DRAN-VIEW®
DRAN-VIEW *Pro*
DRAN-VIEW *Report Writer*

Version 4.0

USER S GUIDE

AC POWER ANALYSIS SOFTWARE
For

Power Platform® PP1 with TASKCard® PQPlus™ and TASKCard Flicker
Power Platform PP4300 with TASKCard PQLite™ and TASKCard 808
658 PQ Analyzer
DRAN-LOGGER® DL1, DL1-T

June 1998

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Part Number OM-DRANVIEW

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Chapter 1 - Introduction

This manual contains information about the contents, installation and operation of the DRAN-VIEW®, DRAN-VIEW *Pro* and DRAN-VIEW *Report Writer* software package.

DRAN-VIEW is a tool for viewing data on a PC from the following Dranetz-BMI analyzers and TASKCards:

- Power Platform® PP1 with TASKCard® PQPlus™ and TASKCard Flicker
- Power Platform PP4300 with TASKCard PQLite™ and TASKCard 808
- 658 PQ Analyzer
- DRAN-LOGGER® DL1, DL1-T

Note: In order to support the above features the proper drivers are required, which may not be included in your installation. To find out about the instrument(s) supported by your installation, use the **Help-About** command from the main menu.

DRAN-VIEW is a Windows 3.1/Windows 95 and Windows NT compatible program that is used to access and retrieve data from data files on a memory card (requires PCMCIA slot or memory card reader) or from other disk media compatible with MS-Windows operating system.

Features and Highlights

- Windows 3.1, 95 and NT compatible
- Direct interface with DRAN-LINK communications software
- Two-pane browser (time plots and waveforms simultaneously)
- Multiple ZOOM levels (up to 15 times)
- Advanced Harmonic analysis (DFT/FFT) featuring phasor diagrams and flexible data presentation
- Toolbar and Button support
- Drop-down Events list
- Multi-parameter time plots
- Time measurement tool (delta measurement)
- Saves data to .DNV (DRAN-VIEW compressed format) or converts to ASCII
- Status bar displays time, date and selected pane parameters
- Accelerator keys and right mouse button support
- Cut and paste to other applications.
- E-mail .DNV data files directly from DRAN-VIEW

Differences between DRAN-VIEW and DRAN-VIEW *Pro*

These features are available only in DRAN-VIEW *Pro*:

- File Append
- Harmonic and 3D timeplots
- Statistics Table with timeplots containing min, max, weighted median, standard deviation, 5%, 95% and 99% figures.
- Report Writer
  (Note: The standard version of DRAN-VIEW may be upgraded to include Report Writer by installing a Report Writer Driver provided on a separate diskette).

New major features in version 4.0

- Support for TASKCard Flicker
- Millennium compliance
- Report Writer in DRAN-VIEW *Pro*
- File Append in DRAN-VIEW *Pro* for PQPlus and PQLite TaskCards
- Phasors diagram
- DFT/FFT phase normalization
- DFT/FFT optional sine or cosine expansion
- DFT/FFT output in Absolute terms, % of FUND, % of RMS or % of Load (User scale)
- DFT/FFT computation of inter-harmonics (with multi-cycle waveforms only).
- Weighted computation of timeplot statistical parameters in order to get better estimated values from threshold (rather than time) triggered data.

Chapter 2 - Getting Started

2.1 Requirements

Operating system:	MS-Windows, version 3.1, 3.11, 95 or NT
Processor:	386 or higher
Memory requirements:	8Mb or more (16 MB recommended)
Disk requirements:	2.0 MB for installation At least 24 MB free disk for file conversions (importing TASKCard data files)
DOS conventional memory required:	303Kb or more

2.2 Installing DRAN-VIEW and DRAN-VIEW *Pro*

NOTE - A typical DRAN-VIEW software installation process will minimally require two diskettes: the DRAN-VIEW installation diskette and an instrument driver diskette. An instrument driver is required for each different analyzer or option, e.g., the PP1 TASKCard PQPLUS driver is required to use DRAN-VIEW with the PP1-PQPLUS analyzer data.

License and security issues

First time installation - READ CAREFULLY

Your DRIVER disks will be digitally marked with the "name" and "company" signature you provide when you install DRAN-VIEW 4.0. Your driver disks will only be accepted by your particular copy of DRAN-VIEW in the future. ***At installation time users should record their license information exactly for possible future use***. In a normal upgrade situation DRAN-VIEW will automatically know who the intended licensee is and will use that information during installation setup. If the system happens to lose the license information (because the DRAN-VIEW directory was deleted, for instance) and the user wishes to upgrade to a new version of DRAN-VIEW you will be left with registered drivers and unregistered applications software. In this situation it is imperative to know the *exact* license signature of the drivers or you will be unable to install the new software successfully.

Upgrading to DRAN-VIEW 4.0 from a older version

Note 1: If you wish to change the name of the licensee and company from that which was recorded in your previous installation of DRAN-VIEW, you must remove the file DRAN-VIEW.LIC in the existing DRANVIEW installation directory, BEFORE running the new DRAN-VIEW setup for the first time. Otherwise the SETUP utility will force your new DRAN-VIEW to have the very same license information as the old version.

Note 2: In order to ensure proper registration of the drivers, reinstallation of the original driver diskettes is strongly recommended.

Note 3: The write protection tab on your old DRIVER diskette(s) must be disabled (WRITE-ENABLED).

Your DRIVER disks will be digitally marked with the same "name" and "company" signature you provided when you installed the old DRAN-VIEW. If the drivers do not match the signature of the DRAN-VIEW application, the program will not accept the driver(s). In other words, you are not allowed to share your drivers with other DRAN-VIEW installations.

Follow these steps to install DRAN-VIEW from Windows 3.xx

Insert the DRAN-VIEW installation diskette in the a: (or b:) drive
Select Run from the File menu in the Program manager.

In the Command line: box, type **a:\setup** (or b:\setup) and click OK

Follow the on-screen instructions -- insert available DRAN-VIEW driver diskette(s) when requested.

Follow these steps to install DRAN-VIEW from Windows 95 or Windows NT

Insert the DRAN-VIEW installation diskette in the a: (or b:) drive
Click the start button and select RUN.

Type **a:\setup** (or b:\setup) and press ENTER

Follow the on-screen instructions - insert available DRAN-VIEW driver diskette(s) when requested

or

Insert the DRAN-VIEW installation diskette in the a: (or b:) drive
Click the Start button and run Explorer

Select drive a: (or b:) and double-click on the SETUP.EXE file

Follow the on-screen instructions - insert available DRAN-VIEW driver diskette(s) when requested

or

Insert the DRAN-VIEW installation diskette in the a: (or b:) drive
Click the Add/Remove icon in the Control Panel and follow the on-screen instructions -- insert available DRAN-VIEW driver diskette(s) when requested

DRAN-VIEW creates a DRANVIEW.INI file in the Windows directory and inserts a reference to DRAN-VIEW under “Programs” in the WIN.INI file.

Once the DRAN-VIEW installation is completed, the DRAN-VIEW icon will be added to the existing Dranetz-BMI Power Suite program group (if one doesn't already exist, a new group will be created). Double-click the DRAN-VIEW icon at any time to start the DRAN-VIEW application.

When the application has started the menu is limited to three options: File, View and Help.

Select the File/Open option to proceed.

2.3 CAPABILITIES AND LIMITATIONS

DRAN-VIEW does NOT support long filenames.

DRAN-VIEW does NOT support OLE (Object Linking and Embedding).

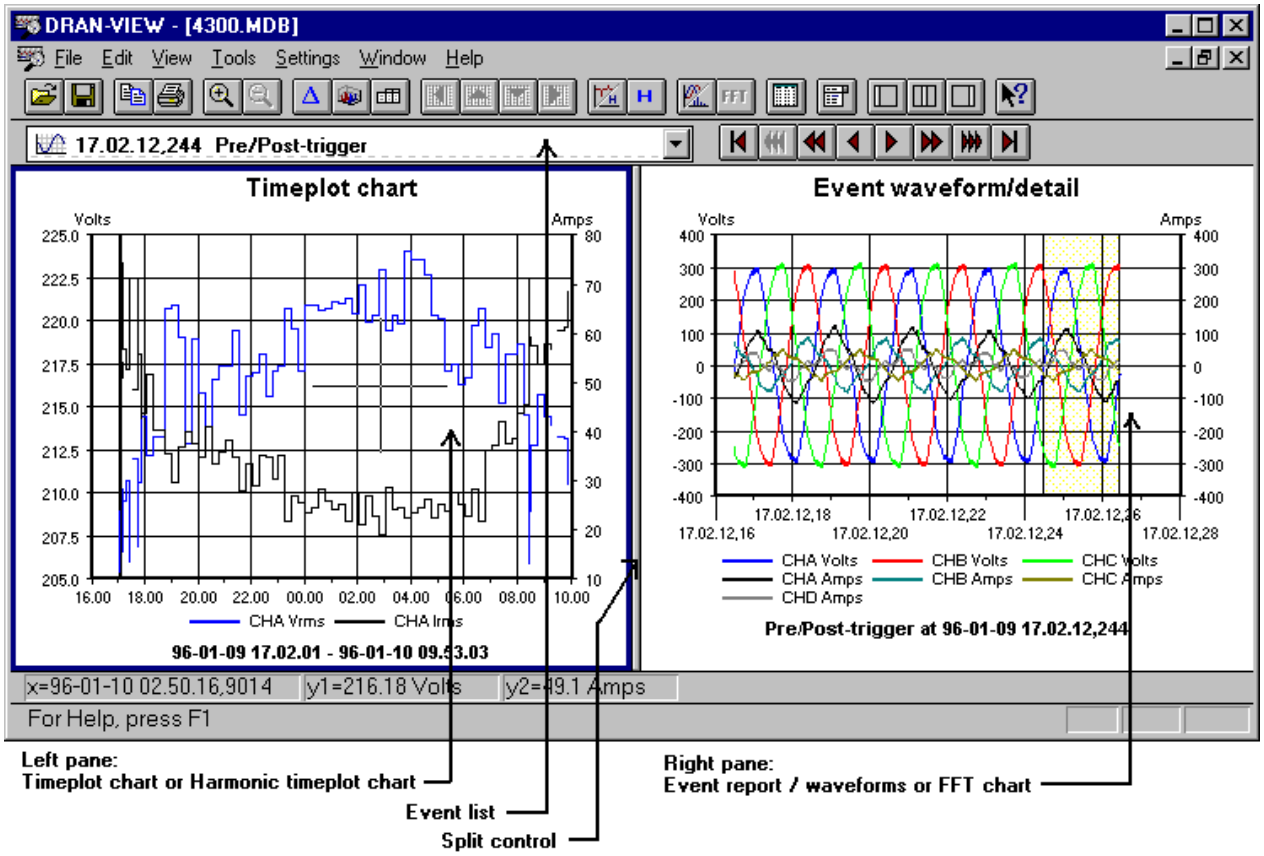
DRAN-VIEW supports DRAG and DROP. If you drag a DRAN-VIEW readable file, such as a .DNV-file from the File manager or Explorer and drop it over either the started DRAN-VIEW application or the DRAN-VIEW icon, DRAN-VIEW starts with the document loaded.

If the following extensions have not been previously associated by another application DRAN-VIEW will associate them to the DRAN-VIEW application automatically: '.DNV', '.EVT', '.MDB', '.DL1', '.$$$' and '.658'. This means that if you double-click a file with one of these extensions, DRAN-VIEW will start with that document loaded (or load it, if already started). DRAN-VIEW adheres to a "first come first serve" association protocol, deferring to a previous association to prevent conflicts with other applications that may associate the same extensions. If Microsoft Access is already installed DRAN-VIEW will not usurp association rights for the MDB extension upon installation. Conversely, if Microsoft Access is installed after DRAN-VIEW is installed the MDB association will be usurped by Access. In either situation, if you wish for DRAN-VIEW to have the association you must do it by hand.

DRAN-VIEW can process, handle and display very large amounts of data very quickly. To achieve this peak performance, DRAN-VIEW must use a considerably large amount of memory. If you have a system with only 8 MB of RAM, you should avoid having too many files loaded at the same time. Without adequate memory, the system will be forced to swap data between disk and physical RAM memory frequently, thus degrading performance. On MS-Windows 3.x a large SWAP-file can be very helpful. To view how much memory DRAN-VIEW is using you can use the 'More info…' button in the Help-About dialog box.

Chapter 3 - General Concepts

3.1 The Main Screen



To fully understand how to operate this program it is important to know how the items on the screen are tied together and how to manipulate them. The document view (window) is divided into two panes *(The Event Waveform detail pane cannot be displayed when using the DRAN-LOGGER DL-1 or DL1-T)*. These panes are divided by the split control (a vertical line between the panes). The position of the split control can be changed, either by clicking and dragging the split control to the left or right with the mouse, or by selecting one of the three split functions in the toolbar.

The left pane shows the TIMEPLOT charts, and the right shows waveform or event details (in text) if available. At any time, only one event can be active (selected) in a document. To select a particular event, pull down the event list (located in the toolbar). If you wish to step back and forth between adjacent events, it is often easier to use the toolbar buttons. Another way is to click directly into one of the charts. As you hold the mouse button down, the cursor is shown as a vertical line. Position the vertical line at the desired time stamp and release the mouse button. If the “Snap to waveform event” option has been selected the selected event will be the closest waveform that matches the time stamp. If “Snap to waveform event” is not selected then the event selected will

be the event closest to the cursor position. In this fashion you can click on the timeplot to select an event in the region of interest and then use the tool bar in the right pane or the event list pull down to select the exact event(s) of interest.

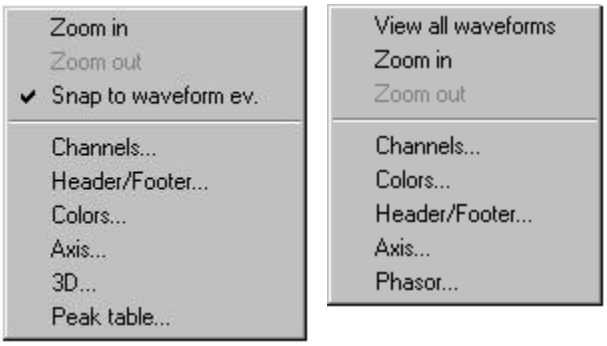
The currently selected event is always marked in the charts with a vertical line, or if zoomed, shown as a rectangle with shaded background.

When you move the mouse over a chart it will show as a cross hair. The coordinates for the cross hair are shown in the indicators below the chart in the lower left of the screen. The cross hair may also be moved by the keyboard arrow keys. The cross hair is also used by the zoom function and the delta measurement feature.

3.2 The Right Mouse Button

To quickly access important settings, the program activates a pop-up menu when you point at a chart and click the right mouse button.

Left pane: Right pane:



Note: The selections lists above may differ slightly dependent on the particular type of file being viewed.

3.3 The Accelerator Keys

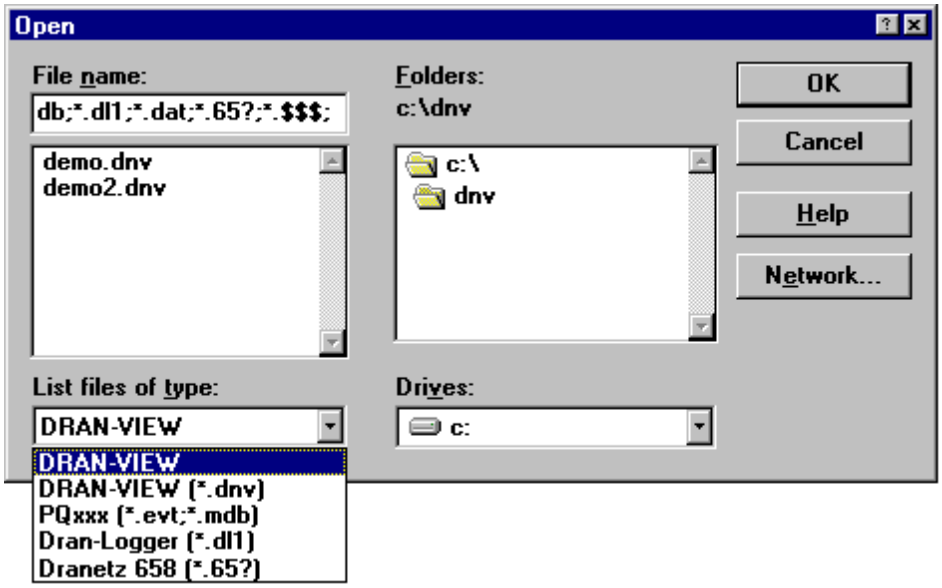
If you are not using a mouse or if you prefer using the keyboard, the program supports the following accelerator (shortcut) keys.

Ctrl+C	Copy to clipboard
Ctrl+D	Show data in table list
Ctrl+E	Put split control in the middle (*)
Ctrl+F	Toggle FFT on/off (*)
Ctrl+H	Harmonic timeplot on/off (*)
Ctrl+I	Toggle Zoom in
Ctrl+M	Toggle delta measurements on/off
Ctrl+O	Open file
Ctrl+P	Print
Ctrl+R	Put splitter to the right (*)
Ctrl+S	Save file
Ctrl+U	Zoom out
F1	Help
Shift-F1	Context help
F3	First event
F4	Previous waveform group (*)
F5	Previous waveform event (*)
F6	Previous event
F7	Next event
F8	Next waveform event (*)
F9	Next waveform group (*)
F10	Last event
Left, Right, Up, Down	Moves the cursor.

(*) = Not supported by DRAN-LOGGER databases.

Chapter 4 The File menu

4.1 Open



DRAN-VIEW can import the following file formats:

- PQLite TASKCard files with the extension .MDB or .EVT.
- PQPlus TASKCard files with the extension .MDB or .EVT.
- Flicker TASKCard files with the extension .MDB or .EVT.
- PQPlus TASKCard remote files, downloaded by serial link or modem with the extension .DAT (with some restrictions)
- DRAN-LOGGER DL1 files with the extension .DL1.
- 658 PQ ANALYZER files with the extension .658 or .$$$

Select one of your files and press OK to start the conversion process.

Multiple files can be opened if you hold down the SHIFT key and click on another filename(s). When you click the OK button these files will be loaded automatically.

If you want to store the file, it will be given the extension .DNV. This is the document file format of DRAN-VIEW. DNV files occupy less space on the disk and also load faster than .MDB and .EVT files. The DNV file format is not compatible with any program other than DRAN-VIEW and is highly compressed. There is little to be gained by packing it with other compression tools.

DNV files contain information about the actual chart settings in use when the file was saved. When the file is loaded it will appear exactly as it was when you saved it.

Toolbar button :

4.2 Close

Closes the currently active document. If changes have been made, you will be prompted to save it first.

4.3 Save

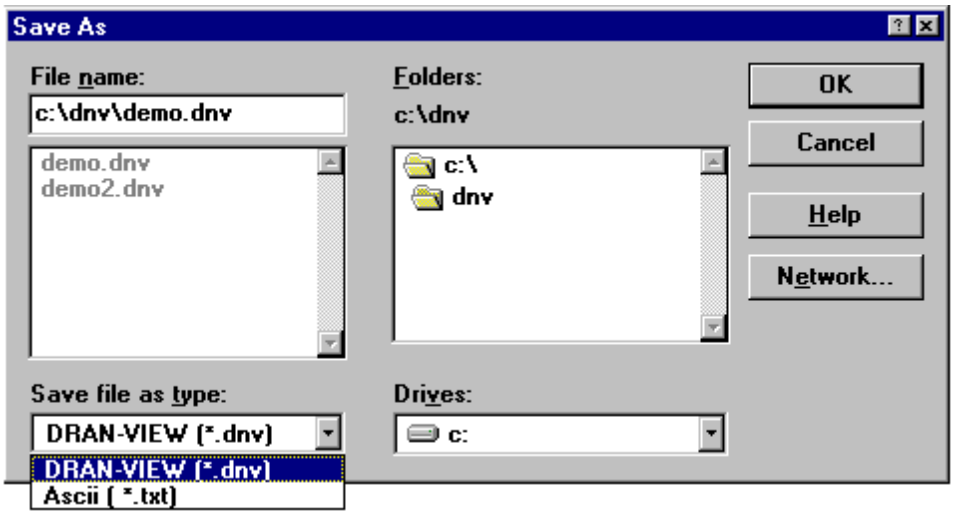
Saves the currently active document. The Save As dialog will appear if it is not a .DNV file.

When you re-save a .DNV file, it takes a very short time. The first time a new file is saved takes longer because DRAN-VIEW must store the complete set of data.

Toolbar button :

4.4 Save As

Use this command to save and name the active document. DRAN-VIEW displays the Save As dialog box so you can name your document.

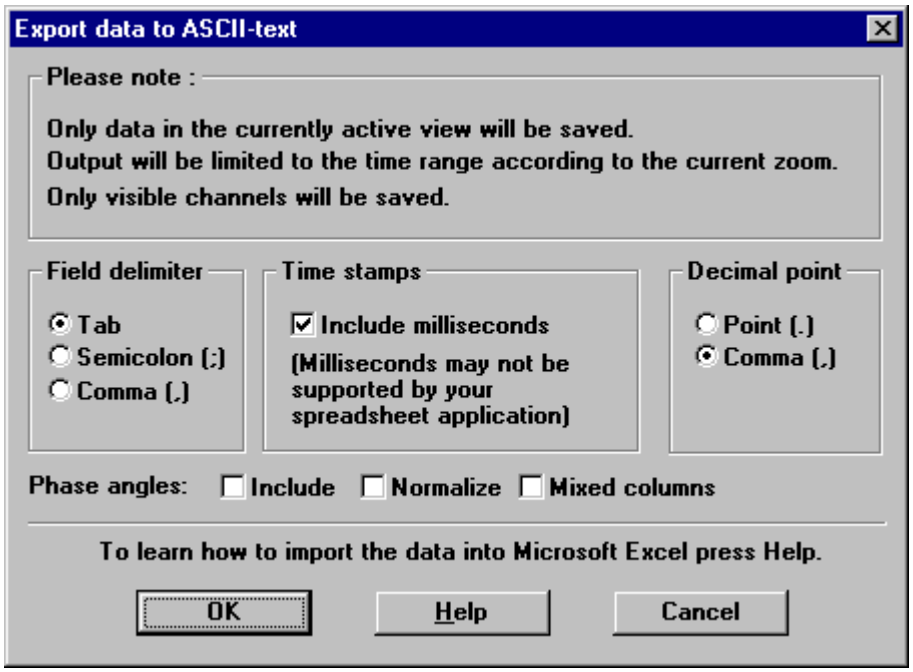


You can use this dialog to give your document another name or to export data to an ASCII-file.

ASCII format
The data available in the current chart may be exported to an ASCII format file (plain text). Later, this file may be loaded into Microsoft EXCEL or some other spreadsheet application.

Important Note: To export an ASCII format file you must select **ASCII(*.txt)** in the *Save file as type:* box. You must make sure that the extension of the file name in the File name: box is .TXT. If the file name extension is .DNV, DRAN-VIEW will save the .DNV file type even if .TXT is selected in the *Save file as type:* box.

After you click the OK button, the following dialog will be shown to customize the data.



The default settings in this dialog are taken from the Windows control panel.

Delimiter

This is the character to be inserted between the data items in the file.
The default delimiter in use by Microsoft Excel is TAB regardless of the language settings of Windows.

Decimal point

This is the character for the decimal point in the numerical data. Normally you should use "**.**" (point). Some countries use "**,**" (comma) in Windows applications.

Include milliseconds

If this option is checked the date and time format for time stamps will also contain milliseconds. Not all spreadsheet applications support this format. Microsoft Excel versions prior to version 5.0 do NOT support milliseconds.

When Exporting a Harmonic chart or table the following commands will be available:

Phase angles: Include

This option runs an additional Fourier Transform on the waveshapes and adds the phase angles to the harmonic magnitudes that are in the scope of your chart (or table). The non-normalized phase angles that are generated are for a cosine series expansion.

Phase angles: Normalize

This option recalculates the phase angles such that the fundamental (FND) phase angle is zero in the cosine expansion. All the harmonic phase angles are adjusted accordingly. This might be convenient if you are only interested in the shape of the waves, not the phase relative to some starting time.

Phase angles: Mixed columns

This option selects how to arrange the magnitudes and phase angle columns. If mixed columns is selected, the phase angle will be stored immediately after each magnitude.

4.5 Append (DRAN-VIEW *Pro* only)

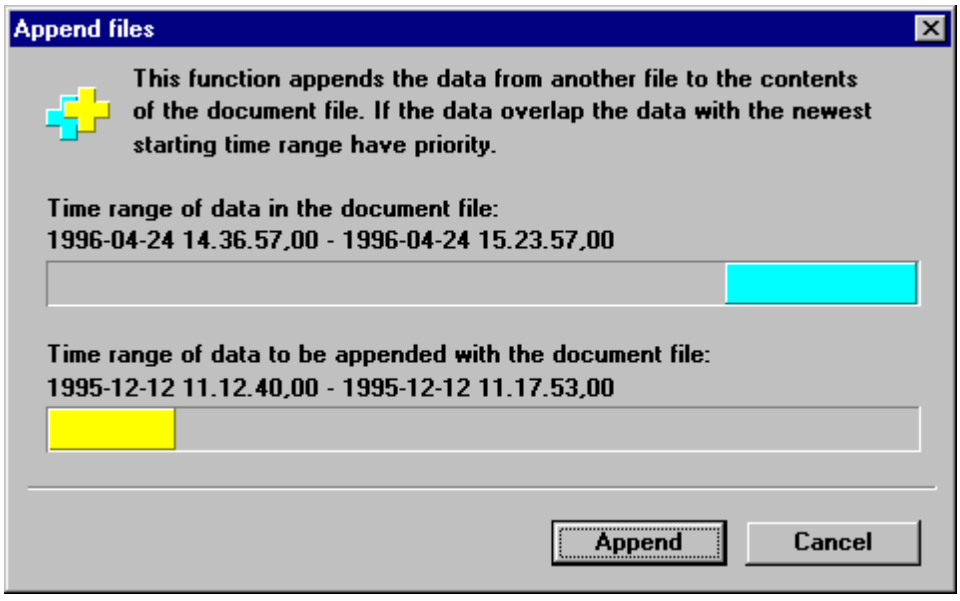
The DRAN-VIEW *Pro* package allows several files to be merged into one DRAN-VIEW DNV file. Use this command to add another database file (DNV, MDB or EVT) to the active document. After the APPEND process, the document will contain data from two individual data files in a single file. Another APPEND can be issued to add data from a third data-file into the document and so on. The data from the individual files will be inserted according to their timestamps. If two data sources overlap (in time) then the file with the most recent starting time will have priority and therefore overwrites existing data.

Note: Version 4.0 cannot append files that do not contain waveforms.

Step 1.
Load the MDB/EVT or DNV file you want to ADD another file into, using the normal File-Open command. This initial file will be referred to as the *Document* in the following steps.

Step 2.
Make sure that the target document has been selected on the screen, and then run the File-Append command. This will bring up a dialog that looks like a **File-Open** dialog.
Select the MDB, EVT or DNV file you want to insert into the target document.

Step 3.
The following dialog box shows the relationship of the two files. If the bars overlap then the oldest file will have its data removed in favor to the data of the newest file in the overlap region.

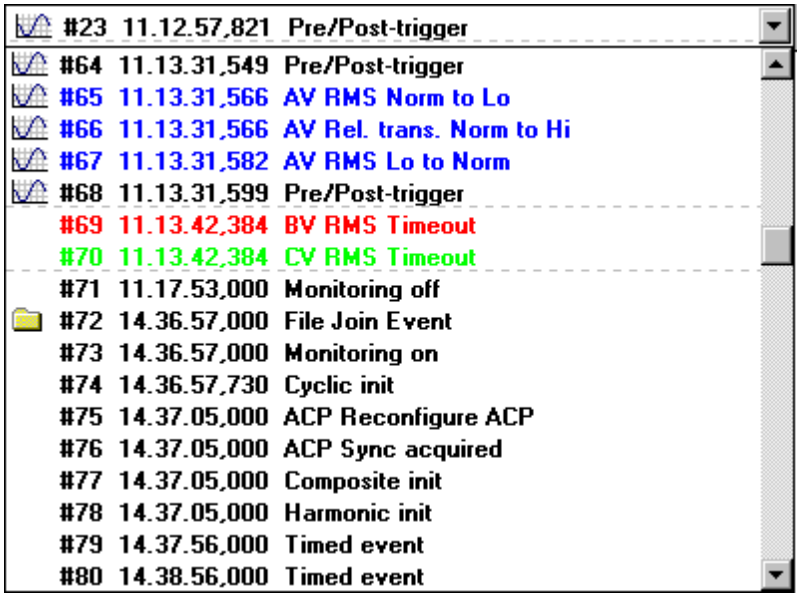


Press Append to start the conversion.

You may now want to save the document into a new disk file with a new name so the original data is not overwritten.

Note: EVT/MDB files will never be modified by this operation. Only the DNV file is changed.

If you take a close look in the event list you will see a new type of event that indicates where in time the newest file starts (Event number 72 in the example below).



The new “File Join”-event contains a complete set of instrument configurations. When you select the first event of the joined file DRAN-VIEW uses the “File Join” - event to insert the instrument configuration context that existed for the joined event file rather than using the old, possibly invalid configuration. This is shown easily by using the *View-Instrument Config* command on an event before the Join Event, and then looking at it again when selecting an event following the Join-Event.

As an example the Site Information String (&s) that you may include in your chart footers may change when DRAN-VIEW comes to the File-Join event. This demonstrates that the “Join - Event” contains both the instrument and the DRAN-VIEW setups of the joined file.

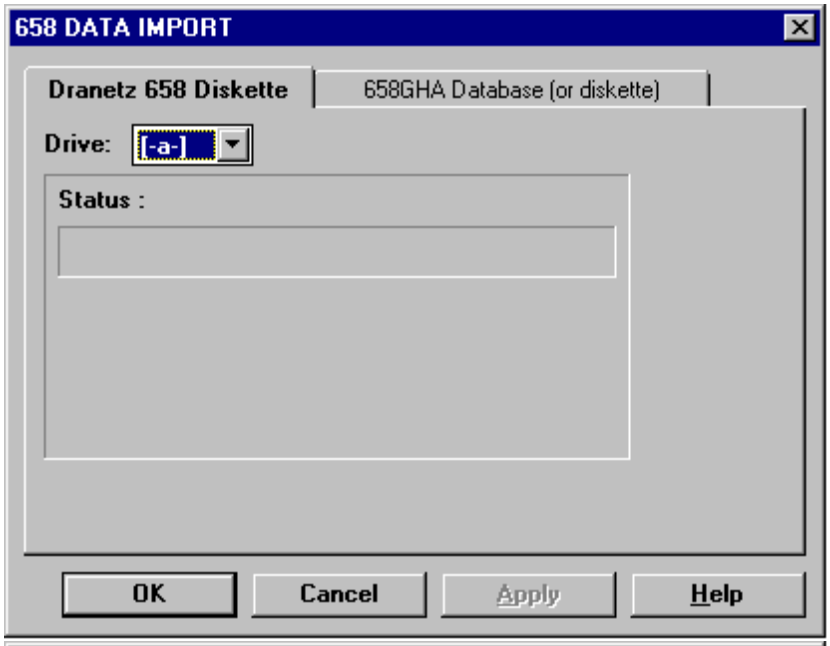
Note: This command is provided primarily as a means to join (concatenate) and merge databases of similar content and origin. There will be some data loss in the older file in regions of data overlap. Some caution is indicated to help avoid unexpected or nonsense results. For instance, combining a 658 with a PP1 PQPlus™ database is not recommended. This command is best used when appending files measured with the same instrument and on the same measuring

point. At minimum, only append files that have the same line frequency. There is no theoretical limitation on how many files may be appended. There is however a theoretical limitation of 32000 events in a DNV file. Before reaching these 32000 events you will find that DRAN-VIEW starts to become slower and slower due to the huge amount of data. The practical limitation depends on the performance of your computer.

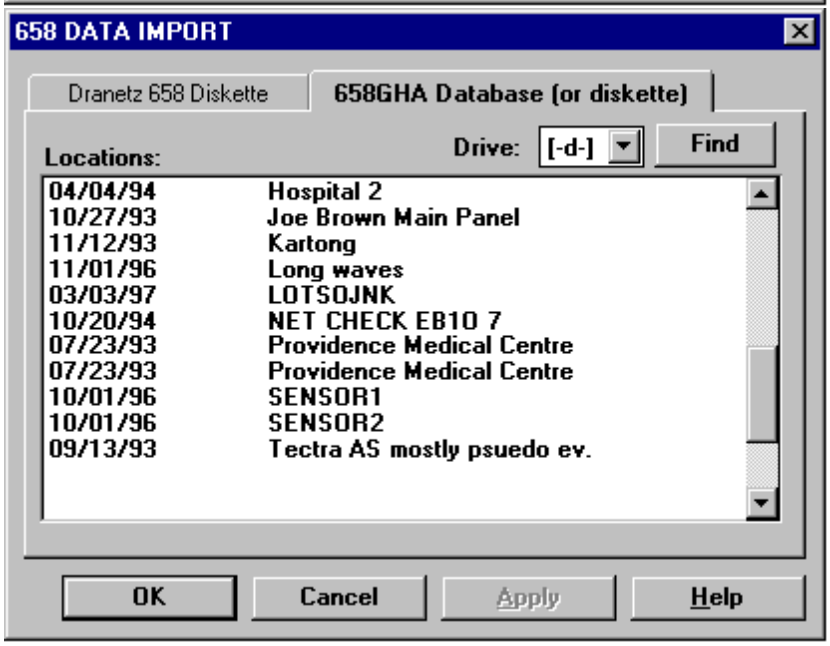
4.6 Import 658

This option is available only if the 658 driver is installed.

Use this command to load native format 658 data stored on a diskette or to import data from an existing installation of the 658 GHA software. This command brings up the Import658 dialog box.



Use this tab to import data from a 658 PQ ANALYZER native data diskette. Insert the diskette, select the correct drive letter and press the OK button. Store the data to a DNV file using the 'File-Save As' dialog box.



Use this tab to read data generated by the 658GHA software.

This tab will accept either ***658GHA DATABASE*** data or ***658GHA BACKUP LOCATION*** diskette data.

The first time you switch to this tab, DRAN-VIEW will automatically check for a 658GHA database on drive C:.

- **Accessing the 658GHA database:**
  Select the appropriate drive using the **Drive** list box. Press the **Find** button. DRAN-VIEW scans the entire disk for the first 658GHA database it finds. If no database is found then the list box will be empty. To read a record in the database select the entry and press the OK button.

- **Accessing a 658GHA BACKUP LOCATION diskette:**
  Select drive A: (or B:) in the **Drive** list box. Then press the **Find** button. DRAN-VIEW checks to see if the diskette contains a backup location file and then shows the location name in the list box. Select the location in the list box and press the OK button.

  After you have read the diskette you may want to change the **Drive** list box back to your primary 658GHA database by first selecting an appropriate hard-disk drive and then pressing the Find button.

4.7 Print

The currently selected chart will be printed after showing the printer dialog box.

Toolbar button :

4.8 Print Preview

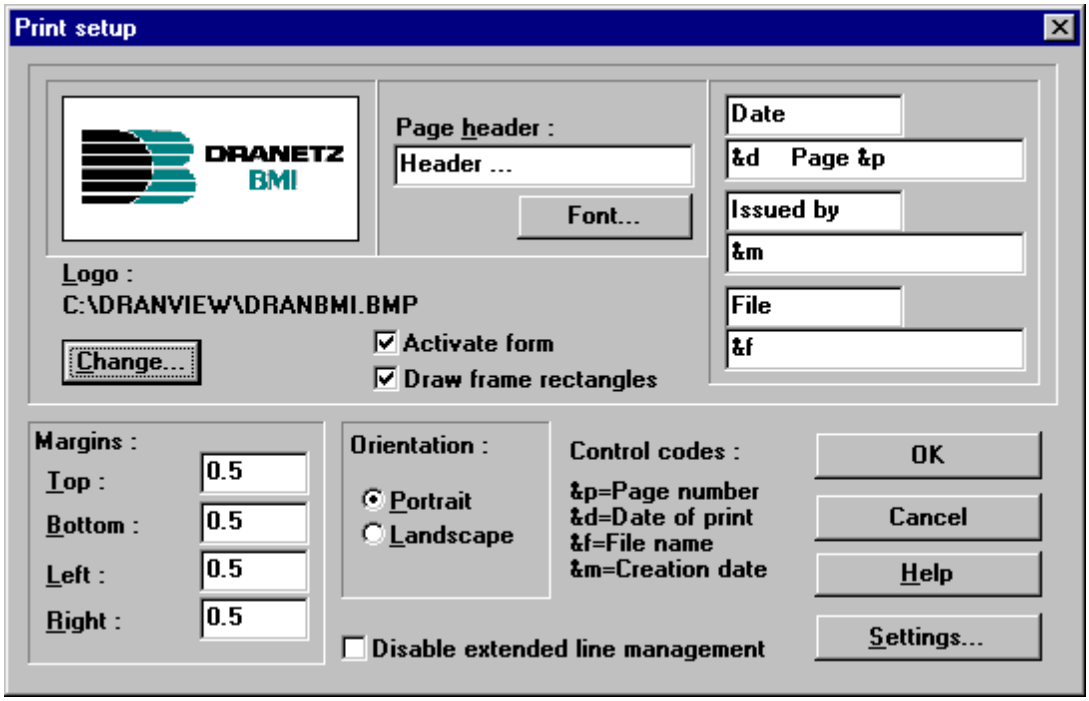
Use this command to display the active document as it would appear when printed. When you choose this command, the main window will be replaced with a print preview window in which one or two pages will be displayed in their printed format. The **print preview toolbar** offers you options to view either one or two pages at a time; move back and forth through the document; zoom in and out of pages; and initiate a print job.

Print Preview toolbar

The print preview toolbar offers you the following options:

Print	Bring up the print dialog box to start a print job.
Next Page	Preview the next page.
Prev Page	Preview the previous page.
One Page/Two Page	Preview one or two pages at a time.
Zoom In	Take a closer look at the page.
Zoom Out	Take a larger look at the page.
Close	Return from print preview to the editing window.

4.9 Print Setup



This dialog box controls the appearance of the prints.

Activate form

Selection of this control enables you to place your own custom picture at the top of every page. This is particularly useful for embedding your logo in the printouts. DRAN-VIEW supports the following picture formats:

- **.BMP and .DIB -** Windows device independent bitmap, used by Windows Paintbrush.
- **.WMF -** Windows Metafile picture (*.WMF) on top of every page. A .WMF file can be created by vector oriented drawing tools like CorelDraw.

Draw frame rectangles

If this control is checked, then the printed page will contain a border and the header will be surrounded by a rectangle.

Change...

When “Activate form” is selected this button opens a dialog so you can select another picture file.

Cautions Regarding .BMP/.DIB files:

Use appropriately sized bitmaps. Very large bitmaps take time to print and use resources. Efficient printing must be balanced against the need for reasonable resolution to make the picture look good when printed on high resolution printers. The bitmap is stretched to fill the rectangular area of the print header. Try to use a

bitmap with an aspect ratio (width/height) similar to the ratio of the rectangle used in the header. It may require some experimentation to achieve the desired results.

Regarding .WMF files:
The program supports both normal .WMF files and placeable .WMF files.

Tip : If the picture is extended too much in either direction, the aspect of the picture will become distorted. You might use CorelDRAW™ (for instance) to try drawing a white or invisible rectangular object around the picture which has approximately the same aspect as the box in the placeholder for the picture in the form. When DRAN-VIEW puts a picture into the placeholder box on top of each page, it extends the picture so it fits both in height and width. If your white rectangle fits into the box the picture aspect (width/height-factor) will not have to be rescaled. Since the rectangle is white it will not be shown at all.

Margins

The margins are in units (inch or millimeters) specific to your country settings. See Control Panel Setup.

Edit fields

As seen in the sample above, you may put control codes in the edit fields above the "OK" button to print special data. The following control codes are available :

&p	= Page number. The current page of the print job is shown instead of this code when printing.
&m	= Measurement/Creating date.
&f	= The current file name.
&d	= Current date (= printing date).

Orientation

Choose either Portrait or Landscape.

Disable extended line management

Some Windows NT printer drivers have problems handling the large amount of data that DRAN-VIEW must generate for particularly complex graphics. This can result in printouts being clipped or distorted. If this option is checked, DRAN-VIEW will use MS-Windows' own GDI commands to draw thick lines and thereby reduce the traffic to the printer. It will have the effect of smoothing the appearance of dotted or dashed lines. If it is not checked DRAN-VIEW will use its own high-speed drawing mechanism. If you are having problems printing complex charts, try this option and see if it helps.

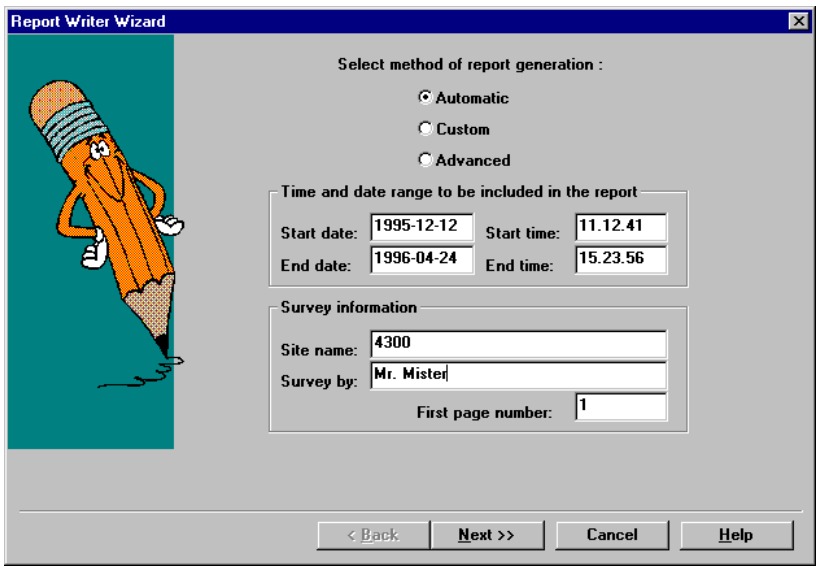
Settings button

The settings button opens up the Printer Setup dialog box to select the printer destination and connection. This dialog box is dependent on the printer driver currently active.

4.10 Report Writer (standard with DRAN-VIEW *Pro*)

The Report Writer wizard guides you through the steps of creating a Report for the data in your DRAN-VIEW document.

4.10.1 Report Writer Wizard - The first page



From this page you select what kind of report you want to create:

Automatic

This mode is the fastest way to create an automated Report. You will directly enter the final page of the Wizard when you select "Next>>". The generated Report will reflect the default settings which may be customized in the "Custom" settings option. From the final page you may Print, Preview or create a Word processor file in Rich Text Format (RTF). The Preview or the RTF file show the maximum number of pages with information gathered from the actual DRAN-VIEW document. The number of pages differs depending on what kind of information has been measured and what kind of instrument was used.

Custom

This mode is the same as the Automatic report except it allows the selection of which pages to include in the report in the customize page. *Customizations made in this mode become the default settings for future Automatic Reports.*

Advanced

This mode is different from the other two modes in several ways:

- The printouts are based on the actual settings of DRAN-VIEW such as colors, 3D-mode, statistic tables etc. Unlike the Automatic and Custom options, the header information of the reports comes from the File menu Print Setup selection.
- This mode brings up three additional selections: Timeplot parameters, Harmonic parameters and a page to select Worst Case Events.

- **You will not be able to create an RTF file for this report. Only Print and Print Preview are available**.

Other commands in this page of the Report Writer Wizard:

Start date/time
End date/time

These edit boxes default to the current time boundaries of the zoom in the TIME-PLOT chart of DRAN-VIEW when the Report Writer Wizard was started. You may change these values to set an exact time-range of data for the Report Writer to process.

Site name

This edit box defaults to the site name extracted from the instrument database. You may set it to anything you prefer. This text is shown in the header of Automatic and Custom reports.

Survey by

You may enter your name here. This text will be shown in the header of Automatic and Custom reports.

First Page Number

This edit box sets the first page number of the printouts. This may be useful if you plan to use Report Writer printouts as an appendix to other documentation of a site measurement. For Automatic and Custom reports this page number will be shown in the header of each page. For Advanced reports this page number will be inserted whenever the "&p" control code is found in the DRAN-VIEW Print Setup. If for example you wish to label your first page "APPENDIX A:1" you must manually edit the Print Setup dialog box and insert "APPENDIX A:&p" in the page header field.

Next

Brings you to the next page of the Wizard.

Cancel

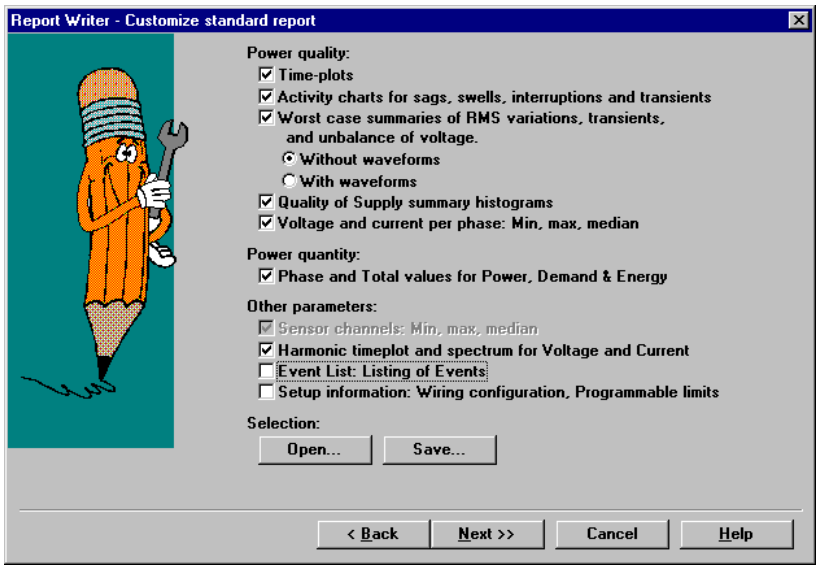
Press this button to cancel the Report Writer Wizard.

Help

Press this button to get help.

4.10.2 Report Writer Wizard - Customizing the automated report

NOTE: All of these selections may not be useful for all instruments. If the Report Writer finds that the data needed to create a particular page is missing, the page will not be included in the report, even if the checkbox for it is selected.



Power quality:

Time-plots
Normally this option will give you Voltage timeplots, but for some instruments/TASKCards it is better to show other parameters. For example: TASKCard 808 will show Demand and Energy for channel ABC instead.

Activity charts for sags, swells, interruptions and transients
This option shows how sags, swells, interrupt and transient events are distributed over the hours of a day. Presented in four bar charts.

Worst case summaries of RMS variations, transients, and unbalance of voltage
Worst Case Summaries are selectable with or without the waveform that corresponds to the worst case event. Worst case events include the worst by duration, magnitude, and overall energy.

Quality of Supply summary histograms
Presents 5%, 95% and 99% values for Vrms, Vthd, Ithd, Voltage unbalance and frequency.

Voltage and current per phase: Min, max, median
A textual report showing min, max and median values for Vrms, Irms and frequency.

Phase and Total values for Power, Demand & Energy
A textual report showing min, max and median values for W, VA, VAR and PF.

Other parameters:

Sensor channels: Min, max, median
A textual report showing min, max and median values for sensor channels (658).

Harmonic timeplot and spectrum for Voltage and Current
THD timeplots (%FND for voltage, Absolute magnitude for current). For the point where THD is highest, a harmonic analysis spectrum chart is presented.

Event List: Listing of Events
Information of all events relative to input channels are displayed

Setup information: Wiring configuration, Programmable limits
Same information as shown by using the command *View-Instrument Configuration*

Other commands in this page of the Report Writer Wizard:

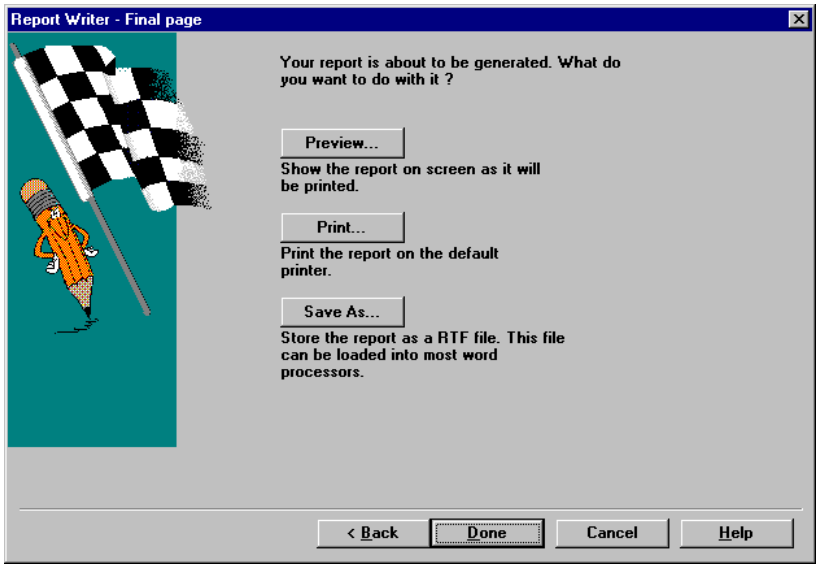
Open
Brings up the File-Open dialog box so you can read an existing Report Writer configuration file (*.rep) into the Report Writer. A configuration file contains all checkbox settings and other configurations of the Report Writer Wizard.

Save
Writes all settings of the Report Writer to a configuration file (*.rep)

Note: If you create a file called DEFAULT.REP in the installation folder (i.e., c:\dranview), these settings will be the default every time you enter the Report Writer Wizard after reading a native instrument database file and entering the Report Writer.

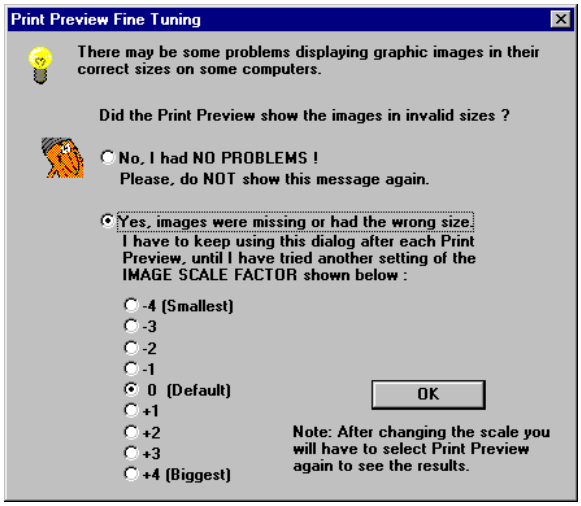
However, if you load a DNV file, it contains all the Report Writer settings you had when the file was last saved. The DEFAULT.REP is not used with .DNV files.

4.10.3 Report Writer Wizard - The Final Page



Preview
Shows your report on the screen as it will be printed.

The very first time you exit the Report Writer Print Preview feature the following dialog box will appear:



In some rare cases the chart pictures get too small or too big when displayed using Print Preview. This dialog will help you scale them to an appropriate size. These rare problems only affect the screen Print Preview (not the paper printout).

If you have no problems (or no further problems after changing the image scale factor from 0 (default)), select the option “No, I had no problems” and this dialog will never appear again. Otherwise this dialog will pop-up each time you exit the Print Preview screen.

Print
Prints the report on the active Windows printer. Automatic and Custom reports always default to portrait. Advanced reports are printed according to the setups in the File - Print Setup menu.

Save As
Save the report into an Rich Text Edit file (RTF). This file format is supported by all major word processors.

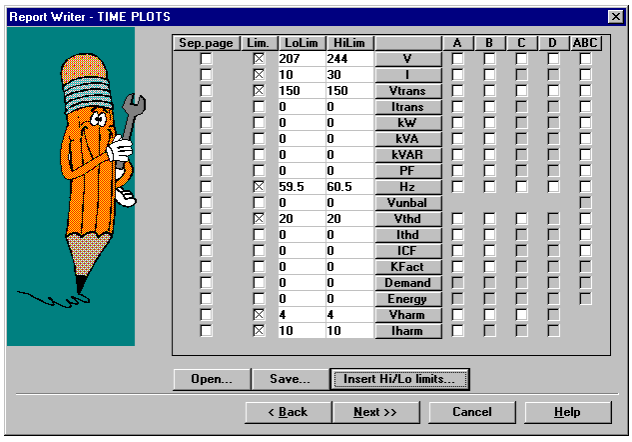
Note 1 : DRAN-VIEW RTF may have pagination problems in your word processor:
The pagination of the Automatic and Custom reports are handled by the report writer when the report is created. Decisions on how large each printed page will be are taken from the type of paper being used and what MARGINS have been set in the File - Print Setup dialog box of DRAN-VIEW. You may experience problems when the file margins used to create a RTF file are incompatible with the margins set in the target Word processor. For example, if you create a report with the margins set to 0.2 inches and then load the resultant file into Microsoft Word with the margins set to approximately one inch, there will not be enough room to fit some Report Writer lines on one line in the word processor. Besides looking wrong (lines will wrap-around) this will cause the Report Writer pages not to fit on one page in the target word processor thus invalidating the previously set page numbers. The solution is to modify the margins in the target word processor. Alternately you may edit the margins in Page Setup of DRAN-VIEW.

Note 2: RTF option is not available for advanced reports.

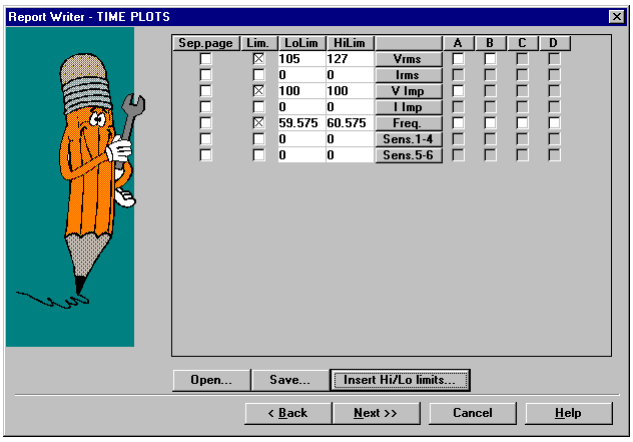
Note 3: RTF files lacks page frame
The RTF file will NOT contain the DRAN-VIEW frame around each page as it is shown when printed from inside DRAN-VIEW.

Done
Exit the Report Writer.

4.10.4 Report Writer Wizard - Time-plot setup for Advanced Report



(PQPlus / PQLite style)



(658 Style)

This is the setup of the time-plots to be included in your Report Writer printout. Each row gives one printed page if any of its parameters are enabled (checked). If the checkbox *Sep. page* is checked for a row, there will be one page/channel for that particular parameter. The layout of this page may vary from one instrument type to another (as shown above).

The following commands are available:

Sep. Page

Separate page: These checkboxes (one for each parameter) indicate that you want to print the channels for that particular parameter on separate pages.

Insert Hi/Lo limits

This button takes the first available threshold settings found in the instrument configuration of the active document and inserts them in the TIME-PLOT Hi/Lo limits columns automatically.

Lim

This column contains a number of checkboxes. Each of the checkboxes activates the Hi/Lo markers in the chart (red dashed lines).

LoLim

This value indicates one of the limits to be shown as a red line in the timeplot chart. The red line is shown only if the Lim-checkbox is enabled.

HiLim

This value indicates one of the limits to be shown as a red line in the timeplot chart. The red line is shown only if the Lim-checkbox is enabled.

The rest of the grid contains checkboxes for the various parameters and channels available for the actual instrument. Enable the parameters you want to view in your Report Writer printout.

Open

Brings up the File-Open dialog box so you can read an existing Report Writer configuration file (*.rep) into the Report Writer. A configuration file contains all checkbox settings and other configurations of the Report Writer Wizard.

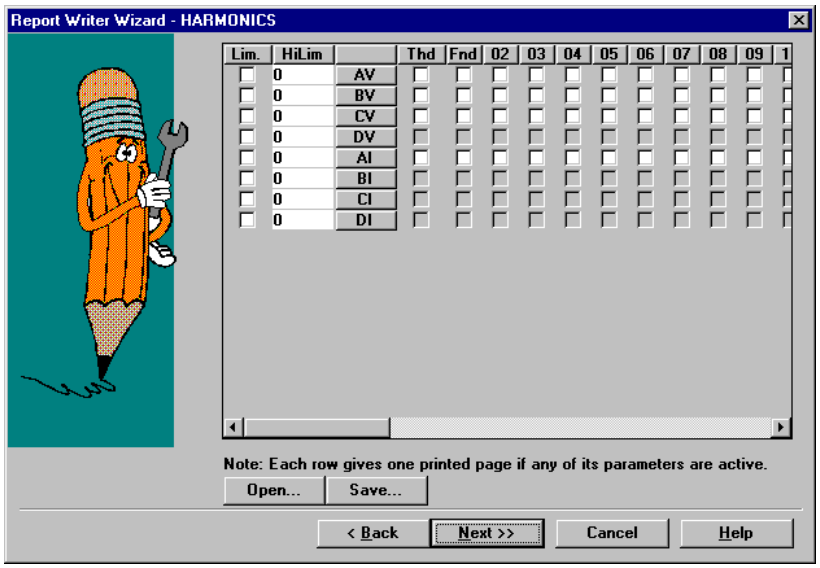
Save

Writes all settings of the Report Writer to a configuration file (*.rep).

Note: If you create a file called DEFAULT.REP in the installation folder (i.e., c:\dranview), these settings will be the default every time you enter the Report Writer Wizard after reading a native instrument database file and then entering the Report Writer.

However, if you load a DNV file, it contains all the Report Writer settings you had when the file was last saved. The DEFAULT.REP is not used with .DNV files.

4.10.5 Report Writer Wizard - Harmonic Time-plot setup for Advanced Report



This is the setup for the Harmonic timeplots to be included in your Report Writer printout.
Each row gives one printed page if any of its parameters are enabled (checked).

The following commands are available:

Lim

This column contains a number of checkboxes. Each checkbox activates the Hi/Lo markers in the chart (red dashed lines).

HiLim

This value indicates one of the limits to be shown as a red line in the timeplot chart. The red line is shown only if the 'Lim'-checkbox is enabled.

The rest of the grid contains checkboxes for the various channels, parameters and harmonics. Enable the parameters you want to view in your Report Writer printout.

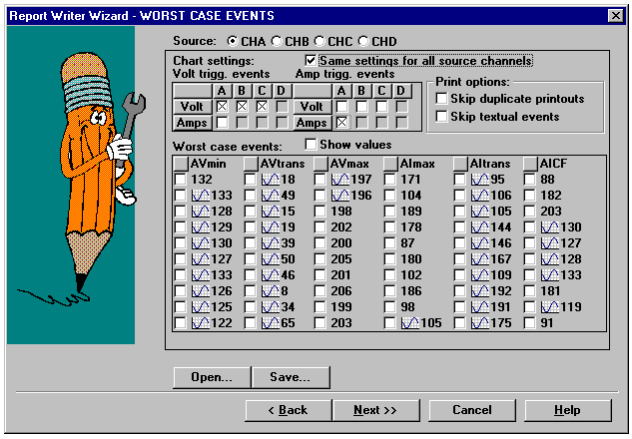
Open

Opens a Report Writer configuration file (*.rep).

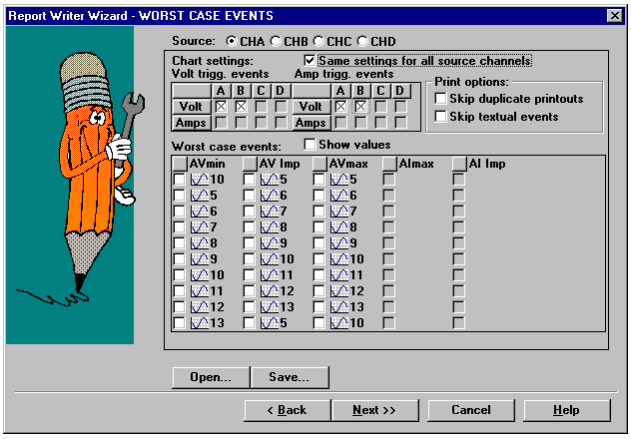
Save

Writes the state of the Report Writer to a configuration file (*.rep)

4.10.6 Report Writer Wizard - Worst Case events setup for Advanced Report



(PQPlus / PQLite style)



(658 Style)

This is the setup of the Worst Case event plots/texts to be included in your advanced report.

CHA, CHB, CHC, CHD

These radio buttons select the channel you currently wish to program. If you switch the channel, the settings and the worst case information in the bottom grid with event numbers (marked as #) will change accordingly. Each channel may have completely different settings.

Chart Settings:

This grid displays which channels/parameters are to be viewed in the GRAPH for waveform events. Note that the settings might be different for each channel setup (CHA, CHB, CHC, CHD selector). There are two grids, one for the detected worst case data on the voltage input channel, and one for the detected worst case data on the current input channel. Because of the separate grids, you can display different channels in the charts showing voltage or current worst case events.

Chart Settings: Shared

If this checkbox is enabled ALL waveform events will be displayed with the same channels visible , according to what you select in the 'Chart settings' grid.

Worst Case Events

This grid contains the event numbers (with optional values) for the selected channel (CHA, CHB, CHC or CHD) and for specific worst case types (Vmin, Vmax, Imax etc.). Enable the events you want to view in your Report Writer Printout. The Events are sorted by magnitude. Select up to ten events for each worst case criteria and channel.

Worst Case Events: Show Values

If you enable this checkbox, the actual value for each event is shown beside the event number.

Output filters: Skip duplicated printouts

If this checkbox is active the print engine will avoid printing two copies of the same event. A “duplicate” is defined as a graph having the same event number and active channels.

Output filters: Skip textual events

Events that do not have a waveform attached (no graph), will not be included in the printout.

Open

Opens a Report Writer configuration file (*.rep).

Save

Writes the state of the Report Writer to a configuration file (*.rep)

Next

Takes you to the Final Page of the Report Writer. From there you can Print or Print Preview.

4.11 Send

Use this option to send your DRAN-VIEW DNV-document using e-mail (electronic mail). Your mail program will start up with the DNV-file as a file attachment. This feature requires that you have a MAPI-compatible mail client installed (e.g., MS-Exchange).

The file needs no additional modification for sending. The DNV file format is heavily compressed, so you will not gain anything by using programs such as PKZIP etc. to compress the .DNV file before sending.

4.12 Exit

Exit the DRAN-VIEW application. Any modified documents will be prompted for Save.

Chapter 5 - The Edit Menu

5.1 Copy

Use this command to copy selected data onto the clipboard. The data might be a chart or a table view.

Chart view

Charts are copied onto the clipboard in two picture formats, a 640x480 pixel bitmap and a vectored and scaleable metafile picture. A text format is used if the view only contains text.

Table List View

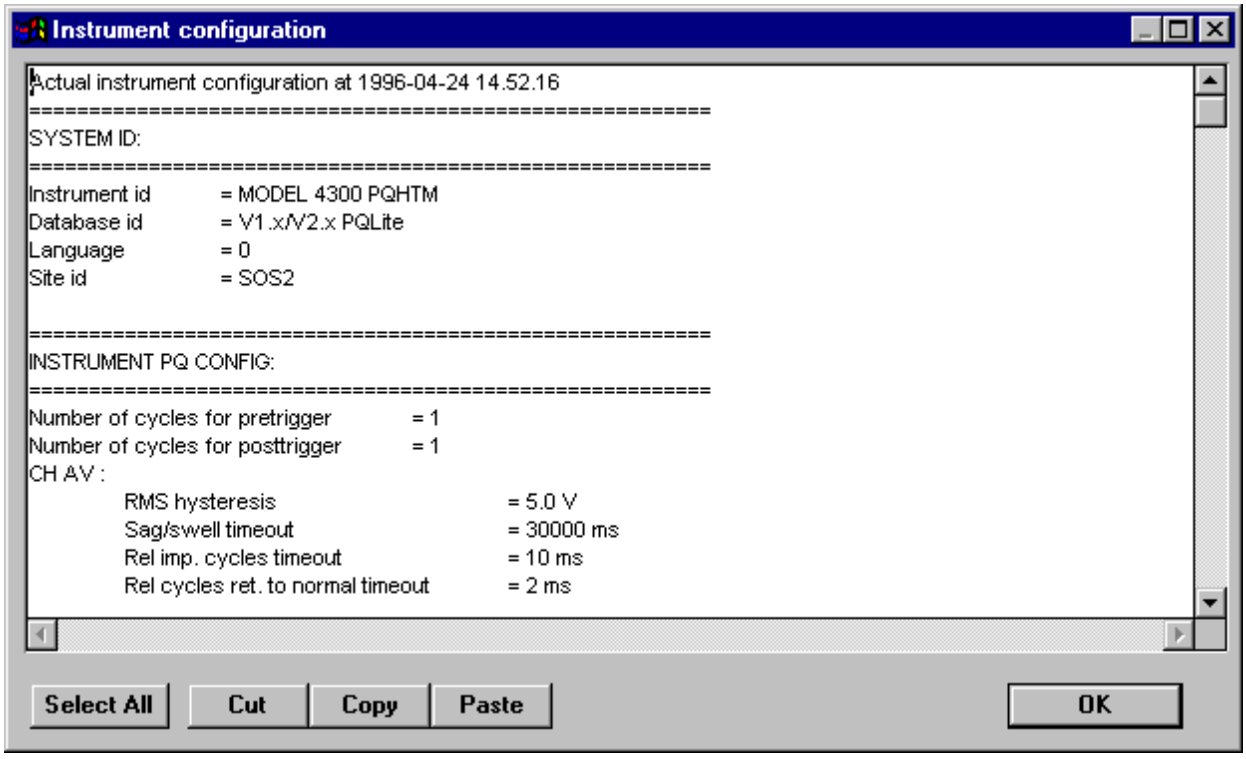
The information is copied onto the clipboard as a delimited ASCII-file. Prior to the copy, a ASCII-Setup dialog is shown (same as when exporting to ASCII-file). The final clipboard contents can then be pasted directly into Microsoft Excel.

Copying data to the clipboard replaces the contents previously stored there.

Toolbar button:

Chapter 6 - The View Menu

6.1 Instrument Configuration



This menu option will show information about the instrument configuration.

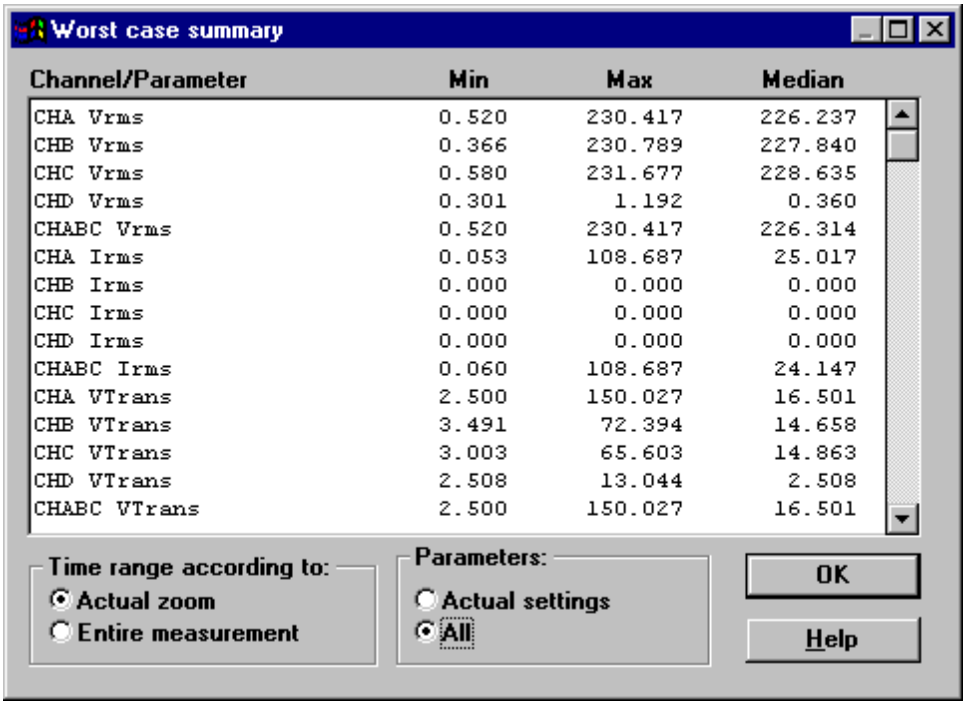
You can export some of the text if you select it with the mouse, or all by pressing the *Select All* button, and then pressing the *Copy*. The selected text will be stored in the Windows clipboard. Afterwards the text may be pasted into another application.

Note: This dialog may be resized.

For PQPlus/PQLite and 658 databases the displayed settings are those which were active when the currently active event was captured. These databases have information about modification of the instrument configuration embedded in the data.

6.2 Worst case summary

This menu option will show a worst case summary dialog box with information on MINIMUM, MAXIMUM and MEDIAN values, within the current time range or for the entire time range.



Worst case summary dialog

This dialog shows the Minimum, Maximum and Median for the parameters.

Time range according to: Actual zoom
If this option is selected then the evaluation of worst case data will only affect data within the time range delimited by the actual zoom in the timeplot chart.

Time range according to: Entire measurement
If this option is selected then the evaluation of worst case data will affect all available data in the entire time range.

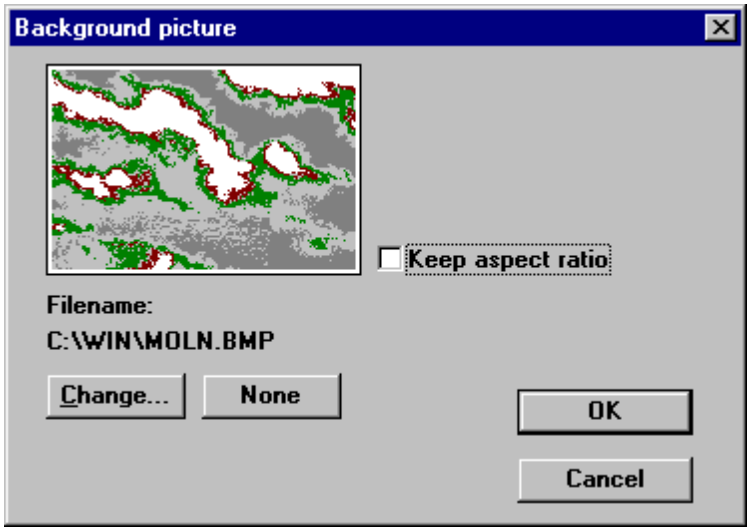
Parameters: Actual settings
Only the parameters viewed in the timeplot chart will be shown.

Parameters: All
All parameters will be shown.

6.3 Toolbars

You can turn toolbars and status bars on or off by using this dialog.

6.4 Background



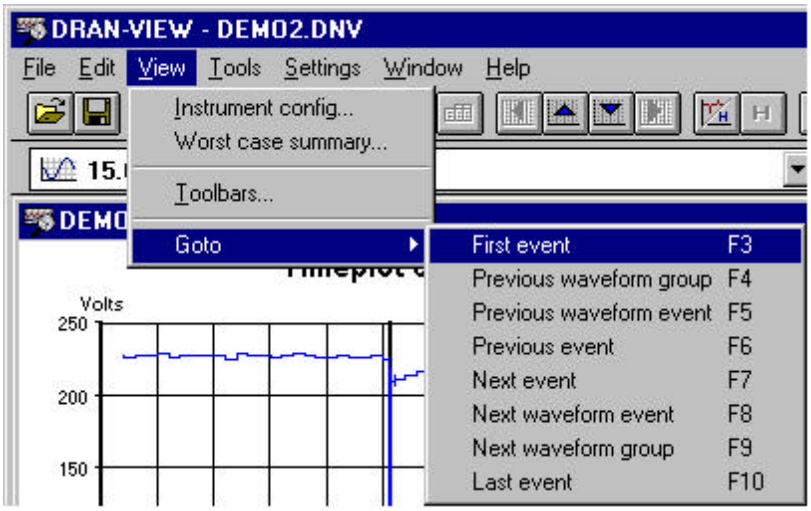
This command makes it possible to select a background picture for DRAN-VIEW.

Change
This button allows you to select a BMP file by showing a File-Open dialog box.

None
Press this button if you do not want to show any bitmap.

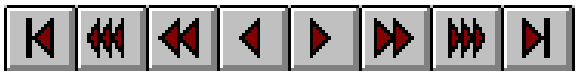
Keep aspect ratio
Check this checkbox if you want to keep the original width/height ratio of the bitmap. In this case the bitmap will be centered on the screen and then made as large as possible. If this option is not checked, the bitmap will be stretched over the entire screen.

6.5 Goto



This menu option makes it possible to step forward and backward in the events. The commands may also be issued by using the function keys F3-F10 as shown.

You can also use these buttons in the toolbar to scroll left or right throughout the events:



Note that they are in the same order as the function key layout.

F3 F4 F5 F6 F7 F8 F9 F10

Chapter 7 - The Tools Menu

7.1 Delta Measurement

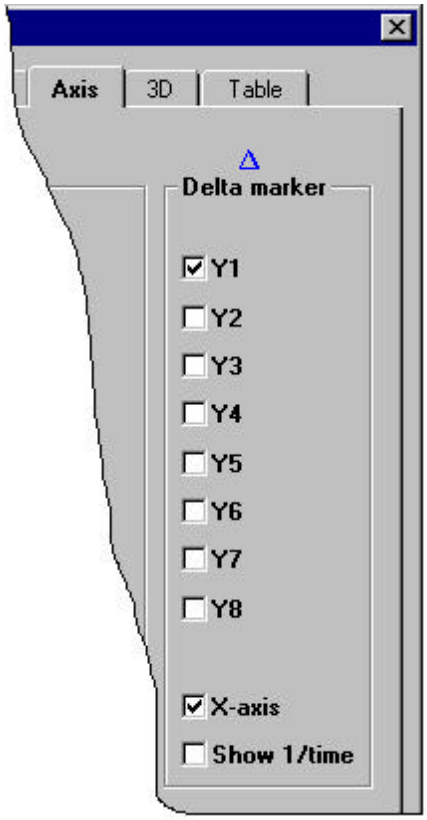
General

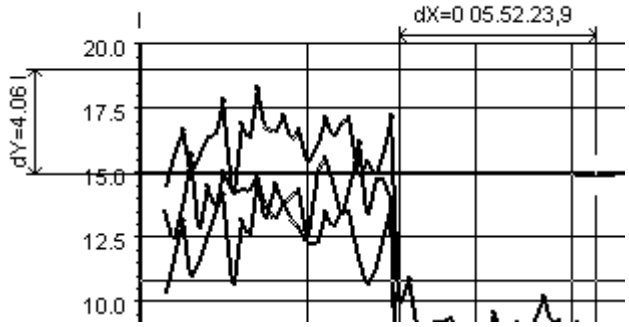
If this function is activated and you click inside a time plot or waveform picture for the first time, you clear the position indicators in the status bar. When you move the cursor the indicators will show the distance from that point. A second click creates a delta x/y graphic relative to the first coordinates and the position indicators in the lower left of the display are re-zeroed to the second click point which is now the new reference. Subsequent move and click sequences within the picture behave the same way except that the most recent click point coordinates are used as the reference.

This technique may be used to make delta x or y measurements.

Using delta markers

The “Axis” setup tab contains a section labeled “Delta marker.” If any of those checkboxes are selected you can make arrow markers visible in the chart; one for each Y-axis or X-axis that is activated.

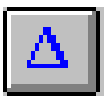




If the chart is saved at that moment, the arrow will be stored in the file. When you reload the file the arrow will appear again, until the delta function is deactivated.

When the function is deactivated (by selecting it again) the indicators at the bottom of the screen will return to the global scope.

Toolbar button :



7.2 FFT

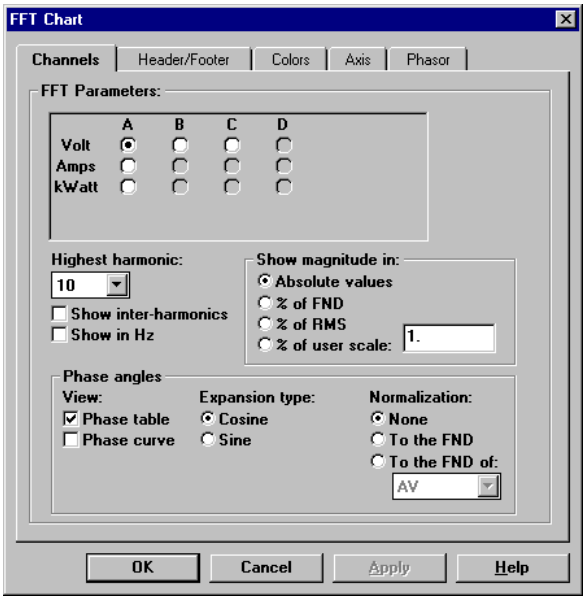
If the currently viewed event in the right pane is a Waveform event and the right pane is active (selected), this function will replace the Waveform with a FFT graphic showing a harmonic analysis of the highlighted (shaded) waveform data. This function toggles on and off. In the case of 658 data or data that is being analyzed using “hand shading” of the waveform, a DFT (Discrete Fourier Transform) is used. The FFT label is used in the menus and tool bars for simplicity only. Regardless of which technique is used, the results are the same. Once selected, the FFT graphic is shown in place of all future waveform graphics until it is de-selected.

Tip : If you want to view both waveforms and FFT charts at the same time, you can use the “Window Duplicate” command to create a new window for the document. In one of the windows you can have the FFT function OFF (waveform) and in the other you can have it ON, to display the FFT chart. When you select another event, all views will update accordingly. To arrange the windows appropriately you can use the “Window Tile”-function.

While the FFT function is enabled there will be additional information in the chart footer showing Total RMS, Fundamental Rms, THD and Even/Odd contributions.

To select the channel and parameter you wish to analyze, press the FFT menu command and then select the ‘Settings-Event details’ command, or you can use the following two buttons:

This will bring up the FFT channel tab (instead of the waveform channel tab).



For detailed information about the FFT channel, see Chapter 10.

To change the state of the FFT function you can use this toolbar button :

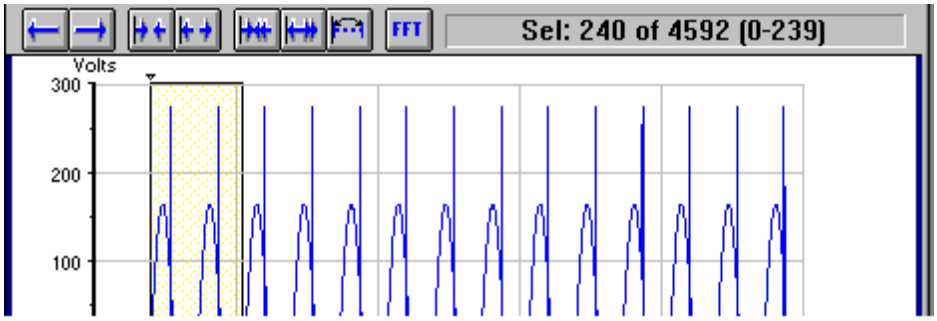
7.2.1 Fine tuning FFT selection.

This section describes how to:

- Select only a part of a multi-waveform event and perform a DFT/FFT.
- Select several continuous waveform events and perform a DFT/FFT.
- Fine tune the start and endpoints of the selection.
- Do a plot of inter-harmonics

Some events (especially those from a 658 data file or a PQPlus/PQLite 400 Hz file) may contain multiple cycles of the line frequency fundamentals. Contiguous single cycle waveform events from some instruments (such as PQPlus and PQLite for example) may be clustered in groups, and therefore we can treat them as one continuous waveform suitable for DFT/FFT analysis. If there is more than one fundamental cycle highlighted and the inter-harmonics checkbox is enabled in the FFT settings tab, it is possible to present inter-harmonics.

To activate the special toolbar shown below, click INSIDE the frame of the currently active event. To make it disappear (and to select the ENTIRE event frame) click at the SAME waveform section again. To select another waveform cycle, just click on it. This special tool is only available when clicking the mouse.



The FFT toolbar buttons (from left to right):

MOVE LEFT, MOVE RIGHT
Moves the FFT-window left or right by 1 sample.

CONTRACT, EXPAND
Contract or Expand the FFT Window by 1 sample

CONTRACT MUCH, EXPAND MUCH
Contract or Expand the FFT Window by approx. half a cycle.

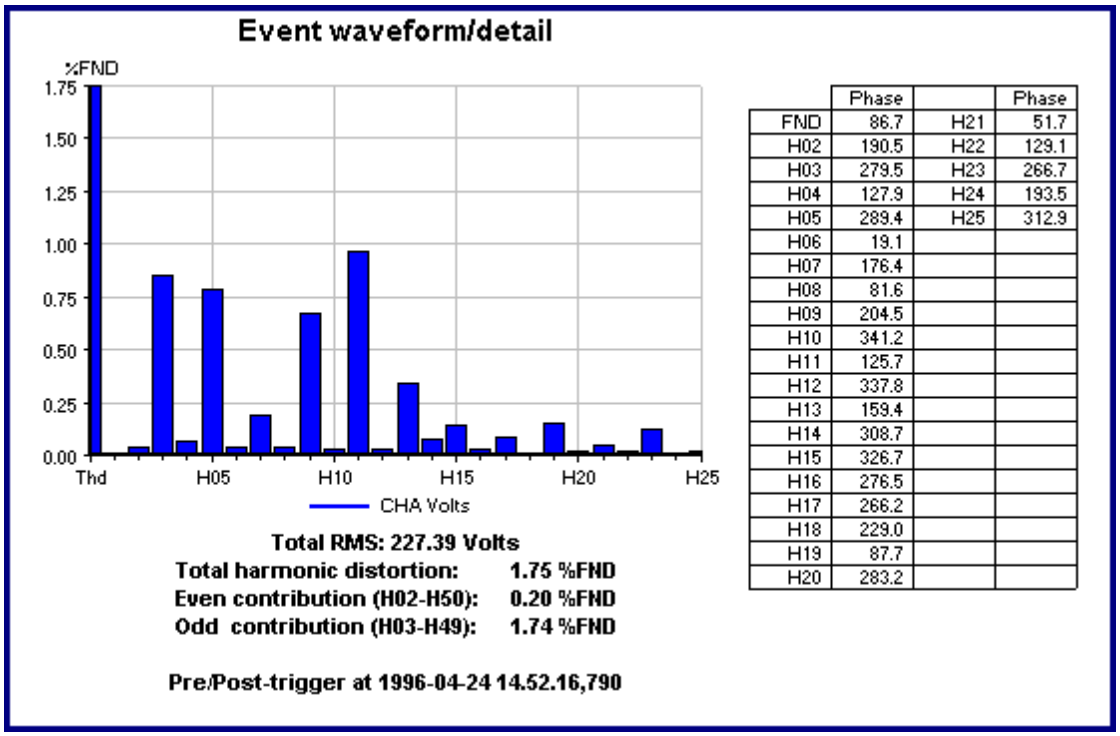
SELECT ALL
Selects all grouped waveforms in the event(s)

FFT
Run FFT/DFT and switch to FFT chart mode

Note: The window ‘slides’ if you hold the toolbar button down a while. After some time the window increment/decrement will accelerate.

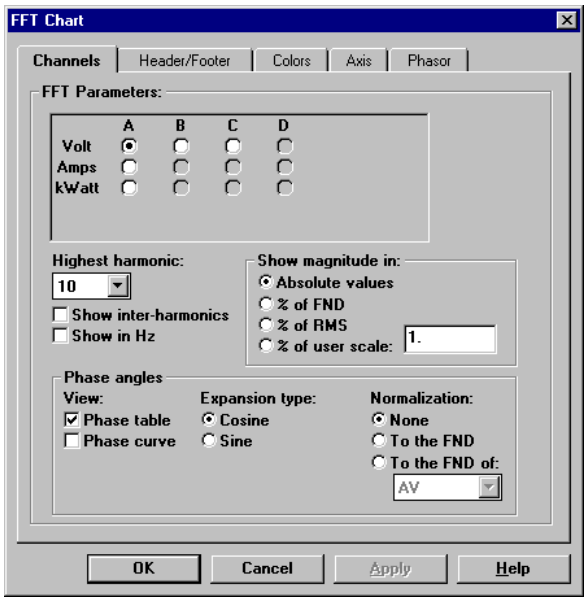
The toolbar also indicates how many data points have been selected. The above example shows: Selected 240 points out of 4592. Starting from point number 0 (the first) and ending at point number 239. This feature is very useful for precise adjustment of the FFT window. For example, a 658 PQ Analyzer samples at 7.2 kilohertz, which translates to 120 samples per cycle at 60 hertz line frequency (144 samples per cycle at 50 hertz). This feature can be used to select ***exact*** multiples of the fundamental frequency for analysis, thus reducing errors due to cycle truncation. The PP1/PP4300 instruments typically collect 128 samples per cycle.

When you have selected the appropriate window, click the FFT button. The chart will change into the frequency domain mode.

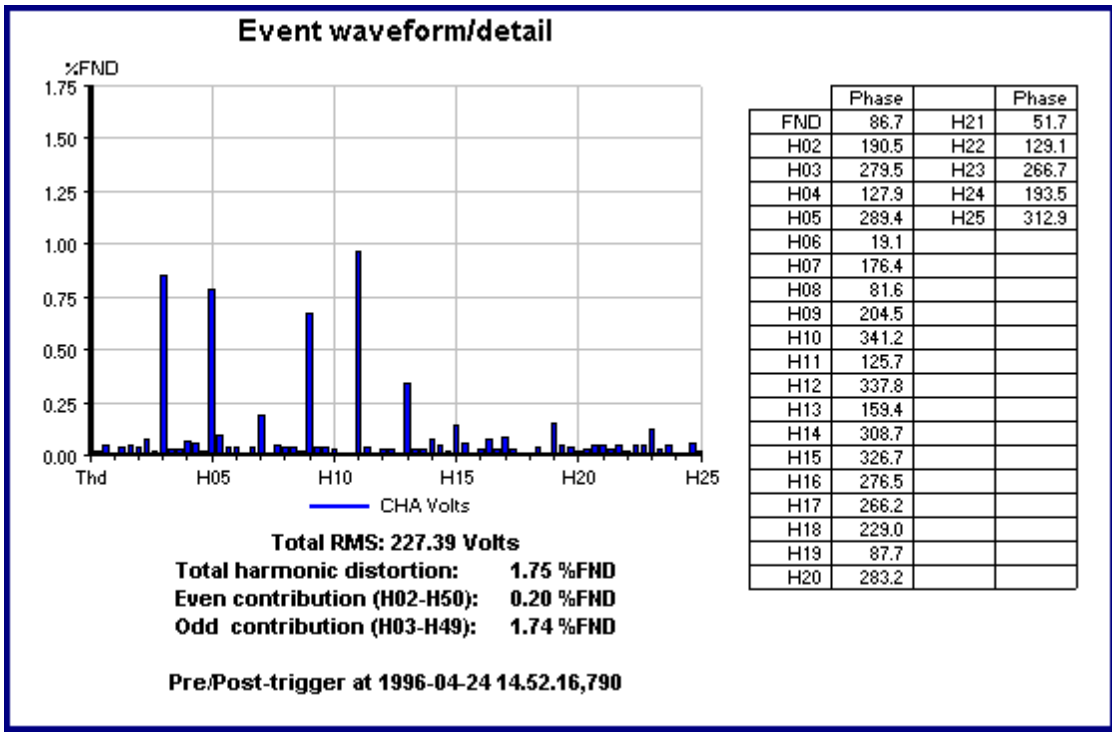


	Phase		Phase
FND	86.7	H21	51.7
H02	190.5	H22	129.1
H03	279.5	H23	266.7
H04	127.9	H24	193.5
H05	289.4	H25	312.9
H06	19.1		
H07	176.4		
H08	81.6		
H09	204.5		
H10	341.2		
H11	125.7		
H12	337.8		
H13	159.4		
H14	308.7		
H15	326.7		
H16	276.5		
H17	266.2		
H18	229.0		
H19	87.7		
H20	283.2		

To enter the FFT setup dialog box, double-click or right mouse click on the chart (or use the Settings - Event details menu option). This dialog box is only available in FFT mode.



Activate the “Show inter-harmonics” checkbox and click OK to display both the inter-harmonics and harmonics in the FFT chart **(if there were multiple cycles selected in the waveform chart).**



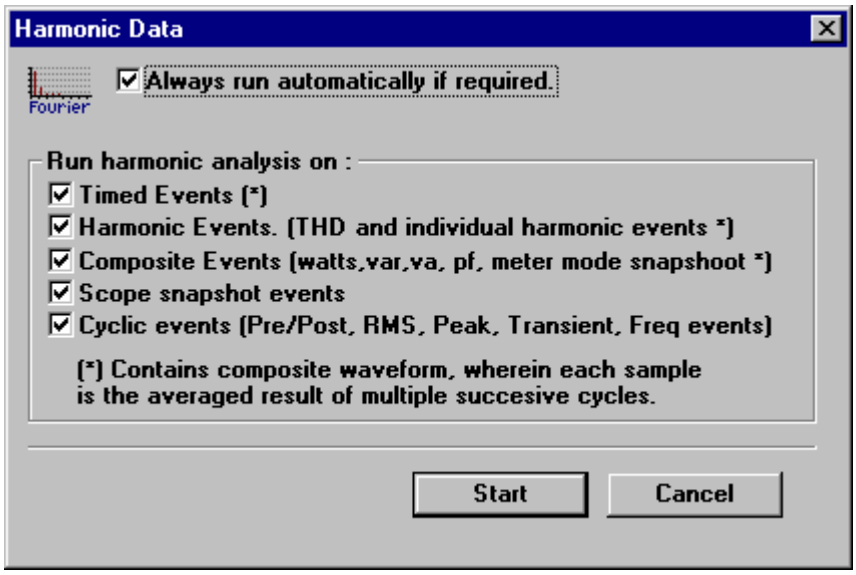
	Phase		Phase
FND	86.7	H21	51.7
H02	190.5	H22	129.1
H03	279.5	H23	266.7
H04	127.9	H24	193.5
H05	289.4	H25	312.9
H06	19.1		
H07	176.4		
H08	81.6		
H09	204.5		
H10	341.2		
H11	125.7		
H12	337.8		
H13	159.4		
H14	308.7		
H15	326.7		
H16	276.5		
H17	266.2		
H18	229.0		
H19	87.7		
H20	283.2		

For detailed information about various settings for this feature, see Chapter 10, *Channels: FFT*.

7.3 Initiate Harmonic data

Use this command to initiate (calculate) the harmonics data needed by the Harmonic Timeplot chart (if not already done automatically).

Note: 658 data files do not display all of the settings shown below.



Always run automatically if required.

If this option is enabled, the Harmonic calculation will be carried out automatically whenever this data is missing in the input file. This might be the case when reading old DNV-files or when you import an instrument data file.

For PQPlus and PQLite databases, you may choose one or several of the following types of events to operate on:

- **Timed Events**
- **Harmonic Events**
- **Composite Events**
- **Scope Snapshot Events**
- **Cyclic Events**

Selecting only timed events containing waveforms is one way to attempt to get a reasonably “un-biased” survey of the harmonic conditions over a period of time. This is because the considered data will only be from periodically time triggered samples rather than threshold triggered samples. For survey purposes time triggering is inherently more “objective” to the extent that it does not capture only “exciting” data. It is always possible, but statistically not likely, that a timed triggered sample could capture a short-lived deviation from the nominal. It is more likely that the timed triggered sample will be

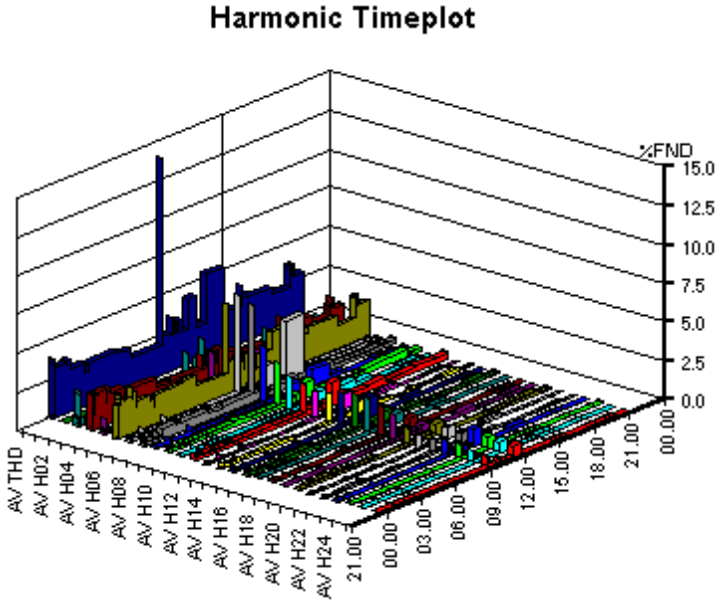
a reasonable estimate of the conditions at the time. Threshold triggered samples have more potential to give a skewed picture of harmonic conditions over time because most threshold triggering is designed to capture the exceptions rather than the nominal conditions. This is especially true if thresholds are set to capture only extreme events. Timed triggering is relatively free of this inherent bias. The weighted statistical techniques used in DRAN-VIEW are designed to minimize the contribution to a nominal conditions estimate by reducing the effective weighting of relatively short lived (transient) events.

For a 658 database there are no available options. All waveforms are considered.

7.4 DRAN-VIEW *Pro* Harmonic features

The DRAN-VIEW *Pro* package provides additional Harmonic features not available in the standard DRAN-VIEW, such as:

- Timeplot chart with harmonic components ranging from the fundamental up to the 50th harmonic including THD. DRAN-VIEW retrieves this information by passing every waveform event through a Fourier Transform.
- Rotatable 3D chart capabilities for all timeplots.
- Statistical information about the timeplot parameters, such as minimum, maximum, median, 5%, 95%, 99% and Standard Deviation. Alternatively, the table may be configured to display the |max| value of every parameter along with the time stamps for when the value occurred. This information is provided by a table located beside the chart.
- ASCII-Export capabilities for harmonics amplitudes and phase-angles.



7.5 Harmonic time-plot (DRAN-VIEW *Pro* only)

This option will convert the left pane Time-plot chart into a Harmonic time-plot chart. In order to activate the Harmonic chart, the leftmost pane must be the active pane and the Harmonics must have been calculated (see the *Initiate Harmonic Data* section in this chapter).

The Harmonic time-plot contains results of FFT analysis for ALL available waveforms over the entire data file time range.

Toolbar button :

7.6 Zoom In

This selection will activate the graphics zoom function. When this function is active, you just click and drag a rectangle in the chart. When you release the mouse button, the chart will be redrawn with the selected area enlarged. The depth of the zoom queue is 15. This means that you may repeatedly zoom 15 times and still be able to return to the previous zoom with the “Unzoom” function. You can also zoom using the keyboard arrow keys and ENTER.

Toolbar button :

7.7 Unzoom

This function will undo the last zoom you made.

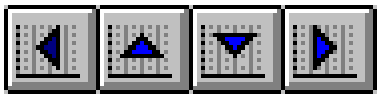
Toolbar button :

7.8 Pan Operations

If you have zoomed the chart, you can pan (scroll) inside the chart using the pan operations, Left/Up/Down/Right.

<u>If the chart is 3D then these controls ROTATE the chart.</u>

Toolbar buttons :



Chapter 8 - The Settings Menu

8.1 Event Chart

This command brings up a tabbed dialog box with the settings for the event (waveform) chart. By clicking on one of the tabs, related settings will be shown.

NOTE - The Event Chart will not display DRAN-LOGGER data because graphics are not recorded by that instrument.

The tabbed dialog box has the following tabs:

- Channels
- Header/Footer
- Colors
- Axis
- Phasors

For more information about each tab, see Chapter 10.

Toolbar button :

8.2 TIMEPLOT Chart

This command brings up a tabbed dialog box with the settings for the TIMEPLOT chart. By clicking on one of the tabs, related settings will be shown.

The tabbed dialog box has the following tabs:

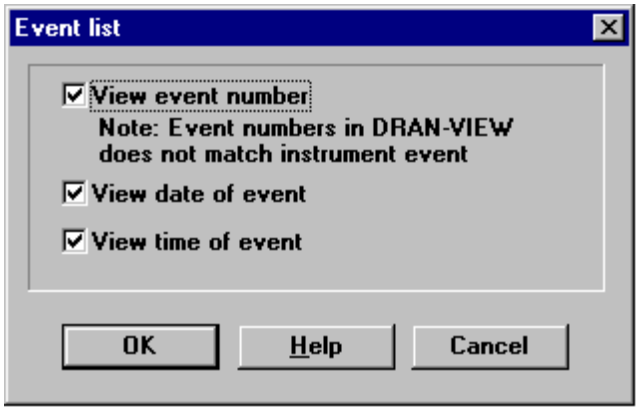
- Channels
- Header/Footer
- Colors
- Axis
- 3D
- Table

For more information about each tab, see Chapter 10.

Toolbar button :

 or 

8.3 Event list



This dialog sets the format for the text in the event list. You can apply date and/or time to the event description.

Toolbar button :

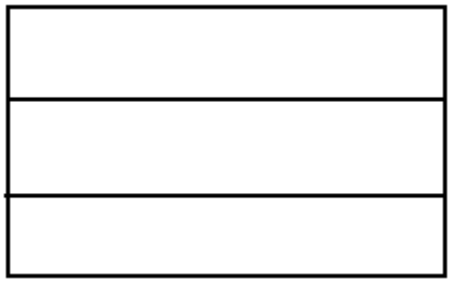
Chapter 9 - The Window Menu

9.1 Cascade

This option arranges the windows in steps as shown below.

9.2 Tile

This option stacks the windows as shown below.



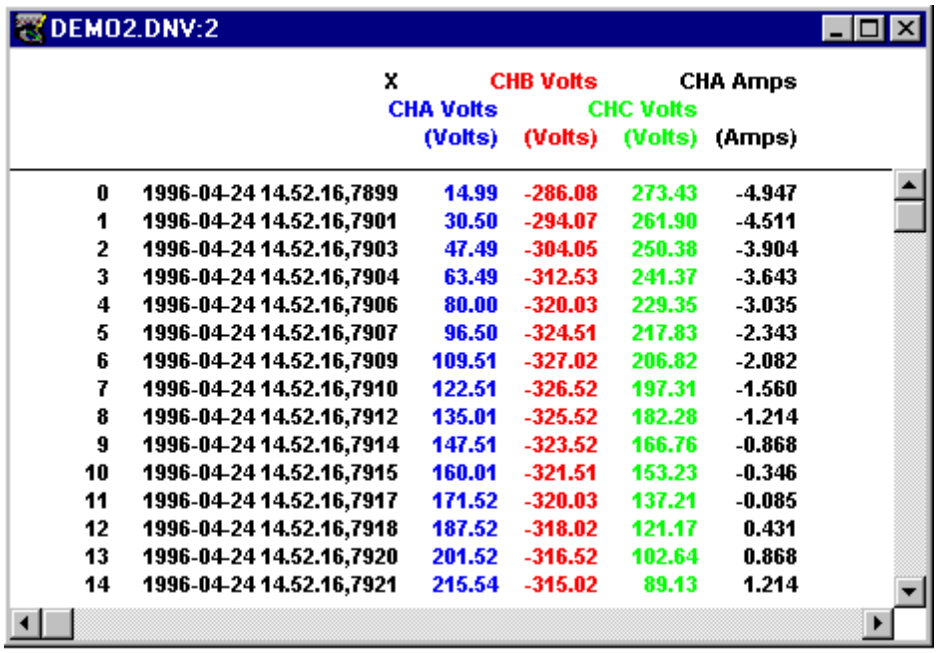
9.3 Duplicate

This option creates a new, additional window in the opened document. For example, this option is particularly useful for showing a FFT chart while the original window shows the waveform chart.

9.4 Data List

To display in numeric form the data presented by the chart, use the “Data List” function. When selected, it will bring up a new window with all the chart’s data in a table list.

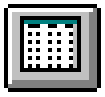
Note : Consider the table list a snapshot of the chart, that was viewed when the table list was activated. The table list will NOT update when switching to another event or modifying the chart.



	X	CHB Volts		CHA Amps
	CHA Volts (Volts)		CHC Volts (Volts)	(Amps)
0	1996-04-24 14.52.16,7899	14.99	-286.08	273.43	-4.947
1	1996-04-24 14.52.16,7901	30.50	-294.07	261.90	-4.511
2	1996-04-24 14.52.16,7903	47.49	-304.05	250.38	-3.904
3	1996-04-24 14.52.16,7904	63.49	-312.53	241.37	-3.643
4	1996-04-24 14.52.16,7906	80.00	-320.03	229.35	-3.035
5	1996-04-24 14.52.16,7907	96.50	-324.51	217.83	-2.343
6	1996-04-24 14.52.16,7909	109.51	-327.02	206.82	-2.082
7	1996-04-24 14.52.16,7910	122.51	-326.52	197.31	-1.560
8	1996-04-24 14.52.16,7912	135.01	-325.52	182.28	-1.214
9	1996-04-24 14.52.16,7914	147.51	-323.52	166.76	-0.868
10	1996-04-24 14.52.16,7915	160.01	-321.51	153.23	-0.346
11	1996-04-24 14.52.16,7917	171.52	-320.03	137.21	-0.085
12	1996-04-24 14.52.16,7918	187.52	-318.02	121.17	0.431
13	1996-04-24 14.52.16,7920	201.52	-316.52	102.64	0.868
14	1996-04-24 14.52.16,7921	215.54	-315.02	89.13	1.214

If you use the “Edit-Copy” command from here, the data will be placed in the clipboard suitable for Microsoft Excel.

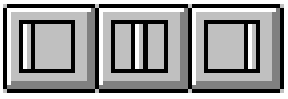
Toolbar button :



9.5 The Split Commands

There are three split commands : Split left, mid, or right.

These options should be used to quickly move the split control. They are also available as accelerator keys (Ctrl/W(aveform) , Ctrl/E(qual) , Ctrl/R(ms)) and as toolbar buttons.



Chapter 10 - The chart properties dialogs

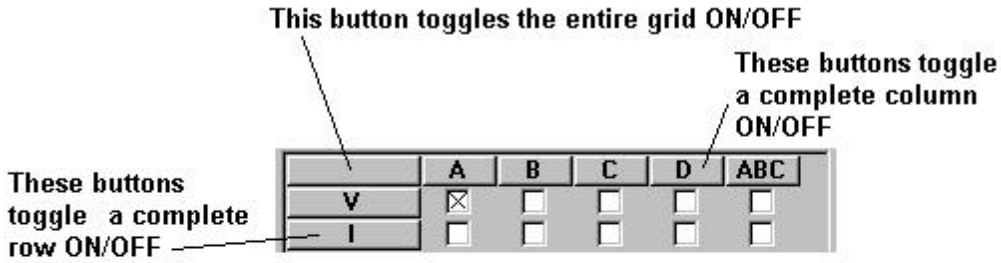
All the dialog boxes needed to set up the charts use the same basic layout and principles. This chapter describes all the tabs you may encounter when using DRAN-VIEW. The dialog boxes can be activated as follows:

- Double clicking the chart (selects tab according to where you clicked).
- Using the right mouse button pop-up menu (direct access to any tab).
- Using the toolbar buttons (access to most recently used tab in the dialog).
- Using the menu (access to most recently used tab in the dialog).

10.1 The Channels tab

This is always the first tab in the dialog box. Its purpose is to select the parameters you want to view in the chart. In many of these tabs there are two different ways of selecting the parameters: either by a grid of checkboxes (this is called the advanced mode) or by using combo boxes (this is called the simple mode).

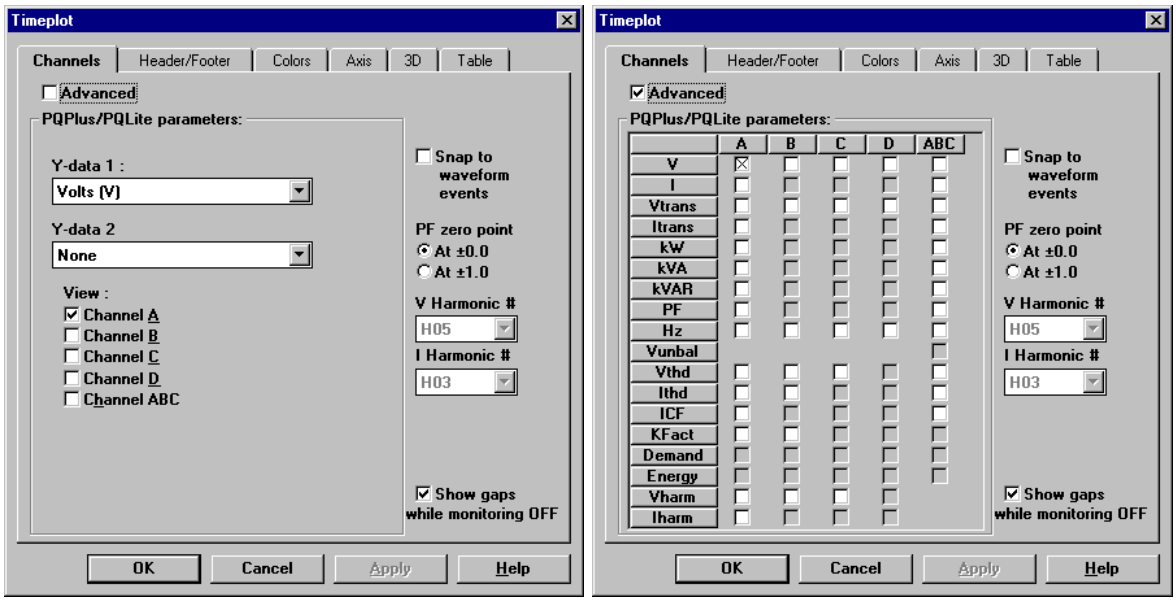
In the advanced mode (grid-style) there are some features you should be aware of:



The following sections describe the various channel tabs.

10.2 Channels: PQPlus/PQLite

The dialogs shown below are for the left pane timeplot.



The two layouts shown above illustrate the *simple mode* and the *advanced modes* of the Timeplot Channels setups dialog. They represent two alternative views of the same setup. In the simple mode (on the left), there are two combo-boxes to select the data source(s). The channels are selected below these combo boxes. In the advanced mode, you can freely select any combination of parameters. If a checkbox is grayed, there is no available data for the parameter in the data file.

V harmonic #

Selects the harmonic voltage component you may want to view. This option is used in conjunction with “Vharm” data selection.

I harmonic #

Selects the harmonic amps component you may want to view. This option is used in conjunction with “Iharm” data selection.

Note: There is only harmonic data available for the harmonic number that the instrument has been programmed for.

Snap to waveform event

If this option is checked, then clicking in the timeplot chart will bring you to the nearest WAVEFORM event. If this option is NOT checked then it will search for the nearest event of ANY type.

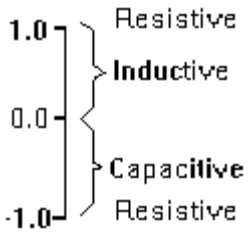
Show gaps while monitoring OFF

If this option is checked, the curves will be interrupted during the time when the instrument was in MONITORING OFF or POWER OFF condition.

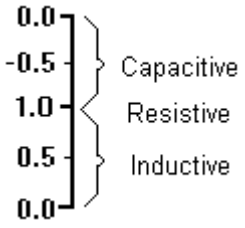
PF zero point

This is a special option implemented for the Power Factor curves. PF values are always between, but not equal to, +1.0 and -1.0. In any real (physical) system, the absolute value of the Power Factor is always less than one and greater than zero. In a primarily resistive system, it is possible for the Power Factor to be so close to one that the influences of noise and small inductive/capacitive changes cause the Power Factor to oscillate between +1 and -1. When using a normal plot for this type of data (origin at ±0.0), the ratcheting of the Power Factor between +1 and -1 makes the plot cluttered, difficult to read and clouds the essential meaning of the data. The essential information here is that the load is primarily resistive and that it varies very little in its reactive characteristics. A normal plot tends to hide this information because of the wild swings between +1 and -1. (A useful device to imagine is that the Power Factor "passes through" but never equals one). As shown below, selecting an origin at ±1.0 produces a much more descriptive plot for this type of data.

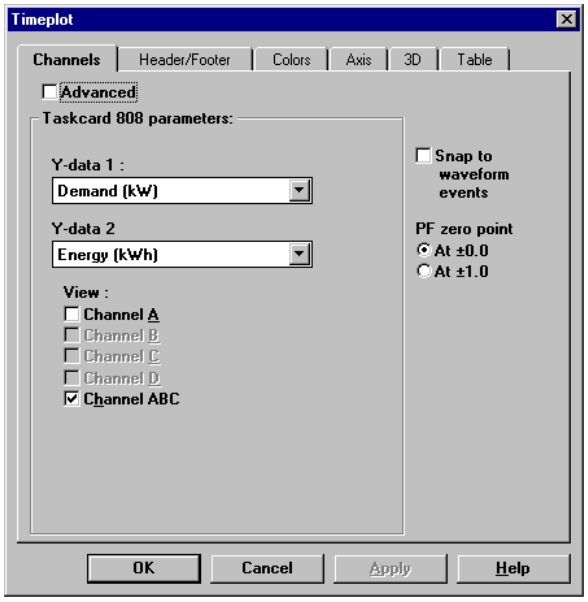
Normal axis, origin at ±0.0

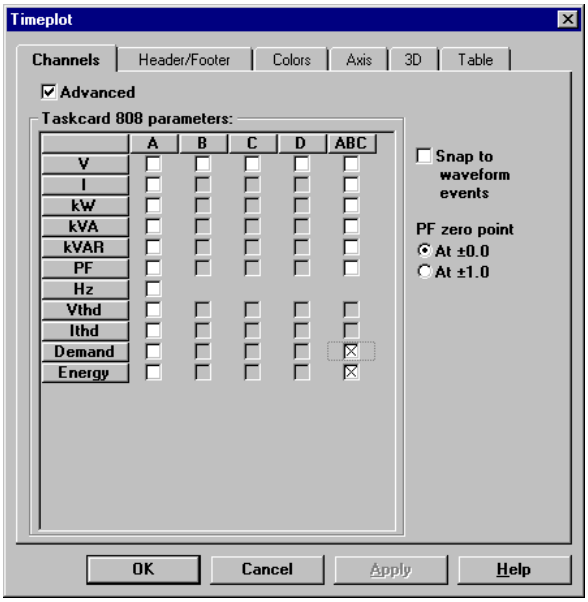


Special axis, origin at ±1.0



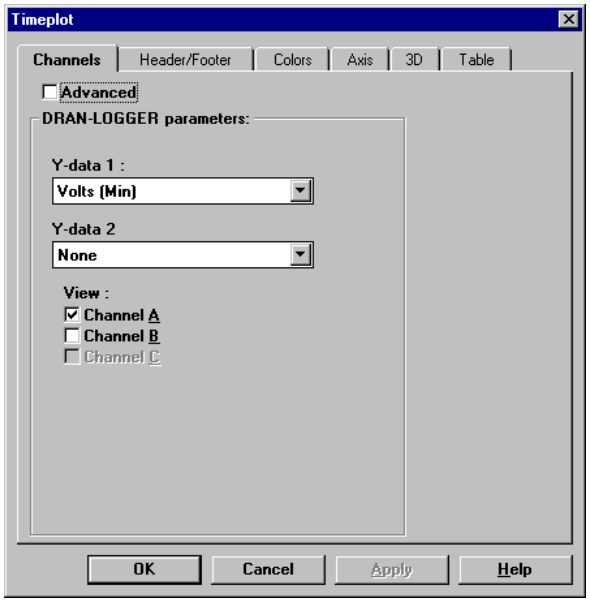
10.3 Channels: TASKCard 808

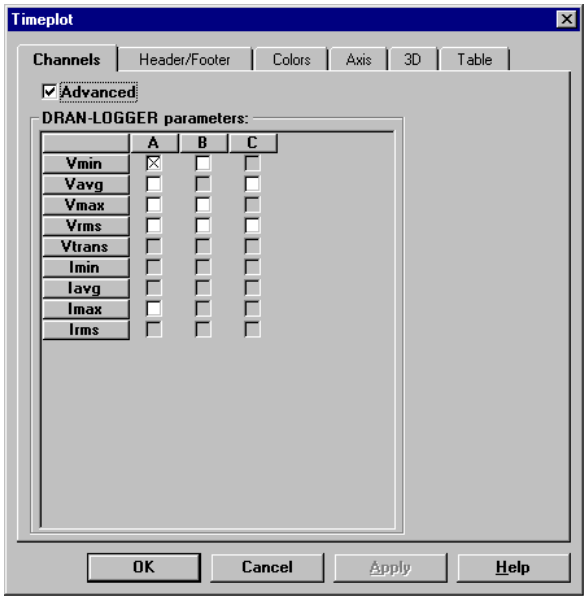




These tabs are very much the same as for the PQxxx Channel tabs, except the number of available parameters.

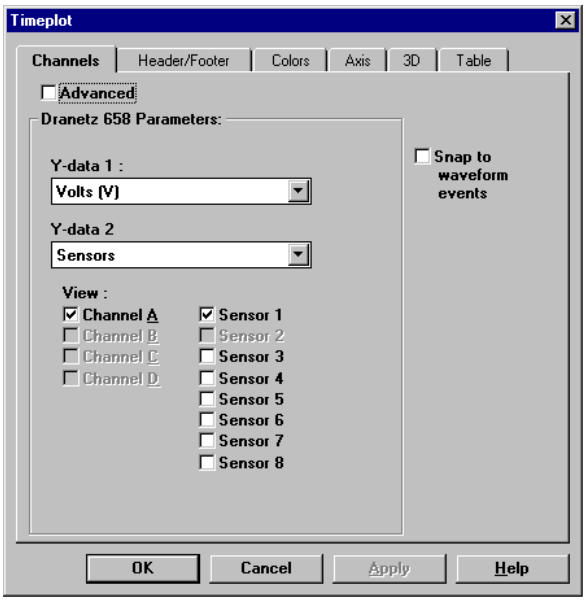
10.4 Channels: DRAN-LOGGER

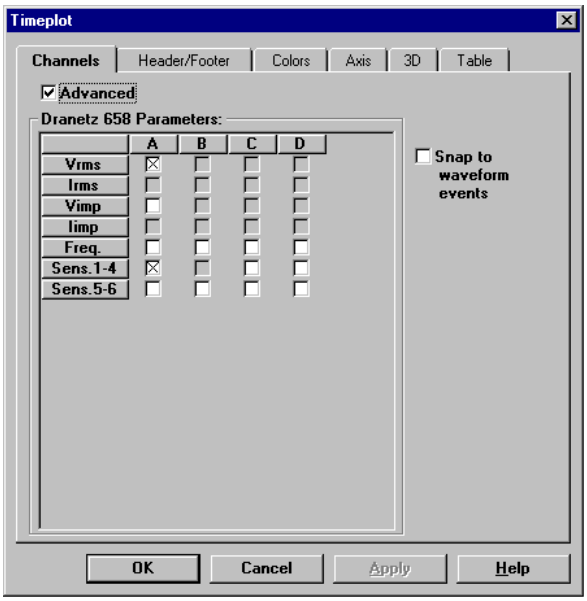




In the case of DRAN-LOGGER, the setup is very simple.

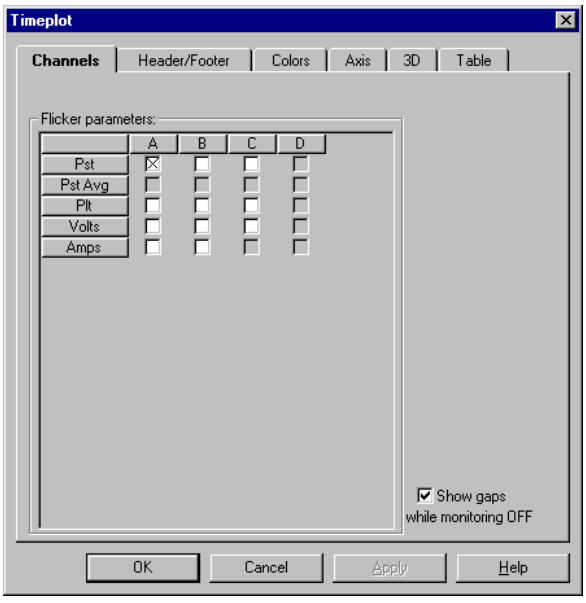
10.5 Channels: 658 PQ ANALYZER





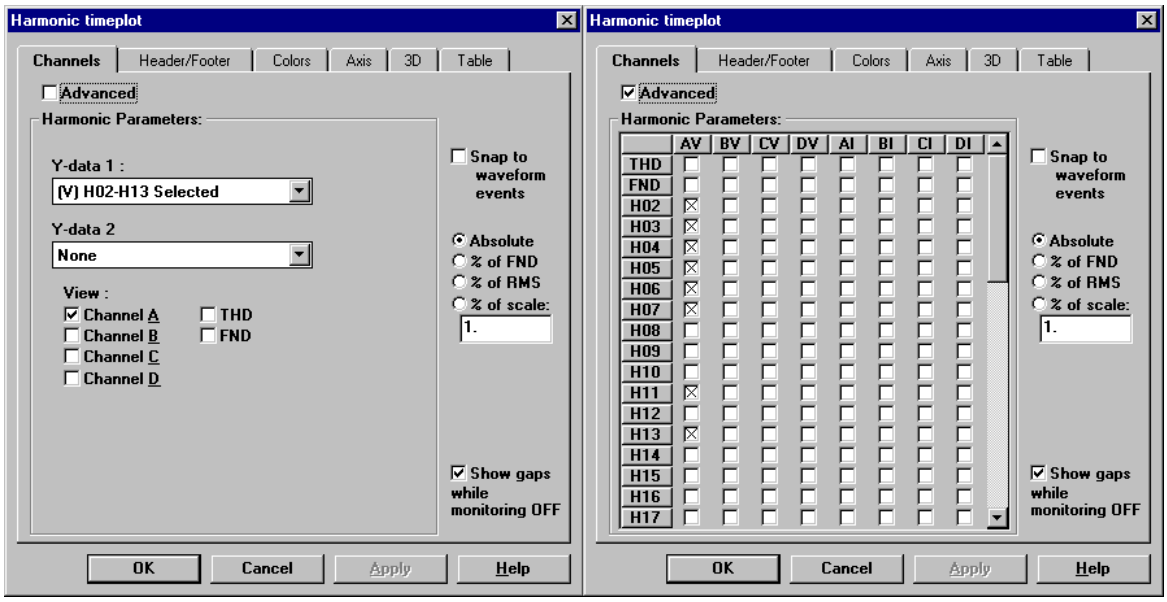
These tabs are very much like the others except that they contain different parameters and the optional eight SENSOR channels.

10.6 Channels: Flicker TASKCard



These tabs are very much like the others except that they contain different parameters.

10.7 Channels: Harmonics (DRAN-VIEW *Pro* only)



The left pane of DRAN-VIEW may show a HARMONIC TIMEPLOT instead of a normal (RMS) TIMEPLOT. The setup contains 50 harmonics plus FND and THD for all channels/parameters.

Many people prefer operating this dialog box using the 'simple mode' since the 'advanced mode' contains a large number of checkboxes.

Snap to waveform event

If this option is checked, then clicking in the timeplot chart will bring you to the nearest WAVEFORM event. If this option is NOT checked then it will search for the nearest event of ANY type.

Absolute, % of FND, % of RMS, % of user scale value

Instead of showing data in Volts or Amperes, this option gives you the possibility to show every component in percentage of the fundamental component (FND), the RMS value or in percentage of your own value. For more details, read about the FFT channel tab which has similar settings.

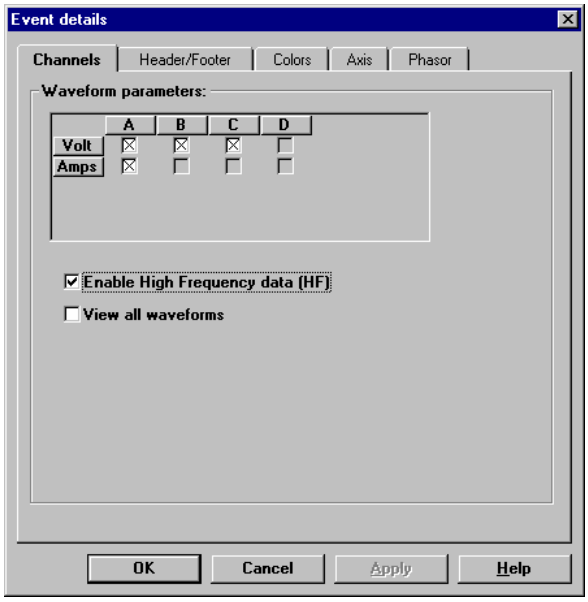
Show gaps while monitoring is OFF

If this option is checked then there will be gaps in the plot for the times were the monitoring was OFF. If it is not checked then there will be no gaps in the plot. Gaps might be shown between a MONITORING OFF or DATABASE FULL event and the next power quality event.

The simple mode contains the following options in the combo boxes:

Combo box Label	What s selected:
(V) H03-H13 Selected Odd	Volts H03, H05, H07, H09, H11 and H13
(V) H02-H06 Selected Even	Volts H02, H04 and H06
(V) H02-H13 Selected	Volts H02, H03, H04,H05, H06, H09, H11 and H13
(V) H03-H25 Lower group Odd	Volts H03, H05, H07 … etc. including H25
(V) H02-H24 Lower group Even	Volts H02, H04, H06 … etc. including H24
(V) H02-H25 Lower group	Volts H02, H03, H04 … etc. including H25
(V) H27-H49 Upper group Odd	Volts H27, H29, H31 … etc. including H49
(V) H26-H50 Upper group Even	Volts H26, H28, H30 … etc. including H50
(V) H26-H50 Upper group	Volts H26, H27, H28 … etc. including H50
(V) H03-H49 All Odd	Volts H03, H05, H07 … etc. including H49
(V) H02-H50 All Even	Volts H02, H04, H06 … etc. including H50
(V) H02-H50 All	Volts H02, H03, H04 … etc. including H50
(A) H03-H13 Selected Odd	Amps H03, H05, H07, H09, H11 and H13
(A) H02-H06 Selected Even	Amps H02, H04 and H06
(A) H02-H13 Selected	Amps H02, H03, H04,H05, H06, H09, H11 and H13
(A) H03-H25 Lower group	Amps H03, H05, H07 … etc. including H25Odd
(A) H02-H24 Lower group	Amps H02, H04, H06 … etc. including H24Even
(A) H02-H25 Lower group	Amps H02, H03, H04 … etc. including H25
(A) H27-H49 Upper group	Amps H27, H29, H31 … etc. including H49Odd
(A) H26-H50 Upper group	Amps H26, H28, H30 … etc. including H50Even
(A) H26-H50 Upper group	Amps H26, H27, H28 … etc. including H50
(A) H03-H49 All Odd	Amps H03, H05, H07 … etc. including H49
(A) H02-H50 All Even	Amps H02, H04, H06 … etc. including H50
(A) H02-H50 All	Amps H02, H03, H04 … etc. including H50

10.8 Channels: Waveforms



This tab selects the channels to view in the waveform chart.

Enable HF-data

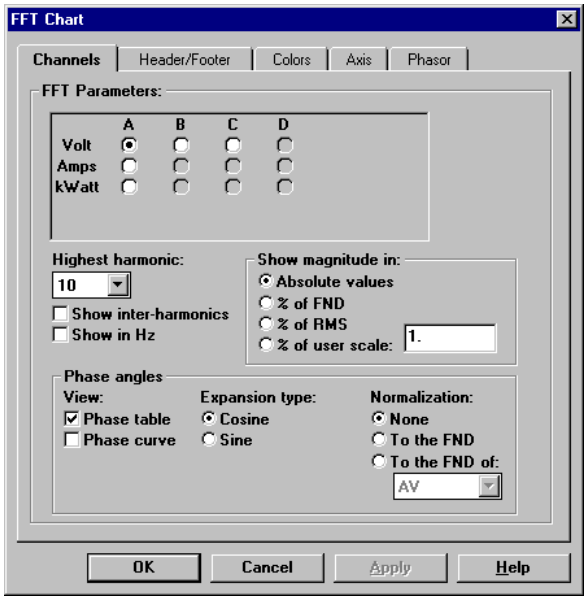
Enables plot of high frequency components that the instrument has captured during the data acquisition.

View all waveforms

This option makes the waveform chart cover the entire time range of the data in the file. This function can also be toggled on and off using the right mouse button pop-up menu.

***Tip**:* If you have a particularly tight burst of waveshape events (for example, ten contiguous waveshape hits followed by ten more contiguous waveshape hits) you may use this option in conjunction with the zoom or x axis lock feature to view the waveforms in one picture. Waveform events separated by large blocks of time will appear as straight lines which mark where in time they occurred. To see the actual waveform detail, zoom in on the events.

10.9 Channels: FFT



When the FFT-function is active, the “Channels” dialog in the event chart displays the following options.

Highest harmonic

This combo box selects how many harmonics to display in your chart. The range is between 5-50 in steps of 5.

FFT Parameters

This block allows you to select which channel/Parameter you wish to have harmonically analyzed. The analysis region is the part of the signal that is shaded in the Waveform (time domain). The frequency domain analysis of a parameter may be viewed even if the time domain view of the signal has been disabled. When the **kWatt** option is selected the harmonic watts chart is generated from the voltage and current waveforms of the same channel. If either voltage and or current is missing the kWatts option is prohibited.

Show inter-harmonics

The term inter-harmonic frequency in this context refers to all the frequencies that lie between the harmonics. By activating this checkbox, the FFT calculations will calculate and display all frequency components possible. The resolution on the frequency axis is dependent on how many fundamental cycles are selected for analysis (see notes below). If only one cycle is selected, there will be no inter-harmonics. The following table illustrates the number of inter-harmonics that will be displayed:

1 Cycle --> Harmonics only
2 Cycles --> Harmonics + one extra inter-harmonic between each harmonic.
3 Cycles --> Harmonics + two extra inter-harmonic between each harmonic.
etc.

Example: To obtain a resolution of 1Hz bands on a 60Hz line, you will have to select 60 cycles.

These cycles must be triggered in a way so they are continuous in time. For a PP1 or 4300 instrument it takes 60 events to make these 60 cycles.

This mode of operation may take considerable calculation time. *If you find that it is taking too long to complete the screen computations it is recommended that you select the least number of harmonics that will suit your purposes.* DRAN-VIEW will only compute frequencies to the highest harmonic requested. For example, if you select twenty five rather than all fifty harmonics, it is possible to complete up to fifty percent faster.

The inter-harmonics are not included in the THD, Even or Odd contribution calculations (according to standards). The Phase angles shown in the table (if activated) are also based on harmonics only.

For inter-harmonics mode using the % of FND display mode, the fundamental frequency component is not removed from the chart as it is when inter-harmonics are disabled. This is because you may want to analyze the bands around and including the FND.

Show in Hz

Scales the X-axis and phase table (if enabled) in Hz instead of harmonic numbers.

Show magnitudes in:

This section allows you to configure four mutually exclusive modes of displaying the harmonic amplitudes as follows:

NOTE: Because the DC component (harmonic zero) is normally zero, this position is utilized to display “THD” instead. The Total Harmonic Distortion entry displays the total energy content of the harmonics in the analyzed signal. The format of this entry is a function of which display mode is chosen.

Absolute Values:

Selecting this option causes the harmonics to be displayed in their native engineering units format. Magnitudes for volts and current are scaled to RMS. Watts amplitudes are signed watts. Positive watts indicate energy is flowing from source to load. Negative watts indicate energy is flowing from the load to the source. In other words, the “load“ is behaving like a generator. *If you find that the fundamental watts is negative, this may indicate that your current probe is reversed or you have some other wiring problem.* The value in the Thd position represents the total energy generation contribution of harmonics 2 through 50. For voltage and current this value is in volts or amps rms. It results from the square root of their squared and summed amplitudes. For watts this value is the linear sum of the harmonic powers. Note that because watts harmonics are signed numbers this

value could sum very close to zero or negative even though the harmonics may contain significant amplitude.

NOTE: The value found in the Thd position when in the "Absolute Values" mode is the value used in the numerator when computing the Thd for the three other modes described below.

% of Fund:
The harmonics are displayed as a percent of the fundamental. *To preserve the scaling the fundamental is always zeroed, as its true value will always be 100% and therefore of no real interest.* The Thd is the total contribution of harmonics 2 through 50 expressed as a percent of the fundamental. This value is also referred to as Distortion Factor in such standards as IEEE-519. Using this format it is possible for Thd to be greater than 100 percent. There are no known standards for expressing harmonic watts as a percentage of a value. Because watts is signed, its "Thd" value may be negative. In the special case where the fundamental is zero, the divisor is forced to one to prevent division by zero.

% of RMS:
The harmonics and Thd are displayed as a percent of the Total Rms or Total Average Watts. In the case of voltage or current the Total Rms is computed as the square root of the mean of the squared and summed sample magnitudes in the shaded area. This method of computing the RMS includes all harmonic and non-harmonic energy *including harmonic zero (DC), the fundamental and any harmonics which may lie beyond the fiftieth.* In the case of Watts the term RMS is really a misnomer. In this situation the term "% of Total Average Watts" is more appropriate. It is computed and used in the denominator of the calculation by doing a signed linear sum of the first through fiftieth harmonics (if available). The Thd position is the total contribution of harmonics 2 through 50 as a percent of the total rms (or average watts). The Thd when expressed in this format is also known as the **Distortion Index** (DIN). The advantage of this format is that for voltage and current the result is bounded between 0 and 100 percent. The watts values are computed in a similar fashion but because watts harmonics are signed values the percentage values are not similarly bounded. It is possible for watts percentages to be negative. It is also possible that an individual harmonic may have a larger amplitude than the total causing the absolute value of the percent to exceed 100. Division by zero is trapped out in the software.

% of user scale:
This option may be used to express the harmonics information as a percent of an arbitrary, user entered number. The most common application would be to compute current harmonics as a percent of load. It is intended for applications such as computing Total Demand Distortion (TDD) as defined in IEEE-519. Zero is illegal.

View: Phase Table

This option provides a phase angle table to the right of the harmonic periodogram. The displayed phase angles are qualified by the selected normalization type and the expansion type (sine or cosine). The “Show in Hz” option may be used to label the table entries in Hertz or Harmonic number.

View: Phase curve

This option will overlay a curve of the actual phase angles on the harmonic bar chart.

Expansion type: Cosine

This option will generate phase angles suitable for a Cosine series expansion.

Expansion type: Sine

This option will generate phase angles suitable for a Sine series expansion. Recommended.

Normalization: None

No normalization. Phase angles are displayed exactly as they are returned from the sine/cosine expansion FFT/DFT. The phase angle of the fundamental will be representative of the actual phase positioning as displayed in the highlighted waveform. These angles may be used to “reconstruct” the waveform as it is seen in the highlighted waveform display.

Normalization: To the FND

This option recalculates the phases such that a reconstruction of the waveform using the normalized angles would appear “phase shifted” (left or right) by the number of degrees determined by the un-normalized fundamental phase angle. It has the effect of always setting the Fundamental phase angle to zero. If you keep the Y axis stationary, a signal reconstructed using a normalized cosine expansion would appear to be “pushed” to the left the number of degrees in the fundamental. A sine expansion would appear “pushed” to the right. This type of normalization destroys input to input phase offset information and as a consequence would modify a hand calculation of harmonic Watts. For this reason this option is not recommended. **DRAN-VIEW always uses un-normalized phase angles when computing harmonic watts.**

Normalization: To the FND of <volts channel>

This option is similar to Normalization to the FND except that **ALL THE CHANNELS** are normalized to the fundamental of the channel selected in the box. Normally, the sampling synchronization channel would be selected, which is usually channel A. If sine expansion is selected this option allows one to quickly view the 0, 240, 120 fundamental phase relationship of a positive rotation three phase system.

Note:

All phase angles are unsigned magnitudes modulo 360. When a cosine expansion is normalized its form is changed from cos (wt - d) to cos (wt + d). All sine expansions are of the form sin (wt + d). d represents the phase angle displayed in the Phase Table to the right of the plot (if enabled). An alternate way to view normalization is that normalization to the fundamental of a pure sine wave has the effect of making its sine “series” expansion look like a sine wave and its cosine “series” look like a cosine wave *regardless of the starting phase of the originating signal.* The term “series” in this context is a little silly because the only component would be the fundamental. Un-

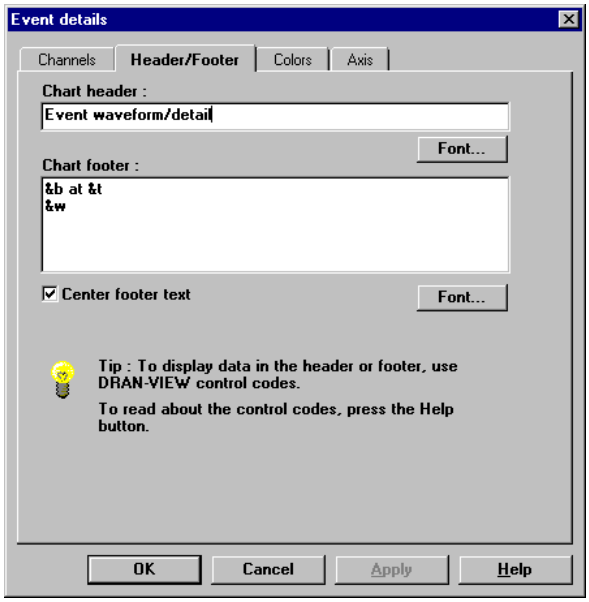
normalized phase angles generate the original signal *as it is viewed in the time domain plot* by just plugging directly in to the appropriate series expansion.

On a nominal 400 Hz PP1/PP4300 database waveform the FFT is only done on the first 16 points of the automatically highlighted 128 data points. On nominal 50/60Hz PP1/PP4300 database waveforms and on all 658 waveforms all the highlighted area is always included in the analysis. One may explicitly direct DRAN-VIEW to consider all, or a subset of the waveform for analysis by using the DFT/FFT mode. In this mode all shaded points are *always* considered by the DFT/FFT routine. You may enter the DFT/FFT mode by clicking on the shaded portion of the waveform picture. A set of toolbars and text (such as "Sel: 16 of 128 (16-31)") will appear to the left and over top of the waveform. The tool bars may be used for adjusting how much of the picture is highlighted and the text and the high-lighting tell exactly which area/samples will be passed through the FFT/DFT for analysis. This feature allows you to custom-select all, or a subset of the waveform. This advanced user feature is particularly useful for fine tuning analysis on 658 waveforms. Since 658 sampling is fixed (rather than phase-locked) you may occasionally get 121 samples (for instance) for a 60Hz cycle which requires only 120 samples. This extra data point may introduce a slight bit of error into the DFT analysis. This feature allows you to fine tune the sample window. ***This is the only mode that allows viewing inter-harmonics***.

Recommendation/Caution: To get the best and most meaningful results from the advanced user FFT/DFT mode it is wise to select only integer multiples of the fundamental. The DFT of a cycle and a half of data (for instance) will return dubious results.

10.10 The Header/Footer tab

This tab defines the chart header and footer.



The header is a single line and the footer may contain many lines.

The header and in particular the footer can be customized to a very high degree by using a combination of plain text in English mixed with DRAN-VIEW control codes.
The control codes translate to readable text at run-time showing in-depth information about the subject.
In the example shown in the dialog box above, the footer text will translate to the following:

<brief description of event> **at** <the time of the event>
<worst/threshold description of the event>

The only English word in the sentence is the small word ‘at’, but together with the control codes this will build a complete sentence :

CV RMS In lim sens. Incr **at** 96-04-24 15-14-09,120
Threshold crossed: 15.00 Volt

Build you own smart footers by mixing English phrases and information combined with one or several of the available control codes:

&s = Site name from instrument database
&f = The actual document filename
&p = Actual page

&m = Measurement date (start - end)
&t = Time and date for the current event.
&d = Current date (now)

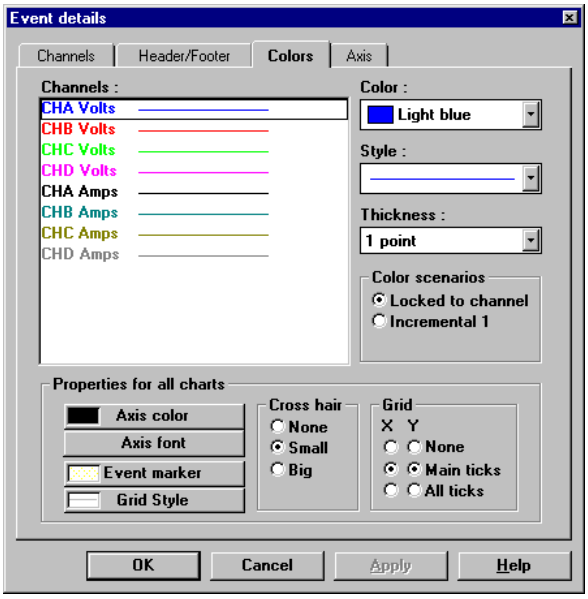
&e = Show the event number. Event numbers used by DRAN-VIEW does not match instrument event numbers.
&b = Brief description of the current event. (Same as viewed in the event list in the toolbar)
&w = Worst/thresholds/limits information (apply only to footer since it may contain several lines)
&v = Very detailed information about event. Information according to &w is shown as well as other data. If you use **&v**, do not use **&w** at the same time.

Font

Use these buttons to change the font and text color for the header or footer.

10.11 Colors

This tab defines the colors, fonts and other visual attributes of the chart.



The topmost part of the dialog contains curve-related properties such as color, style and thickness. A complete set of all properties for the available channels is called a scenario.

For the waveform chart (right pane) there are two color scenarios that may be customized in any configuration.

In the first scenario (**Locked to channel**) every channel ALWAYS has the color that is assigned to it. In the second scenario (**Incremental**) the chart uses colors as they are needed according to how many channels there are to be displayed. The default implementation uses a monochrome setup as scenario 2.

For the TIMEPLOT charts there are two incremental scenarios, **Incremental 1** (colored) and **Incremental 2** (monochrome). You should know that curves with thickness above 1 point and with non-solid styles are drawn more slowly.

Other chart attributes set in this dialog tab:

Axis color

This command brings up the standard color selection dialog box. The dialog allows you to design your own colors.

Axis font

This command brings up the standard font selection dialog box.

Grid Style

This command brings up a dialog box with controls to define a customized line type for the chart grid.

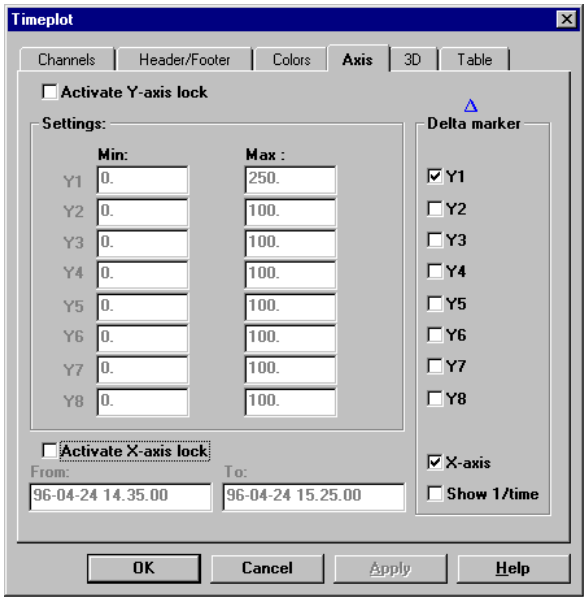
Cross hair

Use these radio buttons to set the size of the cross hair.

Grid

Use these radio buttons to define how detailed grid you want to use.

10.12 Axis



This dialog tab controls the settings for two types of axis-related features: LOCKING and DELTA-MEASUREMENTS.

LOCKING

The charts autoscale their axes according to the present data. In this dialog, however, you can lock (freeze) the axis scaling and set it to any range desired.

DELTA MEASUREMENT

This feature is activated from the toolbar button (or from the tools menu), but the settings are made using this dialog tab.

Zooming and all other functionality in the program will continue to work, even if the X- and Y-axis are LOCKED. Note that the axis may not exactly follow the recommended start and end points given here; DRAN-VIEW always attempts to produce an axis with the best apparent increments.

Activate Y-axis lock

You must enable this checkbox before you can edit the Min and Max values of each Y-axis.

Activate X-axis lock

Use this checkbox to LOCK the X-axis to user defined range. This group of controls is only shown if the active chart contains more then a couple of seconds of information. This is because DRAN-VIEW does not allow editing with higher precision then one second.

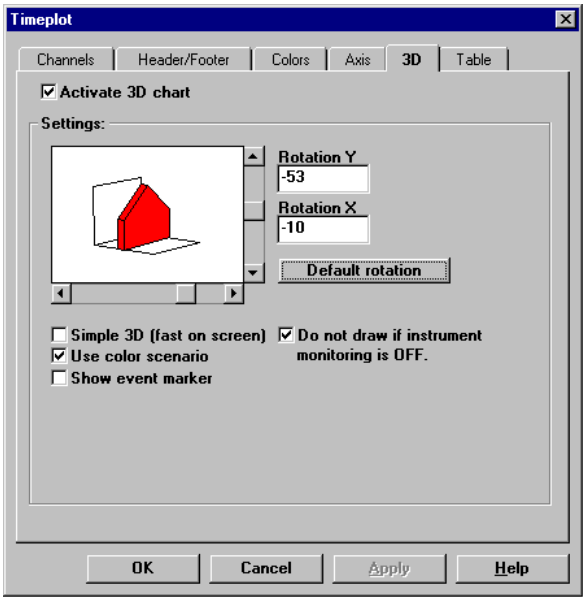
Y1-Y8 and X

Activates delta measurement information related to the selected axis.

Show 1/time

The delta information for the X-axis will show 1/x (Hz) instead of time information.

10.13 3D (DRAN-VIEW *Pro* only)



Use this dialog to switch between 2D and 3D and to rotate the 3D chart. While the chart is in 3D mode the zoom functions are disabled, but you can always switch back to 2D to do the zoom and then go back to 3D.

A 3D chart can be rotated using the PAN-buttons in the toolbar.

Go directly to the 3D-tab using the toolbar button: 

This dialog offers the following options:

Activate 3D chart

If this checkbox is checked the chart becomes 3D. The 3D-settings are only available if this checkbox is ON

Rotation Y

This is the left-right rotation angle. The possible settings are ±90°. Rotation is also possible using the horizontal scrollbar.

Rotation X

This is the up-down rotation angle. The possible settings are ±90°. Rotation is also possible using the vertical scrollbar.

Default rotation

This button resets the rotation to the factory angles.

3D chart

This checkbox indicates if 3D is active.

Simple 3D

This checkbox may be used to speed up the chart drawings on screen. If this checkbox is checked then there will be no shadowed 3D effects on each curve. Note: This setting does NOT affect the printouts, only the image on the screen.

Use color scenario

This checkbox is used to either have the chart completely black and white or to use the currently selected color scenario for the chart. (See the ***colors tab***) in the chart property box)

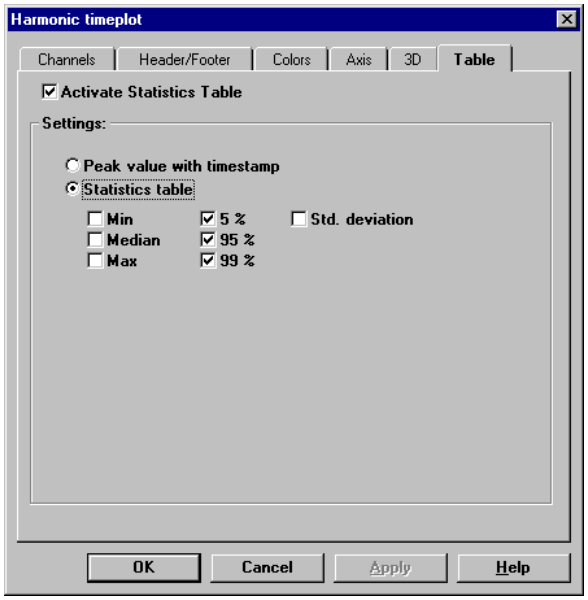
Show event marker

This checkbox may be used to show a 3D marker indicating the current event.

Do not draw if instrument monitoring is OFF

If this control is checked then the 3D chart will stop drawing while the instrument is in Monitoring OFF condition (Activated by events like Monitoring OFF, Database full etc.)

10.14 Table



Use this dialog to activate a table beside the chart with peak values or statistical information.

	Min	Max	Med
CHA Vrms	0.52	230.42	185.86
CHA Irms	0.05	108.69	15.85
CHA W	0.85	17.17	4.83
CHA VA	1.06	23.11	6.81
CHA VAR	0.63	15.46	4.71

The dialog offers the following options:

Activate Statistics Table

If this option is checked then the table will be visible beside the chart.

Peak value with timestamp

If this option is selected then the table will contain the largest absolute value obtained within the actual zoom time-range.

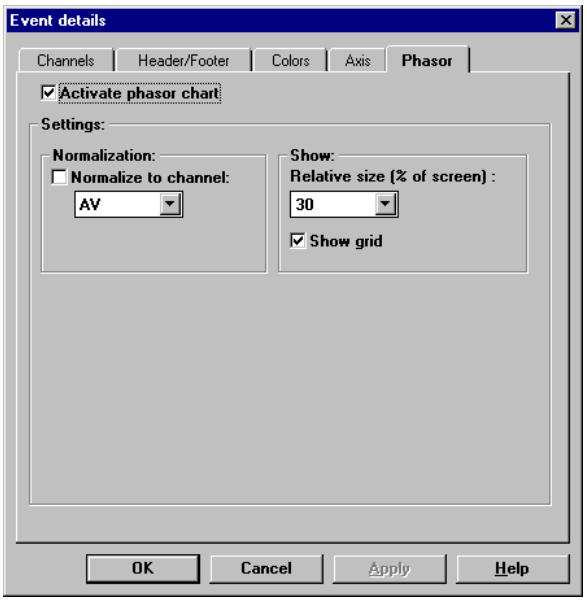
Statistics table

If this option is selected then the table may contain one or several of the statistical analysis shown below:

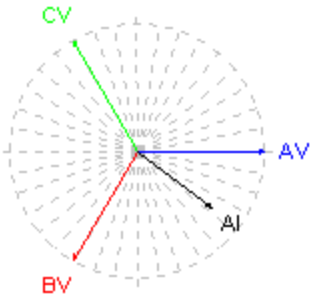
Max	: The maximum value inside the current time limits.
Median	: The median value inside the current time limits.
Min	: The minimum value inside the current time limits.
Standard dev.	: Weighted Standard Deviation of data inside the current time limits.
5%	: For 5% of the time the values are less then the 5% value.
95%	: For 95% of the time the values are less then the 95% value.
99%	: For 99% of the time the values are less then the 99% value.

Go directly to the table-tab using the toolbar button:

10.15 Phasor tab



This tab defines the style of the phasor plot that may be placed beside/below the waveform chart.



Normalized to AV
10 deg/division
AV=0°, BV=240°, CV=120°,
AI=322°

Activate phasor chart

Enable this checkbox to view the phasors.

Normalize to channel <volts channel>

This option normalizes the fundamental harmonic phasors to the selected channel. Normalization to a channel has the effect of "zeroing" (rotating to zero) the phase angle of the selected channel and phase-shifting or "rotating" the phasors of the remaining channels by an amount equal to the un-normalized phase angle of the selected channel. The phase angle *difference* between each channel remains unaffected. Typically the channel one would wish to select would be the measurement synchronization channel (usually channel A). In a three phase system this would have the effect of putting the phasors at the conventional 0, 240 and 120 degree orientation (Channels A, B, C respectively).

Relative size

This command will set the size of the phasor chart. (between 24-45 % of the screen area)

Show grid

This command will activate a grid for the phasors.

TIP: On some displays selecting phasors may distort the Harmonic or Waveform graphic due to display size constraints. If reducing the size of the phasors using the "**Show Relative Size"** option is not adequate for your viewing purposes you can use the "Split Left" option to give the right pane the whole screen. "Split Left" is available via the "Window" menu or the leftmost button of the Split screen toolbar.

Generally, this will size the screen so both graphics may be viewed easily.

Chapter 11 TECH NOTES

11.1 How does DRAN-VIEW do harmonic analysis ?

Harmonic Analysis -A Brief Overview

The essential concept of harmonic analysis is that a *band-limited, periodic,* time domain signal may be equivalently expressed as a summation of harmonically-related sine and cosine functions. To do this, the harmonic amplitudes and phase angle offsets of the sine/cosine functions must be chosen properly. We refer to the process of decomposing the time domain signal (the waveform) into amplitude and phase components as harmonic analysis. DRAN-VIEW transforms *the highlighted part of a displayed time domain (Waveform) signal* into its equivalent amplitude and phase components by doing a Fourier Transform. This function is invoked by the FFT button. A Fast (FFT) or Discrete (DFT) transform is automatically chosen dependent on whether there is a binary number of samples available. The *results* are the same with either method but the FFT is usually considerably faster. Almost all implementations of an FFT are dependent on the capture of a binary number of samples over the *measurement window.* The FFT is appropriate for Dranetz-BMI PP1s' and PP4300s' data because the front end data capture of those instruments has been designed to capture a binary number of samples per fundamental cycle (usually 128). The DFT, which is slower but more flexible, is used in situations such as on instruments like the 658 where the number of samples per fundamental cycle is non-binary or it varies according to the line frequency. In the special "DFT/FFT" mode DRAN-VIEW may be explicitly directed to do the DFT/FFT over any portion of the viewed waveform. This mode is entered by clicking on the shaded portion of the viewed signal and then using the tool bars and text that appear above the signal to select (shade) any portion of the waveform that is desired (shown by the shaded area). In this mode all the shaded area is always used in the analysis. Multiple cycles of the fundamental may be analyzed to achieve better averaging. It also allows one to retrieve the rms of the total shaded area. In special cases such as 400 hertz PP1/PP4300 signals the FFT transform that is performed is only applied to the first cycle of the eight cycles that are shaded. This caveat only applies to the "automatically" shaded and analyzed signals. When the special "by hand" analysis is done in the advanced FFT/DFT mode all of the shaded signal is always used.

Using an appropriate sine/cosine series summation, the original time domain signal (the waveform) may be *approximately* reconstructed from the provided phase and amplitude information. The full set of required harmonics coupled with *infinite arithmetic accuracy* would make it *theoretically* possible to regenerate the signal *exactly.* The number of harmonics required to do an "ideal" reconstruction would be N divided by two, where N is the number of samples in the highlighted sample window. DRAN-VIEW limits the displayed harmonics to fifty. This, coupled with roundup and truncation errors insures

that any attempted reconstruction of the waveform from the phase and amplitude data would only be an approximation of the original signal.

A word about conventions

To minimize confusion, DRAN-VIEW expresses all phase information as **an unsigned positive angle, in degrees modulo 360.** The author has found it wise to follow this convention *religiously.* Failure to do so will usually result in incorrect (or confusing) results. In all the equations in this document, all symbolic variables used on the right side of the equation are inherently, or have been resolved to, positive unsigned numbers. The only exception would be the variable t (time). Negative t might buy you the dubious joy of traversing “backwards” (right to left) through a signal. Except for Harmonic Watts, the outputs of the equations are resolvable to positive unsigned values. It has been the author’s experience that once the basic math is understood the greatest obstruction to getting correct and consistent answers is the failure to consistently handle phase angles and phase angle differences.

Harmonic Series Expansion Equations

Note:

The following equations are for harmonic volts and amps and **not** Harmonic Watts.

Equations for UN-Normalized Transforms

These series expansions are used for **un-normalized** harmonic transforms. Un-normalized phase information is generated from DRAN-VIEW when you have “Normalization-None” selected in the “FFT Chart - Channels” setup dialog. The equations may be used to *approximately* reconstruct a highlighted waveform from the un-normalized transform data.

$$f(t) = \sum_{n=1}^{N} A_n COS(n w t - d_n)$$ for **un-normalized cosine** transforms

$$f(t) = \sum_{n=1}^{N} A_n SIN(n w t + d_n)$$ for **un-normalized sine** transforms

Where:

f(t **)** is the periodic time domain signal. Usually volts or amps.

n is the harmonic number. DRAN-VIEW limits **N** to 50.

A_n is the *peak* amplitude of the nth harmonic sine/cosine. In DRAN-VIEW you may read *rms* amplitudes from the harmonic bar graph or from the View Data List information. These values may be converted to peak form by multiplying them by the square root of two. **Because the energy generation potential of a voltage or amperage harmonic signal is proportional to the Root Mean Square (RMS) of the peak value, DRAN-VIEW displays these values in RMS format for convenience.** Using the rms values you can easily compute the rms energy in any subset of harmonics by taking the square root of the sum of their rms amplitudes squared. This becomes useful if you are interested in the energy contribution of a small subset of harmonics rather than the total harmonic energy which DRAN-VIEW provides directly. For example, to find the rms contribution of the third and fifth, sum their squared values and take the square root. To convert to percent of the total, divide by the Total RMS value.

w is the angular frequency. Conventionally this is $2p\,f_1$ where f_1 is the fundamental frequency in reciprocal seconds (one over the period, T_1) and $2p$ is in radians. DRAN-VIEW expresses all angles in degrees so this value resolves to $360°/T_1$ where T_1 is the fundamental period in seconds. Note that in special situations the period T_1 may be an integral fraction of the highlighted area used in the transform. This rule applies primarily when more than one fundamental wave is highlighted. For instance, at 400 Hz the PP1-PQPlus captures eight cycles of data for each event. If you use the special FFT/DFT ("by hand") mode to analyze the waveform, the software generates the "fundamental" and harmonics by picking every eighth element out of the transform array.

t is in seconds.

d_n Is the positive modulo 360 degree phase angle offset at **t** equals zero. This value is provided by DRAN-VIEW in the phase table or the View Data List.

Note that the phase offset, d_n, is subtracted in the cosine expansion and added in the sine expansion. The cosine expansion is included as an option primarily because it is the form that many texts on the subject of Fourier Analysis prefer to use. It is not the preferred form for power calculations. Agreement with math texts is also the reason that the minus sign was preserved in the cosine expansion above. Negating the un-normalized cosine expansion d before presentation in the DRAN-VIEW phase table would have allowed the sine and cosine expansion forms to be analogous (it would be much easier to remember that way). Because of the preponderance of cosine transforms in texts, you are more likely to get agreement using the cosine transform option if you are using a typical textbook application to do your own transforms on the same data. In the power industry, the sine transform makes the most sense and is the preferred form. For example, the phase relationship of a positive sequence three phase system is usually expressed as 0, 240 and 120 degrees for phases A, B and C, respectively. Expressed in the $\cos(wt - d)$ form preferred by mathematicians these phasor angles would become 90, 210 and 330, respectively. Confusing, to say the least.

Most non-mathematicians visualize and speak of sine waves not cosine waves. Phasors in the power industry almost always come from sine transforms.

NOTE:

In the expansions above (and throughout most of this document) the contribution of the DC component (harmonic zero) has been ignored. To be technically correct it should be included but it is typically discarded because in AC circuits it is usually close to zero. The DC component is simply the algebraic average of all the data points in the cycle. If the DC component is significant then f(t) may be more accurately computed by including the average voltage or current in the summation.

Phase angles and Normalization

Normalization, as used by Dranetz-BMI, refers to the process of recomputing the phase offsets output by the harmonic transform in order to relocate the expression of the signal to a new origin. Since the phase angles generated by a harmonic transform are dependent on both the start point of the sample window and the form of the transform (whether it is sine or cosine; whether the phase angle is added or subtracted etc.) *it is possible to get a bewildering set of equivalent phase angle data sets* ***for the same set of waveforms.*** Normalization attempts to standardize the expression of a (set of) waveform(s) by always referencing the data to the same point. The most useful application of this option is in referencing the phase angles of the harmonic transform to the positive zero crossing of the voltage sample synchronization channel fundamental. This is particularly helpful when viewing the fundamental phasors of highly distorted signals in a three phase system. In the presence of high distortion, typical sampling hardware may not synchronize itself exactly to the zero crossing of a sync channel fundamental. This could cause the phase offsets of the fundamentals that are returned from the un-normalized sine transforms to be, for example, 343, 223 and 103 degrees for channels A, B and C, respectively. Normalizing this data to the fundamental of channel A will yield a familiar 0, 240, 120 degree sequence that we easily recognize as a positive sequence three phase system. This is calculated as follows. Since we wish to normalize to the sync channel (Channel A) we must *subtract out* the phase offset of the sync channel from each of the channels as follows:

Normalized Phase A = 343 -343 = 0
Normalized Phase B = 223 - 343 = -120 + 360 = 240
Normalized Phase C = 103 - 343 = -240 + 360 = 120

Note that for phases B and C we add 360 degrees back in because, by convention, we ***always*** resolve angles to positive modulo 360. If we were to use these normalized angles in the sine expansion equation given above to generate f(t) we would get approximately the original signals *except that their time origins would be shifted left 343 degrees.* Alternatively you could view it as shifting the time axis forward (to the right) -343+360 = 17 degrees. Imagine it as clipping 343 degrees from the end of the cycle

and pasting it to the front, or clipping 17 degrees from the front of the cycle and pasting it to the end.

Normalization to the fundamental of a *single* channel **does not change the channel to channel phase offsets.** This is important because the channel to channel phase offsets are used to compute Harmonic Watts. If you "Normalize to the Fund" of the individual channel you are essentially "zeroing out" the fundamental phase angles of **all** the channels. **This will destroy the true phase to phase relationships between channels and thus change the hand-computed Harmonic Watts from their true values. This is very important to remember! Because of the potential to corrupt the Harmonic Watts computations, we recommend that you exercise caution when using the Normalize to the Fund option. In order to insure that the harmonic watts computations are correct, DRAN-VIEW always internally uses the un-normalized voltage and current phase angles to compute watts.**

The following equations are used in normalization.

To Compute a Normalized Phase Angle from the UN-Normalized Expression

Below is the general formula that may be used to normalize un-normalized phase angles which were intended to be used in expressions of the form sin ($w t \pm d$) or cos ($w t \pm d$). *Remember,* d is unsigned modulo 360!

$$d_{Normalized_n} = b * (d_{UnNormalized_n} - n f_1)$$

For DRAN-VIEW the equation above resolves to two forms

$d_{Normalized_n} = n f_1 - d_{UnNormalized_n}$ Used for **cosine** expansion

$d_{Normalized_n} = d_{UnNormalized_n} - n f_1$ Used for **sine** expansion

Where:

b=1 if you wish the sign of the expression $w t \pm d$ to be the same for the normalized expansion as it was in the UN-normalized expansion (i.e., if the un-normalized expansion used sin ($w t + d$) and the normalized expansion used sin ($w t + d_{Normalized}$), then b=1). Otherwise, b=(-1). For example, in DRAN-VIEW the expansion is changed from cos ($w t - d$) to cos ($w t + d_{Normalized}$), here b=(-1).

d_n is the nth harmonic phase angle. d_n on the ***right*** side of the equation is the phase angle generated from the *Un-Normalized* Transform. The left side is the phase angle transformed to its normalized perspective. d_n is expressed as a positive number modulo 360.

f_1 Is the Un-Normalized fundamental phase angle of the selected channel. If you selected “Normalize To the Fnd” f_1 is the un-normalized phase angle of the currently displayed channel. If you select “Normalize to the Fnd of:” then f_1 is the un-normalized phase angle of the selected *voltage* channel.

n is the harmonic number

The expression used to normalize a sine expansion is what one would intuitively expect to see. We wish to “subtract out” the fundamental phase angle, therefore it is logical to subtract nf_1 degrees from each harmonic phase offset. The harmonic number “n” is required because one degree of shift along the fundamental is equal to n degrees of shift along the nth harmonic. Note that the normalization equation for cosine expansions is just the negation of the expression for sine expansions. This unfortunate bit of confusion is caused by the fact that in the process of normalizing the cosine expansion, the form of the expansion is changed from cos (ωt - δ) to cos (ωt + δ). The change of the minus sign to a plus sign requires the negation of the normalization result. Note that if we are normalizing the channel from which we get f_1 the phase of the normalized fundamental will always be zero.

Equations to recompute waveforms from Normalized Transforms

$$f(t) = \sum_{n=1}^{N} A_n COS\left(n\omega t + \delta_n - nf_1\right)$$ normalized **cosine** transform

$$f(t) = \sum_{n=1}^{N} A_n SIN\left(n\omega t + \delta_n + nf_1\right)$$ normalize **sine** transform

The above equations will generate the *original* signal just like the equations shown for un-normalized transforms. **Note that if you drop the nf_1 term from either equation what remains would be the equation required to redraw the original signal phase shifted f_1 modulo 360 degrees (of the fundamental).**

Power Dissipation Watts

Before discussing harmonic watts, terms are defined as follows:

The *average* steady state power dissipation, $P_{Average}$, ***for an integral number of cycles of a sinusoidal current driven by a sinusoidal voltage*** is:

$$P_{Average} = V_{RMS} * I_{RMS} * \cos \theta$$

Where V_{RMS} = RMS Voltage applied to the current.

I_{RMS} = RMS current in amps.

θ = The phase difference between the volts and the current using volts as the reference. (i.e., if volts are referenced at 0 degrees (its display looks like a sine wave) and the associated current is at 90 degrees (it looks like a cosine wave) then $\theta = 0° - 90° = -90°+360° = 270°$). Using this convention, (keeping volts at 0 degrees) we find that when θ is in the first and fourth quadrant (when θ is 0° to ± 90° degrees but not equal ± 90°) $P_{Average}$ is positive (power goes *to* the load). The second and third quadrants ($90°<\theta<270°$) generate negative power (i.e., your "load" is actually a generator. This usually means your probe is on backwards). When θ is exactly 90° or 270° *no active power is generated* ($P_{average} = 0$). In this special case the power is *pure reactive*. If θ is 90° then it is pure inductive. At 270° it is pure capacitive.

Important Notes about θ :

Because cos θ is equal to cos (-θ) the computation of watts is correct if you reference current to volts or volts to current, either way. As we shall see, this flexibility sets the stage for endless confusion. The reactive power, VAR, is computed as sin θ. Since sin (-θ) is equal to -sin θ we can see that the computation of VAR is *greatly* affected by how you compute the phase difference, θ, between volts and current. Referencing current to voltage will give a different reactive power than if you reference volts to current. To further confuse the issue, the way in which you express the signals also affects your results. For example, the phase angles from the signals expressed as sin ($\omega t + \delta$) must be handled differently than if you take the phase angles from the same signals expressed as cos ($\omega t - \delta_{Prime}$) if you wish to get the same results. Obviously, we need to establish a convention if we ever wish to get *consistent* power calculations.

Statement of Power Convention

When the current signal lags the voltage signal that is driving it we say that it is inductive and *by convention,* we assign the reactive power (VAR) to be positive. When the current signal *leads* the voltage signal that is driving it is considered capacitive and by convention the reactive power is assigned to be negative. **This is the standard used on all Dranetz-BMI products.** This power industry standard is reasonable when you consider that most real world loads are inductive. If you accept that "normal" should be positive then it is reasonable to assign positive to inductive (normal) loads. The terms *leading* and *lagging* are taken from phasor notation. The phasors are imagined to be rotating in a counter-clockwise direction. They are conventionally shown starting at some arbitrary phase offset equivalent to time t equal zero. The phase offset is the phase angle offset gotten when the signals are expressed in the form sin ($\omega t + \delta$). Expressed in this fashion the leading signal is the signal with the greatest unsigned phase offset *unless* the difference between the larger and the smaller δ is greater than

180 degrees. In this case the signal with the smaller δ is the leading signal. Remember, we *always* express δ in unsigned modulo 360 format. Using this carefully constructed convention ***the phase difference between volts and current is correct for computing both active power, watts, and reactive power, VAR, when the signals are expressed in* sin ($\omega t + \delta$) *format and the current phase angle offset is subtracted from the voltage phase angle.***

The following example illustrates what happens if you fail to exercise care when doing power calculations. Given a capacitive load with a voltage signal expressed as sin ($\omega t + .2°$) and a current signal expressed as sin ($\omega t + 35°$) we can compute the watts as cos (.2 - 35° + 360°) = cos (325.2°) = .82 watts. The VAR is computed as sin (325.2°) = -.57 VAR. By our convention, a negative sign on the VAR indicates that the current leads the voltage and consistent with that convention, we can say that it is capacitive. The positive sign on the watts indicates that the power is flowing from the source to the load, as you would expect. If the sign of the watts value was negative it would imply that the "load" was behaving as a generator. If you were looking at the fundamental, it would indicate that you probably have your current probe reversed. Now, if you use the trigonometric identities cos (θ) = cos (-θ) and cos (90° - θ) = sin (θ) to express the signals in cos ($\omega t - \delta$) format you will get very different results.

sin ($\omega t + .2°$) = cos (90° - ($\omega t + .2°$)) = cos (- $\omega t + 89.8°$) = cos ($\omega t - 89.8°$) (Volts)

sin ($\omega t + 35°$) = cos (90° - ($\omega t + 35°$)) = cos (- $\omega t + 55°$) = cos ($\omega t - 55°$) (Current)

Now, using the 89.8° and 55° values that would be presented in the un-normalized cosine expansion phase table and using the same conventions as before to compute watts and VAR you will get the correct value for watts (cos(89.8°-55°) = .82 watts*) but the value you get for VAR will be the negation of the previous computation* (sin(89.8°-55°) = .57 VAR). If you had known to use (-89.8°-(-55°)) = -34.8° + 360° = 325.2° as your θ, then both your watts and VAR would have worked out correctly. **DRAN-VIEW always presents the phase angle θ in the watts harmonic phase table in a manner consistent with computing both watts and VAR correctly *regardless of which expansion form you choose.***

Harmonic Watts

In a non sinusoidal system it turns out that dissimilar voltage and current harmonics do not interact to generate useable power. You can readily convince yourself of this by graphically sketching the power curve resulting from a fundamental voltage signal and a second harmonic of current. The power curve results from a point by point multiplication of the two signals. The average power results from dividing the area under the curve by the total time. You will be able to see that the average power over one cycle of the fundamental and two cycles of the second harmonic will *average* to zero (by symmetry you will see the positive lobes will cancel the negative lobes). The result of this little mathematical bonus is that **only harmonics of the same order interact to generate power.** This means that in the frequency domain the average active power dissipation over one cycle of the fundamental in a system rich in harmonics may be computed by summating the individual **harmonic watts dissipations** .

Mathematically this is:

$$\mathbf{P_{Average}} = V_{DC*}I_{DC} + \sum_{J=1}^{N} V_{RMS_J} * I_{RMS_J} * \cos q_J$$

Where

V_{RMS_J} Is rms voltage at the Jth harmonic

I_{RMS_J} Is the rms current at the Jth harmonic

q_J Is the difference between the phase angles Φ, of the voltage and current at the Jth harmonic. ($q_J = \Phi_{\text{voltage}_J} - \Phi_{\text{current}_J}$). See previous discussion on how to compute θ.

$\mathbf{P_{DC}}$ Is the power dissipation due to the dc components $V_{DC*}I_{DC}$. It can usually be ignored.

Caveats

Harmonic watts may have dubious meaning if “Normalize to Fnd” is selected. Although DRAN-VIEW always gives the correct value, hand-calculations may be erroneous.

Generally, the phase angles for the amperage harmonics are not phase corrected for the lead/lag introduced by the probes. If this value proves to be a significant proportion of the total phase difference between the volts and amps signals then a significant error will be introduced.

The phase accuracy decreases significantly as a function of increasing harmonic frequency therefore the greater the harmonic content the more error you are likely to see in the harmonic watts calculations.

It is possible for the phasors and the fundamental angles in the phase table to disagree if cosine expansion for the phase table is chosen or if the phasors and phase table normalization configuration disagree.

Individual phase harmonic watts values will be incorrect for three phase differential delta configurations because the current values are *line* currents and the voltages are the phase to phase voltages (i.e., *the current that is measured is not the current that is being driven by the measured voltage)*. The phase to phase current is not generally directly accessible in a three phase delta situation. Generally, the voltage and current phase angles will be displaced 30 degrees from what they should be. If the two watt meter method (using Blondel’s Theorem) is used to measure a three phase delta the harmonic totals may be deduced by adding the harmonic watts of the two “phases” constructed in the two watt-meter measurement. **In Dranetz-BMI instruments using the three phase differential delta measurement connection (PP1/PP4300) the two**

watt-meter method is mathematically constructed within the instrument. Therefore the *total* watts presented in meter mode are correct.

11.2 How does DRAN-VIEW do weighted statistics ?

The samples inside the current time limits are sorted in ascending sample magnitude order along with their associated durations. A given sample is assumed to be the best estimate of line conditions until a new sample comes along to replace it. Therefore its duration (or weighting) is given as the time difference between the sample and the next sample. Starting at the lowest sample magnitude the associated sample durations are summed. When the duration sum equals or exceeds 5%, 50% (median value), 95% and 99% of the total duration of all samples, the magnitude is extracted and shown. These are the values used for the 5%, median, 95% and 99% estimates (Also used in the "Quality of Supply" charts of Report Writer).

We can think of the result as :
For N% of the time the values are less than or equal to the N% value. For the rest of the time it is greater.
(where N is 5,50,95 or 99)

The weighted standard deviation is carried out using the following formulas. D denotes durations and X denotes sample magnitudes:

Duration of all samples = D_{total} = $\sum_{n=1}^{N} D_n$

Where D_n is equal to the time duration associated with each individual sample.

Weighted (by duration) Average of Samples = $\overline{X}_{weighted} = \frac{\sum_{n=1}^{N} D_n * X_n}{D_{Total}}$

Using the weighted average as our model the formula for the weighted standard deviation is as follows:

Weighted (by duration) Standard Deviation (biased) = $\sqrt{\frac{\sum D_n * \left(X_n - \overline{X_{Weighted}}\right)^2}{D_{Total}}}$

11.3 How do I get the data into Microsoft Excel ?

Data is exported as ASCII text out of DRAN-VIEW in a text file or using the clipboard. To get the data into Microsoft Excel as quickly as possible, do the following:

- Make the chart that contains your data active by clicking on it.
- Zoom into the area you want to export, if desired.
- Press the 'View table list' toolbar button.
- Press the 'Copy to clipboard' toolbar button.
- The ASCII-Export dialog box is shown, press OK
- Start MS-EXCEL and use the 'Paste' toolbar button.

Detailed information:

The ASCII Export dialog can be brought to you in two ways:

A. You have selected Edit-Copy in a table list view and are going to place the data into the clipboard.
In this case it's important that you selected the TAB delimiter in DRAN-VIEW, otherwise the data will not fit into MS-Excel smoothly. In version 5 of MS-Excel there's the command **Data-Text to columns** to help you out if the delimiters are different, but in older Excel version its impossible to get it right if failed while pasting the data. For problems with date and time formats please read the following section about importing a DRAN-VIEW TXT-file into MS-Excel.

B. You have selected File-Save As and will create a TXT-file.
The following steps shows how to import the file into Microsoft Excel.

1. Select File-Open in Microsoft EXCEL
If you have Microsoft Excel for Windows 3.1 (Microsoft Excel version 3 or 4) follow these steps:
1. In the file open dialog select the **Text** button and select the SAME delimiter that you have chosen in DRAN-VIEW and press the OK button (If using the TAB delimiter then this step may not be needed).

2. Now open up the DRAN-VIEW txt-file. If you have selected the appropriate delimiter, every data field should now have been placed in its column.

The time-stamp problem:

Microsoft Excel 4.0 does not understand the milliseconds information that DRAN-VIEW adds to the time-stamp. Example (US format) : 12/12/95 11.10.36.**4310**. This means that Excel can not plot the samples appropriate since it assumes the X-data to be string labels and not numbers. If you want Excel to treat the X values as time-stamps and not as strings you should export the data without the milliseconds information attached to it.
This might be a problem if you have exported waveforms, since the milliseconds information is crucial. In this case (with string labels) Excel will plot the samples with the same distance between each sample.

To give the time-stamp column (column A) the desired format, use **Format-Number** from the main menu and select Date with the pattern "mm/dd/yy hh.mm.ss". If this pattern is not available you can type it in.

Note: For countries using other date/time formats then English(American) the pattern might differ.
Also the characters representing hours/minutes etc. might differ if you have an Excel version other then English.
Excel may also have problems when using another Windows language setup then the current localized Excel version.

If you have Microsoft Excel version 5, 7 or newer follow these steps:

Microsoft Excel version 5 and newer will handle milliseconds in most cases. There might be problems however when mixing localized versions of MS-Excel with the current Windows settings.
Example : MS-Windows control panel country settings = Sweden and using Swedish Microsoft Excel will work fine with milliseconds. But if changing the country settings to English(American) MS-Excel will fail to understand that the timestamp is a date/time field.

- Open the txt-file and Excel will run the "Text Import Wizard".
  First press the **Next>>** button (this will take you to page 2 of 3)
  If you have selected TAB as delimiter then page 1 of the wizard does not have to be modified.
  Press the **Next>>** button. (this will take you to page 3 of 3)
  Select **Date** for column A (already marked) in the radio group labeled **Column data format**.
  Press the **Finish**-button

- In the sheet, mark the entire column A and all its data and select **Format-Cells**
- In the **Number** tab select category "**Date**" and select **mm/dd/yy hh.mm** or equivalent. Press the OK button and look at column A (you may have to make it wider since it might only show #####) If the date format of column A now has changed according to the date pattern you have selected then everything is all right. If the date strings are unchanged then the milliseconds information is not understood by MS-Excel and you may have to re-export it from DRAN-VIEW without milliseconds.

- To view milliseconds in the sheet you have to **Format cells** using the **Custom** category and then write **"mm/dd/yy hh.mm.ss.000"** as pattern for the date.

11.4 How do I get the chart into other applications, such as Microsoft Word ?

- Select the chart you want to insert by clicking on it.
- Use the Edit-Copy command.
- Go to your application and use the Edit-Paste command. If using MS-Word or MS-Wordpad, use the Edit-Paste Special command to get full graphics. See detailed information below.

Detailed information:

Charts are copied onto the clipboard in two picture formats, ONE 650x480 pixel bitmap and ONE vectored and scaleable metafile picture. Additionally, a text format is used if the view only contains text.
When pasting into MS-Word you can use the command 'Edit-Paste Special' to select what kind of picture you like to embed into the document.

11.5 I got an error message. What does it mean ?

This is a summary of DRAN-VIEW error messages:

Metafile problems
The following error messages may appear if there is a problem displaying or printing a Windows Meta File (*.WMF) in the header of the page.
The solution for these errors is to create a “better” WMF LOGOTYPE file,
or convert it to a BITMAP (*.BMP)-file instead.

“MetaFile Error #1”
“MetaFile Error #2”
“MetaFile Error #3”
“Unable to read placeable header”
“Unable to read metafile header”
“Unable to allocate memory for metafile bits”
“Unable to lock memory for metafile bits”
“Unable to read metafile bits”

Resource problems (should apply to Windows 3.x only) :
Solution for these problems is to shut down other applications to gain more free resources. There are always more resources available when the computer is freshly restarted.

“Could not create memory DC”
“Failed to create memory DC”
“Low on resources.”

Disk space problems
Solution: Free more disk space.

"Unexpected end of TIMEPLOT file"
"Out of memory, ASCII-Export"
"Disk is full"
"Invalid destination"

"FATAL ERROR : Out of disk space"
(Reported while converting database file)

Other disk problems
The Windows TEMP directory has not been found or data conversion has failed prior to this message. You should check that “SET TEMP=<path>” is set in AUTOEXEC.BAT.

"Temporary files not found !"

Memory problems:
Solution for these errors is to add more RAM to the PC or to increase the size of the Virtual memory file (Windows swap-file). In Win95 this is done automatically until out of disk space. In Win 3.x you must change the size of the swap file in the Control Panel using the 386 Enhanced settings.

"Memory allocation error in XARR[]"
Before showing any curves in the chart an memory array is used to calculate the X-coordinates for each timestamp-entry. This error is reported if not enough memory is available for this array. The size of the array is 2*number of samples.
Specially when viewing ALL waveform events in the same chart the size of the array may grow big.

“Failed to create bitmap”
Not enough memory to create the LOGOTYPE bitmap for print header.

"Failed to allocate GLOBAL memory"
Allocating memory for curve entries (data-channels) in the chart has failed.

The following memory error messages may be reported when converting instrument databases:
"No CDranViewData specified"
"ERROR : OUT OF MEMORY for RMS time stamps"
"ERROR : OUT OF MEMORY for RMS data"
"ERROR : OUT OF MEMORY for Event table"
"ERROR : OUT OF MEMORY for DETAIL data"
"ERROR : OUT OF MEMORY for Waveform X-data"
"ERROR : OUT OF MEMORY for Waveform Y-data"
"Memory Re-allocation error C658WaveArray"
“Memory Allocation error C658WaveArray"
“Memory allocation error"
"Memory allocation error, details"
“Failed alloc"

Axis drawing problems

The axis min value is greater then the max value.
"Invalid settings in axis range (min >= max) !"

These problems may be reported (but they should not) if the program fails to create the chart axis. Reason for this problem is hard to know in runtime.
"Error #3:Counts=0"
"Error #4:Parts=0"
"Error #5:Counts=0"
"Error #6:Parts=0"
"Error #5:Counts=0"
"Error #6:Parts=0"

Printing problems:
Solution: Printer driver is not correct installed
"Error : NULL Pointer from MFC"

Instrument data conversion problems due to invalid input data:
Generic:
"No archive specified"
"ERROR: Conversion failed !"
"Failed tracking RMS time stamps"

658 Related:
"Error reading track !"
"Error while creating temporary file"
"Error reading diskette format !"
"Invalid diskette version !"
"Invalid events on diskette !"

11.6 How do I reset everything to factory defaults ?

- Exit DRAN-VIEW
- Remove the file DRANVIEW.INI located in the C:\WINDOWS directory
- Restart DRAN-VIEW