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**User's  
Manual**

**701992/701994  
Xviewer**

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## Foreword

Thank you for purchasing the Xviewer (Model 701992/701994) waveform viewer software.

This User's Manual contains information on the functions and operation of Xviewer, as well as precautions that must be observed. This manual mainly focuses on operation under Windows XP. To ensure the correct operation of Xviewer, read this manual thoroughly before attempting to use the product.

Keep this manual at hand for quick reference and to answer any questions you may have about the software's operation.

For information on the functions and operation of the DL series products, precautions to be observed, or the operation of Windows, refer to their respective manuals.

## Notes

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## Revisions

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# Contents

	Terms and Conditions of the Software License .....	ii
	Product Overview .....	vi
	Important Notice .....	viii
	Installing/Uninstalling Xviewer .....	ix
	Specifications .....	xii
	Functions Described in This Manual and the Software Version .....	xiv
<b>Chapter 1</b>	<b>Basic Operations</b>	
	1.1 Starting and Closing Xviewer .....	1-1
	1.2 Basic Operations Performed From the Startup Windows .....	1-2
<b>Chapter 2</b>	<b>Displaying Waveform Data</b>	
	2.1 Loading Waveform Data .....	2-1
	2.2 Displaying Waveforms in the Main View .....	2-5
	2.3 Displaying Waveforms in a Zoomed View .....	2-6
	2.4 Displaying Waveforms in the History View .....	2-8
	2.5 Displaying a Waveform in the X-Y View .....	2-10
	2.6 Moving Waveforms Vertically or Zooming-In/Out .....	2-11
	2.7 Splitting the Screen .....	2-13
	2.8 Switching between Groups .....	2-14
<b>Chapter 3</b>	<b>Specifying Display Settings for Waveform Data</b>	
	3.1 Loading Display Settings .....	3-1
	3.2 Setting Waveforms (Channels) to be Displayed .....	3-2
	3.3 Specifying Split Settings .....	3-7
	3.4 Specifying Display Settings .....	3-8
<b>Chapter 4</b>	<b>Analyzing Waveform Data</b>	
	4.1 Displaying Measurement Results .....	4-1
	4.2 Analyzing Waveform Data Using Cursors .....	4-2
	4.3 Automated Measurement of Waveform Parameters .....	4-5
	4.4 Analyzing Waveforms by Computations (Optional) .....	4-8
	4.5 Specifying Annotations for Waveforms .....	4-19
	4.6 Transferring a Waveform View to the Clipboard .....	4-21
<b>Chapter 5</b>	<b>Saving Data/Converting Data Formats</b>	
	5.1 Saving Waveform Data .....	5-1
	5.2 Transferring Waveform Data into Excel .....	5-5
	5.3 Saving Waveform Data in a View .....	5-6
	5.4 Saving Automated Measurement Values for Waveform Parameters .....	5-7
	5.5 Saving the Display Settings .....	5-8
	5.6 Converting Multiple Waveform Data Files to CSV Files .....	5-9
<b>Chapter 6</b>	<b>Printing Waveforms in the Displayed View</b>	
	6.1 Setting Up a Printer .....	6-1
	6.2 Printing Displayed Waveforms .....	6-2

<b>Chapter 7</b>	<b>Communicating with the DL Series</b>	
7.1	Connecting to the DL Series .....	7-1
7.2	Displaying a File List .....	7-4
7.3	Manipulating Files .....	7-6
7.4	Operating DL Series Instruments from a PC (Other than the DL9000 Series) .....	7-9
7.5	Operating DL9000 Series Instruments from a PC .....	7-14
7.6	Downloading DL Series Waveform Data .....	7-18
<b>Chapter 8</b>	<b>Troubleshooting</b>	
8.1	Troubleshooting .....	8-1
8.2	Viewing Version Information .....	8-2
8.3	Starting Online Help .....	8-3
8.4	Visiting the Yokogawa Electric Web Page .....	8-4
<b>Index</b>		

<b>1</b>
<b>2</b>
<b>3</b>
<b>4</b>
<b>5</b>
<b>6</b>
<b>7</b>
<b>8</b>
<b>Index</b>

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# Product Overview

## Waveform Viewer Xviewer

### Viewing and Analyzing Data Saved with the DL Series

Xviewer allows you to view and analyze waveform data that has been obtained and saved using either the DL series\* or WE7000.

\* DL750 series, DL9000 series, DL7400 series, DL1700 series, DL1700E series, and DL1600 series

#### File Types Handled by Xviewer

- Files created with the DL series or WE7000 and saved in binary format (.wvf files) or ASCII format (.csv files)
- Files created with real-time recording by the DL750 series (.wdf files)
- Data measured on the DL9000 series and saved in binary format (.wdf files)

### Viewing and Transferring DL Series Files

Xviewer supports the viewing of DL750 series/DL1600/DL1700E/DL7400 series files as well as the transfer of files between the DL unit and your PC by using the GP-IB/USB/Ethernet interface.

#### **Note**

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Xviewer file transfer from your PC to a DL unit is possible only via the USB interface.

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### Remote Control of the DL Series

With the GP-IB/USB/Ethernet interface, Xviewer supports the display of images (control windows) from a DL series\* unit on your PC, as well as the remote-control of the DL unit as if you were operating the unit from its own control panel. In addition, to enable the setup of a control window environment, Xviewer features Environment Setting Keys, which are not found on the DL unit.

\* DL750 series, DL7400 series, DL1700 series, DL1700E series, DL1600 series, and DL9000 series

### Downloading DL Series Acquisition Data

The DL750 series, DL1600 series, DL1700E series, and DL7400 series acquisition data can be downloaded to a PC using the GP-IB, USB, or Ethernet interface.

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## System Environment Requirements

### PC Hardware

Xviewer requires a PC running Windows 2000 (Service Pack 4 and later) or Windows XP (Service Pack 1 and later) and a Pentium 3 CPU running at 1 GHz or better, and at least 256 MB of memory (512 MB recommended).

### Operating System (OS)

Xviewer requires Windows 2000 (Service Pack 4 and later) or Windows XP (Service Pack 1 and later).

To use the USB interface, Xviewer requires that the USB driver for the DL series be installed.

### CD-ROM Drive

A CD-ROM drive is required to install this software.

### Display, Printer, and Mouse

Display: XGA or higher

Colors : 65536 or more

The display must be supported by Windows 2000 (Service Pack 4 and later) or Windows XP (Service Pack 1 and later).

### GP-IB Board or PCMCIA Card (for Communication Through GP-IB Interface)

The PC must have a GP-IB board (made by National Instruments Corporation) installed, or a PCMCIA card. However, the operation of the PCMCIA-GPIB card is not guaranteed on Windows XP.

## Package Contents

After opening the package, check that it contains the items listed below. If any of the contents are incorrect, missing, or damaged, contact the dealer from whom you purchased it.

### CD-ROM

Xviewer

Model : 701992 (standard Xviewer)

Model : 701994 (upgraded version of 700919)

### Manual

Xviewer User's Manual

License seal × 1



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## Important Notice

### **Keep the Original CD-ROM Safe**

Keep the original Xviewer CD-ROM in a safe place. Normally, the software should be installed onto and run from a hard drive.

### **Precautions on the Use of Xviewer**

- When you are using Xviewer, do not attempt to manipulate the DL series units connected to it; the units may malfunction.
- Xviewer may be unable to operate if the PC goes into standby mode. Disable standby mode on your PC before starting up Xviewer.
- Whenever you operate Xviewer via the Ethernet interface, the Ethernet connection will usually be handling no more than 400 Kbytes/s although this may occasionally rise to 1 Mbyte/s. Check with your network administrator as to whether these traffic loads can be handled by your network.
- Do not attempt to use Xviewer to alter the network or communication settings of the connected DL series units. Doing so may lead to a communication failure between the DL series units.
- Do not attempt any self-tests with Xviewer.
- One Xviewer instance can control only one DL series unit. In addition, multiple PCs cannot be connected to a single DL series unit.
- Xviewer does not support the thumbnail previews offered by the DL1600/DL1700E series. Also, Xviewer does not support the thumbnails or previews offered by the DL7400 series.
- In the event of a connection error with a DL series unit, power off the DL unit, and then turn it on again.

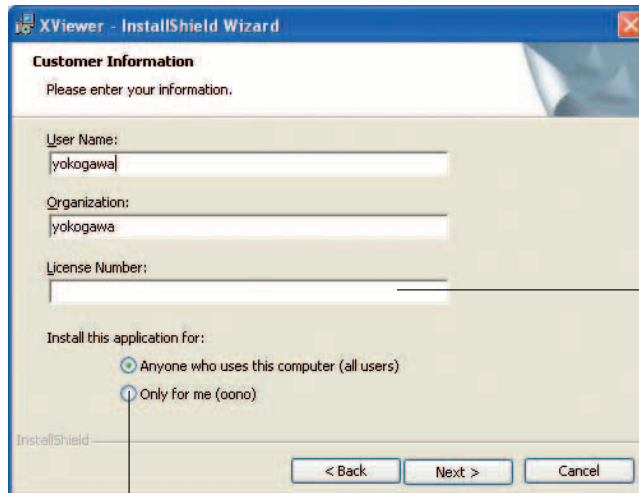
# Installing/Uninstalling Xviewer

## Operations

### Installing Xviewer

The steps below assume the use of Windows XP.

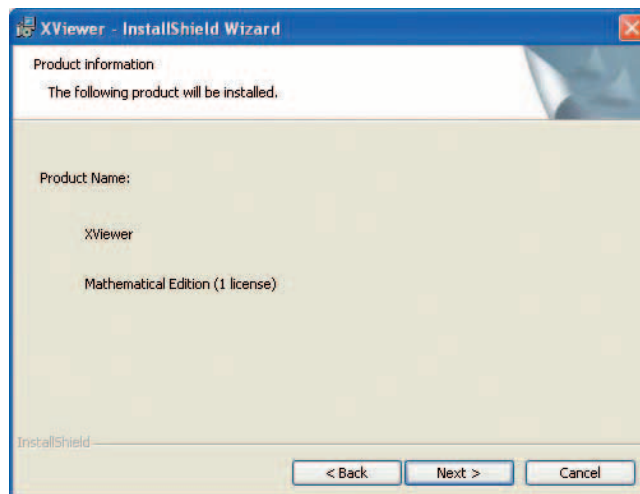
1. Turn on your PC, log on with the Administrator account, then wait for Windows to start up.
2. Place the Xviewer CD-ROM in the PC's CD-ROM drive. The Xviewer Installer starts automatically and begins to prepare the installation.
3. Follow the displayed instructions and then click **Next**.
4. The **Agreements** screen is displayed and prompts you to indicate whether you agree with the conditions of use for the software. Once you have read and agreed to the conditions of use, place a check mark against **I Agree with the Conditions of Use** and then click **Next**.
5. A screen for entering user information is displayed. Enter the **User Name**, **Organization**, and **License Number**, specify the users who will be allowed to use Xviewer, and then click **Next**. The license number can be found on a label applied to the outside of the CD-ROM case.



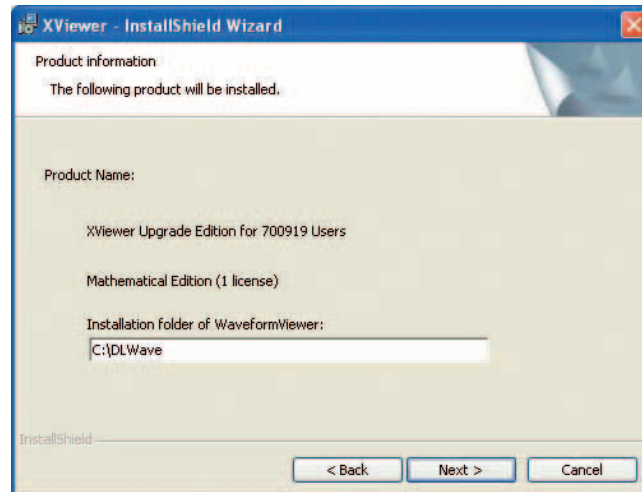
Enter the license number printed on the installation disk package

Place a checkmark in this box to grant access only to the logged-in user who has installed Xviewer

6. A product information screen is displayed. Click **Next**.  
701992:



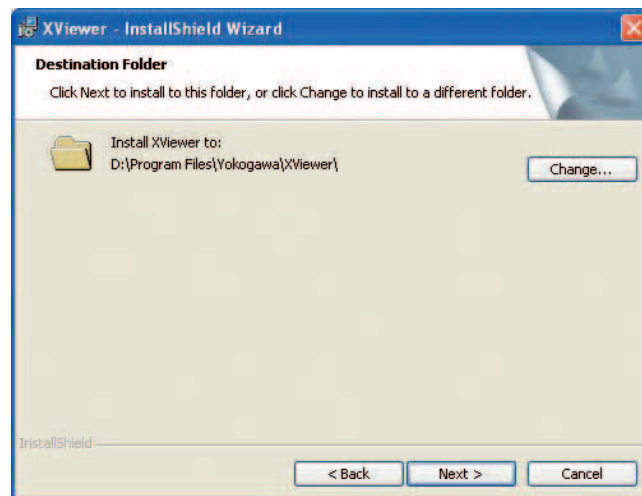
701994:



**Note**

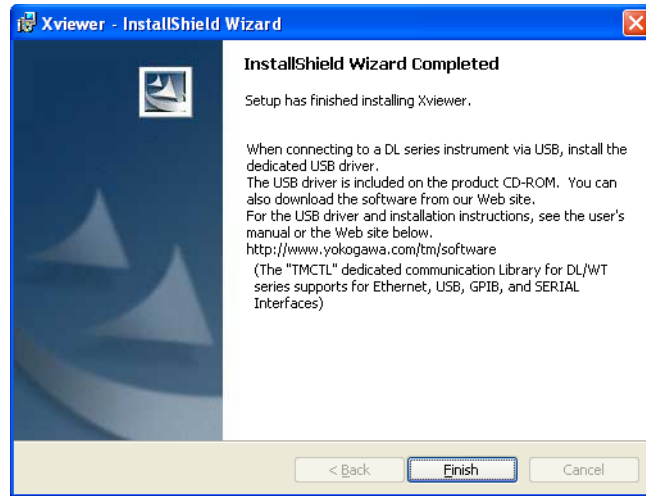
- When you install 701994, the default folder for installation of 700919 is displayed. If 700919 has not been installed in its default folder, specify the folder with 700919 installed.
- If the folder containing 700919 cannot be found, an error message will appear. Input the folder into which 700919 was installed.

7. The installation folder screen is displayed. The default setting is C:\Program Files\Yokogawa\Xviewer. To specify a different installation folder, click **Browse**. After specifying the installation folder, click **Next**.



8. The installation start screen is displayed. Click **Install** to start installing Xviewer. To change the installation settings, click **Back**. To abandon the installation, click **Cancel**.

- The Installer starts the installation of Xviewer. Once the Installer has successfully completed the installation of Xviewer, the following screen is displayed:



- Click **Finish** to close the Installer. A **Yokogawa > Xviewer** selection will be available when you click **Start > Programs** and a shortcut icon to Xviewer will appear on the desktop.

### Uninstalling Xviewer

The steps below assume the use of Windows XP.

- Select **Control Panel** from the **Start** menu.
- Double-click **Add/Remove Programs** on **Control Panel**.
- Select Xviewer in the list displayed for **Add/Remove Programs**, and then click **Remove**.
- A screen appears asking you to confirm whether you want to delete Xviewer. Click **Yes** to proceed. Click **No** to cancel.
- Xviewer is removed from your PC.

## Explanation

### USB Driver

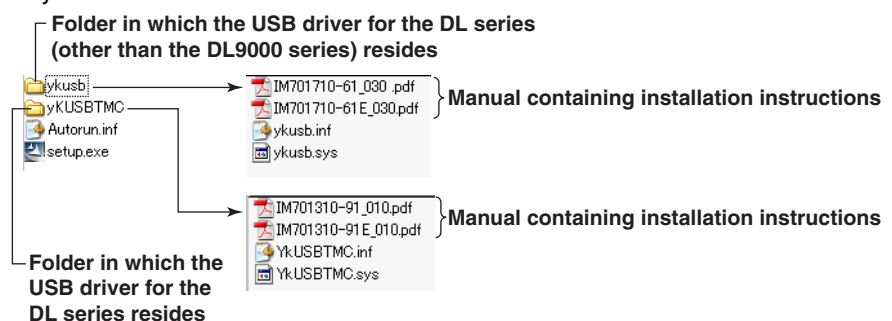
To establish a USB connection with the DL series unit, Xviewer requires that the USB driver be installed for that DL series unit. The USB driver is included in the Xviewer installation disk. The most-recent USB driver can be downloaded from the following Web page.

<http://www.yokogawa.com/tm/tm-softdownload.htm>

- Contents of the Installation Disc**

The following two USB drivers for DL series instruments are included. Please install the USB driver for the DL series instrument you will be using.

- ykusb: For the DL1600/DL1700E/DL7400/DL7500 series
- ykUSBTMC: For the DL9000 series



# Specifications

## System Environment

PC Hardware	
CPU	Pentium 3, 1 GHz or better
Memory	256 MB or more (512 MB recommended)
Space available on HDD	40 MB or more
Operating System	
	Microsoft Windows 2000 (Service Pack 4 and later) or Windows XP (Service Pack 1 and later)
Peripherals	
Display	XGA or higher (Colors: 65536 or more)
Drive	CD-ROM drive
Communication interface	GP-IB/USB/Ethernet
GP-IB Board or PCMCIA Card	GP-IB board made by National Instruments Corporation or PCMCIA card
Sound capabilities	Required to play back voice memos.

## Applicable Models and Features

### Models from which Xviewer can load waveform data:

DL750 series, DL9000 series, DL7400 series, DL1700 series, DL1700E series, DL1600 series, and WE7000

### Models for which Xviewer can view, transfer and remote-control files:

DL750 series, DL7400 series, DL1700E series, and DL1600 series, DL9000 series\*

\* Only remote control possible

### File Types Supported by Xviewer

- Files created by the DL series or WE7000 and saved in either binary format (.wvf files) or ASCII format (.csv files)
- Files of data created with real-time recording on the DL750 series (.wdf files)
- Data measured on the DL9000 series and saved in binary format (.wdf files)

### Models on which acquisition data can be downloaded

DL750 series (firmware version 6.01 or later)  
DL1600 series (firmware version 1.30 or later)  
DL1700E series (firmware version 2.11 or later)  
DL7400 series (firmware version 2.11 or later)

### Available Functions

- Main waveform view, zoom waveform view, history waveform view, X-Y waveform view, and measurement result view
- Measurements with vertical/horizontal/X-Y cursors
- Waveform parameter automatic measurement/computational measurement (optional)
- Data conversion (CSV)
- Saving and printing of measurement data
- Play back of voice memos saved with the DL750 series
- Viewing and transfer of remote files
- Remote control of the DL series

**Required Amount of Memory (Bytes)**

$60 \text{ Mbytes} + (280 \text{ Kbytes} + 40 \text{ Kbytes} \times (\text{number of blocks} + 1)) \times \text{number of channels} \times (\text{No. of channels} \times \text{No. of blocks} + \text{No. of points for computation} \times \text{No. of computation channels} \times \text{No. of blocks}) \times 4$

**Note**

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If the Font size in Windows Display Properties is set to Large, Xviewer does not display the characters properly. Make sure to set the Font size to Normal (default setting) when using Xviewer.

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# Functions Described in This Manual and the Software Version

The contents of this manual describe Xviewer software version 1.20 or later. The table below shows the software versions and the corresponding added functions. If the software is not of the newest version, you will not be able to use all the functions covered in this manual. Check the software version on the version information screen that appears by selecting **Help > Version**. For details on the procedure, see section 8.2.

## Software Versions and the Main Functions That Have Been Added

Version	Added Function	Applicable Models	Reference Page/Section/Chapter
1.10 or later	Support for DL9000 <sup>*1</sup>	DL9000 Series	<a href="#">Page xi</a>
	ACQ save function (Downloads the DL acquisition data to the PC)	DL750/DL1600 Series <sup>*2</sup>	<a href="#">Section 7.4</a>
	Log scale (Set vertical and horizontal axes when displaying the FFT waveform)	–	<a href="#">Page 3-5, section 3.4</a>
	Display the range over which FFT is performed and set the start position	All models <sup>*3</sup>	<a href="#">Section 4.4</a>
	Display the computation start position marker and set the start position	All models <sup>*3</sup>	<a href="#">Page 4-11</a>
	Analyze waveform data using H&V cursors	All models <sup>*3</sup>	<a href="#">Section 4.2</a>
	File associations (wvf and wdf) (Double-click the file to start Xviewer)	–	<a href="#">Page 1-1</a>
	Drag and drop CSV files on the viewer window	–	<a href="#">Page 2-3</a>
1.20 or later	Restore the waveform color and the number of divided displays when the file is loaded	DL750/DL9000 Series	–
	Supports the DL9000 <sup>*4</sup>	DL9000	<a href="#">Page xi, section 7.5</a>
	ACQ save function (Downloads the DL acquisition data to the PC)	DL1700E/DL7400 series <sup>*5</sup>	<a href="#">Section 7.4</a>
	Copying of cursor/waveform parameter measurement results to the clipboard	-	<a href="#">Sections 4.2/4.3</a>
	Automatic display of the measurement results window	-	<a href="#">Section 4.1</a>
	Restored when loading waveform color, number of display divisions, and vertical axis upper and lower limit values	DL1600/DL1700E/ DL7400 series	-
	Arrange Controller window/Xviewer tool bar/Viewer window	-	<a href="#">Section 1.2</a>
	Displays T/Div and V/Div on the waveform display window	-	<a href="#">Section 3.4</a>

\*1 Waveform data (wdf file) can be loaded.

\*2 Supported on version 1.30 or later on the DL1600 Series and version 6.01 or later on the DL750 Series.

\*3 DL750 Series, DL9000 Series, DL7400 Series, DL1700 Series, DL1700E Series, DL1600 Series, and WE7000.

\*4 Only remote control possible

\*5 DL1700E series: Version 2.11 or later, DL7400 series: version 2.11 or later

\*6 With the DL750 series, even if you load files that were saved with P-P Com ON in the Save As dialog box, the Upper/Lower, colors, and number of screen divisions are not restored.

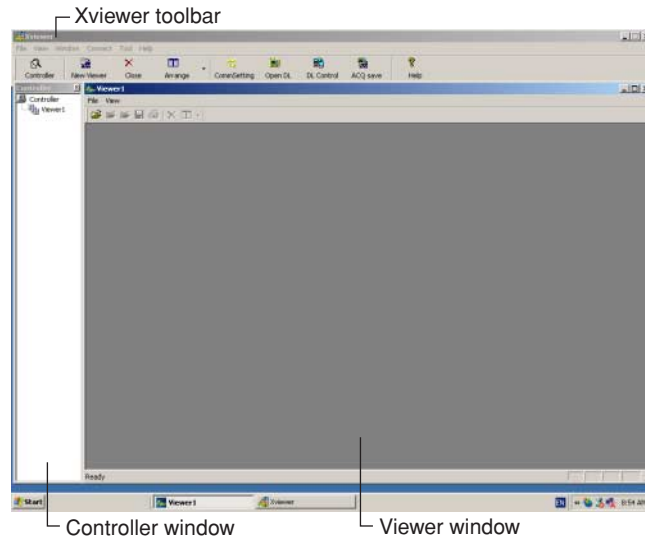
\*7 With the DL1600 series, even if you load files that were saved with Invert ON in the channel settings, the Invert information is not restored.

# 1.1 Starting and Closing Xviewer

## Operations

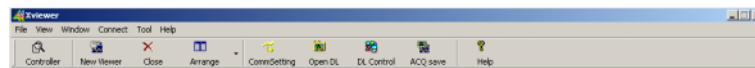
### Starting Xviewer

From the Windows **Start** menu, select **Programs > Yokogawa > Xviewer**. Xviewer starts up and displays the Xviewer toolbar, controller window, and viewer window, as shown below:



### Closing Xviewer

Select **File > Close Xviewer** from the Xviewer toolbar.



### Note

If the extension of the waveform data files is as follows, you can double-click the file to start Xviewer and display the waveform on the viewer.

- wvf
- wdf



## 1.2 Basic Operations Performed From the Startup Windows

### Operations

#### Xviewer toolbar:

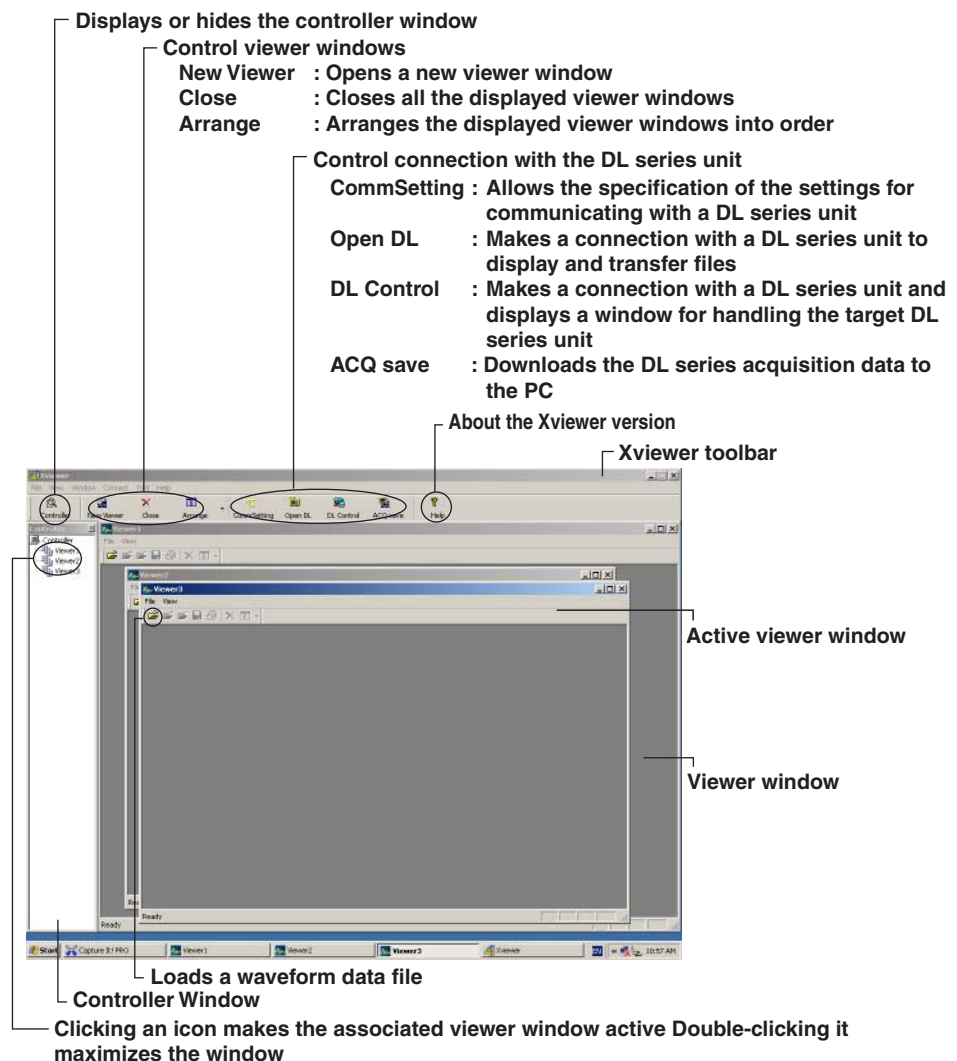
Used to manipulate the controller window and viewer windows and to control the connection with the DL series unit.

#### Controller window:

Used to make one of the displayed viewer windows active.

#### Viewer window:

Used to load, display, and analyze waveform data. Multiple viewer windows can be displayed and used to load, display, and analyze waveform data in the respective viewer windows.

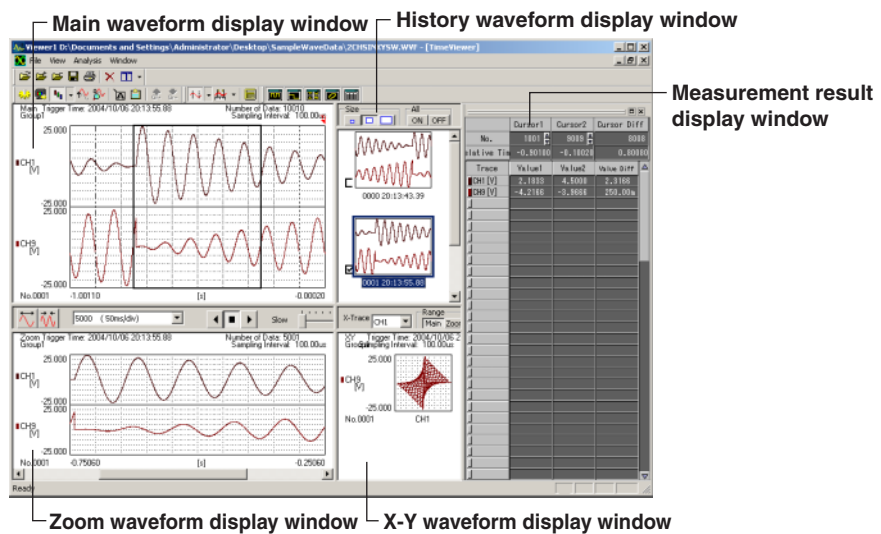


## Explanation

### Types of Viewer Window

There are five types of viewer window:

- **Main waveform display window:** Displays all of the loaded waveform data.
- **Zoom waveform display window:** Zooms the loaded waveform data.
- **History waveform display window:** Displays all the waveform data records obtained by means of sequential store, single (N) trigger mode, and/or history feature.
- **X-Y waveform display window:** Plots a channel (trace) in the main/zoom window as an X-Y view.
- **Measurement result display window:** Measured values such as cursor measurements, automatic measurements, and measurements through computation are displayed as numerical values.



### Resizable Windows

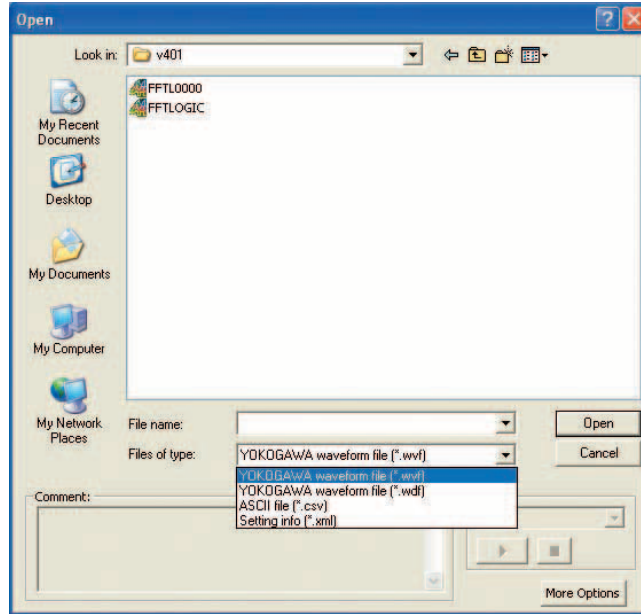
By dragging the borders of the **Xviewer tool bar**, control window, and viewer window, you can change the size of the window arbitrarily.

Click **Arrange** on the tool bar to adjust the size of the Viewer window according to that of the Xviewer tool bar and control window.

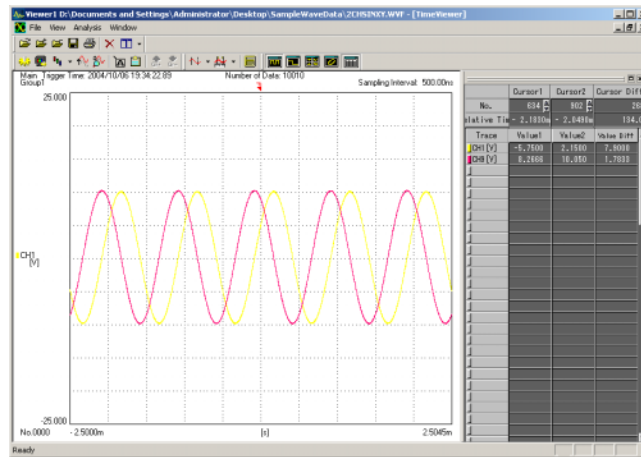
## 2.1 Loading Waveform Data

### Operations

1. Click  or select **File > Open**. The **Open File** dialog box appears.



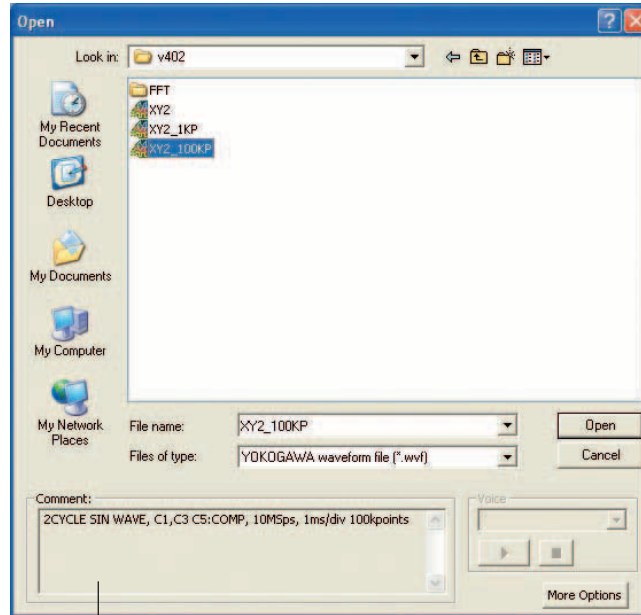
2. To display a waveform, either select the file to open from the **File name** field, or enter the name of the file and then click **Open**. Or, drag the file that you want to open and drop it onto the Viewer window.



## 2.1 Loading Waveform Data

### When opening a file with comments:

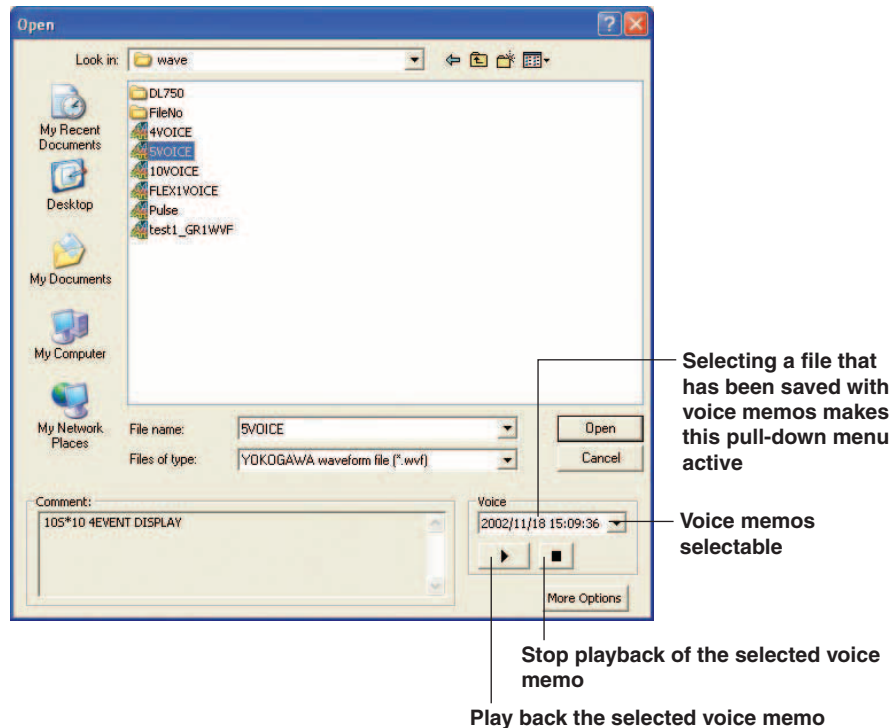
With the DL series, when you open a file that has been saved with comments, those comments appear in the **Comment** field of the dialog box.



Comments are displayed here

### When opening a file with voice memos:

With the DL750 series, when you open a file that has been saved with voice memos, those voice memos can be played back.



### Note

If your PC does not have audio capabilities, the Play and Stop buttons are grayed out.



**Explanation****Types of Files You Can Open with Xviewer**

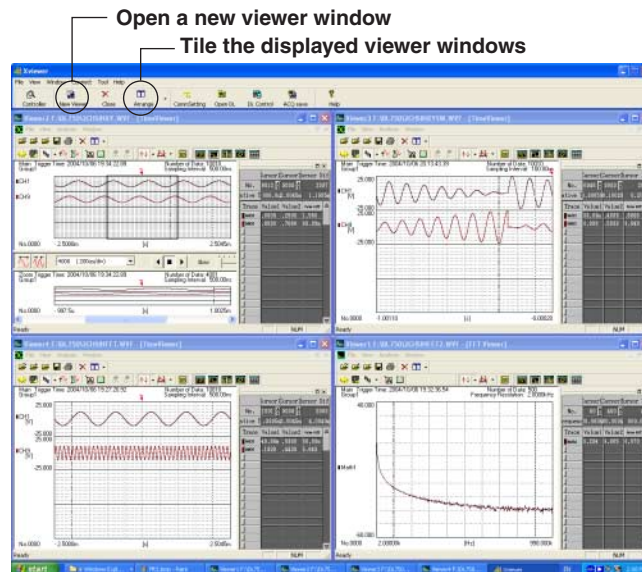
- Measured waveform files saved on the DL series or WE7000 (.wvf or .CSV files)
- Files saved with the real-time recording feature of DL750 series (.wdf files)
- Display setting files saved with Xviewer (.xml files)

**Note**

- To open a file, an .hdr file having the same name as the file you are trying to open must be placed in the same folder.
- Xviewer cannot simultaneously display waveforms that are captured with different measurement intervals, memory partitions (blocks), trigger points, or other conditions. If you attempt to load a file with waveforms that were measured under different conditions, an error message is displayed and the file is not loaded into Xviewer.
- Xviewer cannot simultaneously display the channels of waveforms measured with different sampling intervals, record lengths, or other conditions. If you attempt to load a file with waveforms that were measured under different conditions, an error message is displayed and the file is not loaded into Xviewer.
- Xviewer cannot load files with a trace name that includes a space. To load such a file, first replace the spaces in TraceName in the header file (.hdr file) with underscores (\_) or other characters.
- An error may occur if the DL750.dll file is not of the latest version. The latest version of DL750.dll can be downloaded from ([www.yokogawa.com/tm/700919](http://www.yokogawa.com/tm/700919)). Access the web site as described in Section 8.3 or directly enter the URL into your browser. Place DL750.dll in the Xviewer installation folder.
- Note that files containing more than 2G points cannot be handled.

**Loading Multiple Files**

A new Viewer window can be opened either by clicking the  button or selecting **Window > Viewer**. Multiple Viewer windows can be open at the same time, allowing you to read and display the contents of multiple files. When multiple Viewer windows are being displayed, you can tile them by clicking the  button or selecting **Window > Tile**.

**Files that can be dragged**

The files with the following extensions can be dragged from the load source window onto the viewer window.

- wvf
- wdf
- csv

## 2.1 Loading Waveform Data

### Setting Options for Loading Files

Click the **More Options** button to specify supplementary options for loading a file after selecting that file.

The screenshot shows the 'Open' dialog box with the file 'HIST0000' selected. The 'File Contents' table is expanded, showing two traces: CH1 and CH3. The 'File Contents' table has the following data:

TraceName	BlockNum	RecordLength	SamplingInterval	Date
CH1	14	10010	1000.0ns	2004/02/
CH3	14	10010	1000.0ns	2004/02/

Annotations and their corresponding elements in the dialog:

- Show or hide loading options:** Points to the 'Voice' dropdown menu.
- Prevent all waveform data from being loaded:** Points to the 'ALL OFF' button.
- Uncheck the box for loading waveform data, keeping the current waveform data displayed:** Points to the 'Init. Y-Axis Scale' checkbox.
- Uncheck the box for loading new waveform data, keeping the current Y-axis scale unchanged:** Points to the 'Open New File' checkbox.
- Check the boxes corresponding to the waveform data that you want to load into the viewer:** Points to the checkboxes next to 'CH1' and 'CH3' in the 'File Contents' table.
- List of waveforms in the selected file:** Points to the 'File Contents' table.

### Loading Sequentially Numbered Files

Click either of the buttons shown below to load and display sequentially numbered files in the folder containing the file you are currently viewing, switching the files in ascending or descending order of file numbers.

The screenshot shows the Xviewer software interface with two buttons highlighted. The annotations describe their functions:

- Switches to the file whose name (number) is incremented by one (i.e., 0000.wvf → 0001.wvf → 0002.wvf):** Points to the right-pointing arrow button.
- Switches to the file whose name (number) is decremented by one (i.e., 0002.wvf → 0001.wvf → 0000.wvf):** Points to the left-pointing arrow button.


### Loading Files in DL Units

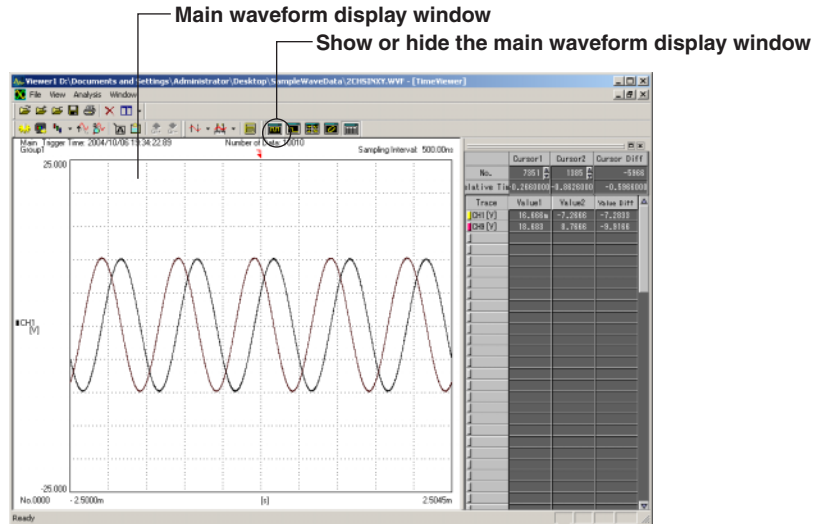
You can directly reference and load waveform data files saved into the media of the DL units and which are connected to Xviewer. For details, see Section 7.3.

## 2.2 Displaying Waveforms in the Main View

### Operations

#### Displaying Waveforms in the Main View

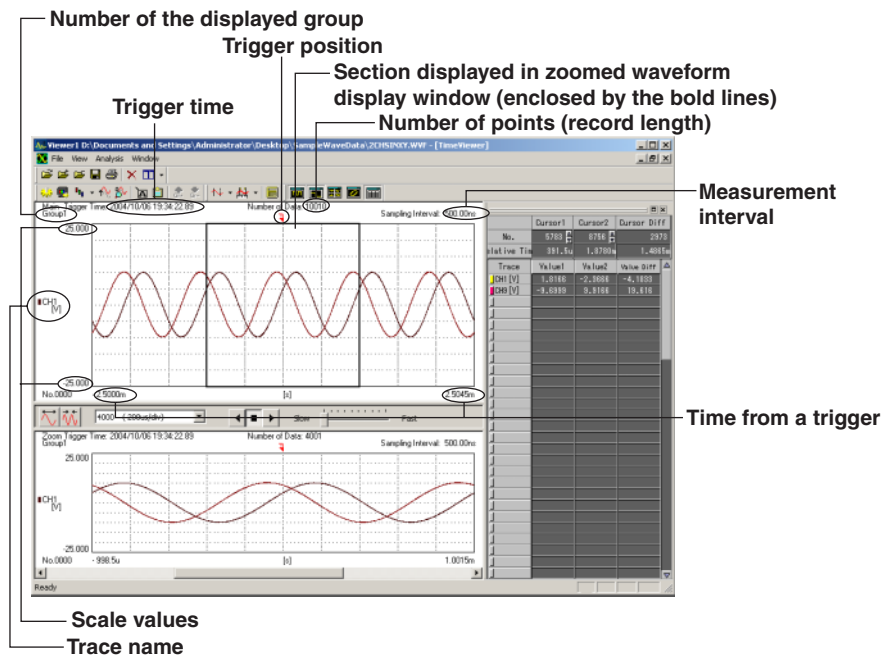
To display waveforms and measurement results, first open a waveform data file. To show or hide the main waveform display window, click the  button or select **Window > Main Window**.



### Explanation

#### Details of the Main Waveform Display Window


The main waveform display window provides a global view of the measured waveform data.





## 2.3 Displaying Waveforms in a Zoomed View

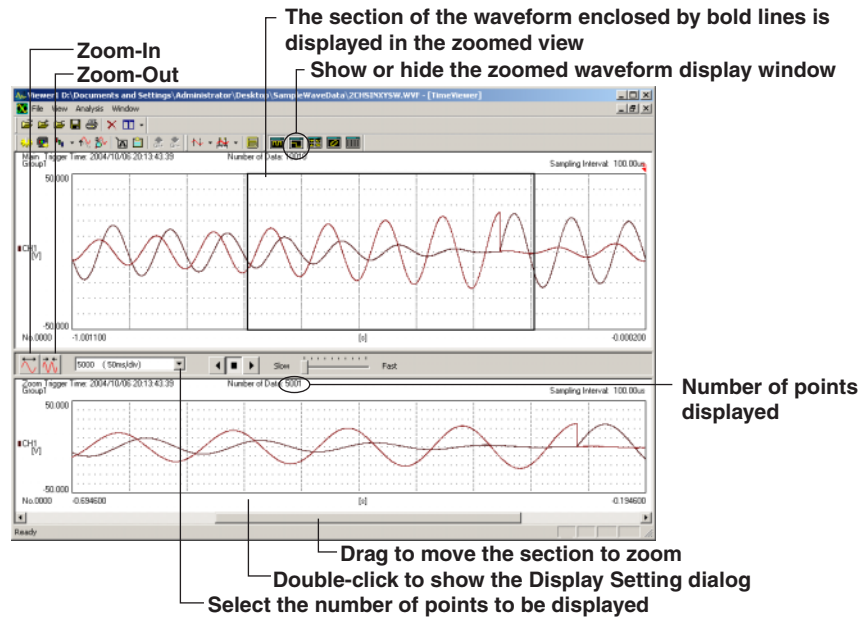
### Operations

#### Displaying Waveforms in a Zoomed View

Click the  button or select **Window > Zoom Window** to display a zoomed view of the section enclosed by the bold lines in the main waveform display window.

#### Setting the Zoom Factor

To increase or reduce the zoom factor, click the  (Zoom-In) or  (Zoom-Out) button.



#### Moving the Zoomed-In Section

You can move the section to zoom by:

- **Dragging the bold line**  
You can drag the bold line in the main waveform display window to move the section to zoom. Use the arrow buttons to move it automatically.
- **Designating a point in the Display Setting dialog**  
You can double-click the bottom of the zoomed waveform display window to show the **Display Setting** dialog in which you can designate a point at which to start the zoomed section display. Click **OK** to apply the point.
- **Dragging the scroll bar**  
You can drag the scroll bar at the bottom of the zoomed waveform display window to move the section to zoom.




**Scrolling Zoomed Waveforms**


• **Arrow Buttons**

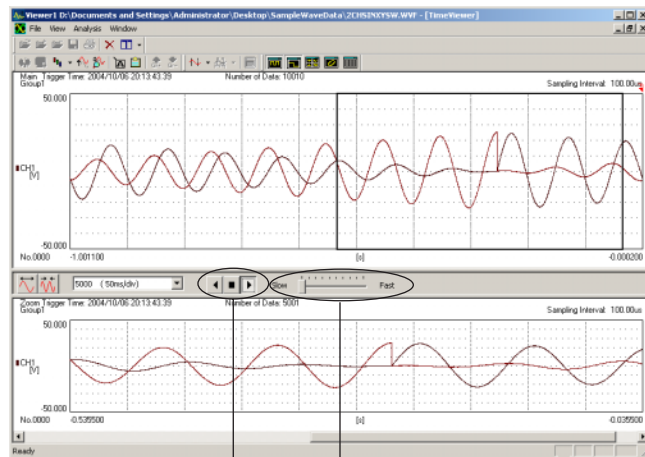
To scroll the zoomed waveforms, click the arrow button corresponding to the direction in which you want to scroll. The zoomed waveform view scrolls at the rate specified on the control bar.

• **Stop button**

To stop scrolling, click the  button.  
To resume scrolling, click the arrow button again.

**Note**

Once the scrolled view reaches the rightmost or leftmost end, click  to stop scrolling.



**Explanation**



**Zoom Rate**

The maximum zoom rate depends on the data being displayed. A view with 10 or fewer points cannot be zoomed.

**Scrolling the Zoomed Waveform View**

The zoomed waveform view can be scrolled automatically. Use the following buttons to select the scrolling direction and rate:

• **Scrolling direction**

-  : Scrolls to the right
-  : Scrolls to the left

 : Stops scrolling

• **Scrolling rate**

Set one of the ten scrolling rates, from Slow to Fast.

**Designating the Section to be Zoomed**

To designate the point at which zooming is to start in the **Display Setting** dialog box, specify the value of the leftmost point of the zoomed section that you want to view. The values that can be specified vary with the zoom rate and displayed waveforms.

Inputting the number of data points: Input an integer to start display from that number of data points.

Inputting a time: In relative time display mode, input a real number to start display from that time. At this time, m ( $10^{-3}$ ), u ( $10^{-6}$ ), n ( $10^{-9}$ ), and P ( $10^{-12}$ ) can be used.

- (Example)
- 1.23 → 1.23s
  - 1.23m → 1.23ms
  - 1.23E-3 → 1.23ms
  - 0.00123 → 1.23ms

## 2.4 Displaying Waveforms in the History View

### Operations

#### Displaying Waveforms in the History View

Click the  button or select **Window > History Window** to open the history waveform display window.

#### Changing View Sizes

To change the size of the history waveform view, click the **Size** button corresponding to the size that you want to apply to the history waveform display window.

#### Selecting the History Waveforms to be Displayed

To display all the history waveforms in the main waveform display window, click **ON** for **ALL**.

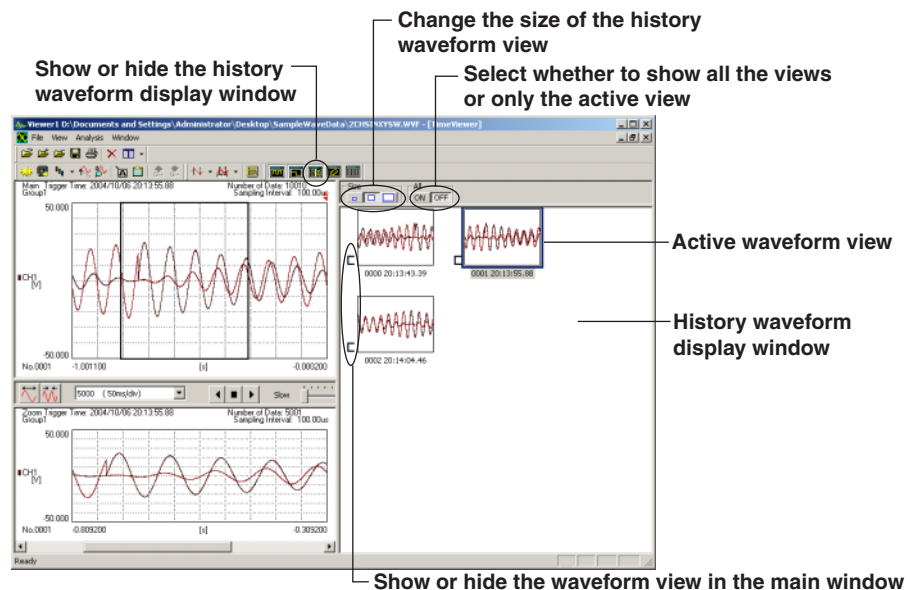
To display only the active history waveforms in the main waveform display window, click **OFF**.

You can place a checkmark in the check box corresponding to individual history waveform views to select specific history waveform views to be displayed in the main waveform display window.

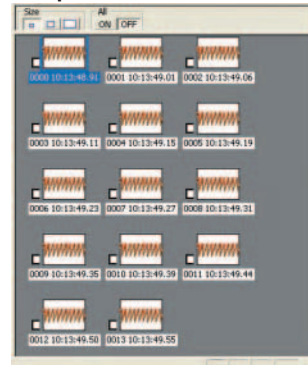
#### Making a History Waveform Active

To make a history waveform active in the main waveform display window, click the history waveform view. The history waveform view is enclosed by blue lines and its history waveform number is highlighted.

When other history waveform views are also displayed, the active history waveform view appears brighter than the others.



#### Sample of minimum-size views



**Explanation****Data That Can Be Loaded Using the History Waveform Display Window**

The history waveform display window can display waveform records saved with the sequential store, single (N) trigger mode, and/or history waveform handling features of the DL series.

**Note**

An error message will appear if there is insufficient memory.  
The history waveform display window can handle up to 2,048 waveforms.

**Sizes of History Waveform Views**

You can select one of three sizes for listing the history waveform views.

**ALL ON/OFF**

You can select whether to display all the history waveform views listed in the history waveform display window in the main waveform display window:

ON: Displays all the history waveform views in the main waveform display window.

OFF: Displays only the active history waveform view.


**Active History Waveform View**

- Cursor measurements can be applied to active history waveforms.
- The waveforms of the active view appear brighter in the main waveform display window.
- The number of the active view is highlighted in the history waveform display window.

## 2.5 Displaying a Waveform in the X-Y View

### Operations

#### Displaying a Waveform in the X-Y View

Click the  button or select **Window > X-Y Window** to display the X-Y waveform display window.

#### Selecting a Waveform to be Displayed in the X-Y view

To see a waveform displayed in the main waveform display window in the X-Y view, click **Main** under **Range**.

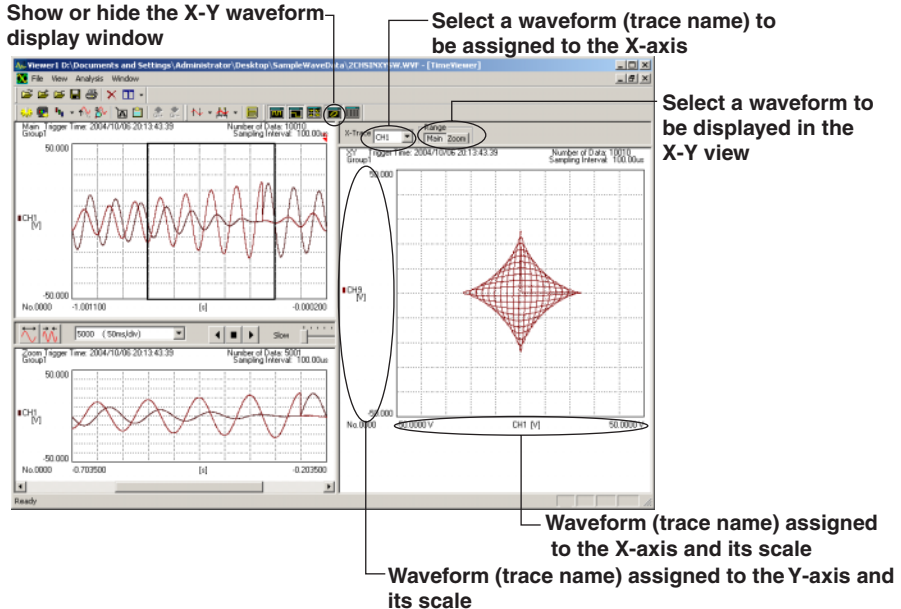
To see a waveform displayed in the zoomed waveform display window in the X-Y view, click **Zoom** under **Range**.

#### Setting the X-Axis

Select a waveform (trace name) to be assigned to the X-axis by using the **X-Trace** list box.

All waveforms other than that assigned to the X-axis are allocated to the Y-axis.

#### Show or hide the X-Y waveform display window



The screenshot shows the software interface with three windows: a main waveform display window, a zoomed waveform display window, and an X-Y view window. The X-Y view window displays a diamond-shaped waveform. Annotations with arrows point to various elements:

- Select a waveform (trace name) to be assigned to the X-axis**: Points to the 'X-Trace' list box in the X-Y view window.
- Select a waveform to be displayed in the X-Y view**: Points to the 'Range' dropdown menu in the X-Y view window.
- Waveform (trace name) assigned to the X-axis and its scale**: Points to the X-axis label 'CH1 [V]' in the X-Y view window.
- Waveform (trace name) assigned to the Y-axis and its scale**: Points to the Y-axis label 'CH2 [V]' in the X-Y view window.


#### Note

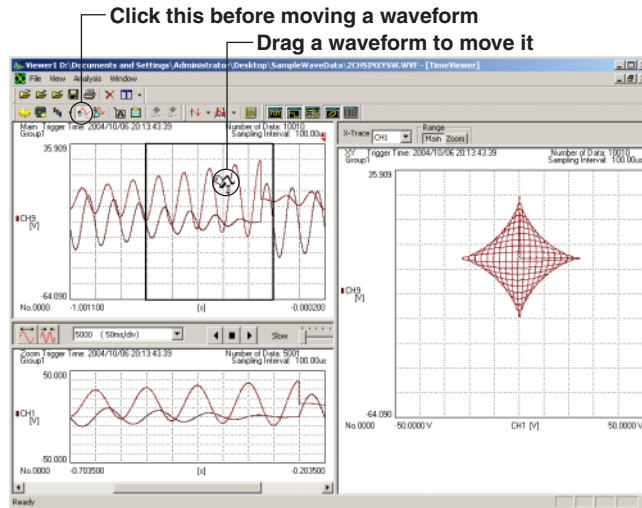
The X-Y waveform display window plots P-P data displayed in the main or zoom waveform display window into the X-Y view.

## 2.6 Moving Waveforms Vertically or Zooming-In/Out


### Operations

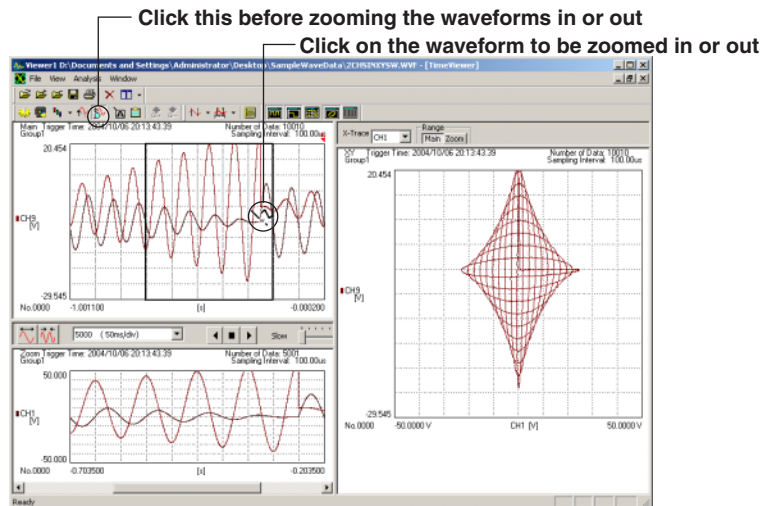
#### Moving a Waveform

1. Click  or select **View > Waveform Vertical Move**.
2. Using the mouse, drag the waveform you want to move.



#### Zooming Waveforms In or Out

1. Click  or select **View > Waveform Vertical Zoom**.
2. Move the mouse pointer to the point at which you want to zoom in, and then left-click; the view around the clicked point is expanded. Right-clicking the point zooms out the surrounding view.



### ***Explanation***

#### **Direction in Which You Can Move/Zoom In or Out**

You can move or zoom in/out only in the vertical direction. You cannot zoom in the horizontal direction.


#### **Windows You Can Move/Zoom In or Out**

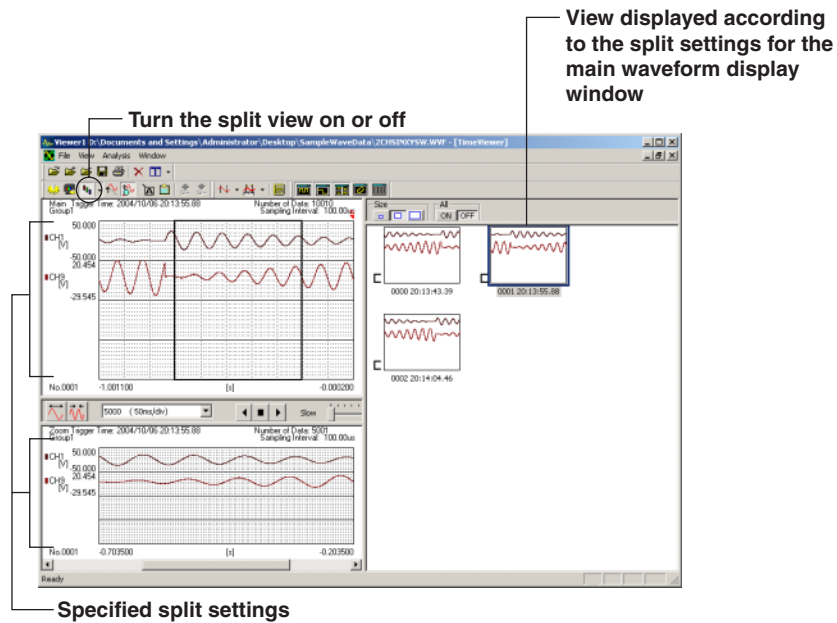
You can move or zoom in/out only in the main waveform display window or zoomed waveform display window.

## 2.7 Splitting the Screen

### Operations

#### Splitting Waveforms by a Trace

Click the  button or select **View > Split** to overlap the waveforms in the main waveform display window or zoomed waveform display window, splitting them based on the trace name.



### Explanation



#### Split Settings

The default value for the number of split waveforms depends on the number of waveforms that are automatically identified by Xviewer, and is used both for the main waveform display window and zoomed waveform display window. The default value can be changed using the split setting dialog. Using this dialog, you can specify different split settings for the main waveform display window and zoomed waveform display window or modify the default split settings. For details, see Section 3.3.

## 2.8 Switching between Groups

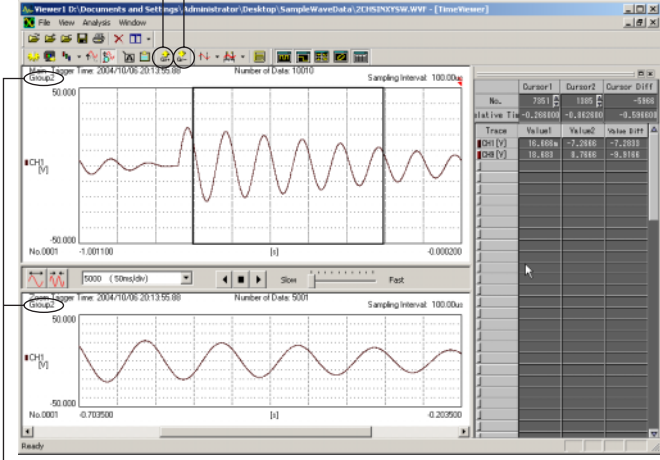
### Operations

#### Switching between Groups

When you have already registered groups, you can switch between those groups either by clicking the  button or  button, or by selecting **View > Next Group/Previous Group**.

Switch to the group whose number is one greater than that of the current group

Switch to the group whose number is one less than that of the current group



No.	Cursor1	Cursor2	Cursor Diff	
7951	1895		-1468	
Val Line	T14	-0.268800	-0.842960	-0.438800
Trace	Value1	Value2	Value Diff	
CH1 (V)	10.4000	-7.2800	-7.2800	
CH2 (V)	10.4000	8.7600	-9.8100	

Number of the group currently being displayed

### Explanation

#### Measurement Groups

In the **Channel Setting** dialog box, you can group measurements by trace name. In addition, the specified number of channels can be automatically allocated to a single group. For details, see Section 3.2.

#### Note


If there are no groups, the  button and  button are unavailable (no operation even if they are clicked).

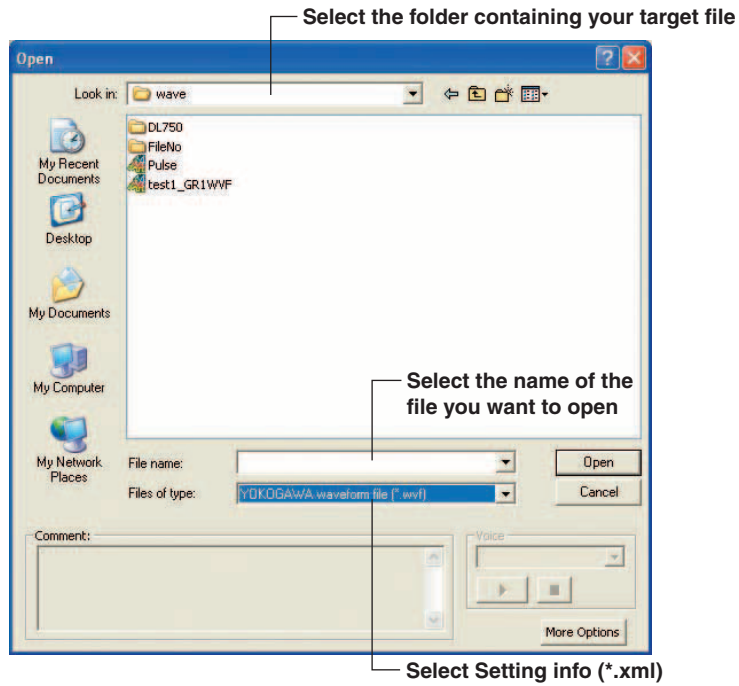


# 3.1 Loading Display Settings

## Operations

### Loading Display Settings

Click  or select **File > Open** to display the **Open File** dialog box. Select **Setting info (\*.xml)** in **Files of type**, browse to the folder containing your target file, select the name of the file you want to open, and then click the **Open** button. The display settings are loaded from the file into the viewer window.



## Explanation


### Application of Display Settings

Loading a Display Setting file already saved applies the display settings in the file to waveform views.

## 3.2 Setting Waveforms (Channels) to be Displayed

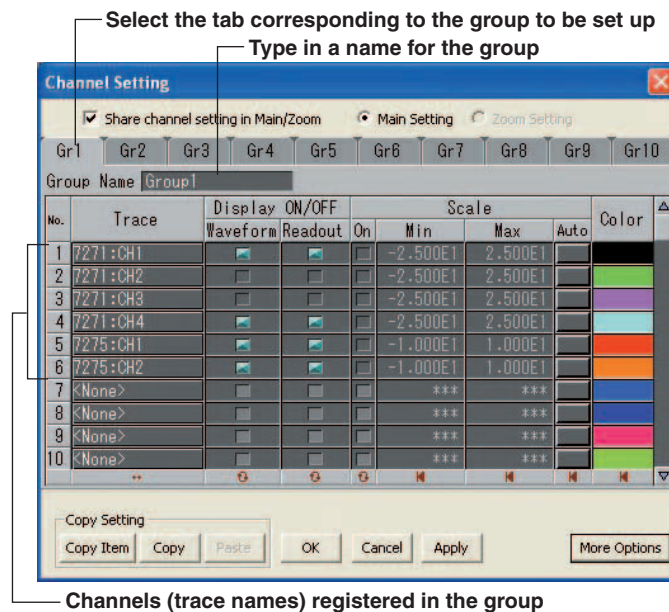
### Operations

#### Displaying the Channel Setting Dialog Box

Click the  button or select **View > Channel Setting** to display the **Channel Setting** dialog box. Using this dialog, you can specify the display and group settings for the respective channels.

#### Grouping Channels

You can group the channels (trace names) to be registered. You can handle waveform display settings in units of groups.



#### Setting Up Channels (Traces)

Set up the channels (traces) for each channel number. Click a trace name to display the **Channel** dialog box, and then select a channel (trace name) from the dialog box.

#### Specifying whether to Show or Hide Waveforms and Cursor Measurement Values

Specify whether to show or hide the waveform and cursor measurement values for each channel number.

#### Setting Scales

Set the scale values for each channel number.

#### Setting Waveform Colors

Using the color palette, set the waveform colors for each channel number.

Click the name of a trace to be displayed in the Channel dialog box, and then select a channel (trace name) from the dialog box

Specify whether to show or hide the waveform

Specify whether to show or hide the cursor measurement values

Click to automatically set scale values according to the amplitude

Using the color palette, set a color for the waveform

Directly input scale values

Place a checkmark in the box to specify scale values

Select the check box to enable log scale (only shown when the waveform to be displayed is FFT)

### Setting Notational Formats

Click the **More Options** button to show notational format fields in the expanded dialog box. You can specify how numerical values are to be displayed and the number of digits to be used to indicate a numerical value in the viewer window, as well as specify the display settings for the logic waveforms in the fields.

Specify how numerical values are to be displayed

Specify the number of digits to be used to indicate a numerical value

Specify the display settings for logic waveforms in the Bit Setting dialog

### 3.2 Setting Waveforms (Channels) to be Displayed

#### Explanation

##### Channel (Trace Name) Settings Shared

Channel (trace name) settings are shared by the main waveform display window and the zoomed waveform display window. The cursor measurement value is used as the main waveform display setting.

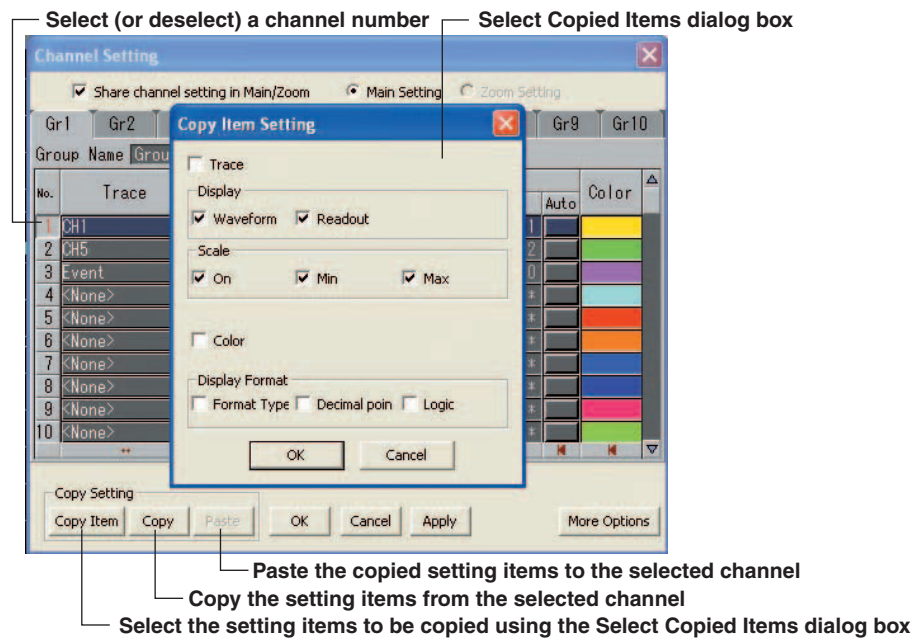
To apply different channel settings to each of the windows, remove the checkmark from **Apply Channel Settings in both Main/Zoom**, place a checkmark in **Main Window** or **Zoom Window**, and then make the individual channel (trace name) settings.

##### Number of Groups and Number of Channels (Traces) that Can Be Registered

Xviewer lets you create up to 10 channel (trace name) groups. You can register up to 90 channels per group.

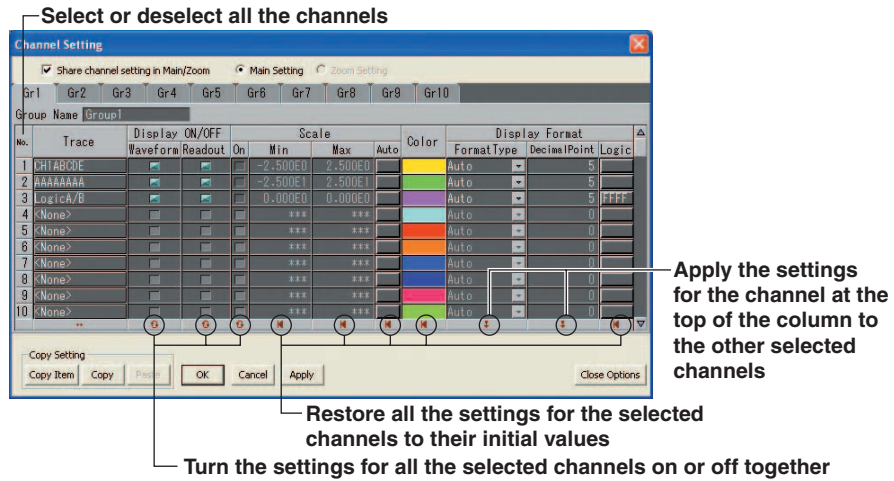
##### Setting Items to Copy and Paste

Xviewer lets you copy the settings for a channel (trace) selectively and then paste those settings to another channel. After pressing the **Copy Item** button to display the **Select Copied Items** dialog box, you can define the setting items that you want to copy in advance. The **Select Copied Items** dialog box is also displayed when you execute a paste command, allowing you to remove any unnecessary setting items and paste only those which are required.



### Changing All Settings Together

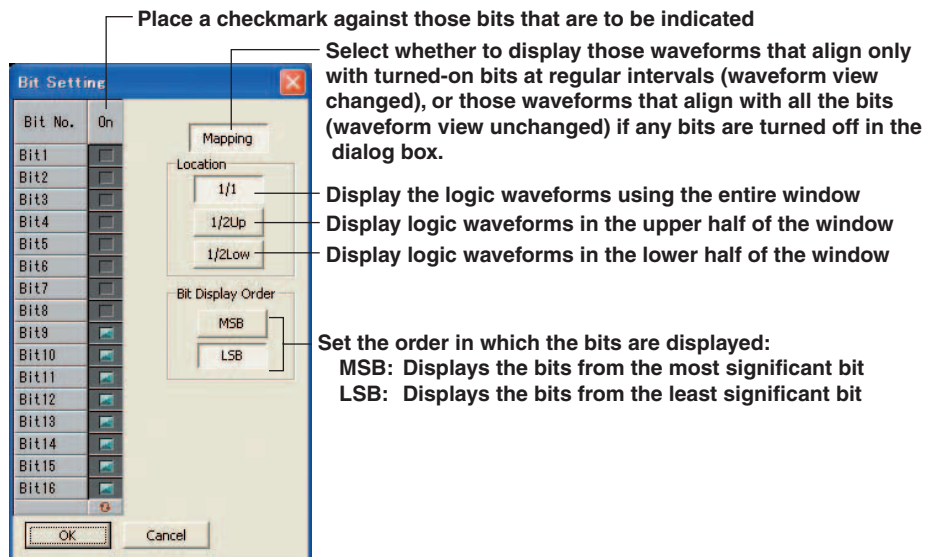
The **Channel Setting** dialog box provides buttons that allow you to select and change all the settings together.



### Notational Format Items

You can specify the following notational format items:

- **Format Type:** Select **Auto Floating Point**, or **Exponential**.  
Selecting either **Floating Point** or **Exponential** causes the following data to be displayed in the viewer windows, using the selected type of notation:  
Scale Values, Values of Cursor Measurement, and Waveform Parameters (Amplitude Maximum, Minimum, High Level, Low Level, Peak to peak value, Average, Middle, RMS, Int1TY, and Int2TY)
- **Decimal Point:** Specify the number of decimal places to be displayed for both the floating point and exponential notations.
- **Logic:** Specify the display settings for the logic waveforms in the **Bit Setting** dialog box.



### Apply Button for Confirmation

Clicking the **Apply** button after you have changed the settings applies the previously specified settings to the window(s) while keeping the **display setting** screen displayed.

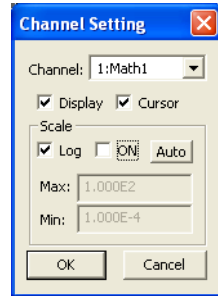
### 3.2 Setting Waveforms (Channels) to be Displayed

---

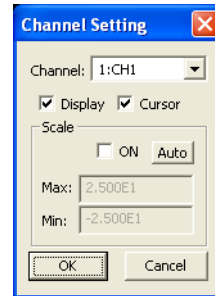
**Note**

If you double-click the scale display area of the vertical axis, a channel setting window (simplified version) appears as shown below. On this window, you can turn OFF the display or set the scale for channels that have been turned ON in advance on the channel setting window of page 3-2.

When the displayed waveform is FFT




When the displayed waveform is not FFT



## 3.3 Specifying Split Settings

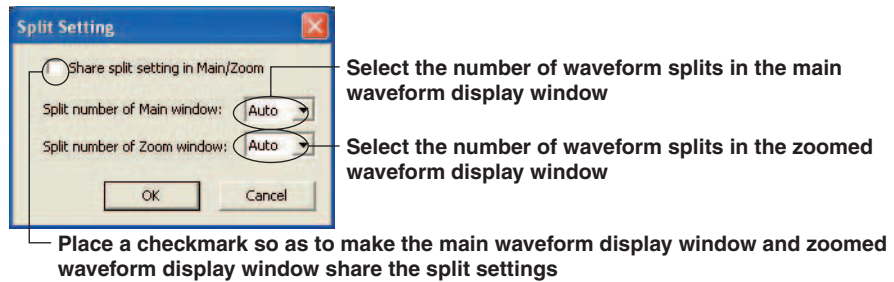
### Operations

#### Displaying the Split Settings Dialog box

Click ▼ beside the  button or select **View > Split Setting** to display the **Split Setting** dialog box.

#### Specifying Split Settings

In the **Split Setting** dialog box, specify whether to allow the main waveform display window and zoomed waveform display window to share the split settings and the number of waveform splits in the respective windows, and then click **OK**. The split settings that you have specified are applied to the window(s).



### Explanation

#### Number of Waveform Splits that Can Be Specified

For each of the main waveform display window and the zoomed waveform display window, you can specify **Auto** or any value between **1** and **16**. **Auto** sets the number of waveform splits according to the number of waveforms to be displayed.

#### Order of Waveform Splits

When the screen is splitted, waveforms are displayed in the order of their channel numbers, starting from the top of the window. For details on the channel number settings, see Section 3.2.


#### Split Settings for the History Waveform Display Window

Split settings made for the main waveform display window are also applied to the history waveform display window.

## 3.4 Specifying Display Settings

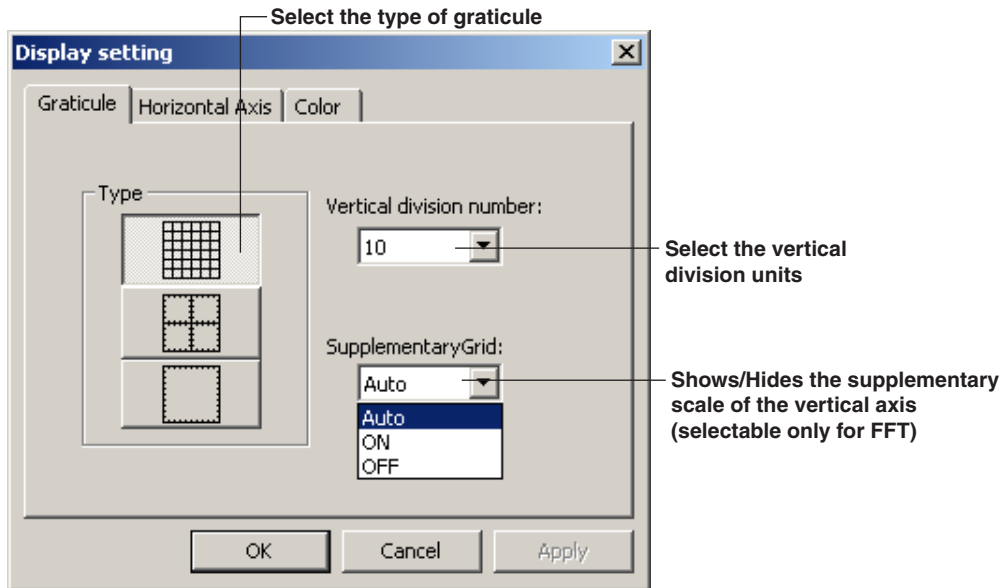
### Operations

#### Displaying the Display Setting dialog box

Click  or select **View > Display Setting** to open the **Display Setting** dialog box. Within the **Display Setting** dialog box, you can make display settings on the **Graticule**, **Horizontal Axis**, and **Colors** tabs.

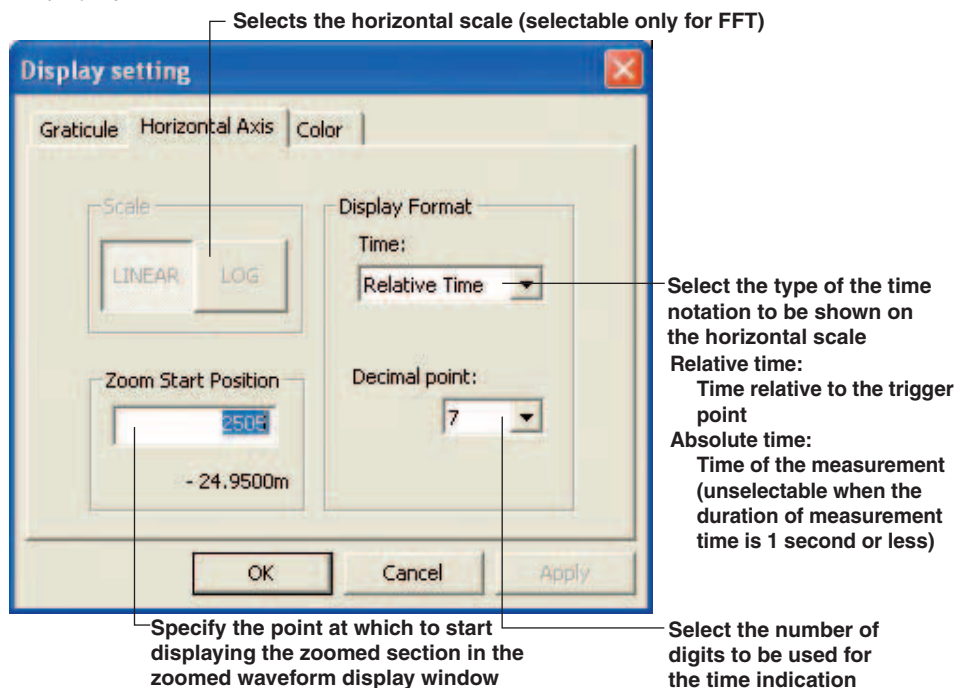
#### Making a Graticule Setting

Click the **Graticule** tab in the **Display Setting** dialog box. The **Graticule** pane appears. Using this pane, you can specify the graticule type and the units of the divisions on the vertical axis.



#### Setting the Horizontal Axis

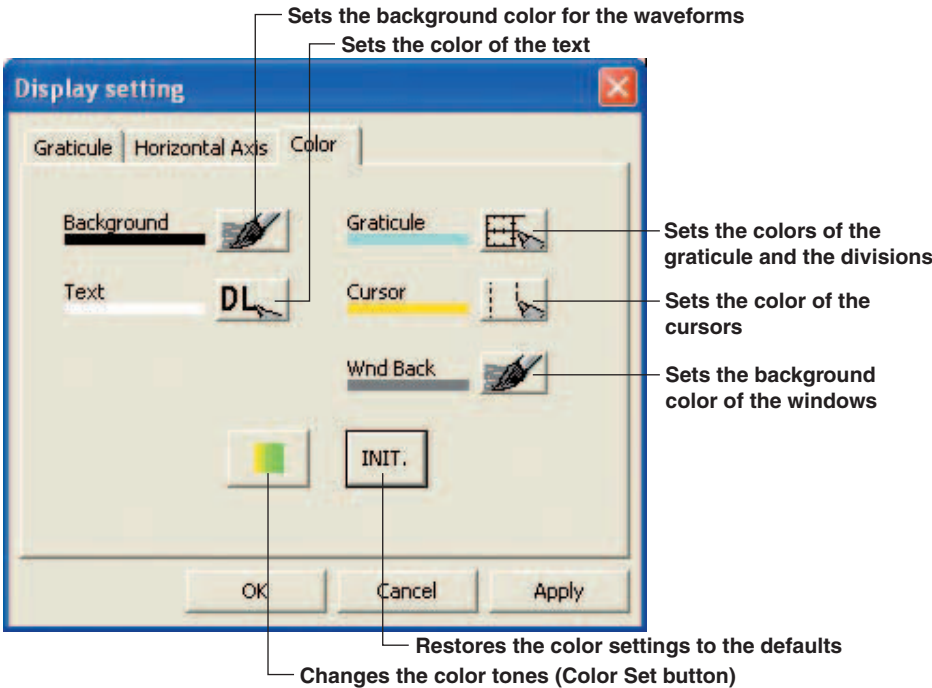
Click the **Horizontal Axis** tab in the **Display Setting** dialog box to display the **Horizontal Axis** pane. Using this pane, you can specify the point at which to start displaying the zoomed section, as well as the notational format for the horizontal axis.





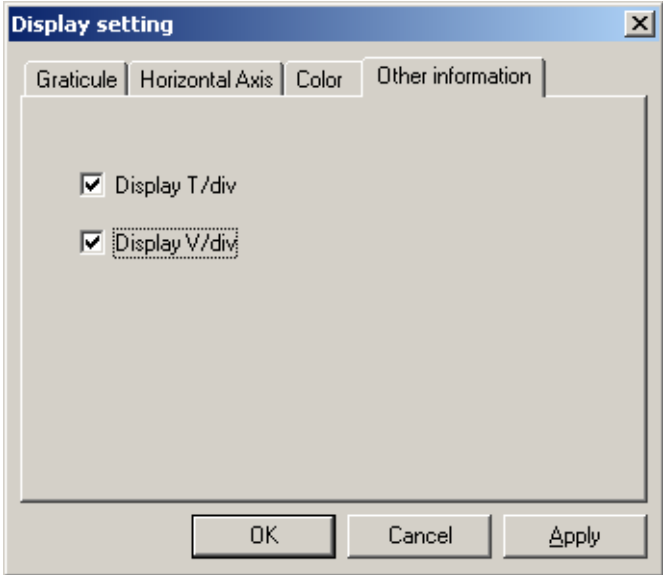
**Setting the Colors**

Click the **Colors** tab in the **Display Setting** dialog box to display the **Colors** pane. In this pane, you can specify the colors for the background, graticule, and text using the color palette.



**Turning the T/div and V/div Display**

Click the **Other Information** tab of the display settings dialog box to display the ON/OFF setting screen for the T/div and V/div display. In this screen, you can turn T/div and V/div display ON and OFF.



**Note**

You can also double-click the scale display area of the horizontal axis to open the Display Setting dialog box.

**Explanation**

**Setting the Grid**

- **Supplementary Grid**  
The supplementary grid can be selected only when the FFT computation waveform is displayed.  
Auto: Automatically determines whether to display the supplementary scale on the vertical axis.  
ON: Displays the supplementary scale on the vertical axis.  
OFF: Does not display the supplementary scale on the vertical axis.

**Setting the Horizontal Axis**

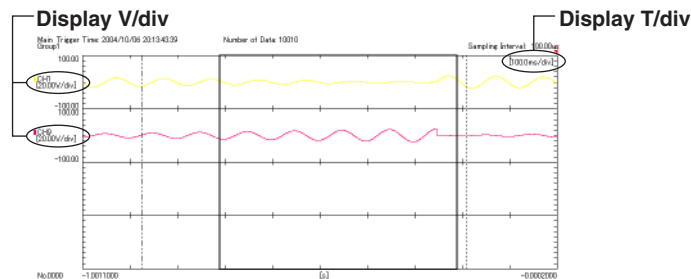
- **Display Format**  
Sets the time type (relative or absolute) and the number of displayed digits. However, the Display Format settings do not appear when the FFT computation waveform is displayed.
- **Zoom Start Position**  
When relative times are being displayed, the settings vary depending on whether an integer or a real number is input.  
Integer input: Start data position  
Real number input: Start time (auxiliary units m, n, u , and P can be input.)
- **Scale**  
Set the horizontal scale to LINEAR or LOG. The horizontal scale can be selected only when the FFT computation waveform is displayed.

**Setting the Color**

- You cannot change the waveform colors in the **Display Setting** dialog box. To change colors of the waveforms, use the **Channel Setting** dialog box. For details, see Section 3.2.
- **Changing the color tone**  
Clicking the Color Set button makes the appropriate color settings for monochrome printing. To restore the color settings, click the Color Set button again.
- **INIT.**  
Initializes the color settings to the default condition.

**T/div and V/div Display**

You can display T/div and V/div in the waveform display window. The values of the selected items are displayed. If multiple waveforms are displayed in the waveform display window, the V/div of the active waveform is displayed.



#### Checking the Changed Settings

Clicking the **Apply** button while you are changing settings applies the settings you have already made for the window(s) to the waveform display, without closing the **Display Setting** dialog box.

#### **Note**

---


The Supplementary Grid of the Graticule tab and the Scale of the Horizontal Axis tab can be set only on Xviewer with the computation option (-GP01/05/10/20 option).

---

# 4.1 Displaying Measurement Results

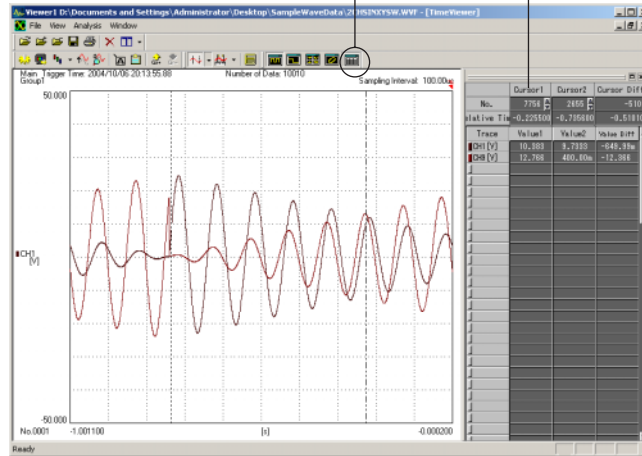
## Operations

### Displaying Measurements in the Result View

Open a waveform data file for which waveforms and measurement results are to be displayed. To display or hide the measurement result display window, click the  button or select **Window > Measure Result**.

Display or hide the measurement result display window

Measurement result display window



## Explanation

### Items and Measured Values That Are Displayed

The items and measured values that are displayed depend on the measurements and waveforms.

### Reference to Cursor Positions

The positions of the cursors are indicated using either of the references below, according to the notational format of the horizontal axis:

- Absolute time: The positions of cursors are indicated as absolute times.
- Relative time: The positions of cursors are indicated as being relative to the trigger position.


### Note

If you perform cursor measurement or automatic measurement of waveform parameters without the measurement results display window being displayed, the measurement results window is automatically displayed.

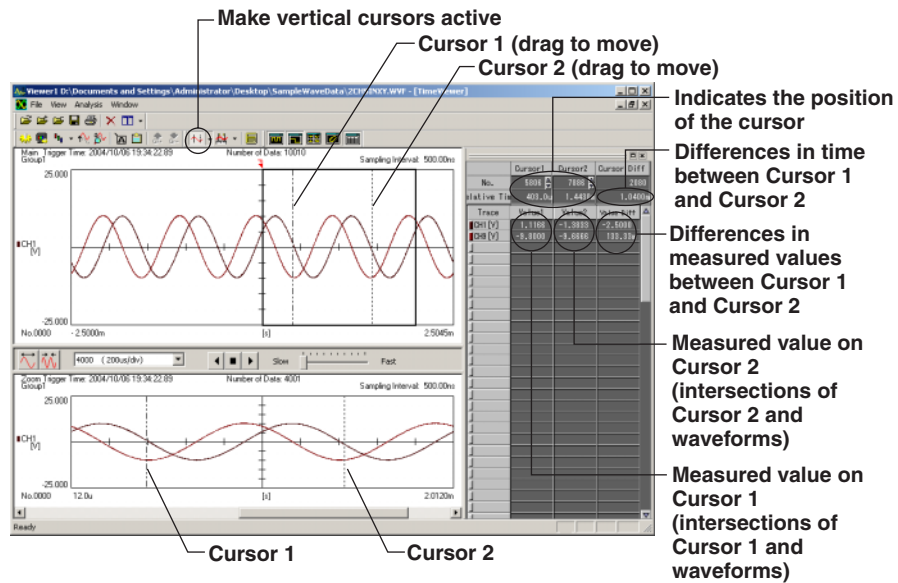
## 4.2 Analyzing Waveform Data Using Cursors

### Operations


#### Analyzing Waveform Data Using Cursors

Choose **Vertical Cursor** from the  icon drop-down menu or choose **Analysis > Analysis Mode > Vertical Cursor** to display two vertical cursors in the main waveform display window and the zoomed waveform display window.

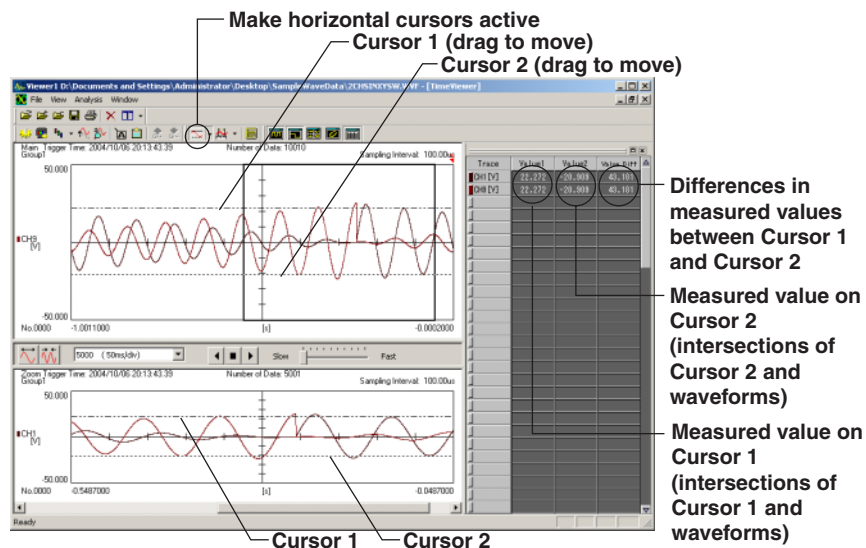
The measurement result window displays the cursor positions (time) and measured values as well as the difference in the time and measured values between the cursors. Each cursor can be moved by dragging. You can also click on the window to move Cursor 1 to that position. Likewise, you can right-click on the window to move Cursor 2 to that position.




#### Analyzing Waveform Data Using Horizontal Cursors

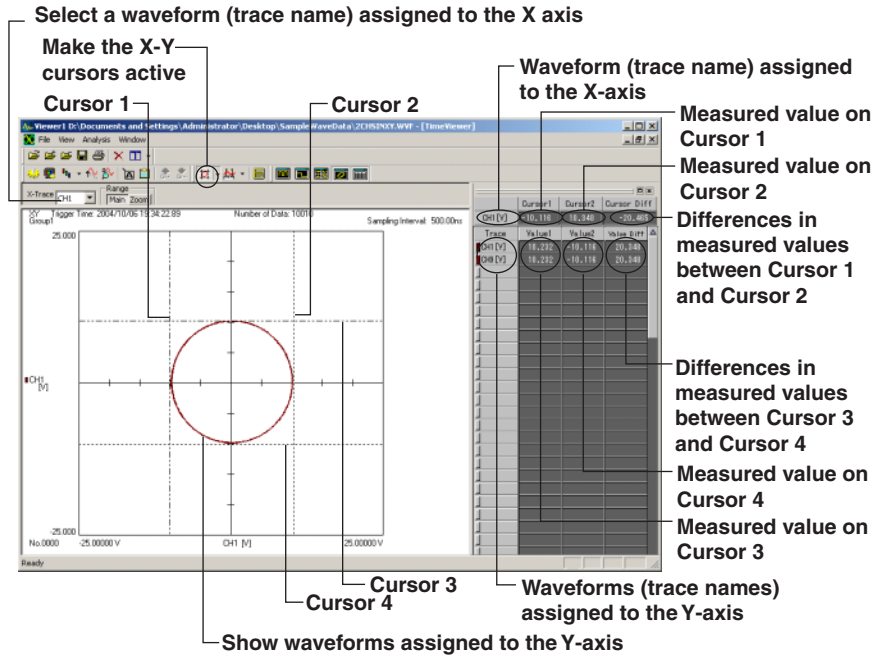
Choose **Horizontal Cursor** from the  icon drop-down menu or choose **Analysis > Analysis Mode > Horizontal Cursor** to display two horizontal cursors in the main waveform display window and the zoomed waveform display window.

The measurement result window displays the measured value at each cursor. Each cursor can be moved by dragging. You can also click on the window to move Cursor 1 to that position. Likewise, you can right-click on the window to move Cursor 2 to that position.




**Analyzing Waveform Data Using X-Y Cursors**

Choose **X-Y Cursor** from the  icon drop-down menu or choose **Analysis > Analysis Mode > X-Y Cursor** to display two vertical cursors and two horizontal cursors in the X-Y waveform display window. You can move a cursor by dragging it. The measurement result display window displays the measured values at the cursor positions at that time, as well as the differences in the measured values.



**Analyzing Waveform Data Using H&V Cursors**

Choose **H&V Cursor** from the  icon drop-down menu or choose **Analysis > Analysis Mode > H&V Cursor** to display four cursors (two vertical cursors and two horizontal cursors) in the main waveform display window and the zoomed waveform display window. The measurement result window displays the measured value at each cursor and the differences between the measured values between the cursors.

**Explanation**

**Cursor Measurements on History Waveform Views**

When you are displaying history waveform views, only the active waveform view can be used for measurement using the cursors.

**Linking of Vertical Cursors or Horizontal Cursors**

If you drag a vertical cursor or horizontal cursor while holding down the Ctr key, the two vertical or horizontal cursors can be moved simultaneously.

## 4.2 Analyzing Waveform Data Using Cursors

### \*\*\* Indication

If the measurement result is invalid, "\*\*\*\*" is displayed as the measured value.

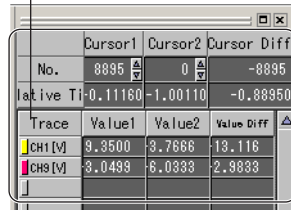
### Note

#### Copying Measurement Results to the Clipboard

You can copy the contents of the measurement results display window to the clipboard. Specify the range to be copied, press Ctrl + C, then the measured results are copied to the clipboard. The following methods can be used to specify a range.

- Press Ctrl + C without specifying a range to copy:  
All contents in the measurement results display window are selected
- Click Trace:  
All rows are selected except for the data at the cursor.
- Click or drag the trace names of the items to copy:  
The rows of the clicked or dragged traces are selected

Selects all rows except the cursor information.  
Click once again to clear the selection.




	Cursor1	Cursor2	Cursor Diff
No.	8895	0	-8895
Relative Time	-0.11180	-1.00110	-0.88950
Trace	Value1	Value2	Value Diff
CH1 [V]	9.3500	3.7666	13.116
CH3 [V]	-3.0499	-6.0333	-2.9833

If no range is specified,  
all are copied

# 4.3 Automated Measurement of Waveform Parameters

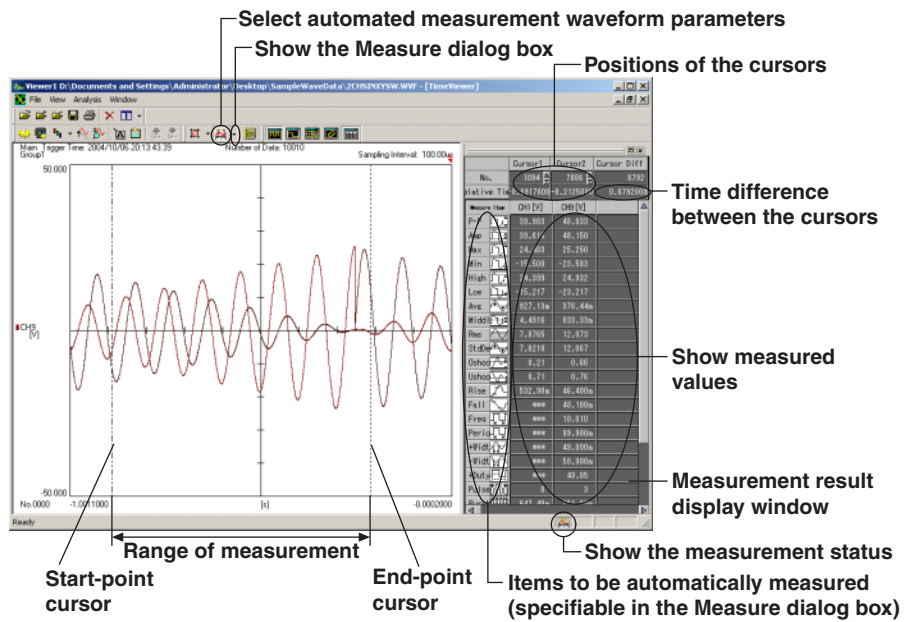
## Operations

### Automated Measurement of Waveform Parameters



Click the  button or select **Analysis > Analysis Mode > Measure Waveform Parameter** to allocate two vertical cursors in the main waveform display window and display the results for the waveforms, after they are automatically analyzed, in the measurement result display window. By setting waveform parameters for the items to be measured, you can automatically measure the waveform parameters in the range specified by the cursors.

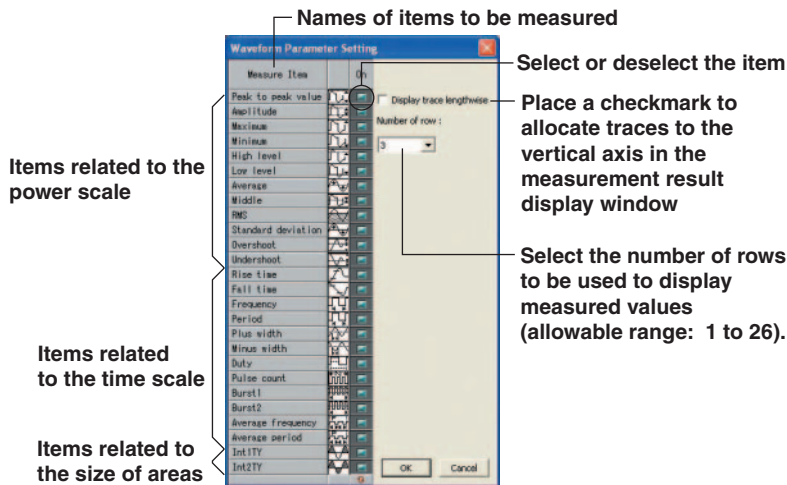
### Changing the Range of Automated Measurement

You can change the range of automatic measurement by dragging the two vertical cursors to the new measurement start and end points.



### Setting Items That Are Automatically Measured

Click  beside the  button, or select **Analysis > Measure Waveform Parameter** to display the Measure dialog box. In the dialog box, you can specify the display settings for the items to be measured and the measured values.





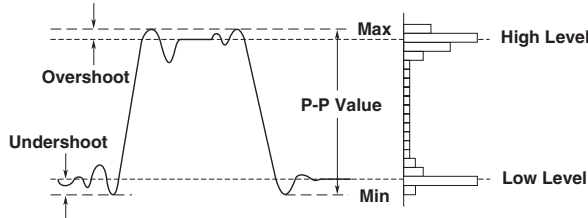
**Explanation**

**Items that Can Be Specified**

You can set and measure items related to the power scale and time scale as waveform parameters.

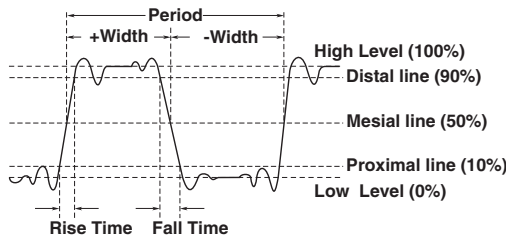
- Items related to the power scale

Maximum : Maximum voltage [V]	Average : Average voltage $(1/n)\sum xi$ [V]
Minimum : Minimum voltage [V]	RMS : Root-mean-square value $(1/\sqrt{n})(\sum(xi)^2)^{1/2}$ [V]
High level : High voltage [V]	Middle : Mean value for amplitude $(Max + Min)/2$ [V]
Low level : Low voltage [V]	Standard deviation : Standard deviation $(1/n(\sum x^2 - (\sum x)^2/n))^{1/2}$
Peak to peak value : P-P value $(Max - Min)$ [V]	Overshoot : Amount of overshoot $(Max - High)/(High - Low)_100$ [%]
Amplitude : Amplitude $(High - Low)$ [V]	Undershoot : Amount of undershoot $(Low - Min)/(High - Low)_100$ [%]



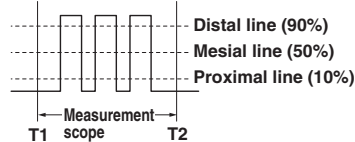
- Items related to the time scale

Rise time : Rise time [s]	Plus duty : Duty ratio, $Width1/Period\_100$ [%]
Fall time : Fall time [s]	Minus duty : Duty ratio, $Width2/Period\_100$ [%]
Frequency : Frequency [Hz]	Plus width : Time width greater than the mesial value [s]
Period : Cycle [s]	Minus width : Time width less than the mesial value [s]

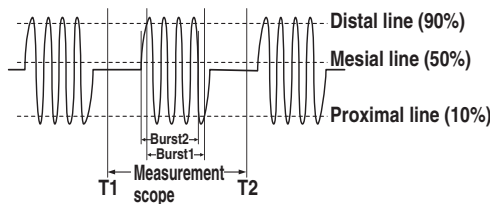


Pulse : Pulse count      Adjust the measurement scope to the pulses you want to measure.

When Pulse=3



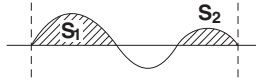
Burst1, Burst2 : Burst width [s]      Adjust the measurement scope to the burst widths you want to measure.



- Items related to the size of areas
  - Int1TY: Size of the positive portion of an amplitude
  - Int2TY: Size of the positive portion of an amplitude - Size of the negative portion of an amplitude

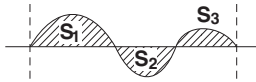
Int1TY

Size of only the positive areas :  $S_1+S_2$



Int2TY

Size of both positive and negative areas :  $S_1+S_3-S_2$



**\*\*\* Indication**

If the measurement result is invalid or impossible, “\*\*\*\*” is displayed as the measured value. Waveforms with small amplitudes may fail to produce correct readings.

**Data Obtained through Automatic Measurements with Waveform Parameters**

To keep the obtained data, save it into a file. For details, see Section 5.4.

**Icon Displayed during Automatic Measurement**

While automatic measurement is being performed, the icon shown below appears in the status bar.



: Performing automatic measurement (blinks on and off)

**Note**

- When the scope to analyze includes two cycles or more of a waveform, time-axis parameters are analyzed only for the first cycle.
- No logic waveform can be automatically analyzed.
- It may take a long time to automatically analyze a waveform with some conditions for the scope, number of items, and/or waveforms to analyze.
- An FFT computation allows to make measurement only for Max and Min.
- **Copying Measurement Results to the Clipboard**  
 You can copy the contents of the measurement results display window to the clipboard. Specify the range to be copied, press Ctrl + C, then the measured results are copied to the clipboard. The following methods can be used to specify a range.
  - Press Ctrl + C without specifying a range to copy:  
 All contents in the measurement results display window are selected
  - Click Measure Item:  
 All rows are selected except for the data at the cursor.
  - Click or drag the measurement items of the items to copy:  
 The rows of the clicked or dragged items are selected

Selects all rows except the cursor information.  
Click once again to clear the selection.


	Cursor1	Cursor2	Cursor Diff
No.	774	0	-774
Relative Time	4.2260m	5.0000m	-774.0u
Measure Item	CH1 [V]	CH2 [V]	
P-P	1.0086	833.33m	
Amp	994.99m	166.66m	
Max	1.0099	333.33m	
Min	9.2222m	500.00m	

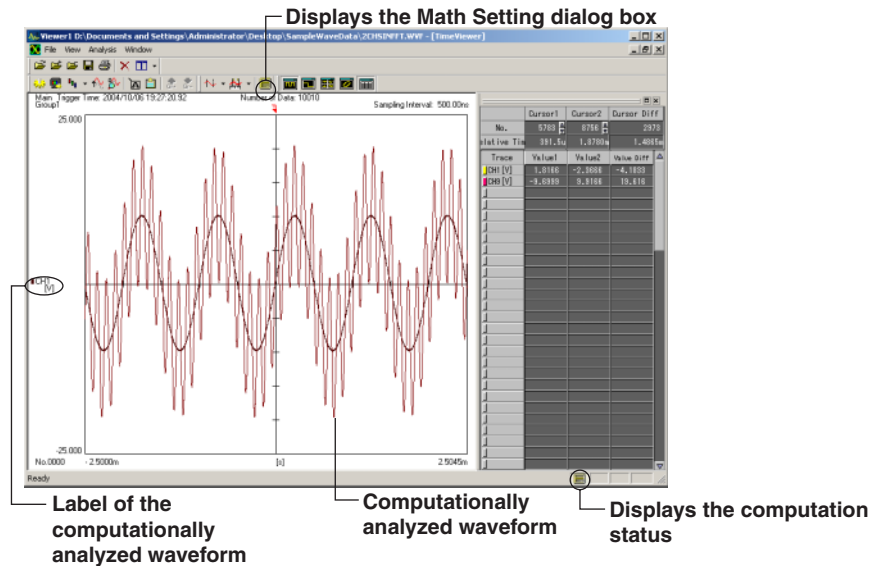
If no range is specified, all are copied

## 4.4 Analyzing Waveforms by Computations (Optional)

### Operations

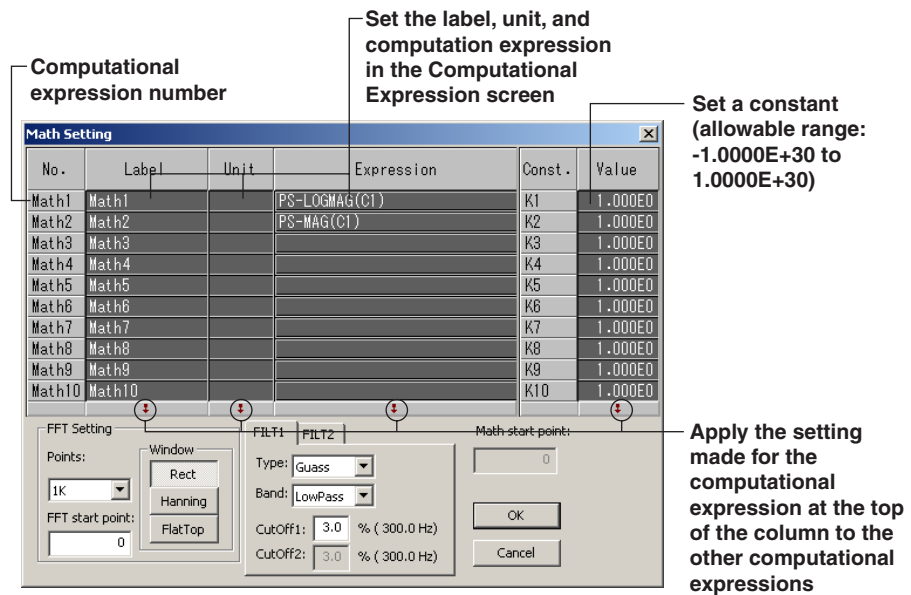
#### Displaying Waveforms in the Computation View

Click the  button or select **Analysis > Math Setting** to display the **Math Setting** dialog box for analyzing waveforms by computational expressions. The **Math Setting** dialog box allows you to set computational expressions, filters, FFT computations, and other computations for waveforms.



#### Setting Computational Expressions

Click a computational expression in the **Math Setting** dialog box to display the **Computational Expression** screen, which allows you to specify user-defined computation settings. Set up a required computational expression by using variables and operators.



Specify a name for the label (using up to 31 one-byte characters)

Set the units (up to 15 one-byte characters)

Displays the trace names corresponding to the variables

Set a computational expression (up to 63 characters)

Display the operators menu

Buttons for setting numerals and variables

PS\_LOGMAG simple input

Show other computational expressions

**User Define Math1**

Label: Math1 Unit:

Expression: C1

Function: ...

CLR DEL

1 2 3 4 5 6 7 8 9 0 . ,

E C M K T + - \* / PS ( )

Math 2= Math 3= Math 4= Math 5= Math 6= Math 7=

OK Cancel

Variable	Trace
C1	CH1
C2	CH9

**Setting Filters**

Use the **FILT1** and **FILT2** tabs on the **Math Setting** dialog box to set up the filters.

Switch between the filter 1 and filter 2 panes

Select the type

Select the band

Set the cut-off frequency

**Math Setting**

No.	Label	Unit	Expression	Const.	Value
Math1	Math1		PS-LOGMAG(C1)	K1	1.000E0
Math2	Math2		PS-MAG(C1)	K2	1.000E0
Math3	Math3			K3	1.000E0
Math4	Math4			K4	1.000E0
Math5	Math5			K5	1.000E0
Math6	Math6			K6	1.000E0
Math7	Math7			K7	1.000E0
Math8	Math8			K8	1.000E0
Math9	Math9			K9	1.000E0
Math10	Math10			K10	1.000E0

FFT Setting

Points: 1K

Window: Rect, Hanning, FlatTop

FFT start point: 0

FILT1 | **FILT2**

Type: Guass

Band: LowPass

CutOff1: 3.0 % ( 300.0 Hz)

CutOff2: 3.0 % ( 300.0 Hz)

Math start point: 0

OK Cancel

**Specifying FFT Settings**

Use **FFT Setting** on the **Math Setting** dialog box to specify the FFT settings.

Select a time window type

Select the number of points to be used for FFT computations

Set the FFT start point

**Math Setting**

No.	Label	Unit	Expression	Const.	Value
Math1	Math1		PS-LOGMAG(C1)	K1	1.000E0
Math2	Math2		PS-MAG(C1)	K2	1.000E0
Math3	Math3			K3	1.000E0
Math4	Math4			K4	1.000E0
Math5	Math5			K5	1.000E0
Math6	Math6			K6	1.000E0
Math7	Math7			K7	1.000E0
Math8	Math8			K8	1.000E0
Math9	Math9			K9	1.000E0
Math10	Math10			K10	1.000E0

FFT Setting

Points: 1K

Window: Rect, Hanning, FlatTop

FFT start point: 0

FILT1 | **FILT2**

Type: Guass

Band: LowPass

CutOff1: 3.0 % ( 300.0 Hz)

CutOff2: 3.0 % ( 300.0 Hz)

Math start point: 0

OK Cancel

### Explanation

#### Function Menu Button

The **Function** menu button of the **Computational Expression** dialog contains operators that can be specified for user-defined computational expressions, as follows:

Basic: SHIFT, ABS, SQRT, LOG, EXP, NEG, P2, P3, F1, F2  
Trigonometric: SIN, COS, TAN, ATAN, PH  
Pulse Width: PWHH, PWHL, PWLH, PWLL, PWXX, FV, DUTYH, DUTYL  
DIF & INTG: DIF, DDIF, INTG, IINTG  
Filter: FILT1, FILT2, HLBT, MEAN, BIN  
FFT > LS : LS-REAL, LS-IMAG, LS-MAG, LS-LOGMAG, LS-PHASE  
RS : RS-MAG, RS-LOGMAG  
PS : PS-MAG, PS-LOGMAG, PSD-MAG, PSD-LOGMAG  
CS : CS-REAL, CS-IMAG, CS-MAG, CS-LOGMAG, CS-PHASE  
TF : TF-REAL, TF-IMAG, TF-MAG, TF-LOGMAG, TF-PHASE  
CH : CH-MAG

#### Settings for the Filters

- **Type/Band**

Gauss (gauss) : Lowpass  
Sharp (sharp) : Lowpass/Highpass/Bandpass  
IIR (butterworth): Lowpass/Highpass/Bandpass

- **CutOff1/CutOff2**

Set either or both cutoff frequencies as a ratio to the sampling frequency. The allowable range is 2.0% to 30.0% (0.2% steps). When you specify **Bandpass** for **Band**, specify the orders of both **CutOff1** and **CutOff2**. The higher the order, the longer the computation.

#### Settings for FFT

- **Points** (number of points used for computation):

Select 100 points, 200 points, 500 points, 1000 points, 2000 points, 5000 points, 10000 points, 20000 points, 50000 points, 100000 points, 200000 points, 500000 points, 1000000 points, or 2000000 points.

#### Note

---

Executing an FFT calculation with 1000000 points or more, only M1 is calculated and the result is displayed.

---

- **FFT start point:**

When the number of loaded points is less than 10M: Specify 0 to “Number of loaded points-no. of FFT computation points”  
When larger than 10M: set between computation start point and “computation start point + 10M - no. of FFT points”

- **Window** (time window):

Select the **Rect** (rectangle), **Hanning** (hanning), or **FlatTop** (flat-top) window.

#### Number of Points for Computation

- There are 10M points for computation/channel.
- Computation with more than 2G points is not possible.

#### Variables and Operators

The variables and operators that can be used in computational expressions are listed below. You can use up to 63 characters to define a computational expression. You can register up to 10 computational expressions.

#### Computational accuracy

Single-precision floating-point type

**Variables**

Variable	Sample Use	Description
Cx	C1+C2	<b>Value measured on channel CHx</b>
My	ABS(M1)	<b>Value of computation (Math)</b>
T	SIN(T)	<b>Integrated value for the number of data points to the time axis</b>

x: stands for a number. However, specify the number according to the number of channels that are loaded. For example, if three channels, CH1, CH5, and CH8, are loaded, specify the channels as C1, C2, and C3.

y: stands for a number

**Operator**

Operator	Sample Use	Description
+, -, *, /	C1+C2	<b>Four arithmetical Operations on two specified waveforms</b>
SHIFT	SHIFT(C1,1000)	<b>Phase shift</b>
ABS	ABS(M1)	<b>Absolute value of a specified waveform</b>
SQRT	SQRT(C2)	<b>Square root of a specified waveform</b>
LOG	LOG(C1)	<b>Logarithm of a specified waveform</b>
EXP	EXP(C1)	<b>Exponent of a specified waveform</b>
NEG	NEG(C1)	<b>Inversion</b>
SIN	SIN(T)	<b>Sine of a specified waveform</b>
COS	COS(C1)	<b>Cosine of a specified waveform</b>
TAN	TAN(C1)	<b>Tangent of a specified waveform</b>
ATAN	ATAN(C1,C2)	<b>Arctangent of two specified waveforms (value within <math>\pm \pi</math>)</b>
P2	P2(C1)	<b>Square of a specified waveform</b>
P3	P3(C1)	<b>Cube of a specified waveform</b>
F1	F1(C1,C2)	<b><math>\sqrt{ C1^2 + C2^2 }</math> of a specified waveform</b>
F2	F2(C1,C2)	<b><math>\sqrt{ C1^2 - C2^2 }</math> of a specified waveform</b>
K1 to K10	C1 + K1	<b>Constant (any value specified)</b>
BIN	BIN(C1,A,B)	<b>Binarization of a specified waveform</b>
PWHH	PWHH(M1,A,B)	<b>Computation of a pulse width between a rising edge and the next rising edge</b>
PWHL	PWHL(C2,A,B)	<b>Computation of a pulse width between a rising edge and the next falling edge</b>
PWLH	PWLH(C1,A,B)	<b>Computation of a pulse width between a falling edge and the next rising edge</b>
PWLL	PWLL(C1,A,B)	<b>Computation of a pulse width between a falling edge and the next falling edge</b>
PWXX	PWXX(C2,A,B)	<b>Computation of a pulse width between a raising/falling edge and the next rising/falling edge</b>
FV	FV(C1,A,B)	<b>PWHH reciprocal</b>
DUTYH	DUTYH(C1,A,B)	<b>Duty cycle between a rising edge and the next rising edge</b>
DUTYL	DUTYL(C1,A,B)	<b>Duty cycle between a falling edge and the next falling edge</b>
MEAN	MEAN(C1)	<b>10th moving average of a specified waveform</b>
DIF	DIF(C1)	<b>Differentiation of a specified waveform</b>
DDIF	DDIF(C1)	<b>Second-order derivative of a specified waveform</b>
INTG	INTG(C1)	<b>Integration of a specified waveform</b>
IINTG	IINTG(C1)	<b>Second-order integration of a specified waveform</b>
PH	PH(C1,C2)	<b>Phases of two specified waveforms</b>
HLBT	HLBT(C1)	<b>Hilbert function of a specified waveform</b>
FILT1	FILT1(C1)	<b>Filter for a specified waveform</b>
FILT2	FILT2(C1)	<b>Filter for a specified waveform</b>
LS-REAL	LS-REAL(C1)	<b>Real part of the linear spectrum of a specified waveform</b>
LS-IMAG	LS-IMAG(C1)	<b>Imaginary part of the linear spectrum of a specified waveform</b>
LS-MAG	LS-MAG(C1)	<b>Amplitude of the linear spectrum of a specified waveform</b>
LS-LOGMAG	LS-LOGMAG(C1)	<b>Logarithmic amplitude of the linear spectrum of a specified waveform</b>
LS-PHASE	LS-PHASE(C1)	<b>Phase of the linear spectrum of a specified waveform</b>
RS-RS-MAG	RS-MAG(C1)	<b>Amplitude of the effective spectrum of a specified waveform</b>
RS-LOGMAG	RS-LOGMAG(C1)	<b>Logarithmic amplitude of the effective spectrum of a specified waveform</b>
PS-MAG	PS-MAG(C1)	<b>Amplitude of the power spectrum of a specified waveform</b>
PS-LOGMAG	PS-LOGMAG(C1)	<b>Logarithmic amplitude of the power spectrum of a specified waveform</b>
PSD-MAG	PSD-MAG(C1)	<b>Amplitude of the power spectrum density of a specified waveform</b>
PSD-LOGMAG	PSD-LOGMAG(C1)	<b>Logarithmic amplitude of the power spectrum density of a specified waveform</b>
CS-REAL	CS-REAL(C1,C2)	<b>Real part of the cross spectrum of two specified waveforms</b>
CS-IMAG	CS-IMAG(C1,C2)	<b>Imaginary part of the cross spectrum of two specified waveforms</b>
CS-MAG	CS-MAG(C1,C2)	<b>Amplitude of the cross spectrum of two specified waveforms</b>
CS-LOGMAG	CS-LOGMAG(C1,C2)	<b>Logarithmic amplitude of the cross spectrum of two specified waveforms</b>
CS-PHASE	CS-PHASE(C1,C2)	<b>Phase of the cross spectrum of two specified waveforms</b>
TF-REAL	TF-REAL(C1,C2)	<b>Real part of the transfer function of two specified waveforms</b>
TF-IMAG	TF-IMAG(C1,C2)	<b>Imaginary part of the transfer function of two specified waveforms</b>
TF-MAG	TF-MAG(C1,C2)	<b>Amplitude of the transfer function of two specified waveforms</b>
TF-LOGMAG	TF-LOGMAG(C1,C2)	<b>Logarithmic amplitude of the transfer function of two specified waveforms</b>
TF-PHASE	TF-PHASE(C1,C2)	<b>Phase of the transfer function of two specified waveforms</b>
CH-MAG	CH-MAG(C1,C2)	<b>Amplitude of the coherence function of two specified waveforms</b>

## 4.4 Analyzing Waveforms by Computations (Optional)

### Restrictions Imposed on Computational Expressions

- When  $m \leq n$ , a computational expression for Mathm cannot include the variable Mn (Operations for Mathn).  
Example of an expression that is not allowed:  $\text{Math5} = \text{M6} + \text{M3}$
- One FFT computation allows the specification of one waveform.  
Example of an expression that is not allowed:  $\text{PS-MAG}(\text{C1}+\text{C2})$
- A computation cannot be performed on the result of an FFT computation.  
Example of an expression that is not allowed:  $\text{PS-MAG}(\text{C1})+\text{C2}$

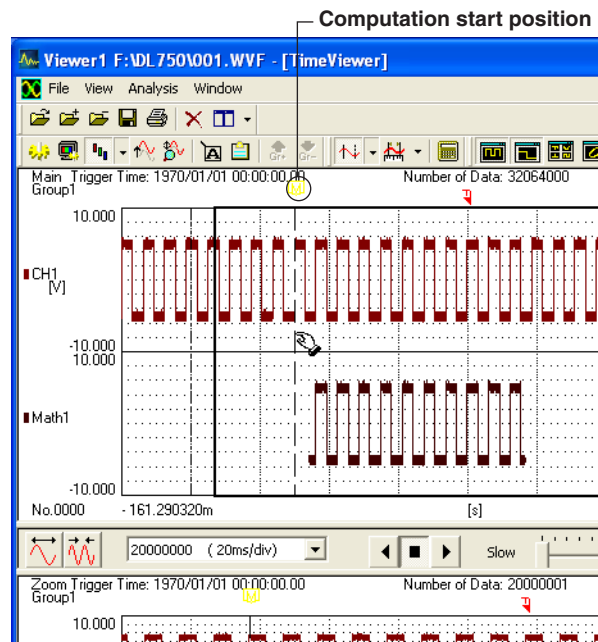
### Cautions on Computations

- An FFT computation that does not have a record length that is sufficient for the required number of points for computation in the target view cannot be performed.

### Changing the Computation Start Position


If the record length (the number of data points) is greater than or equal to 10 Mpoints, you can specify the computation start point and perform the computation.


If the record length is greater than or equal to 10 Mpoints, a yellow mark indicating the computation start position appears on the screen as shown below. If you drag the yellow mark, a cursor appears allowing you to move the computation start position.



### Icon displayed during measurement through computation

While measurement through computation is being performed, the icon shown below appears in the status bar.

 : Computing (blinks on and off)

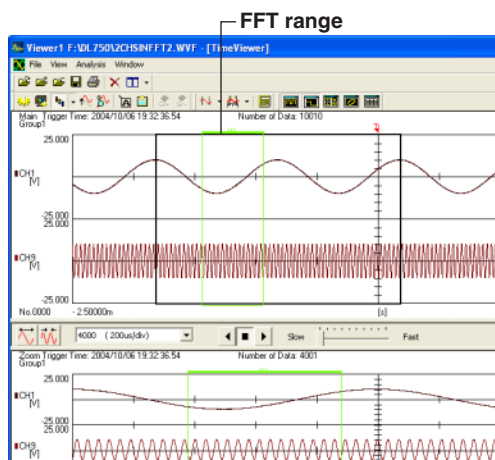
 : Accessing file

### Displaying the FFT Range

The FFT range is indicated with a green bar on the main waveform display window and the zoomed waveform display window.

Drag the bar to move the computation range.

If FFT cannot be performed, the bar indicating the range and the word “FFT” turn red.



### Details of Various Computations

#### Filter (FILT1/FILT2)

##### Type

Type	Bandwidth
Gauss	Lowpass
Sharp	Lowpass/Highpass/Bandpass
IIR (Butterworth)	Lowpass/Highpass/Bandpass

#### Filter Orders

See the following table for the filter orders.

Cutoff frequency/sampling frequency × 100		2%	5%	10%	20%	30%
Gauss	Lowpass	49	21	9	5	5
	Highpass	159	65	33	17	13
IIR	Lowpass	4	4	4	3	2
	Highpass	4	4	4	4	3

#### Note

- You can set the cutoff frequency in the range from 2 to 30% of the sampling frequency (in 0.2% steps).
- The higher the filter order, the longer computation takes.

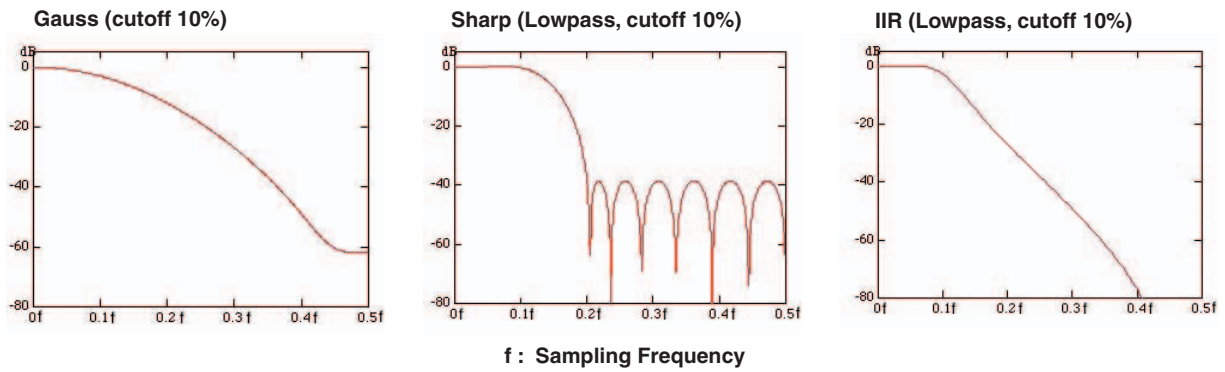
#### Filter Characteristics

Filter	Passband Ripple	Attenuation slope	Attenuation in the Stopband	Phase
Gauss	0 dB	*	-	Linear
Sharp	±0.3 dB	-40 dB at 1 oct (Lowpass), -40 dB at -1 oct (Highpass)	-40 dB	Linear
IIR	0 dB	-5 dB at 1/6 oct (Lowpass), -20 dB at -1 oct (Highpass)	-	Non-linear

\* Attenuation for a Gauss filter is  $-3.0 \times (f/f_c)^2$  dB (where f is the frequency and  $f_c$  is the cutoff frequency).



Examples of Frequency Characteristics for Various Filters



**Hilbert Function (HLBT)**

Normally, when we analyze a real time signal, it is convenient to think of the signal as the real part of a complex valued signal. Analysis is often more convenient when done using the complex signal. Given that the real time signal is considered to be the real part of the complex signal, the imaginary part is then equal to the Hilbert transform of the real part. When performing a Hilbert transform on a signal in the time domain, the signal is first transformed into the frequency domain using the Fourier transform. Next, the phase of each frequency component is shifted by -90 degrees if the frequency is positive and +90 degrees if negative. Lastly, the Hilbert transform is completed by taking the inverse Fourier transform. As can be seen from the above description, the Hilbert transform does not change the order of the individual variables. The Hilbert transform of a time signal results in another time signal.

**Application Example**

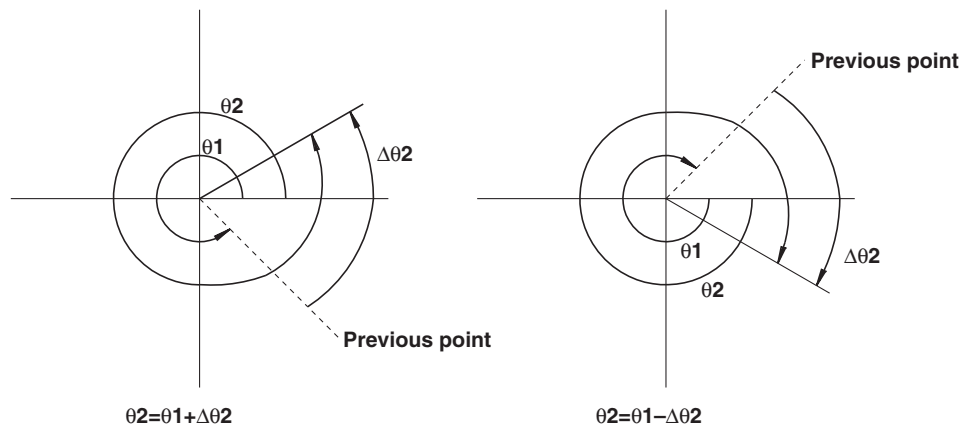
The Hilbert transform can be used to analyze an envelope waveform.

AM (amplitude modulation):  $SQRT(C1 * C1 + HLBT(C1) * HLBT(C1))$

Demodulation of a FM signal:  $DIF(PH(C1, HLBT(C1)))$

**Phase Function (PH)**

Phase function  $PH(C1, C2)$  computes  $\tan^{-1}(C1/C2)$ . However, the phase function takes the phase of the previous point into consideration and continues to sum even when the value exceeds  $\pm\pi$  (The ATAN function reflects at  $\pm\pi$ ). The unit is radians.



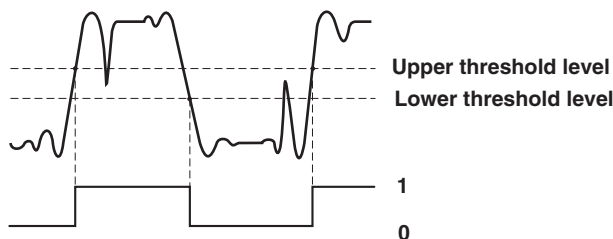
**Binary Conversion (BIN)**

Performs binary conversion with respect to the specified threshold level.

The threshold level is specified as follows:

A and B represent the Upper and Lower threshold levels, respectively.

$BIN(C1, A, B)$

**Pulse Width Computation (PWHH/PWHL/PWLH/PWLL/PWXX)**

The signal is converted into binary values by comparing to a preset threshold level, and the time of the pulse width is plotted as the Y-axis value for that interval.

The following 4 intervals are available:

PWHL: From the rising edge to the next falling edge.

PWLL: From the falling edge to the next falling edge.

PWHL: From the rising edge to the next rising edge.

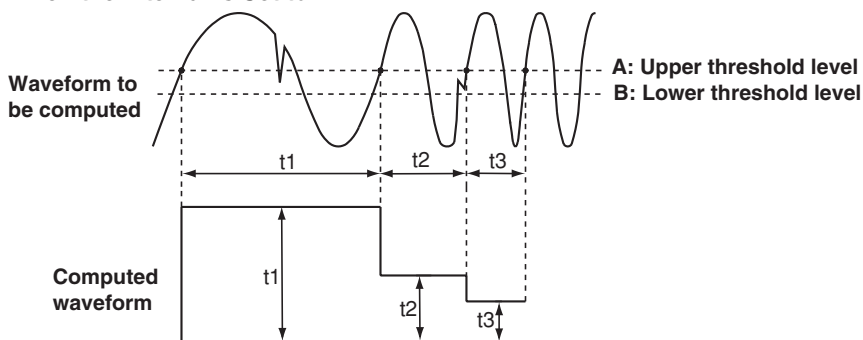
PWLL: From the falling edge to the next rising edge.

PWXX: From the rising or falling edge to the next rising or falling edge.

The threshold level is specified as follows:

A and B represent the Upper and Lower threshold levels, respectively.

$PWHL(C1, A, B)$

**When the Interval is Set to PWHH**

#### 4.4 Analyzing Waveforms by Computations (Optional)

##### FFT

##### Linear Spectrum (LS-REAL/LS-IMAG/LS-MAG/LS-LOGMAG/LS-PHASE)

The linear spectrum is directly determined by the FFT. The power spectrum and cross spectrum can be determined from one or two linear spectra.

The FFT is a complex function, and thus the linear spectrum is composed of both a real and an imaginary part. The magnitude and phase of the frequency components of the measured waveform can be derived from the real and imaginary parts of the FFT result. The following spectra can be determined:

Item	Expression	Computation
Real part	LS-REAL	R
Imaginary part	LS-IMAG	I
Magnitude	LS-MAG	$\sqrt{(R^2+I^2)}$
Log magnitude	LS-LOGMAG	$20 \times \log \sqrt{(R^2+I^2)}$
Phase	LS-PHASE	$\tan^{-1}(I/R)$

Log magnitude reference (0 dB): 1 V<sub>peak</sub>

R, I: R and I represent the real part and the imaginary part, respectively, when each frequency component G of a linear spectrum is represented by "R+jI."

##### Rms Value Spectrum (RS-RS-MAG/RS-LOGMAG)

Rms value spectrum expresses the rms value of the magnitude of the linear spectrum. It does not contain phase information.

The following spectra can be determined:

Item	Expression	Computation
Magnitude	RS-MAG	$\sqrt{(R^2+I^2)}/2$
Log magnitude	RS-LOGMAG	$20 \times \log \sqrt{(R^2+I^2)}/2$

Log magnitude reference (0 dB): 1 V<sub>rms</sub>

##### Power Spectrum (PS-MAG/PS-LOGMAG/PSD-MAG/PSD-LOGMAG)

The power spectrum expresses the power of each frequency component included in the measured signal. It is determined by taking the product of the linear spectrum and its complex conjugate. It does not contain phase information.

The following spectra can be determined:

Item	Expression	Computation
Magnitude	PS-MAG	$(R^2+I^2)/2$
Log magnitude	PS-LOGMAG	$10 \times \log(R^2+I^2)/2$

Log magnitude reference (0 dB): 1 V<sub>rms</sub><sup>2</sup>

##### Power Spectral Density (PSD-MAG/PSD-LOGMAG)

The power spectral density (PSD) expresses the power spectrum per unit frequency. It is determined by dividing the power spectrum by the frequency resolution  $\Delta f$  found during the analysis of the power spectrum. The results of the PSD computation vary depending on the window function chosen. The power spectral density is used to compare power spectra analyzed at different frequency bands. However, it is not necessary for signals having a line spectrum such as a sine wave.

The following spectra can be determined:

Item	Expression	Computation
Magnitude	PSD-MAG	PS-MAG/ $\Delta f$ (for rectangular window) PS-MAG/ $1.5\Delta f$ (for Hanning window)
Log magnitude	PSD-LOGMAG	$10 \times \log \text{PS-MAG}/\Delta f$ (for rectangular window) $10 \times \log \text{PS-MAG}/1.5\Delta f$ (for Hanning window)

Log magnitude reference (0 dB): 1 V<sub>rms</sub><sup>2</sup>

**Cross Spectrum (CS-REAL/CS-IMAG/CS-MAG/CS-LOGMAG/CS-PHASE)**

The cross spectrum is determined from 2 signals. It is found by taking the product of the linear spectrum of one signal( $G_x$ ) and the complex conjugate ( $G_x^*$ ) of the linear spectrum of the other signal ( $G_y$ ).

If the linear spectra of the 2 signals are represented by

$$G_x = R_x + jI_x$$

$$G_y = R_y + jI_y$$

then the cross spectrum  $G_{yx}$  is

$$G_{yx} = G_y \times G_x^* = (R_y + jI_y)(R_x - jI_x) = R_{yx} + jI_{yx}$$

where  $R_{yx} = R_y R_x + I_y I_x$

$$I_{yx} = R_x I_y - R_y I_x$$

The following spectra can be determined:

Item	Expression	Computation
Real part	CS-REAL	$R_{yx}/2$
Imaginary part	CS-IMAG	$I_{yx}/2$
Magnitude	CS-MAG	$\sqrt{(R_{yx}^2 + I_{yx}^2)}/2$
Log magnitude	CS-LOGMAG	$10 \times \log \sqrt{(R_{yx}^2 + I_{yx}^2)}/2$
Phase	CS-PHASE	$\tan^{-1}(I_{yx}/R_{yx})$

**Transfer Function (TF-REAL/TF-IMAG/TF-MAG/TF-LOGMAG/TF-PHASE)**

The transfer function expresses the frequency characteristics between the input and the output of a system. The transfer function is given by the ratio of the linear spectrum of the output( $G_y$ ) to the spectrum of the input( $G_x$ ) at each frequency. Also, as can be seen from the equation below, the transfer function can be defined as the ratio of the cross spectrum of the input and output ( $G_{yx}$ ) and the input power spectrum ( $G_{xx}$ ).

$$\text{Transfer Function} = G_y/G_x = (G_y \times G_x^*) / (G_x \times G_x^*) = G_{yx}/G_{xx} = (R_{yx} + jI_{yx}) / (R_x^2 + I_x^2)$$

The following items can be determined:

Item	Expression	Computation
Real part	TF-REAL	$R_{yx}/(R_x^2 + I_x^2)$
Imaginary part	TF-IMAG	$I_{yx}/(R_x^2 + I_x^2)$
Magnitude	TF-MAG	$\sqrt{(R_{yx}^2 + I_{yx}^2)}/(R_x^2 + I_x^2)$
Log magnitude	TF-LOGMAG	$20 \times \log \sqrt{(R_{yx}^2 + I_{yx}^2)}/(R_x^2 + I_x^2)$
Phase	TF-PHASE	$\tan^{-1}(I_{yx}/R_{yx})$

The magnitude of the transfer function gives the ratio of the magnitudes of the linear spectra of the output and input, whereas phase of the transfer function gives the phase difference between the two.

**Coherence Function (CH-MAG)**

This function expresses the ratio of the output power generated by the input to the system to the total output power.

$$\text{Coherence function} = G_{yx} \times G_{yx}^* / (G_{xx} \times G_{yy})$$

Item	Expression	Computation
Magnitude	CH-MAG	$(R_{yx}^2 + I_{yx}^2) / (G_{xx} \times G_{yy})$

If the output signal is due entirely to the input signal, the coherence function becomes 1. As the ratio decreases, it falls below 1. Thus, the coherence function always takes on a value between 0 and 1.

**Note**

- On one data acquisition, the coherence function becomes 1 across all frequencies.
- The computed waveform must be averaged.

#### 4.4 Analyzing Waveforms by Computations (Optional)

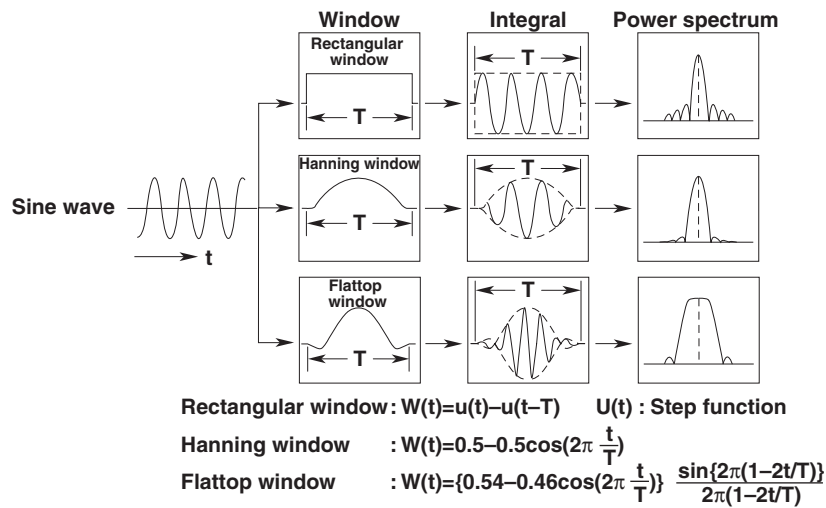
##### Number of Computed Points

You can select 100 points, 200 points, 500 points, 1000 points, 2000 points, 5000 points, 10000 points, 20000 points, 50000 points, 100000 points, 200000 points, 500000 points, 1000000 points, or 2000000 points.

##### About Time Windows

You can select rectangular, Hanning, or flattop as the time window.


The rectangular window is best suited to transient signals, such as an impulse wave, that attenuate completely within the time window. The Hanning window allows continuity of the signal by gradually attenuating the parts of the signal located near the ends of the time window down to the “0” level. Hence, it is best suited to continuous signals. The frequency resolution of the Hanning window is higher compared with the Flattop window. However, the flattop window has a higher level of accuracy of the spectrum. When the waveform being analyzed is a continuous signal, consider the above characteristics when selecting the proper window to use.

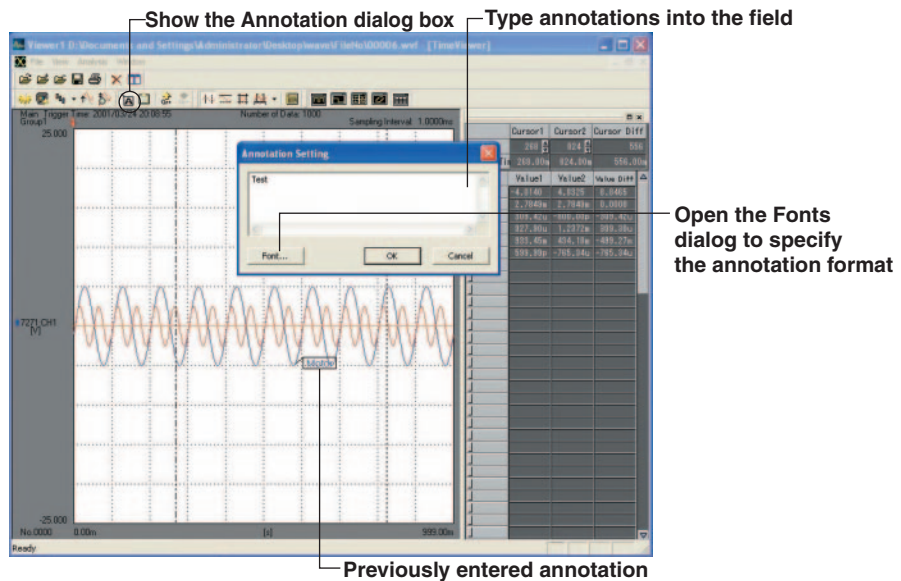


## 4.5 Specifying Annotations for Waveforms

### Operations

#### Specifying Annotations for Waveforms

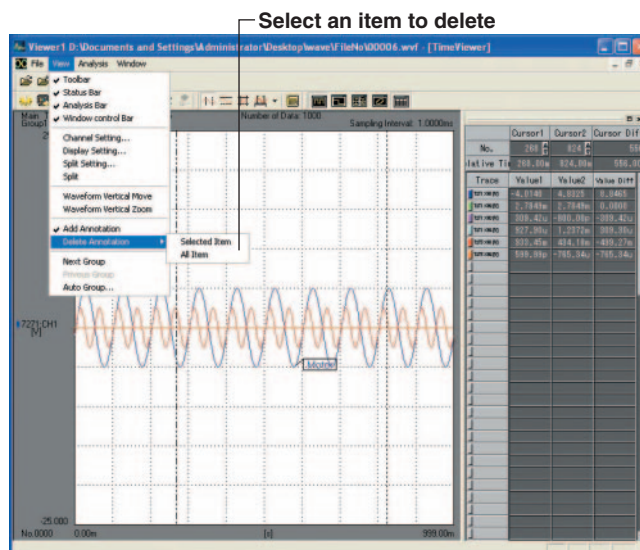
To display the **Annotation Setting** dialog box, either select  and double-click a point in a window, or select **View > Add Annotation**. Type annotations into the field on the dialog box, and then click **OK** to have the annotations appear in the window. When you double-click on a waveform, you can insert an annotation at the position linked to the waveform data. When you double-click a point other than the waveform, you can insert an annotation at a relative position on the screen.



#### Deleting Annotations

To delete annotations that have already been entered, select **View > Delete Annotations > Selected Item** or **All Item**.

To delete an annotation, click it (such that the frame around the annotation is bolded), and then press the **Delete** key.



### Copying and Pasting the Annotations

Click the annotation to be copied (such that the frame around the annotation is bolded) and right-click to display the menu shown below. Select Copy, right-click the position where you wish to paste the annotation, and select Paste.

### Explanation

The only setting data that is saved is the annotations that are inserted at relative positions on the screen.

### Adding Annotations

You can add annotations for each history waveform.

The following two types of annotations can be added.

- Annotations linked to the waveform data  
You can add an annotation for each waveform data. The annotation for each waveform data is linked to the waveform data even if the displayed group is switched. This type of annotations can be added to the main waveform display window or the zoomed waveform display window.
- Relative positions on the window  
This type of annotations can be added to the main waveform display window, the zoomed waveform display window, or the XY waveform display window.

### Copying and Pasting the Annotations


Place the mouse pointer on an annotation or window and right-click to carry out the following operations.

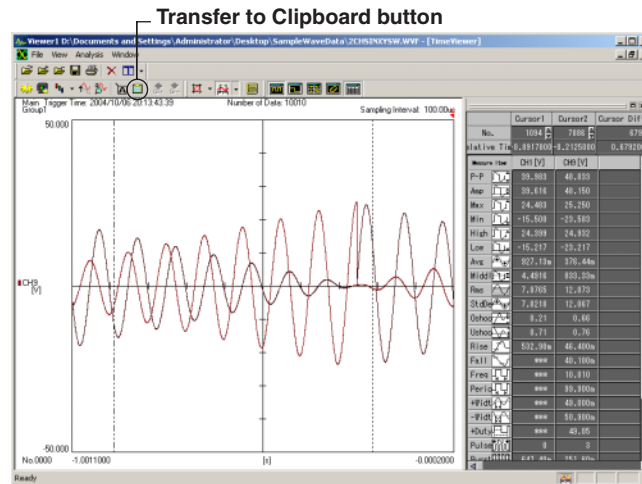
Operation	When pointing to an annotation	When pointing on the window
Add	No	Yes
Delete	Yes	No
Copy	Yes	No
Paste	No	Yes
Edit	Yes	No

## 4.6 Transferring a Waveform View to the Clipboard

### Operations

#### Transferring a Waveform View to the Clipboard

Click  to transfer the viewer window you are viewing as image data to the clipboard. You can see the image by executing a paste command in an application that can handle image data.



#### Note


Only the waveform view is transferred to the clipboard without any image of the menu bars and other functional components.

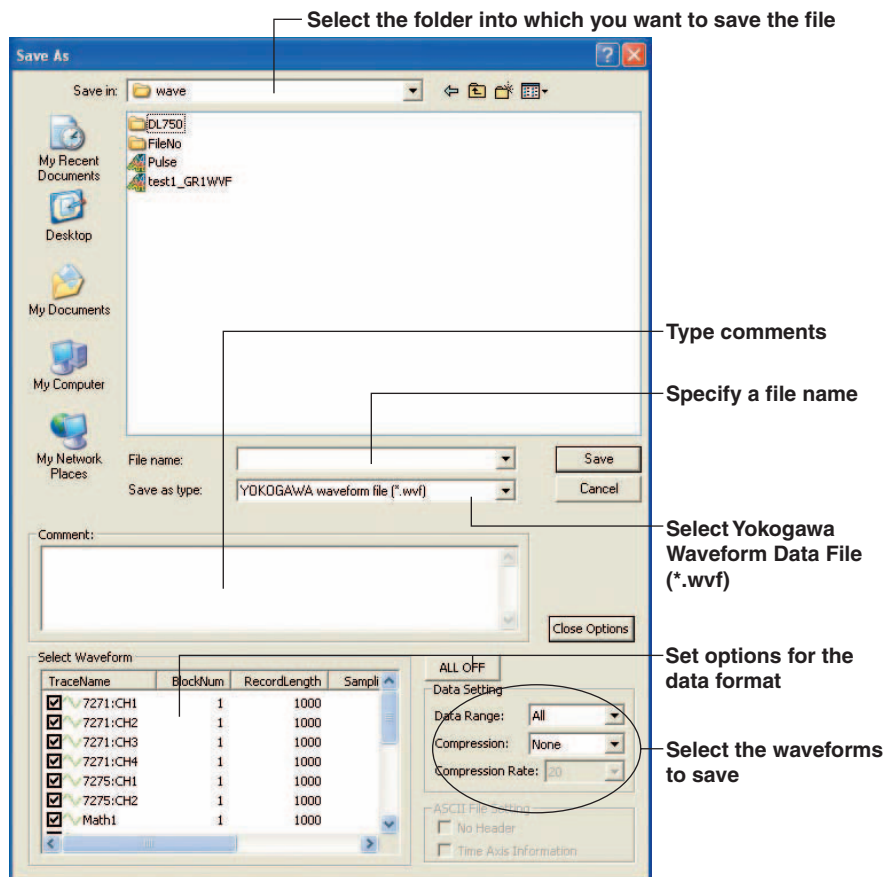


# 5.1 Saving Waveform Data

## Operations


### Saving Waveform Data in Binary Format

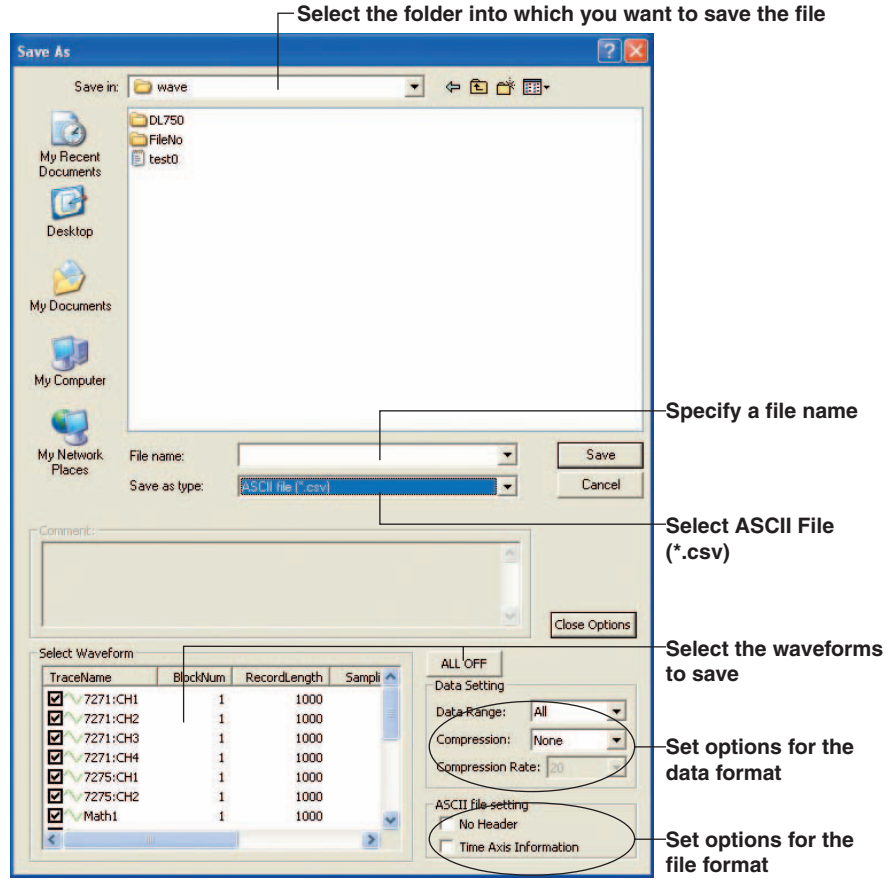
Click  or select **File > Save** to display the **Save File** dialog box. Select the folder into which you want to save the file, specify the file name, select **Yokogawa Waveform Data File (\*.wvf)** in **Files of type**, set any other required options, and then click the **Save** button. To set the options, click the **More Options** button.




## 5.1 Saving Waveform Data

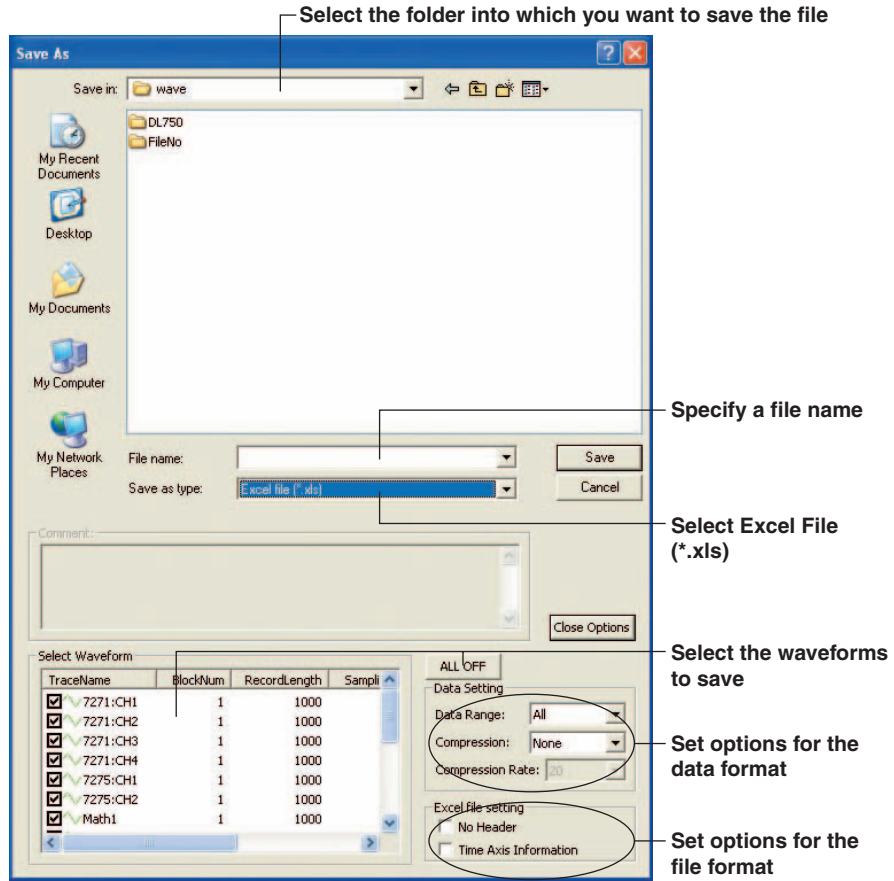
### Saving Waveform Data in ASCII Format

Click  or select **File > Save** to display the **Save File** dialog box. Select the folder into which you want to save the file, specify the file name, select **ASCII File (\*.csv)** in **Files of type**, set any other required options, and then click the **Save** button. To set the options, click the **More Options** button.



**Saving Waveform Data in XLS Format**

Click  or select **File > Save** to display the **Save File** dialog box. Select the folder into which you want to save the file, specify the file name, select **Excel File (\*.xls)** in **Files of type**, set any other required options, and then click the **Save** button. To set the options, click the **More Options** button.



### **Explanation**

#### **Files Saved in Binary Format**

Files saved in binary format conform to our proprietary WVF format. The saved data consists of the active waveform data and that for the block checked in the history window.

#### **Options for Saving Binary Files**

When you save waveform data in WVF format, you can not only select the waveforms to save but you can also set the following options:

- Range to save: Select **All**, **Zoom Range**, or **Cursor Range**
- Compression: Select **None**, **PP Comp**, or **Decim**
- Compression Rate: Selectable when **Compression** is specified.  
Select **5**, **10**, **20**, **50**, **100**, **200**, **500**, **1000**, **2000**, **5000**, or **10000**.

#### **Files Saved in ASCII Format**

Files saved in ASCII format conform to CSV format.

#### **Note**

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For waveform data that is divided into blocks, you can save only one block in ASCII format (CSV file).

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#### **Options for Saving CSV Files**

When you save waveform data in CSV format, you can not only select the waveforms to save but also set the following options:

##### **Data format options:**

- Range to save: Select **All**, **Zoom Range**, or **Cursor Range**
- Compression: Select **None**, **PP Comp**, or **Decim**
- Compression Rate: Selectable when **Compression** is specified.  
Select **5**, **10**, **20**, **50**, **100**, **200**, **500**, **1000**, **2000**, **5000**, or **10000**.

##### **File format options:**

- Header: Select whether to set a header
- Time-Axis: Select whether to set information about the time-axis

#### **Files Saved in XLS Format**

Files saved in XLS format conform to MS Excel format.

#### **Options for Saving XLS Files**

When you save waveform data in XLS format, you can not only select waveforms to save but also set the following options:

##### **Data format options:**

- Range to save: Select **All**, **Zoom Range**, or **Cursor Range**
- Compression: Select **None**, **PP Comp**, or **Decim**
- Compression Rate: Selectable when **Compression** is specified.  
Select **5**, **10**, **20**, **50**, **100**, **200**, **500**, **1000**, **2000**, **5000**, or **10000**.

##### **File format options:**

- Header: Select whether to set a header
- Time-Axis: Select whether to set information about the time-axis

#### **Note**


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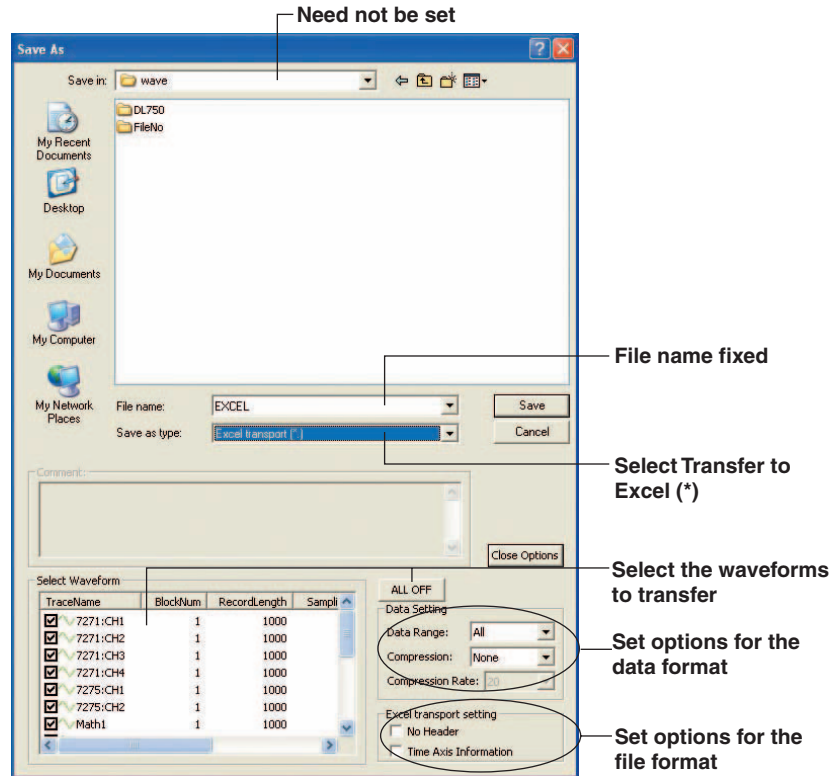
- For waveform data divided by the block, you can save only one block you focus on into the XLS format.
  - Data saved in WVF format cannot be loaded on DL series instruments.
-

## 5.2 Transferring Waveform Data into Excel

### Operations

#### Transferring Waveform Data into Excel

Click  or select **File > Save** to display the **Save File** dialog box. Select **Excel transport (\*.\*)** in **Files of type**, set any other required options, and then click the **Save** button. To set the options, click the **More Options** button.



### Explanation

#### Transfer to Excel

The Transfer to Excel command directly redirects data for the selected waveforms to an Excel sheet. Clicking the **Save** button automatically starts up Excel and then plots the waveform data onto an Excel sheet according to the specified format options.

#### Note

- If there are a number of channels, Transfer to Excel may take a long time to complete in some operating environments. In such a case, save the data into a CSV file, and then read the file into Excel.
- Using the mouse to close the sheet opened by the Transfer to Excel feature causes Xviewer to malfunction when you execute Transfer to Excel again. If you need to close the sheet and execute Transfer to Excel again, close the first sheet, quit Xviewer, and then execute Transfer to Excel again.
- When the measured values exceed the measurement range, or the size of the computed waveform data is smaller than that of the measured waveform data, the measured data is not saved. In this case, a value of "65535" is written into each cell.

#### Options for Transfer to Excel

When you transfer waveform data to Excel, you can not only select the waveforms to transfer but also set the following options:

##### Data format options:

- Range to save: Select **All**, **Zoom Range** or **Cursor Range**
- Compression: Select **None**, **PP Comp**, or **Decim**
- Compression Rate: Selectable when **Compression** is specified. Select **5**, **10**, **20**, **50**, **100**, **200**, **500**, **1000**, **2000**, **5000**, or **10000**.


##### File format options:

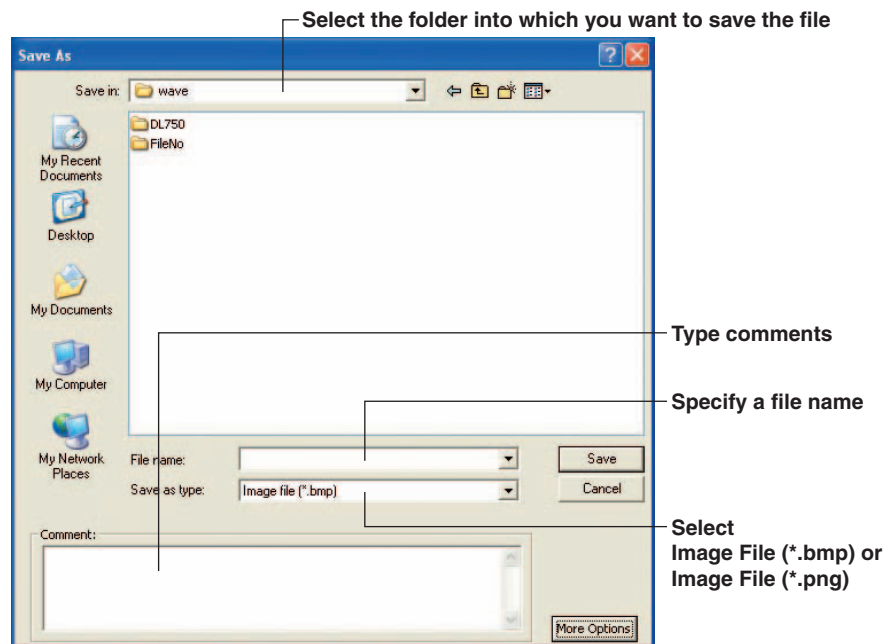
- Header: Select whether to set a header
- Time-Axis: Select whether to set information about the time-axis

## 5.3 Saving Waveform Data in a View

### Operations

#### Saving Waveform Data in a View

Click  or select **File > Save** to display the **Save File** dialog box. Select the folder into which you want to save the file, specify the file name, select **Image File (\*.bmp)** or **Image file (\*.png)** in **Files of type**, and then click the **Save** button.



### Explanation


#### Files Saved in BMP/PNG Format

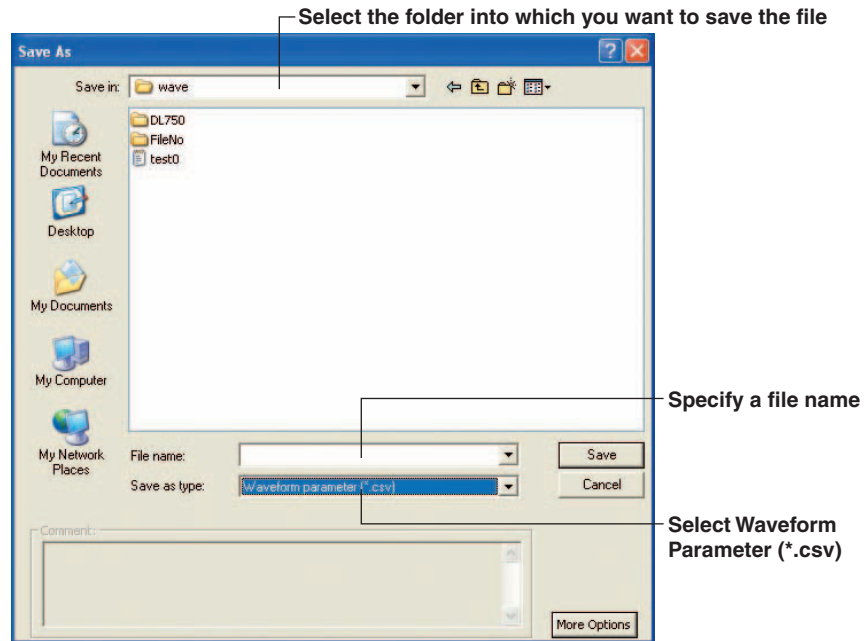
You can save the viewer window you are viewing into an image data file in either BMP or PNG format. You can attach comments to the file, but the file can include only one line of comments.

## 5.4 Saving Automated Measurement Values for Waveform Parameters

### Operations

#### Saving Values Automated Measurement Waveform Parameters

Click  or select **File > Save** to display the **Save File** dialog box. Select the folder into which you want to save the file, specify the file name, select **Waveform Parameter (\*.csv)** in **Files of type**, and then click the **Save** button.



### Explanation

#### Files Saved in Waveform Parameters (\*.csv) Format

You can save the automated measurement values for the specified waveform parameters (values displayed in the measurement result display window) in a .csv file.

#### Saved Data


Among the automated measurement values, the following data is saved.

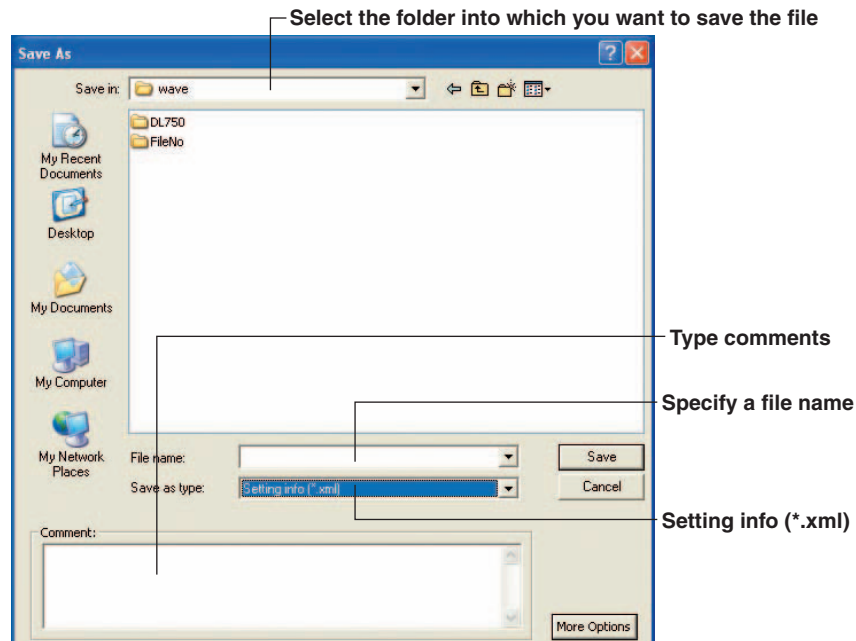
- Measurement results for block selected in the history window
- Trace measurement results for ch; .el setting for which the cursor display is ON

## 5.5 Saving the Display Settings

### Operations

#### Saving the Display Settings

Click  or select **File > Save** to display the **Save File** dialog box. Select the folder into which you want to save the file, specify the file name, select **Setting info (\*.xml)** in **Files of type**, and then click the **Save** button.



### Explanation

#### Files Saved in Setting info (\*.xml) Format

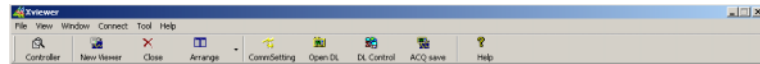
You can save the display settings specified for the viewer window you are viewing into a .xml file. You can also include comments. Loading a Display Setting file already saved applies the display settings in the file to waveform views.



## 5.6 Converting Multiple Waveform Data Files to CSV Files

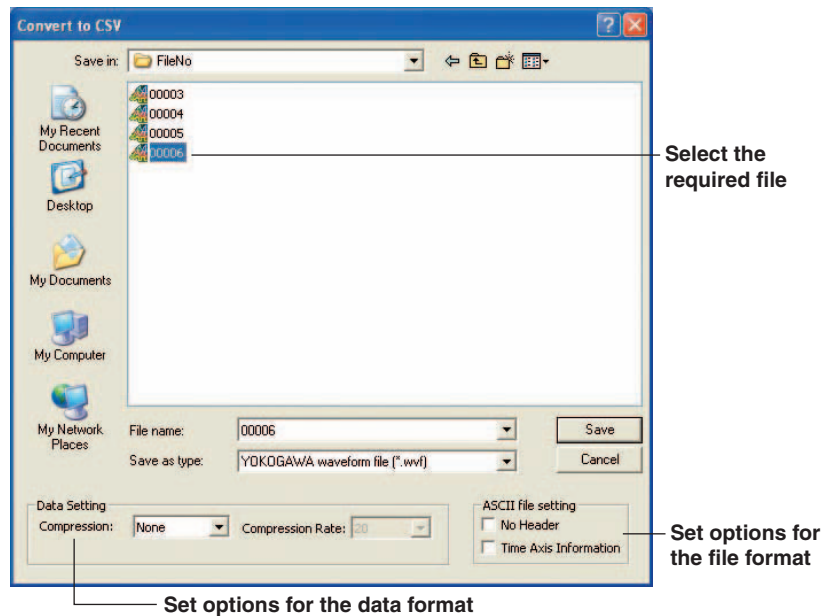
### Operations

1. Close the viewer window.
2. Click **Tools > Convert to CSV** on the XViewer tool bar to display the **Convert to CSV** dialog box.



Select the files to convert and options and click **Save**.

The selected files are stored into the folder in which the originals are included.



### Note

Select multiple measurement data files in the Convert to CSV dialog box and click Save to collectively convert the selected files to CSV files.

**Explanation**

**Setting Options**

You can specify the following two options for waveform data files to convert to the CSV format:

**Data format options:**

- Compression: Select **None**, **PP Comp**, or **Decim**
- Compression Rate: Selectable when **Compression** is specified. Select **5**, **10**, **20**, **50**, **100**, **200**, **500**, **1000**, **2000**, **5000**, or **10000**.

**File format options:**

- Header: Select whether to set a header
- Time-Axis: Select whether to set information about the time-axis

**Records Horizontally Arranged**

```
CH1-Record1-data001, CH2-Record1-data001
CH1-Record1-data002, CH2-Record1-data002
CH1-Record1-data003, CH2-Record1-data003
      :
CH1-Record1-data100, CH2-Record1-data100

CH1-Record2-data001, CH2-Record2-data001
CH1-Record2-data002, CH2-Record2-data002
CH1-Record2-data003, CH2-Record2-data003
      :
CH1-Record2-data100, CH2-Record2-data100

CH1-Record3-data001, CH2-Record3-data001
CH1-Record3-data002, CH2-Record3-data002
CH1-Record3-data003, CH2-Record3-data003
      :
CH1-Record3-data100, CH2-Record3-data100
```

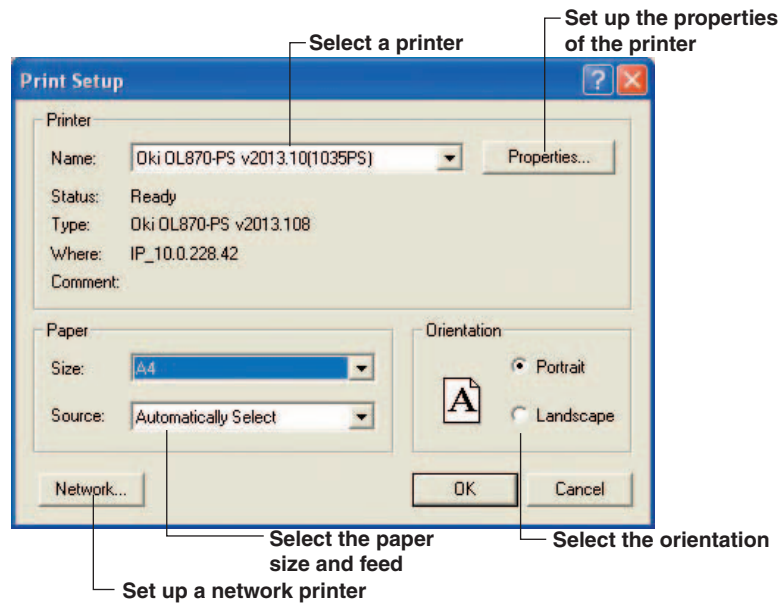
## 6.1 Setting Up a Printer

### Operations

#### Setting Up a Printer

Select **File > Printer Setup....** to display the **Printer Setup** dialog box.

Select a printer and specify the paper size, orientation, and other settings in the dialog box, and then click **OK**.



### Explanation

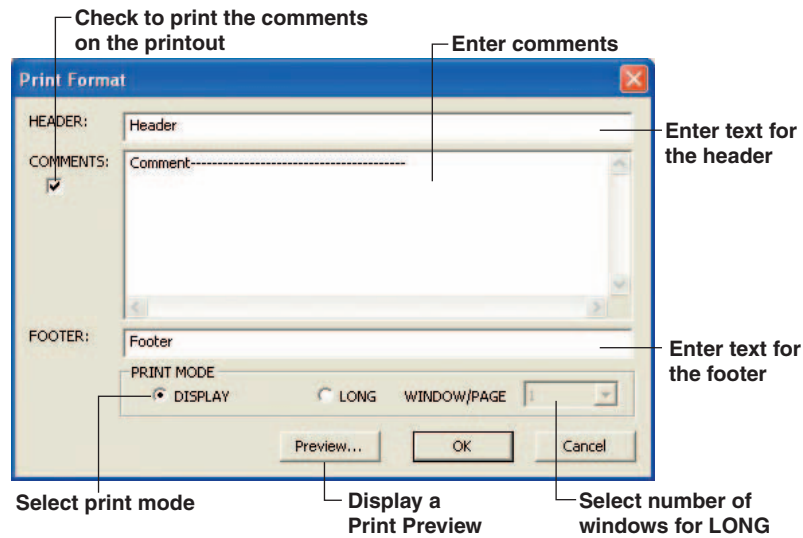
Set up the printer according to your system configuration.

## 6.2 Printing Displayed Waveforms


### Operations

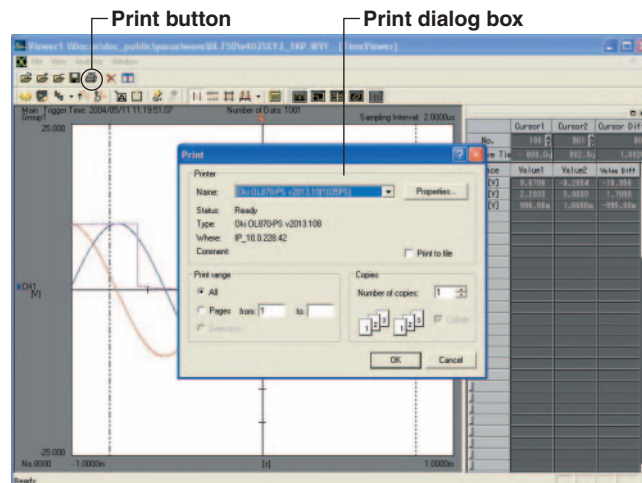
#### Setting Up the Print Format

Select **File > Print Format** to display the **Print Format** dialog box. Fill in the comment, header, and footer fields, specify the print mode settings, and then click the **OK** button.



#### Printing

Click  to display the **Print** dialog box. Click **OK** to start printing with the settings you specified in the **Print Format** dialog box.



## Explanation

### Printable Information

You can specify the printing of the following types of information on printouts:

- **COMMENTS:** Comments (printed under the waveforms.)
- **HEADER:** Page header
- **FOOTER:** Page footer

### Print Mode

Set the following items for the **PRINT MODE** selections:

- **DISPLAY** : Mode in which the display on the screen is printed as is
- **LONG** : Prints the waveforms (main waveform display window), separating them by the zoom rate specified for the zoomed waveform display window. (The entire waveform view is printed by the zoomed waveform display window, starting from the left end. In the dialog, the size of the zoomed waveform display window is in units of one window\*.)

Set a value of **1** to **10** for **WINDOW/PAGE** for the number of windows to be printed on one page.

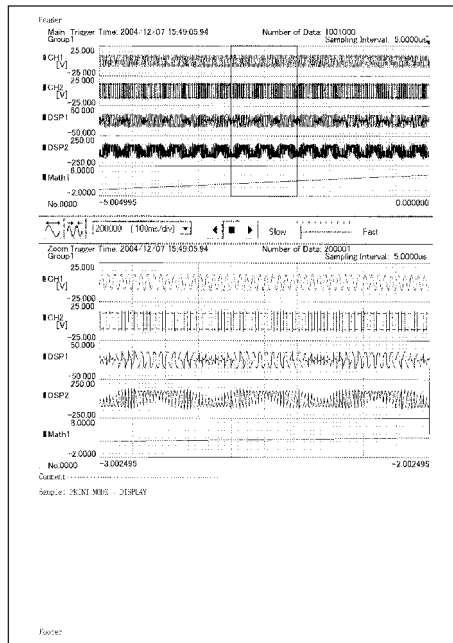
- \* The number of windows printed equals (the number of points displayed in the main waveform display windows) divided by (the number of points displayed in the zoomed waveform display windows), or (quotient of the division) + 1.

### Print Preview

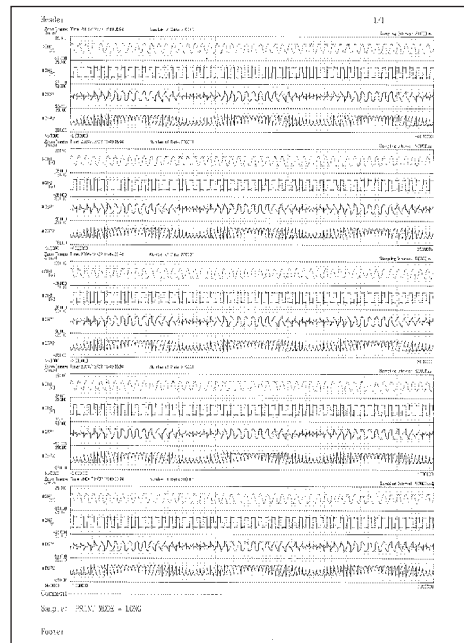
Click the **Preview** button or select **File > Print Preview** to switch the viewer window to the print preview. This lets you check the layout of the sheet you are going to print. To proceed with printing, click the **Print** button.

### Printout Sample

#### Print Mode : DISPLAY



#### Print Mode : LONG



# 7.1 Connecting to the DL Series

**Note**

Before attempting to use this function, connect the PC to the DL unit using an appropriate communications cable. For details on how to make this connection, see the manual provided with your DL series unit.

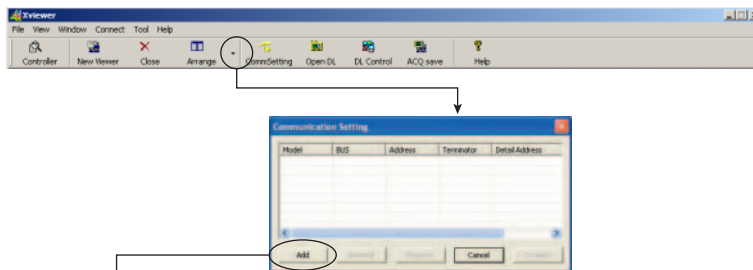
**Operations**

**Setting Up/Adding a Connection**

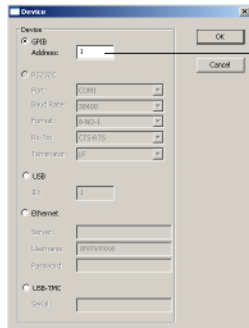
On the **Xviewer tool bar**, click the **CommSetting** button to open the **Communication Setting** dialog box. Then, click the **Add** button to open the **Devices** dialog box, make the settings for the connection interface and communications conditions, and then click **OK**.

**Note**

- If connections to DL units have already been registered, those connections will be displayed as a list. Select the required DL unit and then click the **Connect** button to establish the connection with that unit.
- Up to 16 connections can be registered.

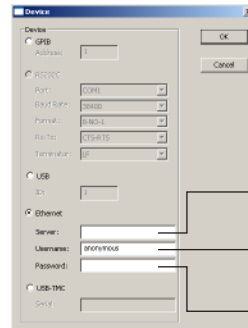


• **GP-IB connection**



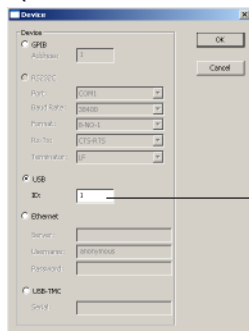
Input the GP-IB address of the DL unit to be connected (0 to 30)

• **Network connection**



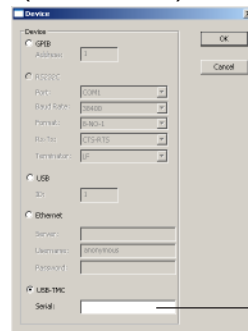
Input the IP address of the DL unit to be connected  
 Input the network user name for the DL unit to be connected  
 Input the network password for the DL unit to be connected

• **USB connection (Other than the DL9000 Series)**



Input the USB ID number of the DL unit to be connected (0 to 127)

• **USB connection (DL9000 Series)**



Input the serial number of the DL9000 unit to be connected (9-digit)

## 7.1 Connecting to the DL Series

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### Modifying a Connection

On the **Xviewer tool bar**, click the **CommSetting** button to open the **Communication Setting** dialog box. Select the required DL unit and then click the **Properties** button to open the **Devices** dialog box, change the settings as needed and then click **OK**.

### Removing a Connection

On the **Xviewer tool bar**, click the **CommSetting** button to open the **Communication Setting** dialog box. Select the required DL unit and then click the **Remove** button to remove the selected connection.

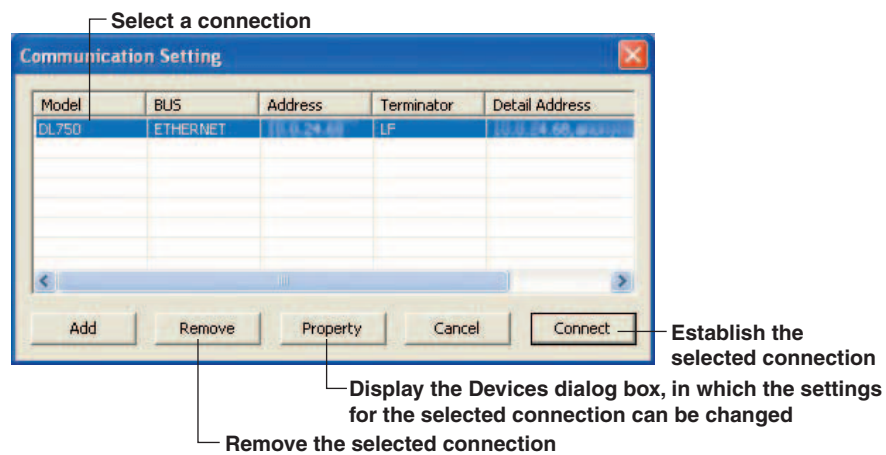
### Establishing a Connection

On the Xviewer tool bar, click the **CommSetting** button to open the **Communication Setting** dialog box. Select the required DL unit and then click the **Connect** button to establish the connection with the DL unit.

### Note

If the DL unit contains a very large number of files, it may take some time to establish the connection.

---



### Ending a Connection

A connection with a DL unit is ended when you exit from Xviewer.

### Note

The connection with a DL unit cannot be ended while a file is being transferred.

---

**Explanation****Setting Contents**

Ensure that the interface settings and communication conditions are the same as for the DL unit to which you want to connect. Check the setting contents using the following menu.

**Address/ID Number**

DL750, DL750P, DL1600, DL1700E : **MISC > Remote Cntl**  
 DL7400 : **MISC > Remote Control**  
 DL9000 : **SYSTEM > Remote Control > GPIB**

**Server**

DL750, DL750P, DL1600, DL1700E, DL7400 : **MISC > Network > TCP/IP Setup**  
 DL9000 : **SYSTEM > Network > TCP/IP Setup  
> Configuraiton**

**User Name (for the Network interface)**

DL750, DL750P, DL1600, DL1700E : **MISC > Remote Cntl > User Account**  
 DL7400 : **MISC > Remote Control > User Account**  
 DL9000 : **SYSTEM > Remote Control > Network  
(User Name/Password)**

**Serial No. (for the USB-TMC interface)**

DL9000 : **SYSTEM > Overview**

**“unknown” Model Name Display**

Once you have made the connection settings and, using those settings, a connection is made successfully, the model name of the connected device will appear under **Model** in the **Communication Setting** dialog box. If a connection cannot be established, however, an error message is displayed and **unknown** appears as the model name.

**Firmware Versions**

Xviewer may not be able to establish a connection with a DL unit, depending on the firmware version of the software installed in that unit. Xviewer is compatible with the following firmware versions.

DL750 series : **Firmware versions 2.50 and later**  
 DL1600 series : **Firmware versions 1.12 and later**  
 DL7400 series : **Firmware versions 1.23 and later**  
 DL1700E series : **All firmware versions**

**Transfer Rate**

GPIB downloading : 150 to 400 Kbytes/s  
 USB downloading : 300 to 600 Kbytes/s  
 Ethernet downloading : 400 to 800 Kbytes/s  
 USB uploading : 15 Kbytes/s

**Note**

The transfer rate varies depending on the networking environment and the model being used.



## 7.2 Displaying a File List

### Operations

#### Displaying a File List

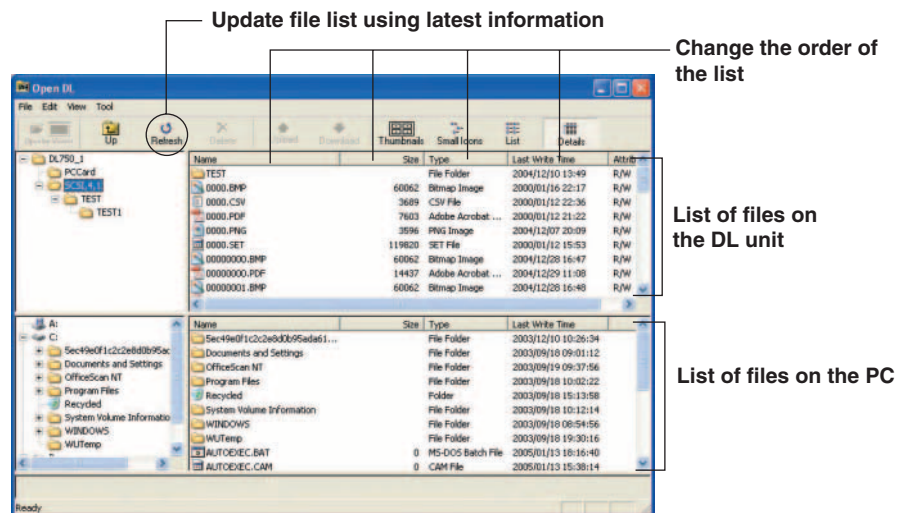
On the Xviewer tool bar, click the **Open DL** button to open the **Communication Setting** dialog box. Select the required DL unit and then click the **Connect** button to establish the connection with the DL unit and display a file list.

#### Note

- If a connection has already been established with the required DL unit, the **Communication Setting** dialog box does not appear and the file list appears immediately.
- When you click the **DL Control** button to enable operation of the DL unit from a PC, the **Open DL** button is grayed out.
- If the DL unit contains a very large number of files, it may take some time for the file list to appear.

#### Changing the Order of/Updating the File List

When you click the **Name**, **Size**, **Type**, or **Updated** button in the file list, the file list is sorted based on that clicked item. Clicking **Update** on the tool bar causes the file list to be refreshed based on the latest information.

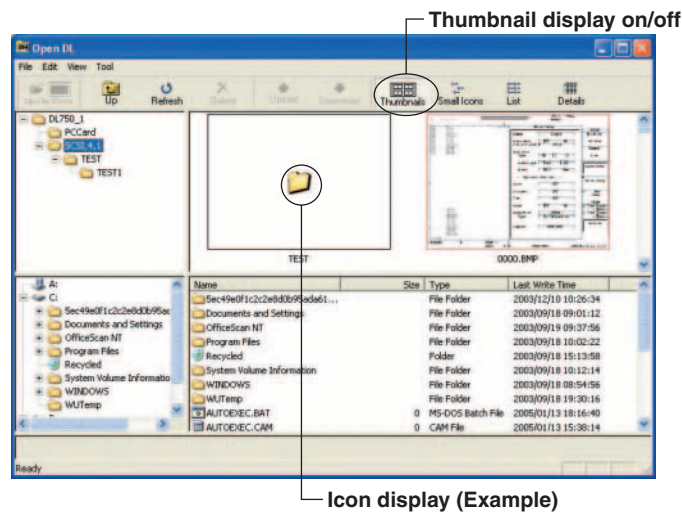


### Thumbnails Image Files

Clicking **Thumbnails** on the tool bar causes the image files stored on the DL unit to be displayed as thumbnails.

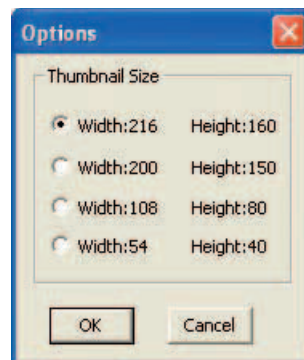
#### Note

- Files other than image files will be displayed as icons.
- Those image files for which there is no thumbnail file to display will be displayed as icons.



### Changing the Size of the Displayed Thumbnails

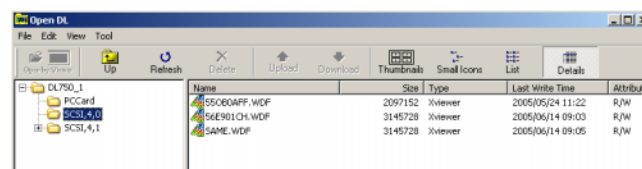
Select **Tools > Options** on the file list menu bar to display the **Option** dialog box. Select a size for the thumbnails (width and height), and then click the **OK** button.



### Explanation

#### Displaying Realtime Recording Data

On the DL750/DL750P with firmware version 6.01 or later, the file list of the [SCSI,4,0] folder on the DL750/DL750P can be displayed. The [SCSI,4,0] folder contains data that has been real-time recorded on the DL750/DL750P (.wdf data).



## 7.3 Manipulating Files

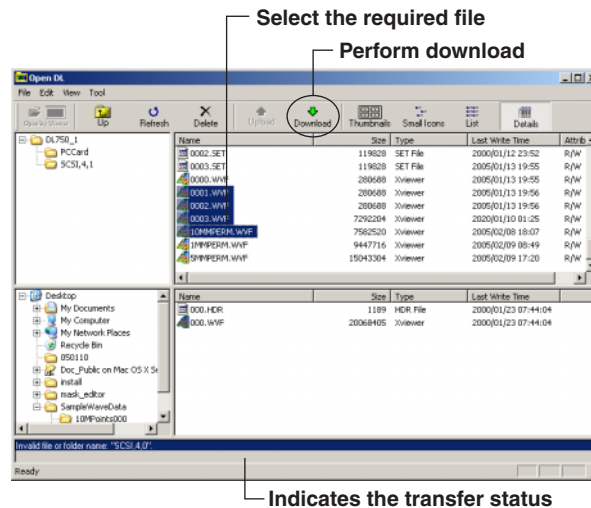
### Operations

#### Downloading from a DL Unit to a PC

If you select a file from the list of files stored on the DL unit, the **Download** button is enabled. If you then click the **Download** button, the selected file is transferred to the PC.

#### Note

- Multiple files can be specified for transfer.
- While files are being transferred, the connection to the DL unit cannot be terminated.

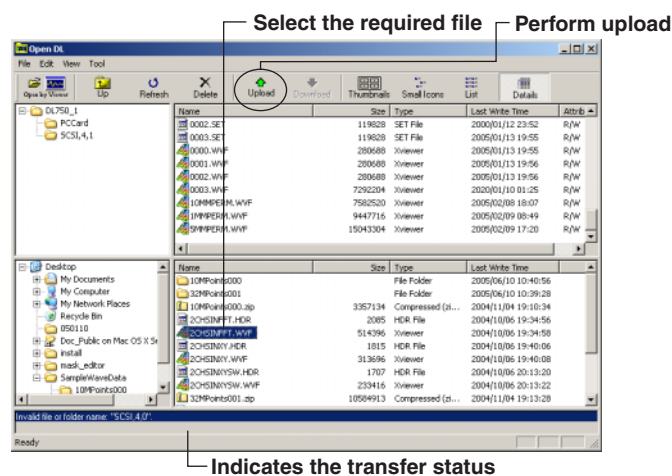


#### Uploading from a PC to a DL Unit

If you select a file from the list of files stored on the PC, the **Upload** button is enabled. If you then click the **Upload** button, the selected file is transferred to the DL unit.

#### Note

- Files can be transferred from the PC to the DL unit (upload) only when the USB interface is being used for the connection.
- Multiple files can be specified for transfer.
- While files are being transferred, the connection to the DL unit cannot be terminated.
- The data in the [SCSI,4,0] folder in which the realtime recording data (DL750 series only) can be downloaded to the PC. However, you cannot create a directory in the folder or upload data to the folder.



### Deleting a File

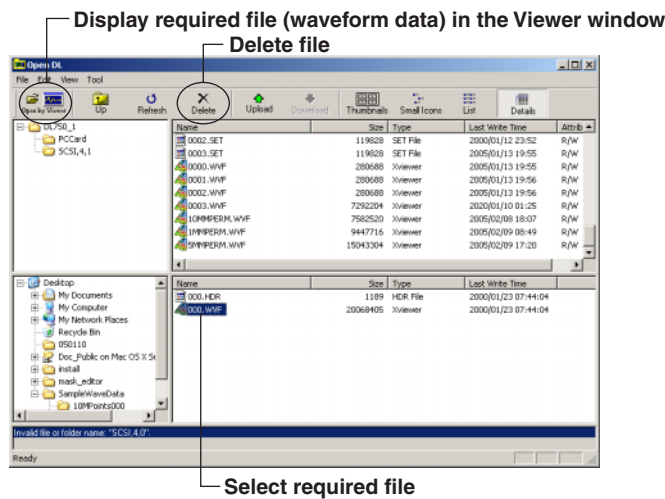
If you select a file from the file list and then click the **Delete** button, the selected file is deleted.

#### Note

- When you delete an image file, the corresponding thumbnail file is deleted at the same time.
- A folder cannot be deleted.

### Reading a Waveform Data File

If you select a WVF-format waveform data file (\*.wvf / \*.wdf) from the file list on the PC, the **Open in Viewer** button is enabled. If you then click the **Open in Viewer** button, the selected file is read and the waveform data that it contains is displayed in the Viewer window.



### Creating a Folder

Select **Tools > New Folder** on the file list menu bar to display the folder creation dialog box. Input a name for the new folder, and then click the **OK** button.

#### Note

- The new folder will be created under the current directory of the file list.
- For the folder name, you can specify ASCII characters (alphanumerics, etc.) only. Double-byte characters cannot be used.

**Explanation**

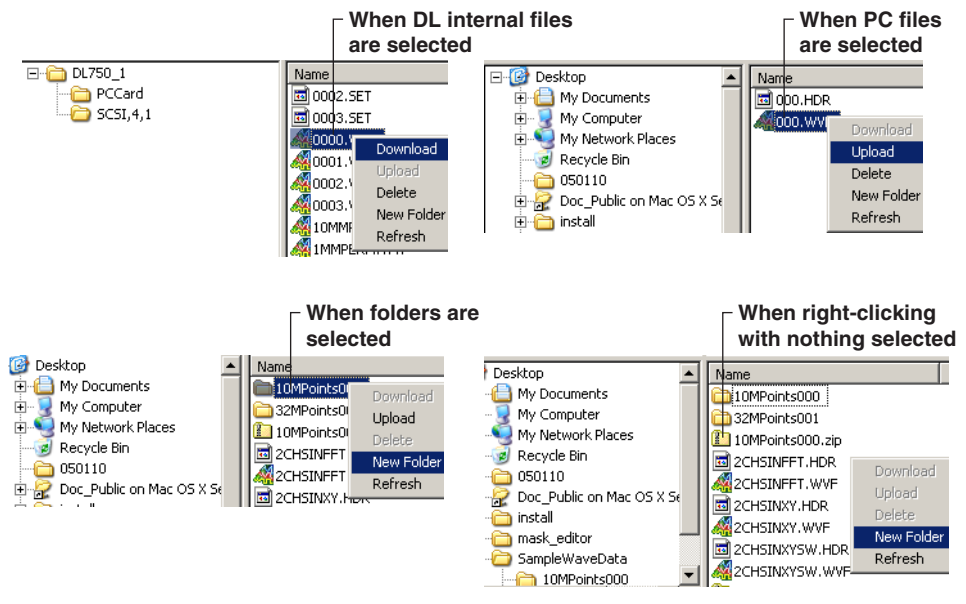
**Cautions to Observe When Transferring a Waveform Data File**

A WVF-format waveform data file (\*.wvf) cannot be opened unless there is an .hdr file with the same name in the same folder. Therefore, when transferring a WVF-format file, be careful to also transfer the corresponding .hdr file.

**Note**

Right click the files selected to be manipulated, and select one of the following from the shortcut menu.

- Download: Available when DL internal files or folders are selected
- Upload: Available when PC files or folders are selected
- Delete: Available when a file is selected
- Create folder: Available whether a file, folder, or nothing is selected
- Update to Latest Information: Available whether a file, folder, or nothing is selected



# 7.4 Operating DL Series Instruments from a PC (Other than the DL9000 Series)

## Operations

### Displaying the Control Screen

Click the **DL Control** button on the **Xviewer tool bar** to display the **Communication Setting** dialog box. If you then select the required DL unit and then click the **Connect** button, a connection with the DL is established and the control screen (an image of the front panel) appears.

### Note

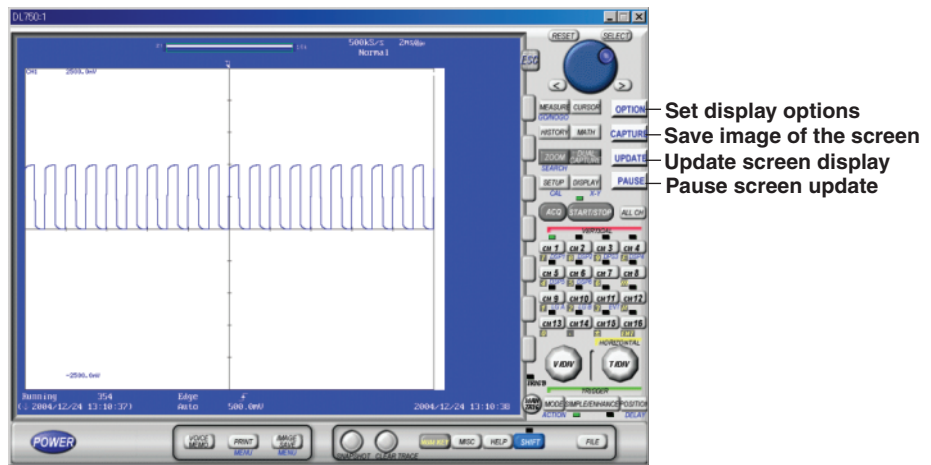
- If a connection has already been established with the required DL unit, the **Communication Setting** dialog box does not appear and the control screen appears immediately.
- When you click the **Open DL** button to display a list of files on the DL unit, the **DL Control** button is grayed out.

### Controlling the Update of the Display

Click the **UPDATE** button on the control screen to forcibly update the control screen display. If you click the **PAUSE** button, the update of the control screen is stopped temporarily. Clicking the **PAUSE** button again restarts the update of the screen display.

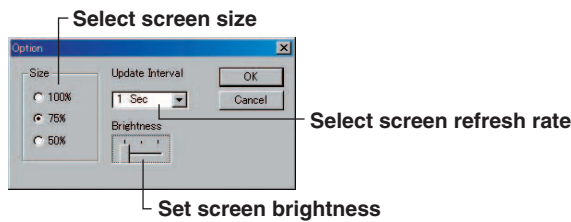
### Operation of the Control Screen

The control screen allows you to operate or control a DL unit using the PC's mouse or keyboard.



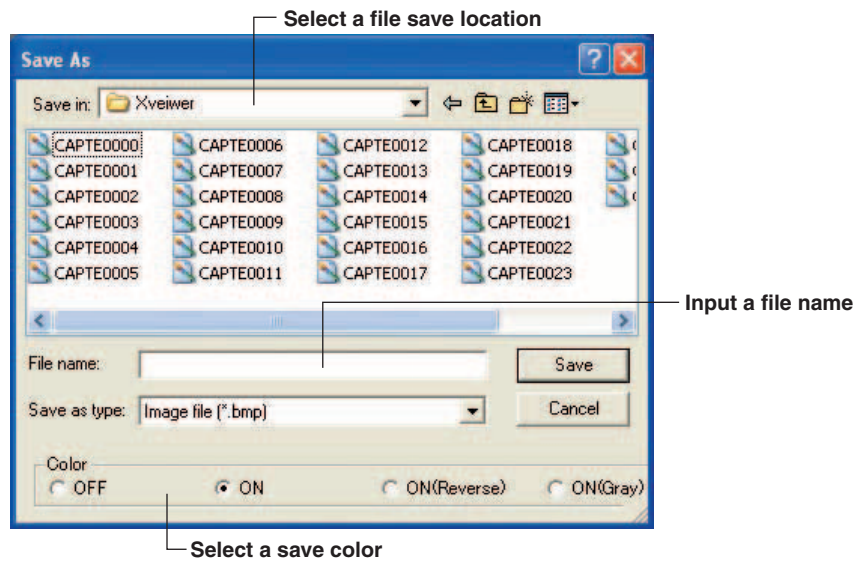
### Setting Screen Display Options

Click the **OPTION** button on the control screen to display the **Option** dialog box. Set the control screen display size, the refresh rate, and display brightness, and then click the **OK** button.



### Saving an Image of the Screen

Click the **CAPTURE** button on the control screen to display the file save dialog box. Select the folder into which you want to save the file, specify the file name, select a save color and then click the **OK** button.



### Note

Press the SHIFT key (keyboard) and click the CAPTURE button (control screen) to copy the screen to the clipboard.

## Explanation

### Option Settings

The following settings can be made for the screen display options.

- Display size (**Size**) : Select **100%**, **75%**, or **50%**
- Display refresh rate (**Update Interval**) : Select **1 sec**, **2 sec**, **5 sec**, **10 sec**, **30 sec**, **1 Min**, **5 Min**, **10 Min**, **20 Min**, **30 Min**, **1 hr**, or **Minimum**
- Brightness (**Brightness**) : Adjust using the slide bar

### Note

- Depending on the network transmission method or the communications load, the actual display refresh rate may be slower than the set value.
- When you select **Minimum** for the screen refresh rate, the fastest possible refresh rate for your environment is set automatically. Note that if the connection to the DL unit is made via a network, the network load may affect the refresh rate.

### Using the Display Update Button

- The **UPDATE** button is used to forcibly refresh the display when, for example, a slow refresh rate has been set or refresh has been temporarily stopped (when the **PAUSE** button is available).
- The **PAUSE** button is used to temporarily stop refresh when the ON/OFF settings of many items must be changed, values must be entered using the keyboard, or when better system response is needed.

### Screen Image Save Format

When you click the **CAPTURE** button to save a screen image, an image of the currently displayed screen is saved as a BMP-format file.

**Screen Image Save Color**

When you save a screen image, you can select and of the following colors.

- **OFF** : Screen image is saved in monochrome
- **ON** : Screen image colors are saved as is
- **ON (Reverse)** : Other than the channel colors are saved in monochrome
- **ON (Gray)** : Other than monochrome colors are saved as grays

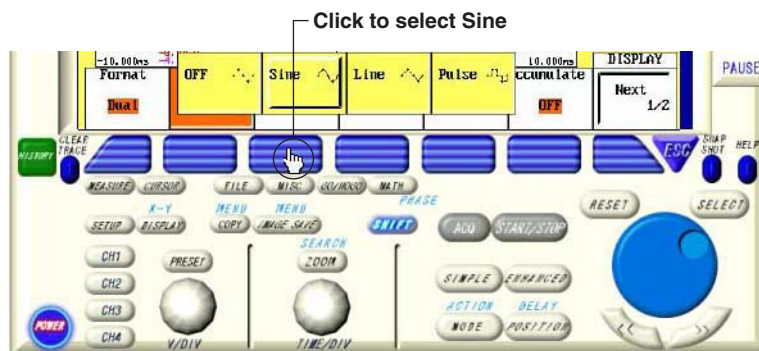
**Using the Mouse**

If you position the mouse cursor to a control key or knob on the control screen, the mouse pointer (icon) changes, indicating that that key or knob on the screen can be operated. The displayed icon and the action of the mouse changes depending on where on the control screen it is positioned.

Mouse Pointer Position	Displayed Icon & Mouse Action	Setting Operation
Operation key	Click	Same as pressing an operation key
Soft key menu or dialog box	Click Wheel	Same as pressing a soft key or a button Same as turning the jog shuttle
Voltage axis information display area	Click Wheel	Same as pressing a channel key Same as turning the V/DIV knob
Time axis information display area	Click Wheel	Same as turning the T/DIV knob
Jog shuttle left- and right-hand areas	Click Wheel	Same as turning the jog shuttle to the left of the right Same as turning the jog shuttle
V/DIV knob left- and right-hand areas	Click Wheel	Same as turning the V/DIV knob to the left or the right Same as turning the V/DIV knob
T/DIV knob left- and right-hand areas	Click Wheel	Same as turning the T/DIV knob to the left or the right Same as turning the T/DIV knob

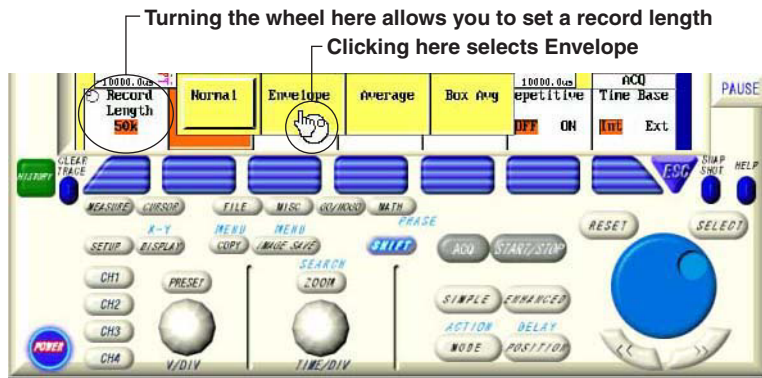
**Example of Using the Control Screen**

**Using the Operation Keys**

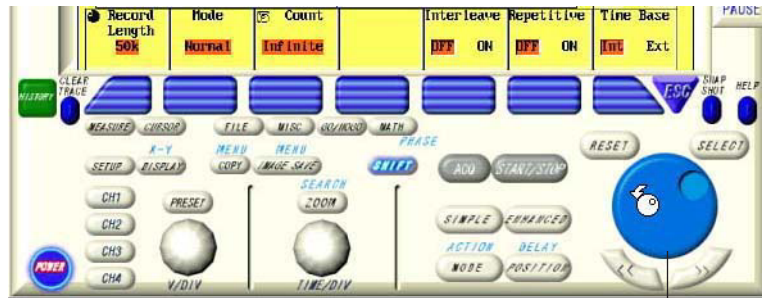




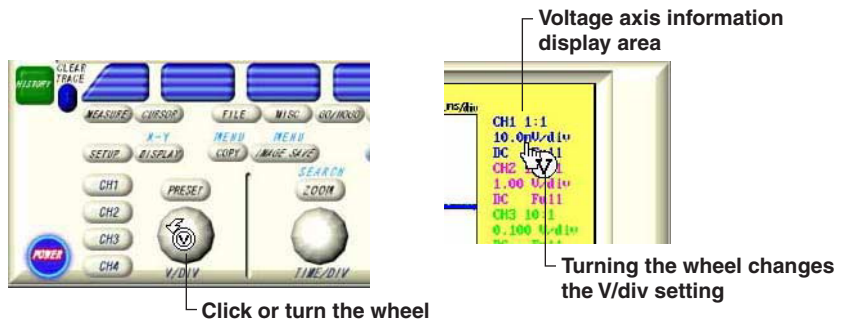
Soft Key Menu Operation



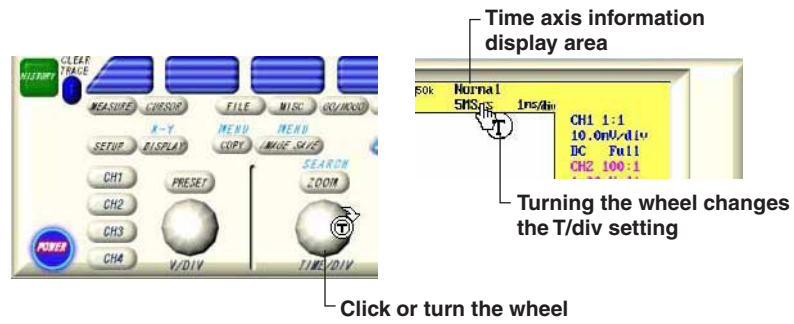
Jog Shuttle Operation



V/DIV Knob Operation

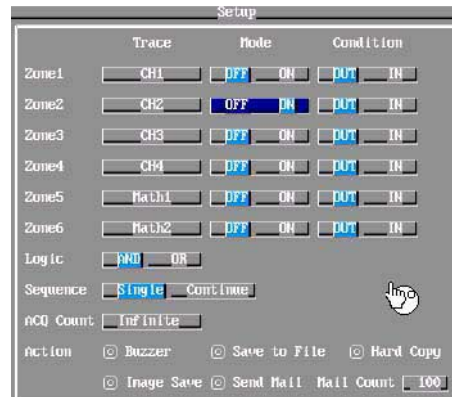


T/DIV Knob Operation



Dialog Box Operation

- Position the mouse cursor to the item you want to turn ON: Click the **jog shuttle** or turn the wheel
- ON/OFF setting: Click **SELECT** or click the item directly, as shown below



## 7.5 Operating DL9000 Series Instruments from a PC

### Operations

#### Displaying the Control Screen

Click the **DL Control** button on the **Xviewer tool bar** to display the **Communication Setting** dialog box. If you then select the required DL9000 unit and then click the **Connect** button, a connection with the DL9000 is established and the control screen (an image of the front panel) appears.

#### Note

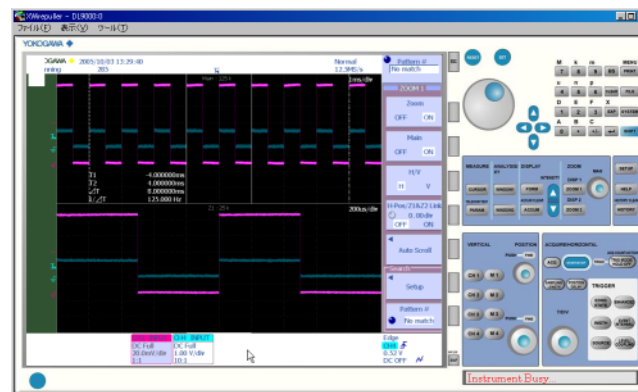
- If a connection has already been established with the required DL unit, the **Communication Setting** dialog box does not appear and the control screen appears immediately.
- When you click the **Open DL** button to display a list of files on the DL unit, the **DL Control** button is grayed out.

#### Controlling the Update of the Display

Choose **Menu > View > Update** in the control screen to force an update of the control screen. Choose **Menu > View > Pause** to pause updating of the control screen. To restart display updating, choose **View > Pause** again.

#### Operation of the Control Screen

The control screen allows you to operate or control a DL unit using the PC's mouse or keyboard.

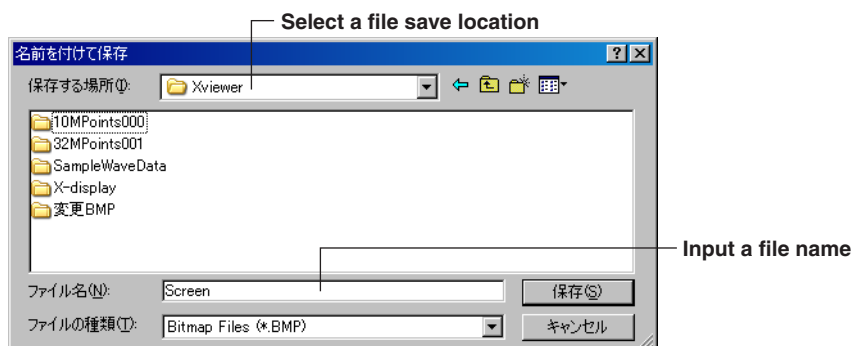


#### Screen Display Size

Choose **Menu > View > Zoom > Smaller**, **Standard**, or **Larger**. The control screen changes to the selected size.

### Saving an Image of the Screen

Choose **Menu > File > Save > Image** in the control screen to display the file save dialog box. Select the folder into which you want to save the file, specify the file name and then click the **OK** button.



### Note

If you hold down the ctrl key and right click in the control screen, you can select from the following settings menu.

- Save > Image
- Zoom > Smaller, Standard, Larger
- Pause
- Update
- Options

## Explanation

### Screen Display Size

You can select the zone from below.

Smaller, standard, larger

### Display Update Interval

You can select the zone from below.

300 ms, 500 ms, 1 s, 2 s, 5 s, 10 s

### Note

Depending on the network transmission method or the communications load, the actual display update interval may be slower than the set value.

### Display Update Operation Control





- Forced updating is used when setting a slow display update rate or when pausing display updating (by choosing Menu > View and selecting Pause).
- Pause is used to improve the response when turning many items ON/OFF at once, or when entering numerical and other values with the keyboard.

### Screen Image Save Format

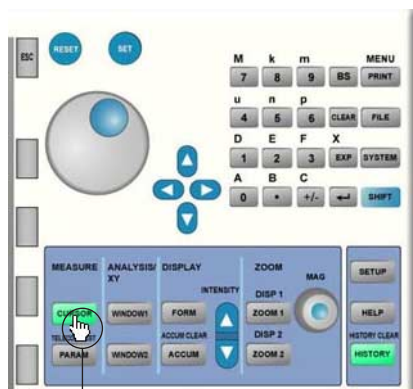
An image of the currently displayed screen is saved as a BMP-format file.

**Using the Mouse**

If you position the mouse cursor to a control key or knob on the control screen, the mouse pointer (icon) changes, indicating that that key or knob on the screen can be operated. The displayed icon and the action of the mouse changes depending on where on the control screen it is positioned.

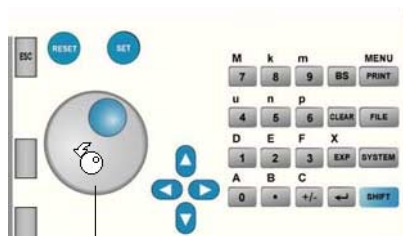
Mouse Pointer Position	Displayed Icon & Mouse Action	Setting Operation
Operation key	 Click	Same as pressing an operation key
Rotary-knob left- and right-hand areas	 Click Wheel	Same as turning the rotary knob to the left of the right Same as turning the rotary knob
Center of POSITION, SCALE knob	 Click Wheel	Same as pushing the POSITION knob or SCALE knob
POSITION, SCALE, T/DIV, and MAG knob left- and right-hand areas	 Click Wheel	Same as turning the POSITION, SCALE, T/DIV, and MAG knob to the left or the right Same as turning the POSITION, SCALE, T/DIV, and MAG knob

**Example of Using the Control Screen Using the Operation Keys**



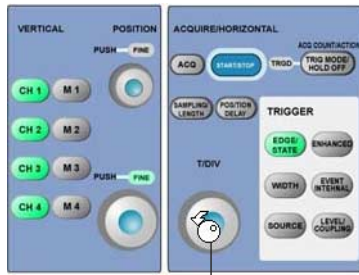
Click to display the cursor menu.

**Rotary Knob Operation**



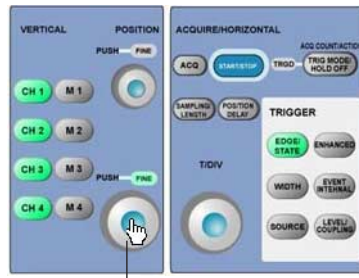
Click or turn the wheel

### T/DIV Knob Operation



Click or turn the wheel

### SCALE Knob Pushing Operation



Click

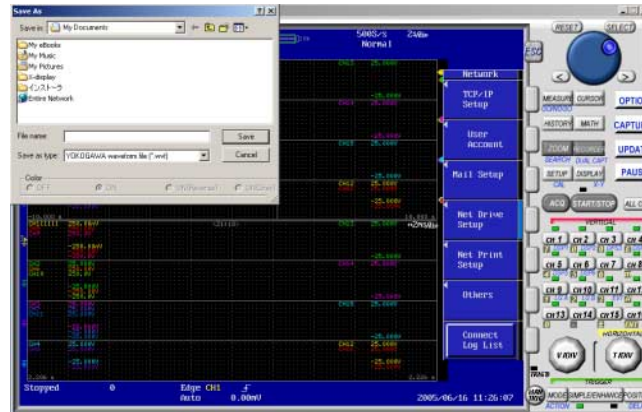
## 7.6 Downloading DL Series Waveform Data

### Operation

Click the **ACQ save** button on the Xviewer toolbar. A control screen and file save dialog box open. If the connection with the DL is not established, the Communication Setting dialog box opens. Establish a connection with the DL according to the operations given in section 7.1.

### Saving the Waveform Data

Set the destination and file name and click the OK button. The extension is .wvf.



### Explanation

Waveform data can be downloaded (saved) to the PC.

Click the **CAPTURE** button on the control screen to display the file save dialog box. Set Save as type to \*.wvf, specify the file name, and select Save to download (save) the waveform data.

### Waveforms That Are Saved

All waveforms including computed waveforms displayed on the control screen are saved. However, if multiple history waveforms are displayed with the history memory function, only the waveform selected with Select Record is saved.

### Applicable Models

- DL750 series (firmware version 6.01 or later)
- DL1600 series (firmware version 1.30 or later)
- DL1700E series (software version 2.11 or later)
- DL7400 series (software version 2.11 or later)

### Note

- If the data compression setting of the DL series (P-P Comp, Decim, etc.) is ON, turn data compression OFF before saving the waveform data.
- On the DL1600 series, waveform data cannot be downloaded if the record length is greater than or equal to 8 MW.
- When multiple history waveforms are displayed, the DL series settings are changed when downloading is executed as follows:  
DL750 series and DL7400 series: HISTORY > DisplayMode > One  
DL1600 series and DL1700E series: HISTORY > Display > One
- Sub waveforms acquired using the dual capture function on the DL750 are not saved.

## 8.1 Troubleshooting

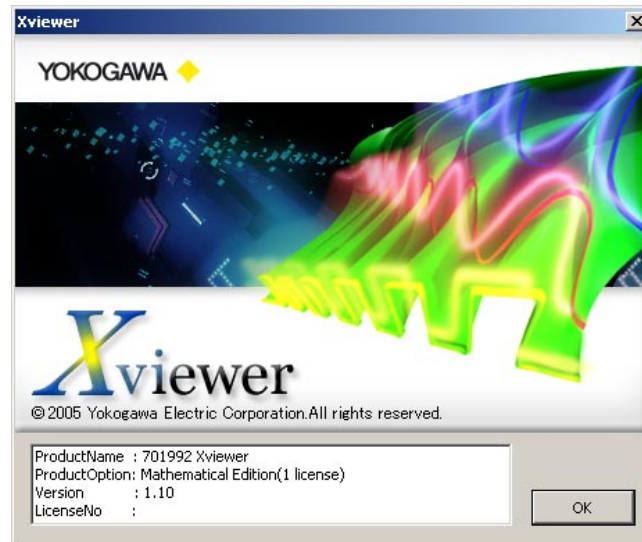
Problem	Probable Cause/Corrective Action
Xviewer cannot communicate with the DL7400 series/DL750 series/DL1700E series/DL1600 series.	<p>The GP-IB or USB interface cable is incorrectly connected. Connect the cable correctly.</p> <p>The address specified for the GP-IB interface is incorrect.</p> <p>The ID specified for the USB interface is incorrect.</p> <p>No USB driver has been installed.</p>
A file cannot be opened.	<p>A .hdr file having the same name as the file you are trying to open is not present in the same folder. Place the header file in the folder.</p> <p>The file is not of a type that the DL series Xviewer can handle.</p>
A trace name is incorrectly displayed.	<p>If a trace name includes a space, it may not appear correctly.</p>
A voice memo cannot be played back.	<p>Your PC does not support audio playback. Use Xviewer on a PC with sound capabilities.</p>
Files saved with real time recording on the DL750 series cannot be loaded.	<p>The installed DL750.dll may not be of the latest version. Install the latest version of DL750.dll.</p>
Comments in files saved on the DL750 series are not displayed.	<p>DL750.dll does not exist in the folder in which Xviewer is installed, or an old version of DL750.dll exists. Install the latest version of DL750.dll.</p>
The Yokogawa web site is inaccessible.	<p>Your PC is connected with the Internet.</p>
A message stating "Insufficient memory. Terminate any unnecessary applications." appears.	<p>There is insufficient memory. Reduce the number of waveforms to be loaded, or terminate another application.</p>



## 8.2 Viewing Version Information


### Operations

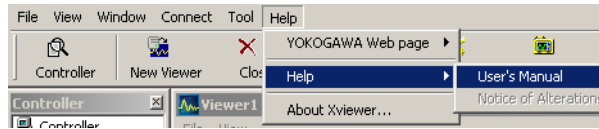
Select **Help > About Xviewer**. The version of Xviewer you are currently using is displayed.



## 8.3 Starting Online Help

### Operations

Click  or choose **Help > Help > User's manual** on the tool bar. If Acrobat Reader is installed in the PC, it launches, and a pdf file of this instrument's user's manual is displayed.



### Explanation

#### Online Help

You can display a pdf file of this instrument's user's manual. If a notice of alteration has been made, you can display a pdf of the notice by choosing Help > Help > Notice of Alteration from the tool bar.

#### Displaying the Latest User's Manual/Notice of Alteration

If you copy the following pdf files to the installation folder specified in step 7 on page ix, you can display the latest user's manual and notice of alteration in the online help.

- File name of the latest user's manual: IM701992E.pdf
- File name of the latest notice of alteration: AlterationsE.pdf

You can download the latest versions of the user's manual and notice of alterations from the following Web site under **Download Version Upgrade Program > Procedure (User's Manual & Notice of Alteration)**.

<http://www.yokogawa.co.jp/tm/Bu/701992/>

#### Note

Adobe Reader by Adobe Systems is required to open PDF files. You can download Adobe Reader from the following Web page.

<http://www.adobe.com/products/acrobat/readstep2.html>

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## 8.4 Visiting the Yokogawa Electric Web Page

### *Operations*

Select **Help > YOKOGAWA Web Page > Test & Measurement**, or **Help > YOKOGAWA Web Page > Xviewer** to access our web page.



### *Explanation*

When your PC is connected to the Internet, you can visit our web page.

Test & Measurement: Displays our Test & Measurement top page.

Xviewer: Displays the Xviewer page.

# Index

<b>A</b>	<b>Page</b>
Add Annotation .....	4-19
Analysis Mode .....	4-5
Analyzing .....	vi
Annotation .....	4-19
Applicable Model .....	xii
ASCII Format .....	5-2

<b>B</b>	<b>Page</b>
Binary Format .....	5-1

<b>C</b>	<b>Page</b>
Channel Setting .....	3-2
Clipboard .....	4-21
Closing Xviewer .....	1-1
Color .....	3-9
comment .....	2-2
Communication Setting .....	7-1
Connecting to the DL Series .....	7-1
Control Screen .....	7-9, 7-14
Controller window .....	1-2
Convert to CSV .....	5-9
Converting .....	5-9
Cursor .....	4-2

<b>D</b>	<b>Page</b>
Display Setting .....	3-8, 5-8
Displaying Waveforms in a Zoomed View .....	2-6
Displaying Waveforms in the History View .....	2-8
Download .....	7-6

<b>E</b>	<b>Page</b>
Example of Using the Control Screen .....	7-11, 7-16

<b>F</b>	<b>Page</b>
FFT Setting .....	4-9
File List .....	7-4
File Types Supported .....	xii
Filter .....	4-9

<b>G</b>	<b>Page</b>
Gaticule .....	3-8

<b>H</b>	<b>Page</b>
History waveform display window .....	1-3
History Window .....	2-8
Horizontal Axis .....	3-8

<b>I</b>	<b>Page</b>
Image File .....	5-6
Installing .....	ix

<b>L</b>	<b>Page</b>
Loading Display Settings .....	3-1
Loading Waveform Data .....	2-1

<b>M</b>	<b>Page</b>
Main waveform display window .....	1-3
Main Window .....	2-5
Math Setting .....	4-8
Measure Result .....	4-1
Measure Waveform Parameter .....	4-5
Measurement result display window .....	1-3
Moving a Waveform .....	2-11

<b>N</b>	<b>Page</b>
Next Group/Previous Group .....	2-14
Notational Format .....	3-3
Number of points .....	2-5
Number of the group .....	2-5

<b>P</b>	<b>Page</b>
Package Contents .....	vii
Precautions .....	viii

<b>R</b>	<b>Page</b>
Record length .....	2-5
Remote Control .....	vi

<b>S</b>	<b>Page</b>
Save .....	5-1
Scale .....	3-2
Scale values .....	2-5
Sequentially Numbered Files .....	2-4
Setting info .....	5-8
Setting Up a Printer .....	6-1
Setting Up the Print Format .....	6-2
Show or Hide .....	3-2
Split .....	2-13
Split Setting .....	3-7
Split Settings .....	3-7
Splitting Waveforms by a Trace .....	2-13
Starting Xviewer .....	1-1
Switching between Groups .....	2-14
System Environment .....	vii

<b>T</b>	<b>Page</b>
Trace name .....	2-5
Transferring .....	5-5
Transferring Files .....	vi
Transferring into Excel .....	5-5
Trigger position .....	2-5
Trigger time .....	2-5

## Index

---

<b>U</b>	<b>Page</b>
Uninstalling .....	xi
Upload .....	7-6

<b>V</b>	<b>Page</b>
Version .....	8-2
Viewer .....	2-3
Viewer window .....	1-2
Viewing Data .....	vi
Viewing Files .....	vi
Viewing waveform data .....	2-1
voice memo .....	2-2

<b>W</b>	<b>Page</b>
Waveform Color .....	3-2
Waveform Parameter .....	4-5
Waveform Vertical Move .....	2-11
Waveform Vertical Zoom .....	2-11
Waveforms in the Computation View .....	4-8
Web Page .....	8-4

<b>X</b>	<b>Page</b>
X-Y waveform display window .....	1-3
X-Y Window .....	2-10
XLS Format .....	5-3
Xviewer toolbar .....	1-2

<b>Z</b>	<b>Page</b>
Zoom Factor .....	2-6
Zoom waveform display window .....	1-3
Zoom Window .....	2-6
Zoomed-In Section .....	2-6
Zooming Waveforms .....	2-11