialog and leave the File Name field empty. The selected channels are converted to the selected Comtrade format and are named using the IEEE long file naming format.

Restrictions: The selected file must be a supported oscillography file.

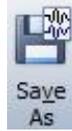
See Also: [Comtrade Driver](#)
[IEEE Log File Naming Format](#)

SAVE AS CSV FORMAT

Location: File Manager and Analysis

Description: Save specific analog information into a CSV comma delimited format. The "CSV Format" will save the RMS, Instantaneous or Vector (Magnitude and Angle or RMS and Angle) values to a comma delimited text file.

Activation: *Menu:* Alt-(F) File, (A) Save As, (V) CSV Format, (R) –RMS Values...
Menu: Alt-(F) File, (A) Save As, (V) CSV Format, (I) – Instantaneous Values...
Menu: Alt-(F) File, (A) Save As, (V) CSV Format, (V) – Vector Values (Mag & Angle)...
Menu: Alt-(F) File, (A) Save As, (V) CSV Format, (E) – Vector Values (RMS & Angle)...



File Manager: *Ribbon, Files Tab:*

Analysis: *Ribbon, Waveform Tab:*

Fields: *Path:* The destination path.
Filename: The filename with no extension.
Use the ComNames Naming Convention: Check this box to have the file automatically named using the IEEE long file naming format.
Save As Type: Select the CSV type from the drop down list.

Options: *Enter/Ok:* Save the selected channel values in an ASCII comma delimited file.
Esc/Cancel: Exit the dialog without executing the command.

Comments: The first line in the CSV file is the header information for each channel. All the analog channels displayed in the active data plotting window are saved.

The four Save as CSV options are:

- Save As CSV - RMS Values: Save the RMS Values.
- Save As CSV - Instantaneous Values: Save the Instantaneous Values.
- Save As CSV - Vector Values (Mag & Ang): Save the DFT Magnitude and Angle.
- Save As CSV - Vector Values (RMS & Ang): Save the RMS Value and Angle.

The file format saved is a comma delimited ASCII file and the .CSV extension is automatically assigned. The first line in the file defines the header information.

All files saved using the Save as CSV format are tagged as SDC files and are plotted using the SDC driver.

To automatically save the CSV file using the IEEE long file naming convention check the Use the ComNames Naming Convention to Name the CSV File field in the Save as CSV Dialog and leave the File Name field empty. The selected channels are saved in a comma delimited ASCII file and are named using the IEEE long file naming format.

Restrictions: The selected file must be a supported oscillography file.

See Also: [Associating File Types](#)
[IEEE Long File Naming Format](#)
[Save As Comtrade](#)

SAVE USER VIEWS

Location: Analysis

Description: Save the displayed view information in an ASCII text file.

Activation: *Menu:* Alt-(V) View, (S) Save View...



Ribbon, Waveform Tab:

Fields: *View File Path:* Destination path for the file.
View Name: The name of the view. A file extension is not needed. The “.VIW” extension is automatically assigned.

Options: *Enter/Ok:* Save the view.
Esc/Cancel: Exit the dialog without executing the command.

Comments: The following information is saved:

- Displayed analog channels,
- Analog channel order,
- Superimposed channels,
- Analog channel colors,
- Digital channels displayed,
- Digital channel order,
- Sampling frequency,
- Time scale,
- Sliding window size (RMS bar to Data bar),
- Phasor window size,
- Table window size,
- Red fault bar,
- Auto scale and
- Phasor or circular chart displayed

See Also: [Select User Views](#)
[Select Line Views](#)

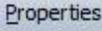
SECONDARY VALUES

Location: Analysis (Analog Table)

Description: The values displayed in the analog table are either in primary or secondary quantities. If the file defines the type of values saved then the type is displayed in the window header. Also, if the CT and PT ratios are defined in the configuration file then the values can be changed from primary to secondary and vice versa. To change the values open the properties dialog and click on the Driver Data Type tab, select the Primary or Secondary radio button to switch between values.

Activation: *Direct:* Window Properties Menu button  Driver Data Type Tab
Menu: Alt-(F) File, (T) Window Properties..., Driver Data Type Tab



Ribbon, Waveform Tab:  , Driver Data Type Tab

Comments: The CT and PT ratio values can also be changed using the Edit Ratio Values button located in the Driver Data Type tab. The changed ratio values are not saved to the file. To save the changed ratio values select the Save As option in the Waveform tab.

See Also: [Primary Values](#)
[Ratio Values](#)

SELECT LINES/VIEWS

Location: Analysis

Description: Select a specific line or view for display.

Activation: *Direct:* Line/View drop down menu button 
Menu: Alt-(V) File, (V) Select Views...



Ribbon, Channel Tab: 

Comments: The DFR Transcan, Faxtrax USI and APP records have predefined views encoded into their format. To select the predefined views click on the Show All/ Select View drop down menu button or select the Select Views option under the Channels tab. A list of the available lines/graphs will be displayed. To view all the analog channels in the file press the <esc> key, the <backspace>, or click the Show All  button.

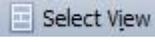
See Also: [Save User Views](#)
[Select User Views](#)

SELECT USER VIEWS

Location: Analysis

Description: Select a view file from the list of files located in the displayed view path.

Activation: *Menu:* Alt-(V) View, (V) Select Views..

Ribbon, Waveform Tab: 

Fields: *View Files:* A list of all the view files in the displayed view path.
Analog Channels: All analog channel information defined in the view file.
Digital Channels: All digital channel information defined in the view file.

Options: *Enter/Ok:* Select the highlighted view.
Esc/Cancel: Exit the dialog without executing the command.

Comments: The following information is read from the selected view file and applied to the displayed file:

- Displayed analog channels,
- Analog channel order,
- Superimposed channels,
- Analog channel colors,
- Digital channels displayed,
- Digital channel order,
- Sampling frequency,
- Time scale,
- Sliding window size (RMS bar to Data bar),
- Phasor window size,
- Table window size,
- Red fault bar,
- Auto scale and
- Phasor or circular chart displayed

If the analog channel and digital channel names defined in the view file are not in the displayed file than an error message is displayed.

A number of manufactures save the lines contained in a DFR record in the header format of the file. These predefined lines/views are listed in the top section of the view drop down menu.

See Also: [Save User Views](#)
[Select Lines/Views](#)

SEMI F47-0706 VOLATGE SAG CHART

Location: Analysis

Description: The SEMI F47-0706 Voltage Sag display shows the sag immunity chart. The chart depicts the required voltage sag ride-through capability curve. The unaffected region is the green area, and the miss operation region is the red area.

Activation: *Menu:* Alt-(C) SEMI F47 Voltage Sag Chart



Ribbon, Channel Tab:

Comments: To view the chart, first mark the voltage channels then click on the SEMI F47 option from the Channels menu.

To the right of the chart is the sag percentage which is calculated for each voltage channel using the following equation: $(\text{Nominal RMS} * 100) / (\text{Lowest Sag RMS})$. Each displayed percentage is followed by the channel number and the duration in milliseconds.

The trigger value for the duration calculation is set in the System Settings dialog. The default setting is 15% of nominal.

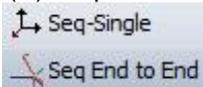
See Also: [Display Dialog](#)
[Three-D Plots](#)

SEQUENCE COMPONENTS CALCULATOR

Location: Analysis

Description: The sequence components calculator calculates the zero, positive and negative sequence components for the data values at the data bar for the active window (single) or for two open windows (end to end).

Activation: *Menu:* Alt-(D) Data, (N) Sequence Calculator, (S) Single End...
Menu: Alt-(D) Data, (N) Sequence Calculator, (E) End to End...



Ribbon, Data Tab:

Fields:

| | |
|-----|--|
| VA: | Magnitude and Angle of Channel VA. |
| VB: | Magnitude and Angle of Channel VB. |
| VC: | Magnitude and Angle of Channel VC. |
| IA: | Magnitude and Angle of Channel IA. |
| IB: | Magnitude and Angle of Channel IB. |
| IC: | Magnitude and Angle of Channel IC. |
| V0: | Zero Sequence Voltage Magnitude and Angle. |
| V1: | Positive Sequence Voltage Magnitude and Angle. |
| V2: | Negative Sequence Voltage Magnitude and Angle. |
| I0: | Zero Sequence Current Magnitude and Angle. |
| I1: | Positive Sequence Current Magnitude and Angle. |
| I2: | Negative Sequence Current Magnitude and Angle. |

Angle Rotation: Increment the voltage and current angles.

Options:

| | |
|-----------------|--|
| <i>Refresh:</i> | Refresh VA, VB, VC, IA, IB and IC from the date bar locations. |
| <i>Close:</i> | Close the dialog. |
| <i>Rotate:</i> | Increment the voltage and current angles. |
| <i>Vectors:</i> | Select the vectors to display. |



Turns auto scale on or off for displayed vectors.



Increase the displayed vectors.



Decrease the displayed vectors.

Comments: The channels in the active records must be organized as follows: The first 3 visible channels are the voltage channels, VA, VB and VC. The next 3 visible channels are the current channels, IA, IB and IC. To reposition the analog channels first mark the channels then drag them to the proper location or use the plus key to move the channels up one position and the minus key to move the channels down one position. If the channels are not organized as suggested then the channel numbers can be changed directly in the dialog using the Channel drop down list to the left of the channel titles.

The values populated in the dialog are read at the data bar positions in the open records. The sequence calculator dialog is a stay on top window. This allows for repositioning the data bars without closing the dialog. The values are automatically populated in the dialog when the data bar is moved. To refresh the voltage and current values in the dialog use the Refresh button.

To increment the voltage and current angles enter an increment value in the Angle Rotation field and click on the Rotate button.

See Also: [Double Ended Fault Location](#)

SET OPENING FREQUENCY

Location: Analysis

Description: Set a driver to always open a file using the defined sampling frequency. This feature is available in the Change Sampling Frequency dialog.

Activation: *Menu:* Alt-(D) Data, (F) Change Sampling Frequency...

Ribbon, Data Tab:  Sampling

Fields: *Open Frequency:* Always open the driver's file using the entered frequency.

Options: *Enter/Ok:* Exit the dialog, then save and execute the entered information.
Esc/Cancel: Exit the dialog without saving the information.

Comments: Setting the Always Open field will open all files associated with the active driver using the entered frequency. This feature is useful for files with low sampling frequency.

See Also: [Change Frequency](#)

SET SLIDING WINDOW

Location: Analysis

Description: Set the size of the window between the data bar and the RMS bar. The Sliding Win option has a drop down list to select the size. Use the drop down list or click directly on the button to display the sliding window dialog.

Activation: *Menu:* Alt-(V) View, (W) Set Sliding Window Size

Ribbon, Waveform Tab:  Sliding Win ▾

Fields: *# Cycles:* Enter the number of cycles or days or hours to display between the data bar and the RMS bar. For log files the days or hours is displayed in the dialog and for waveform files cycles is displayed.

Options: *OK:* Save and set the number of cycles and close the dialog.
Cancel: Exit the dialog without saving.

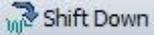
Comments: The RMS column in the analog table is calculated from the data bar to the RMS bar. If there is a large number of samples per cycle then it may slow down the system when calculating the RMS values.

See Also: [Data Bar](#)
[RMS Bar](#)

SHIFT MARKS DOWN

Location: Analysis

Description: Shift all the marked analog and digital channels down one position.

Activation: *Direct:* "-" key
Menu: Alt-(C) Channels, (W) Shift Marks Down
Ribbon, Channels Tab: 

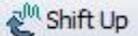
Comments: Individual channels can be marked or unmarked by clicking on the channels corresponding display ID number or channel information or by pressing the spacebar. Marked channels are displayed in red. To restore the channels back to their original position select the Reorder option under the Channels tab. All marked analog and digital channels are moved down one position.

See Also: [Drag Drop Channels](#)
[Reorder Channels](#)
[Shift Marks Up](#)

SHIFT MARKS UP

Location: Analysis

Description: Shift all the marked analog and digital channels up one position.

Activation: *Direct:* "+" key
Menu: Alt-(C) Channels, (U) Shift Marks Up
Ribbon, Channels Tab: 

Comments: Individual channels can be marked or unmarked by clicking on the channels corresponding display ID number or channel information or by pressing the spacebar. Marked channels are displayed in red. To restore the channels back to their original position select the Reorder option under the Channels tab. All marked analog and digital channels are moved up one position.

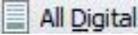
See Also: [Drag Drop Channels](#)
[Reorder Channels](#)
[Shift Marks Down](#)

SHOW ALL DIGITAL CHANNELS

Location: Analysis

Description: Show all digital channels or just the triggered digital channels. This option toggles between the two views.

Activation: *Direct:* F9
Menu: Alt-(V) View, (D) All Digital Channels

Ribbon, Waveform Tab: 

Comments: Placing the mouse on the horizontal separator bar and dragging it up or down can resize the digital channel display area. The cursor changes to the horizontal resize cursor when the mouse is positioned over the bar.

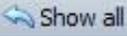
See Also: [All Digital Channels](#)

SHOW ALL HIDDEN

Location: Analysis

Description: Show all hidden analog and digital channels.

Activation: *Direct:* ViewAll menu button , the <esc> key or the <backspace> key
Menu: Alt-(C) Channels, (S) Show All Hidden

Ribbon, Channels Tab: 

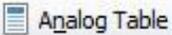
See Also: [View Mark\(s\)](#)
[Hide Mark\(s\)](#)
[Restore Mark\(s\)](#)

SHOW CHANNEL INFORMATION

Location: Analysis

Description: Show or hide the channel information window. This option toggles between the two views.

Activation: *Menu:* Alt-(V) View, (C) Channel Information

Ribbon, Waveform Tab: 

Comments: The channel information window can be resized by placing the mouse on the vertical separator bar and dragging it to the right or the left. The cursor changes to the vertical resize cursor when the mouse is positioned over the bar.

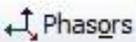
See Also: [Show Phasor/Circular Chart Information](#)

SHOW PHASOR/CIRCULAR CHART INFORMATION

Location: Analysis

Description: Show or hide the phasor/circular chart information window. This option toggles between showing and hiding the phasor/circular chart window.

Activation: *Menu:* Alt-(V) View, (P) Phasor/Circular Chart Window

Ribbon, Waveform Tab: 

Comments: The phasor/circular chart window can be resized by placing the mouse on the vertical separator bar and dragging it to the right or the left. The cursor changes to the vertical resize cursor when the mouse is positioned over the bar.

See Also: [Show Channel Information](#)

SINGLE ENDED FAULT LOCATION – RADIAL LINE

Location: Analysis

Description: Display the single ended fault location calculator dialog. The single ended fault location calculator calculates a single ended Fault Location. The single ended calculator has four types of calculators: Radial Line Method, Reactance Method, Multi-Phase and Three Phase. This section describes the Radial Line Method.

Activation: *Menu:* Alt-(D) Data, (U) Fault Calculators, (S) Single Ended... Radial Line Method Tab



Ribbon, Data Tab:

Fields:

- V Channel #:* Faulted Voltage channel number.
- I Channel #:* Faulted Current channel number.
- Z1:* Magnitude and Angle Z1.
- Z0:* Magnitude and Angle Z0.

Options:

- Refresh:* Refresh V and I values from the data bar location and calculate the FL.
- Calculate:* Calculate the fault location.
- Plot:* Plot the fault location between bars or for the entire record.
- Report* Display an ASCII report of the calculated radial line fault location.
- Close:* Close the dialog.

Comments: To calculate the radial line method click on the Radial Line Method tab. Select the faulted voltage channel from the V Channel Number drop down list and select the faulted current channel from the I Channel Number drop down list. Next, enter the Z1 and Z0 magnitude and angle. If the Z1 and Z0 values are stored in the opened file then these fields will be automatically populated. To have the current and voltage channels automatically populated when the dialog is displayed mark the channels first in the analysis window.

The single ended calculator is a stay on top window which allows for changing the position of the data bar while the dialog is open. Use the cursor keys or mouse to move the data bar.

The magnitude and angle for V_f and I_f are read from the data bar position in the selected open window. To change the position of the data bar, click on the desired location in the analysis window or use the left and right arrow keys. The values in the single ended fault location dialog are updated automatically. To calculate the fault location click on the Calculate button.

To plot the fault location in the data plotting window as a new channel, click on the drop down arrow in the plot button. The two options are plot the fault location between bars or plot the fault location for the entire record. The default option of the plot button is plot between bars. Between bars plots the fault location between the data bar and the reference bar.

See Also: [Double Ended Fault Location](#)

SINGLE ENDED FAULT LOCATION – REACTANCE

Location: Analysis

Description: Display the single ended fault location calculator dialog. The single ended fault location calculator calculates a single ended Fault Location. The single ended calculator has four

types of calculators: Radial Line Method, Reactance Method, Multi-Phase and Three Phase. This section describes the Reactance Method.

Activation: *Menu:* Alt-(D) Data, (U) Fault Calculators, (S) Single Ended... Reactance Method Tab



Ribbon, Data Tab:

- Fields:**
- V Channel #:* Faulted Voltage channel number.
 - I Channel #:* Faulted Current channel number.
 - N Channel #:* Faulted Neutral channel number.
 - Z1:* Magnitude and Angle Z1.
 - Z0:* Magnitude and Angle Z0.
- Options:**
- Refresh:* Refresh V, I and N values from the date bar location and calculate the FL.
 - Calculate:* Calculate the fault location.
 - Plot:* Plot the fault location between bars or for the entire record.
 - Report:* Display an ASCII report of the calculated Reactance fault location.
 - Close:* Close the dialog.

Comments: To calculate the radial line method click on the Reactance Method tab. Select the Voltage faulted channel from the V Channel Number drop down list, select the faulted current channel from the I Channel Number drop down list and select the neutral channel from the N Channel Number drop down list. Next, enter the Z1 and Z0 magnitude and angle. If the Z1 and Z0 values are stored in the opened file header then these fields will be automatically populated. To have the current and voltage channels automatically populated when the dialog is displayed mark the channels first in the analysis window.

The single ended calculator is a stay on top window which allows for changing the position of the data bar while the dialog is open. Use the cursor keys or mouse to move the data bar.

The magnitude and angle for V_f , I_f and I_N are read from the data bar position in the selected open window. To change the position of the data bar, click on the desired location in the analysis window or use the left and right arrow keys. The values in the single ended fault location dialog are updated automatically. To calculate the fault location click on the Calculate button.

To plot the fault location in the data plotting window as a new channel, click on the drop down arrow in the plot button. The two options are plot the fault location between bars or plot the fault location for the entire record. The default option of the plot button is plot between bars. Between bars plots the fault location between the data bar and the reference bar.

See Also: [Double Ended Fault Location](#)

SINGLE ENDED FAULT LOCATION – MULTI-PHASE

Location: Analysis

Description: Display the single ended fault location calculator dialog. The single ended fault location calculator calculates a single ended Fault Location. The single ended calculator has four types of calculators: Radial Line Method, Reactance Method, Multi-Phase and Three Phase. This section describes the Multi-Phase Method.

Activation: *Menu:* Alt-(D) Data, (U) Fault Calculators, (S) Single Ended... Multi-Phase Tab



Ribbon, Data Tab:

Fields:

- Vf1 Channel #:* First faulted Voltage channel number.
- Vf2 Channel #:* Second faulted Voltage channel number.
- If1 Channel #:* First Faulted Current channel number.
- If2 Channel #:* Second Faulted Current channel number.
- Z1:* Magnitude and Angle Z1.
- Z0:* Magnitude and Angle Z0.

Options:

- Refresh:* Refresh the two voltage and two current values from the data bar location.
- Calculate:* Calculate the fault location.
- Plot:* Plot the fault location between bars or for the entire record.
- Report:* Display an ASCII report of the calculated Multi-Phase fault location.
- Close:* Close the dialog.

Comments: To calculate the Multi-Phase method click on the Multi-Phase tab. Select the two faulted voltage channel from the Vf1 and Vf2 Channel Number drop down lists then select the IF1 and IF2 Channel Drop down lists. Next, enter the Z1 and Z0 magnitude and angle. If the Z1 and Z0 values are stored in the opened file then these fields will be automatically populated. To have the current and voltage channels lists automatically populated when the dialog is displayed mark the channels first in the analysis window.

The single ended calculator is a stay on top window which allows for changing the position of the data bar while the dialog is open. Use the cursor keys or mouse to move the data bar.

The magnitude and angle for Vf1, Vf2, If1 and IF2 are read from the data bar position in the selected open window. To change the position of the data bar, click on the desired location in the analysis window or use the left and right arrow keys. The values in the single ended fault location dialog are updated automatically. To calculate the fault location click on the Calculate button.

To plot the fault location in the data plotting window as a new channel, click on the drop down arrow in the plot button. The two options are plot the fault location between bars or plot the fault location for the entire record. The default option of the plot button is plot between bars. Between bars plots the fault location between the data bar and the reference bar.

See Also: [Double Ended Fault Location](#)

SINGLE ENDED FAULT LOCATION – THREE PHASE

Location: Analysis

Description: Display the single ended fault location calculator dialog. The single ended fault location calculator calculates a single ended Fault Location. The single ended calculator has four types of calculators: Radial Line Method, Reactance Method, Multi-Phase and Three Phase. This section describes the Three Phase Method.

Activation: *Menu:* Alt-(D) Data, (U) Fault Calculators, (S) Single Ended... Three Phase Tab



Ribbon, Data Tab:

- Fields:**
- VA Channel #:* Faulted VA channel number.
 - VB Channel #:* Faulted VB channel number.
 - VC Channel #:* Faulted VC channel number.
 - IA Channel #:* Faulted IA channel number.
 - IB Channel #:* Faulted IB channel number.
 - IC Channel #:* Faulted IC channel number.
 - Z1:* Magnitude and Angle Z1.
 - Z0:* Magnitude and Angle Z0.
- Options:**
- Refresh:* Refresh VA, VB, VC, IA, IB and IC from the data bar locations.
 - Calculate:* Calculate the fault location.
 - Plot:* Plot the fault location between bars or for the entire record.
 - Report:* Display an ASCII report of the calculated Multi-Phase fault location.
 - Close:* Close the dialog.

Comments: To calculate the multi-phase method click on the Multi-Phase tab. Select the three faulted voltage channels from the VA, VB and VC Channel Number drop down lists and select the three faulted current channels from the IA, IB and IC Channel Number drop down lists. Next, enter the Z1 and Z0 magnitude and angle. If the Z1 and Z0 values are stored in the opened file then these fields will be automatically populated. To have the voltage and current channels automatically populated when the dialog is displayed move the VA, VB and VC channels to the first three display positions in the window followed by IA, IB and IC channels.

The single ended calculator is a stay on top window which allows for changing the position of the data bar while the dialog is open. Use the cursor keys or the mouse to move the data bar.

The magnitude and angle for VA, VB, VC, IA, IB and IC are read from the data bar position in the selected open window. To change the position of the data bar, click on the desired location in the analysis window or use the left and right arrow keys. The values in the single ended fault location dialog are updated automatically. To calculate the fault location click on the Calculate button.

To plot the fault location in the data plotting window as a new channel, click on the drop down arrow in the plot button. The two options are plot the fault location between bars or plot the fault location for the entire record. The default option of the plot button is plot between bars. Between bars plots the fault location between the data bar and the reference bar.

See Also: [Double Ended Fault Location](#)

SOFTWARE ANALOG CHANNELS

Location: Analysis

Description: Display the software analog channel dialog for creating virtual analog channels.

Activation: *Direct:* F5
Menu: Alt-(C) Channels, (A) Software Analog Channels...



Ribbon, Channel Tab:

- Fields:**
- Titles:* The titles for the software analog channels.
 - Operators:* Each analog operation followed by an operator terminator “/”.
 - Fast SACs:* A list of predefined SAC titles and operators.
- Options:**
- Enter/Ok:* Exit the dialog then save and execute the operators.
 - Esc/Cancel:* Exit the dialog without saving or executing the operators.
 - Apply:* Execute the SAC Channels without closing the dialog.
 - Open:* Open a *.SAC file.
 - New:* Create a new *.SAC file.
 - Save:* Save the active SAC file.
 - Save As:* Save the active SAC file under a new name.
 - Clear All:* Clear all the SAC titles and Operators.
 - Show Help:* Show or hide the help window.

Comments: Software analog channels (SAC's) are extra channels provided by the system. These channels can be used to calculate a missing phase, create +, - and 0 sequence channels, create an envelope of a selected trace, or define an under/over-trigger values to monitor a given channel. The SAC window is split into two sections: the titles and the operators. To navigate between fields use the tab, up arrow and down arrow keys.

Operators are formatted as a stacked set of instructions. To select from the predefined fast SACs click on the drop down list then double click on the desired SAC. The name of the SAC is in the first column and the operator is in the second column. To have the SAC name automatically copied to the SAC title click on the Set SAC Titles using Fast SAC headers check box. The position of the channel in the operators is marked by a Pound Sign #. If there are any marked channels in the data plotting window then the fast SAC will be populated with the marked channel numbers. For example if channels 4, 5 and 6 are marked and the Calculate Neutral fast SAC is selected then the Operator will be displayed as: +4/+5/+6/u=A/. If there are no channels marked the operator will be +#/+#/#/u=. The user will have to replace the # with the desired channels numbers and complete the unit.

The SAC instructions are composed of an operator and an operand. An operand can be a channel defined by the channel number or a constant. Constant values must have a “^” operator before each value to distinguish between channel numbers and constant values. To phase shift analog channels, use the “@” sign before each angle defined. All angles must be defined in degrees. Following is a list of all the software operators that are available:

- “+” - Add (Analog),
- “-” - Subtract (Analog),
- “*” - Multiply (Analog),
- “/” - Divide (Analog),
- “^” - Constant value (Analog),
- “@” - Phase Shift (Analog),
- “e” - Adjusted envelope (Analog),
- “a” - Envelope (Analog),
- “<” - Under-trigger (Analog),
- “>” - Over-trigger (Analog),
- “h” - Harmonic for Channel (Analog),
- “h=” - Harmonic for all Back Operations (Analog),
- “x” - real component (Analog),

- "y" -imaginary component (Analog),
- "m" -magnitude (Analog),
- "d" -angle (Analog),
- "r" -true RMS (Analog),
- "f" -cyclic frequency (Analog),
- "q" -instantaneous frequency (Analog),
- "t" -delta time frequency (Analog),
- "s" - sin operator (Analog),
- "c" - cos operator (Analog)
- "b" -operate between bars only (Analog),
- "l" - Absolute Value (Analog),
- "p=" - Prefix (Analog),
- "u=" - Unit (Analog),
- "+" - And (Digital),
- "." - Or (Digital),
- "/" - Instruction terminator (Analog & Digital)

NOTE: All SAC/SDC operations are performed in Reverse Polish Notation (one operation at a time).

The instruction set must always terminate with a "/". An operation error is generated if the instruction formats are not followed.

See Also: [Software Digital Channels](#)

SOFTWARE DIGITAL CHANNELS

Location: Analysis

Description: Display the software digital channel dialog.

Activation: *Menu:* Alt-(C) Channels, (D) Software Digital Channels...

Ribbon, Channel Tab:  SDCs

Fields: *Titles:* The titles for the software digital channels.
Operators: Each digital operation followed by an operator terminator "/".

Options: *Enter/Ok:* Exit the dialog then save and execute the operators.
Esc/Cancel: Exit the dialog without saving or executing the operators.
F1/Help: Display the help window.

Comments: Software digital channels (SDC's) are extra channels provided by the system. The SDC window is split into two sections: the SDC titles, and the SDC operators. To navigate between fields use the tab, up arrow and down arrow keys.

The specified SDC operators must be formatted as a stacked set of instructions.

An instruction is composed of three attributes:

- 1: the operation: "." for AND, "+" for OR.
- 2: the event or sensor to operate on "1", "2",.. "N" .
- 3: an instruction termination character: "/".

All specified instructions must be terminated by a "/". Examples are:

Ex-1: +2/.33/ means set to Event 2, then "and" with Event 33.

Note: In the set of instructions the first operator must be set to the "OR" operation.

Example - +2/.44/+23/

The channels will not be computed if there is an "AND" operator as the first operator in the set of instructions.

Operation Error:

An operation error will be generated if the instruction formats are not adhered to such as, there is a missing instruction terminator "/", or a non-valid operator was specified in the SDC instruction sequence. The error message displays the channel number containing the error.

See Also: [Software Analog Channels](#)

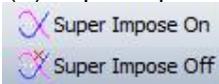
SUPER IMPOSE

Location: Analysis

Description: Superimpose the marked analog channels.

Activation: *Direct:* F7

Menu: Alt-(D) Data, (S) Super Impose



Ribbon, Data Tab:

Comments: To superimpose two or more analog channels, mark the channels and press F7 or select the Super Impose On option under the Data tab. Multiple groups of channels can be superimposed in one display. To superimpose the current channels mark the channels then press F7. The channels will automatically be unmarked after a superimpose operation. Next, mark the voltage channels and press F7 or select the Super Impose On option. To unsuperimpose the channels press F7 or select the Super Impose Off option under the data tab. If no channels are marked and the channels are superimposed then all channels will be un-superimposed, Press F7 to turn this feature ON/OFF.

See Also: [Mark/Unmark All Channels](#)

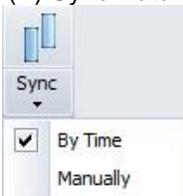
SYNC DATA CURSORS

Location: Analysis

Description: Synchronize the data cursors for two or more open display windows by time or manually.

Activation: *Menu:* Alt-(D) Data, (Y) Sync Data Cursors, (T) By Time

Menu: Alt-(D) Data, (Y) Sync Data Cursors, (M) Manually



Ribbon, Data Tab:

Options: *By Time:* When the By Time sync cursor feature is turned ON the data cursors in the non-active windows are moved to the sample value time in the active window. For

example if the active data cursor is positioned on sample time 01:12:34.560, all non-active data cursors are moved to the sample value at that time. If the time is not found in the non-active window, the cursor position is unchanged. The active window defines the master data cursor and all other cursors follow this position.

Manually: The Manual feature allows for selection of different cursor positions in the open data windows before synchronization is turned ON. For example, open two data windows and tile horizontally, move the data cursors to the beginning of the fault cycle, and select the sync manual cursor option. When the left, right, ctrl-left, ctrl-right, page up, page down, ctrl-page up, ctrl-page down, home and end keys are pressed the data cursors move simultaneously.

Comments: A check mark indicates that the sync feature is ON. To turn synchronizing OFF click on the active sync menu option to remove the check mark. When synchronizing is ON the channel information displayed to the right of the traces is updated for all open data windows.

See Also: [Data Bar](#)

THREE-D PLOTS

Location: Analysis

Description: The Plot 3-D feature plots a maximum of 3 channels in 3-D. To plot the channels in 3-D first mark the 3 channels then click on the Draw 3-D icon under the Channels tab. Viewing channels in a 3-D fashion allows for viewing power flow.

To open the 3-D Plot chart first mark the channels then click on the Draw 3-D icon under the Channel tab.

Activation: *Menu:* Alt-(C) Channels, Draw 3D Plots



Ribbon, Channel Tab:

Comments: To the right of each channel is the channel number, the channel title, the instantaneous maximum and minimum values of the entire channel and the duration of the fault in cycles and milliseconds. The calculation for the duration is defined in the Display dialog located the File Manager's Options tab. The values used in the duration calculation can be edited. The default setting is 15% of nominal for the voltage channels, and times 5 of nominal per unit for the current channels.

See Also: [Display Dialog](#)
[Rose Plots](#)
[SEMI F47-0706 Voltage Sag](#)

TIME BASED DISPLAY

Location: Analysis

Description: The time base display plots the channel data in time. Time base displays are useful for showing changes in line frequency.

Comments: To change the time based display field open the Properties dialog under the Waveform Tab. Click the Display Settings tab and change the Trace Display Type field to time based or sample based.

See Also: [Sample Based Display](#)

TOTAL HARMONICS DISTORTION

Location: Analysis (Harmonics Dialog)

Description: The Total Harmonic Distortion field displays the square root of the summation of the squares of DFT Magnitudes for harmonics 2 to the maximum harmonics and that quantity divided by the DFT Magnitude of the Fundamental. The maximum harmonic is the number of samples per cycle (sampling frequency / line frequency) divided by 2.

See Also: [Harmonics Table Histogram](#)

TRACE SCALE MULTIPLIER

Location: Analysis (Window Properties Dialog)

Description: Used as a multiplier to increase/decrease the amplitude of the visible analog channels

Activation: *Menu:* Alt-(F) File, (T) Window Properties..., Display Settings Tab



Ribbon, Waveform Tab:

Range: Greater Than 1.00

Default: 1.75

Comments: When a channel's amplitude is increased, the trace scale value is multiplied with the current amplitude value, and when the channel's amplitude is decreased the trace scale value is divided by the current amplitude value.

See Also: [Auto Scaling](#)
[Decrease Amplitude](#)
[Increase Amplitude](#)

TRIGGER-TIME

Location: Waveform Summary (Events/Sensors Activity Log)

Description: Displays the time the digital channel changed state. This value is displayed in the third column of the Events/Sensors Activity Log.

Comments: The Events/Sensors Activity Log displays a time-sequenced list of all the events and sensors activity.

See Also: [Waveform Summary](#)

TRUERMS

Location: Harmonics Table (Analysis)

Description: Displays the RMS value for all the samples between the RMS bar (black dotted line) and the data bar (black solid line).

Comments: This value is taken directly from the RMS column inside the analog information table.

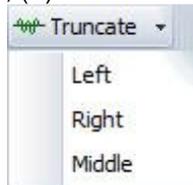
See Also: [Harmonics Table Histogram](#)

TRUNCATE CYCLES

Location: Analysis

Description: Remove beginning, middle or end cycles from the active analysis window.

Activation: *Menu:* Alt-(D) Data, (T) Truncate Cycles, (L) Left-Start to Data Bar
Menu: Alt-(D) Data, (T) Truncate Cycles, (R) Data Bar to End
Menu: Alt-(D) Data, (T) Truncate Cycles, (M) Data Bar to Reference Bar



Ribbon, Data Tab:

Comments: There are 3 options available under the Truncate Cycles menu option. Left removes the cycles from the first sample to the data bar (solid black vertical line). Right removes the cycles from the data bar to the last sample. Middle removes the cycles from the data bar to the reference bar (dotted blue vertical line)

See Also: [Duplicate Cycles](#)

TVE (TOTAL VECTOR ERROR) CALCULATOR

Location: Analysis

Description: The TVE (Total Vector Error) calculator is used to calculate the TVE for synchro-phasor measurements. TVE is defined as the square root of the difference squared between the real and imaginary parts of the theoretical actual phasor and the estimated phasor. The equation used in the calculator is from the IEEE C37.118-2005 Standard, Equation # 2.

The TVE is calculated on the first displayed channel or the first marked channel. To mark channels use the spacebar or mouse. Marked channels are displayed in red.

Activation: *Menu:* Alt-(D) Data, (V) TVE Calculator

Ribbon, Data Tab: 

Fields:

| | |
|-----------------------------------|---|
| <i>Actual Values Magnitude:</i> | Enter the actual magnitude value. |
| <i>Actual Values Angle:</i> | Enter the actual angle value. |
| <i>Measured Values Magnitude:</i> | The measured magnitude is read from the RMS column in the data plotting window. |

Measured Values Angle: The measured angle is read from the Phase column in the data plotting window.

Total Vector Error (TVE): Displays the TVE calculated between the measured and actual values.

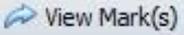
Options: Refresh: Read the measured values at the data bar position.
Enter/Calculate: Calculate the TVE.
Esc/Close: Close the dialog.

Comments: The TVE dialog is a stay on top dialog allowing for the data bar to be moved in the data window while the dialog is open. Use the cursor keys or the mouse to move the data bar. To populate the Measured values with the values at the data bar click the Refresh button. Enter the Actual values then click the Calculate button to show the TVE between the Actual values and the measured values.

VIEW MARK(S)

Location: Analysis

Description: Hide all the unmarked channels and resize the marked channels.

Activation: *Direct:* Enter
Menu: Alt-(C) Channels, (V) View Mark(s)
Ribbon, Channels Tab : 

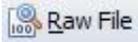
Comments: Individual channels are marked and unmarked by clicking the left mouse button on the channel's corresponding display ID number or channel information or by pressing the spacebar. Marked channels are displayed in red.

See Also: [Hide Mark\(s\)](#)
[Show All Hidden](#)
[Restore Mark\(s\)](#)

VIEW RAW DATA FILE

Location: Analysis

Description: View the contents of the active displayed file in an ASCII editor or a hexadecimal editor.

Activation: *Direct:* Menu button 
Menu: Alt-(F) File, (V) View Raw Data File...
Ribbon, Waveform Tab: 

Comments: The waveform file is displayed in an ASCII editor if the contents of the file are in text format and displayed in a hex editor if the file is in binary format.

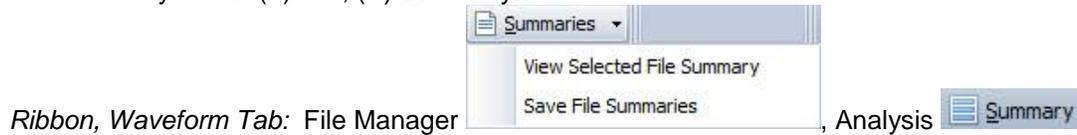
See Also: [Restore Original](#)

WAVEFORM SUMMARY

Location: File Manager and Analysis

Description: Generates and displays analog and digital summaries for the active file in the file table or in the analysis window.

Activation: *Direct:* Summary menu buttons File Table , Analysis 
Menu: File Table: Alt-(O) Options, (S) Waveform Summaries,
Menu: Analysis: Alt-(F) File, (S) Summary...



Ribbon, Waveform Tab: File Manager

, Analysis  Summary

Comments: The summary file displays the following information:

Waveform Information

Station: Name of the Station associated with the waveform.

Filename: The name of the waveform file.

File Size: The size of the file in kilobytes.

Prefault-Time: The date and time of the first prefault sample.

Fault-Time: The date and time of the first fault sample.

Save-Time: The date and time the file was saved to hard disk.

Process-Time: The date and time the file was processed into this summary.

Start Date & Time: Date and time of the first sample in the file.

End Date & Time: Date and time of the last sample in the file.

File Duration: Duration of the file measured in days, hours, seconds, milliseconds and/or microseconds, depending on the type of file.

Sampling Frequency: Sampling frequency and the time between each sample.

Line Frequency: Line Frequency defined in the file.

Fault Information

Fault Information is displayed for SEL, DLP and Transcan files. The fault information includes: Fault Type, Fault Time, Location, Targets, Triggers, Frequency, Event and Targets.

Maximum/Minimum Analog Summary

Max-Inst: Instantaneous maximum values.

Min-Inst: Instantaneous minimum values.

Max-RMS: RMS maximum values.

Min-RMS: RMS minimum values.

OneBit: The channel's full-scale value divided by the channel's resolution.

Inst-Diff: The difference between the Max-Inst and Min-Inst values.

RMS-Diff: The difference between the Max-RMS and Min-RMS values.

pU: The channel's prefix and units.

Description: The number and title of the channel.

Events/Sensors Activity Summary

Fst: The state the channel started at, A=alarm, N=normal.

Lst: The state the channel ended at, A=alarm, N=normal.

Fst-Change: The date and time the channel first changed state.

Lst-Change: The date and time the channel last changed state.

Changes: The number of times the channel changed state.

Description: The number and title of the channel.

Events/Sensors Activity Log

State: The state of the channel at the triggered time, A=alarm, N=normal.

Trigger Time: The time the channel changed state.

Description: The number and title of the channel.

Note: An xx:xx:xx.xxx in the events/sensors activity summary indicates that the digital channel's state did not change from the initial state (Fst).

WINDOW PROPERTIES

Location: Analysis

Description: The Analysis Window Properties dialog allows for repositioning the columns in the analog table, change the fields displayed in the combination view, change the background colors and trace colors; change the driver's data type, change the trace/phasor scale multipliers and more refer to the fields below.

Activation: *Direct:* Properties Menu Button 
Menu: Alt-(F) File, (T) Window Properties



Ribbon, Waveform Tab :

| | |
|----------------|--|
| Fields: | <p><i>Analog Table Tab:</i> Reorder/Show/Hide the columns in the analog table.</p> <p><i>Analog Combination Tab:</i> Change the display positions in the analog combination view.</p> <p><i>Comtrade:</i> Define the Comtrade format for saving, the date and time format for display and set automatic conversion from RMS data to Peak data when using the Save As Comtrade option.</p> <p><i>Colors:</i> Change the background colors and trace colors.</p> <p><i>Display Settings:</i> Change the trace/phasor scale multipliers and set general display properties.</p> <p><i>Append/Merge:</i> Define the append type and merge analog titles.</p> <p><i>Driver Data Type:</i> Set the current display driver's data type to Peak type or RMS calibrated, convert the analog samples from primary to secondary and visa verse, edit the ration values and convert the line impedance values from primary to secondary or secondary to primary.</p> <p><i>Filters:</i> Delete spikes and set up spike properties.</p> |
|----------------|--|

Options: *OK:* Apply the selected changes and redraw the analysis window.
Cancel: Exit the dialog without executing the changes.

Comments: The active data window and all future opened files will be updated with the settings changed in the properties dialog.

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