HIOKI

9725

Instruction Manual

MEMORY HiVIEWER

EN

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Contents

Introduction

Thank you for purchasing the HIOKI “Model 9725 Memory HiViewer." To obtain maximum performance from the software, please read this manual carefully, and keep it handy for future reference.

The 9725 Memory HiViewer is a PC program for use with the Models 8860, 8861, 8860-50, and 8861-50 Memory HiCorders.
The 9725 Memory HiViewer is afterwards referred to as the program.
Also, the Models 8860, 8861, 8860-50, and 8861-50 Memory HiCorders are afterwards referred to as the instrument.

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Confirming Package Contents and Handling the CD

When you receive the software, inspect it carefully to ensure that no damage occurred during shipping. If damage is evident, or if it fails to operate according to the specifications, contact your dealer or Hioki representative.

9725 Memory HiViewer Program Software (CD)

Instruction Manual

⚠CAUTION

CD Handling Precautions

Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

- Always hold the disc by the edges, so as not to make fingerprints on the disc or scratch the printing.
- Never touch the recorded side of the disc. Do not place the disc directly on anything hard.
- Do not wet the disc with volatile alcohol or water, as there is a possibility of the label printing disappearing.
- To write on the disc label surface, use a spirit-based felt pen. Do not use a ball-point pen or hard-tipped pen, because there is a danger of scratching the surface and corrupting the data. Do not use adhesive labels.
- Do not expose the disc directly to the sun's rays, or keep it in conditions of high temperature or humidity, as there is a danger of warping, with consequent loss of data.
- To remove dirt, dust, or fingerprints from the disc, wipe with a dry cloth, or use a CD cleaner. Always wipe radially from the inside to the outside, and do no wipe with circular movements. Never use abrasives or solvent cleaners.
- Hioki shall not be held liable for any problems with a computer system that arises from the use of this CD, or for any problem related to the purchase of a Hioki product.

Symbols and Terminology

The following symbols in this manual indicate the relative importance of cautions and warnings.

Symbols

⚠CAUTION	Indicates that incorrect operation presents a possibility of injury to the user or damage to the instrument.
NOTE	Indicates advisory items related to performance or correct operation of the instrument.

(⇒ p.)	Indicates the location of reference information.
*	Indicates that descriptive information is provided below.
MEM	Indicates Memory function support.
REC	Indicates Recorder function support.
REC&MEM	Indicates REC&MEM function support.
FFT	Indicates FFT function support.
REALTIME	Indicates Real-time saving function support.

Mouse Operation Terminology

Click	Press and quickly release the left button of the mouse.
Right-click	Press and quickly release the right button of the mouse.
Double click	Quickly click the left button of the mouse twice.
Drag	While holding down the left button of the mouse, move the mouse and then release the left button to deposit the chosen item in the desired position.
Activate	Click on a window on the screen to activate that window.

Other Terminology

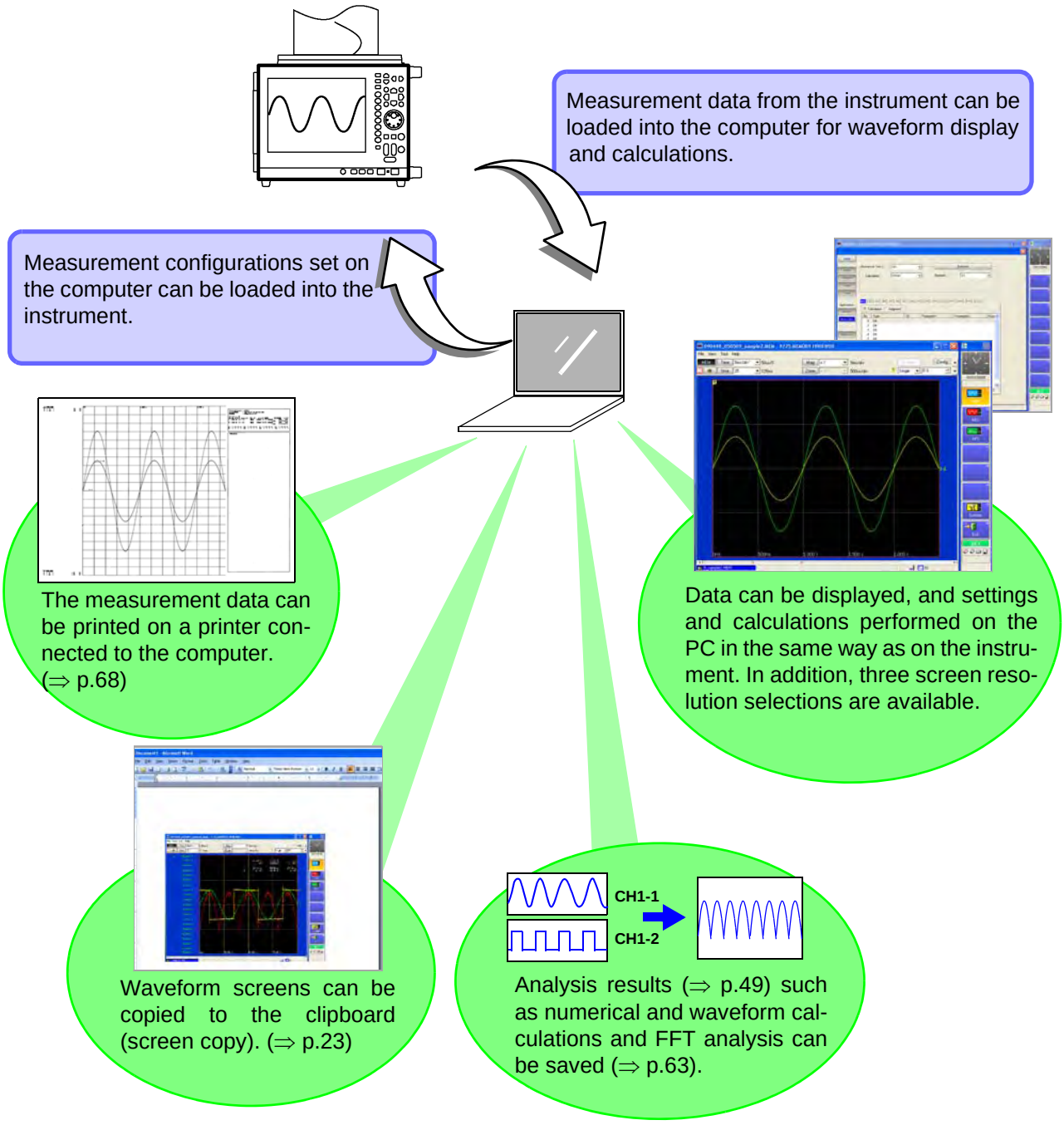
- Unless otherwise specified, "Windows" represents Windows 2000, Windows XP, Windows Vista, Windows 7 or Windows 8.
- Dialog box represents a Windows dialog box.
- Menus, dialogs, buttons in a dialog, and other names on the screen are indicated in brackets.
- Example: [File]-[Open] indicates that you should click [File] in the menu bar, and then click [Open] in the displayed pull-down menu.
- Example: Channel -[All Ch] page indicates that you should click the [Channel] menu item on the Settings screen, then click the "[All Ch]" page.

Overview

Product Overview and Features

The 9725 Memory HiViewer program enables a personal computer to handle measurement and settings data from the instrument. When data is saved to a shared folder on the computer and no removable media such as a PC Card is present in the instrument, files can be read from both the instrument and the PC.

The 9725 Memory HiViewer offer the following kinds of functions.



Operational and Functional Differences between the 9725 Memory HiViewer and the 8860 Series

On-screen operating and setting procedures are almost the same as on the instrument.
Refer to the instrument's *Instruction Manual* for setting procedure details.
The operational and functional difference between the program and the instrument are described below.

File Operation Differences

File operations on the instrument are performed on the File screen, while with the 9725 Memory HiViewer they are performed using Windows Explorer.

System Settings and Setting Screen Item Differences

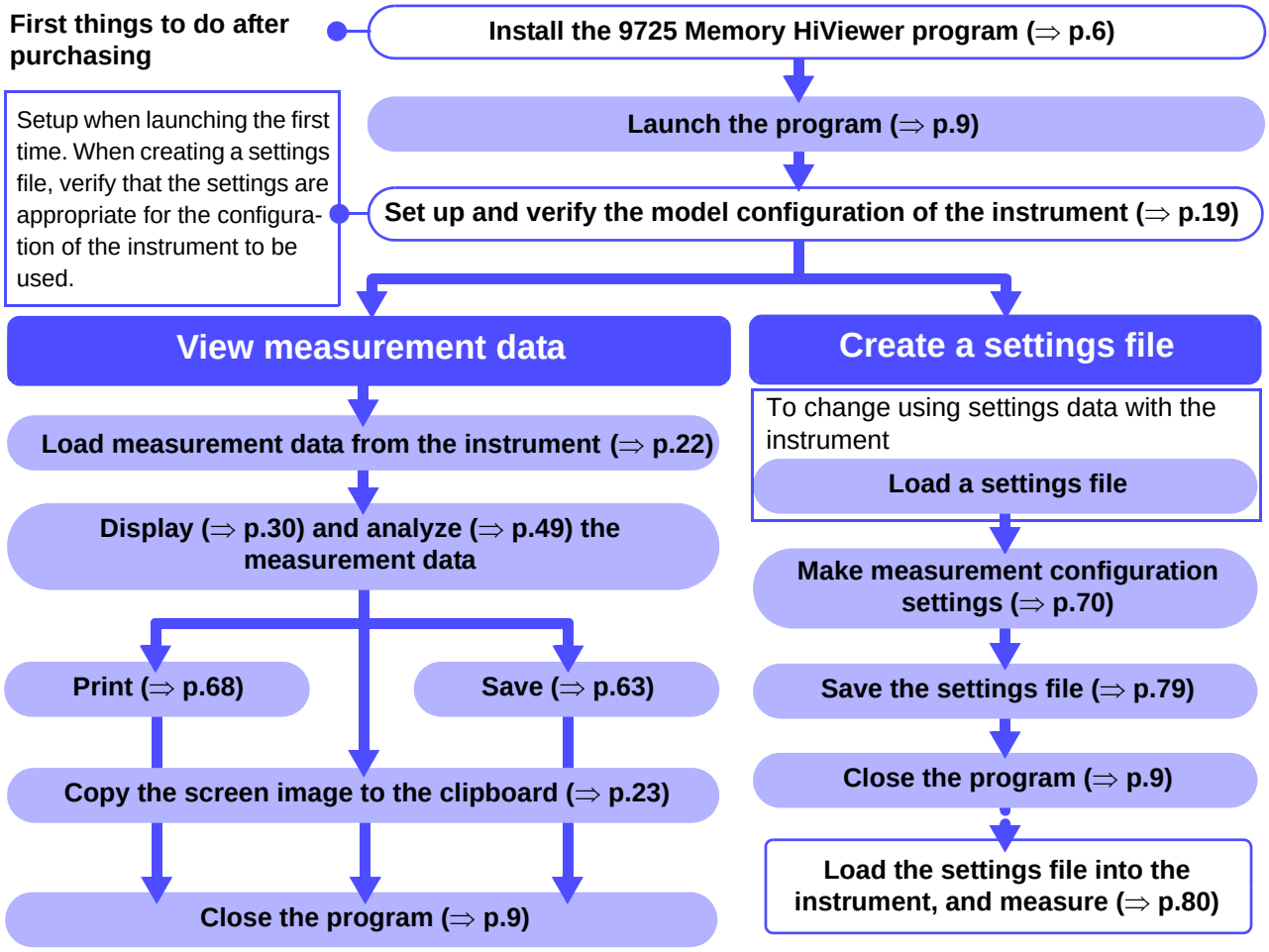
The Communication Settings, External Terminal Settings and Setting Configuration screens in the System Settings are not available in the program.
In addition, some setting items on each setting screen are not displayed in the program.

Measurement Function

The following functions used for actual measurements are not available in the program.

- Input level monitor function
- Auto adjustment function
- Manual trigger
- Offset cancellation
- Zero adjustment
- Auto-balance

Operation Flowchart



Hardware and OS Requirements (System Configuration)

The 9725 Memory HiViewer requires the following hardware and software. Please verify your system configuration.

Computer	IBM PC/AT compatible A 500 MHz or faster Pentium III (2 GHz or faster Pentium 4 recommended) At least 256 MB RAM (512 MB or more recommended) At least 8 GB available hard disk space
OS	Microsoft Windows 2000, Windows XP, Windows Vista, Windows 7 or Windows 8
CD-ROM drive	used for installation
Display	At least 1024 × 768 resolution with at least 16-bit color depth Small fonts should be used (large fonts may not display properly)

NOTE Adequate hard disk space is required for loading large waveform files. Be sure to provide sufficient hard disk space for the volume of data you expect to handle.

Installing the 9725 Memory HiViewer Program

Install the program by the following procedure.

Example: Installing on Windows XP
Note: screen messages may differ slightly depending on the operating system.

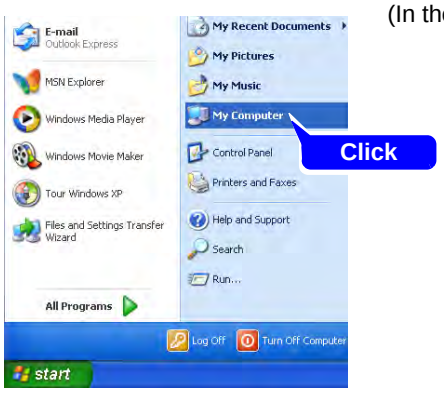
Installation may be prevented when programs such as virus protection software are running. In this case, close such programs before beginning installation.

1 Boot Windows.

Close all running programs.

2 Insert the program CD into the CD-ROM drive.

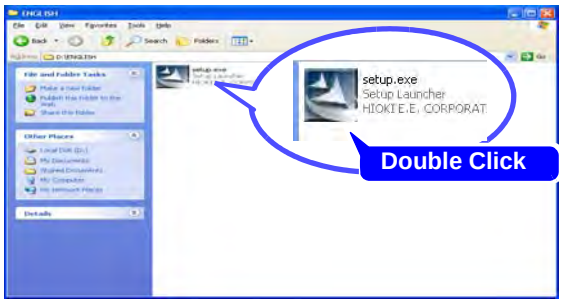
3 From the Start menu, click My Computer and select the CD drive to display the contents of the CD.



(In the following example, you would double click drive F:)

The contents of the CD are displayed when you double click.

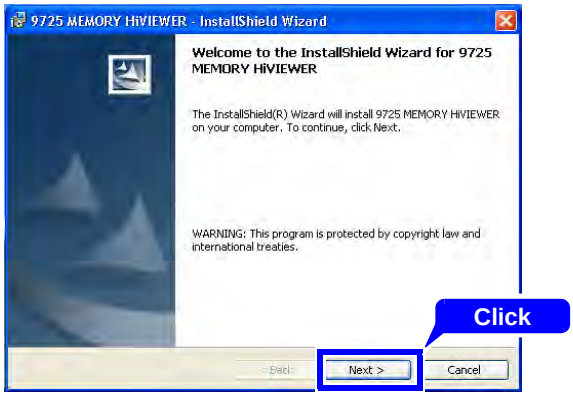
4 In the ENGLISH folder, double click setup.exe (the extension may not be displayed) to start the installer.



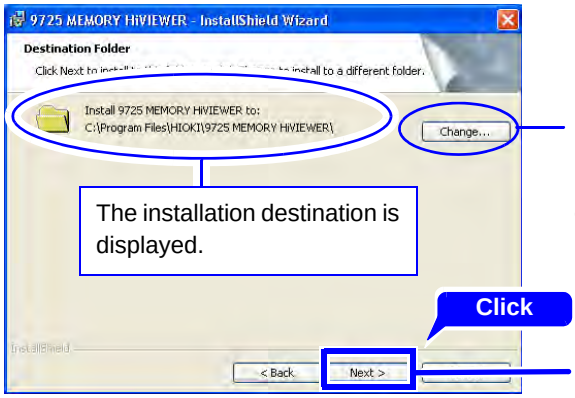
The installer starts when you double click.

(\ENGLISH\setup.exe)

5 In the installer, click [Next] and confirm the installation destination.



[Next]



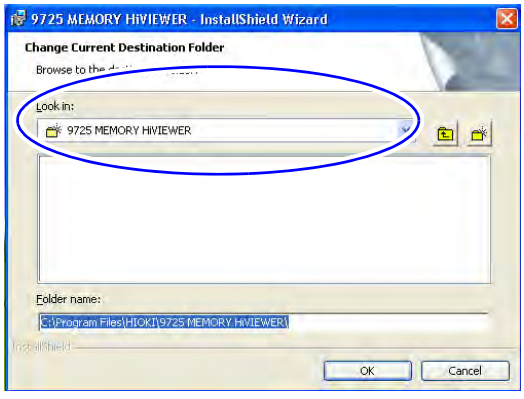
[Next]

The installation destination folder can be changed on this screen.

To change the installation destination, click **[Change]** to select another folder. There is normally no need to change it.

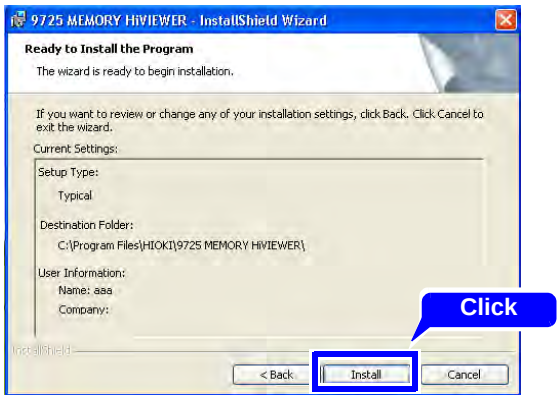
If you are not changing the installation destination, click **[Next]**.

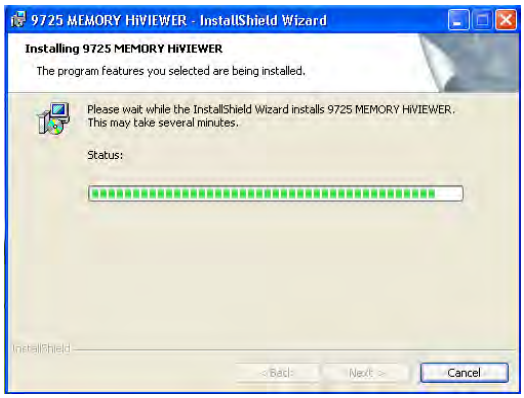
To change the installation destination



Select the installation folder in the **[Look in]** field.

6 Click [Install] to start installing.

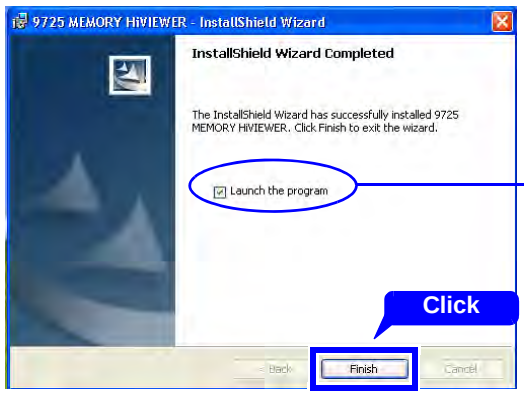




Installation starts.

Progress is displayed during installation.

To interrupt installation in progress, click [Cancel].



To have the program launch automatically when installation finishes, select [Launch the program].

Click [Finish] to finish installation.

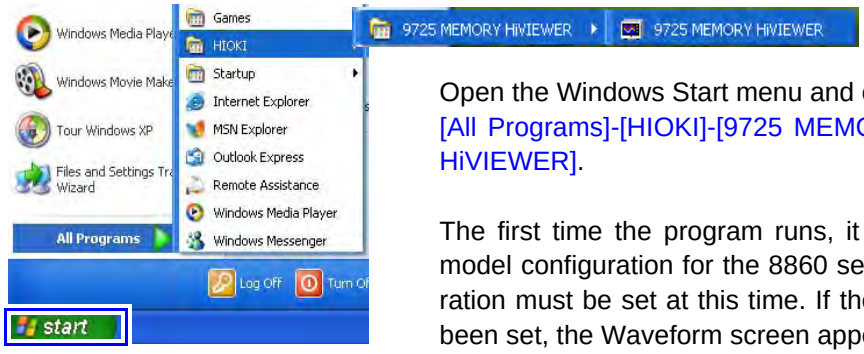
Installation finished

7 Remove the CD from the CD-ROM drive.

To uninstall the program, refer to "Uninstalling the Program"(⇒ p.81).

Starting and Closing the Program

Starting the Program



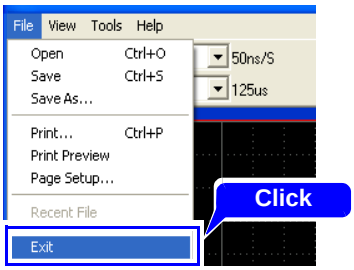
Open the Windows Start menu and click [All Programs]-[HIOKI]-[9725 MEMORY HiVIEWER]-[9725 MEMORY HiVIEWER].

The first time the program runs, it displays a screen for setting the model configuration for the 8860 series (⇒ p.19). The model configuration must be set at this time. If the model configuration has already been set, the Waveform screen appears.

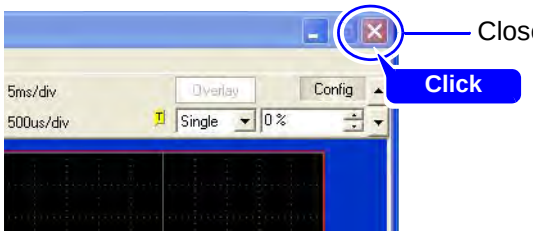
Closing the Program

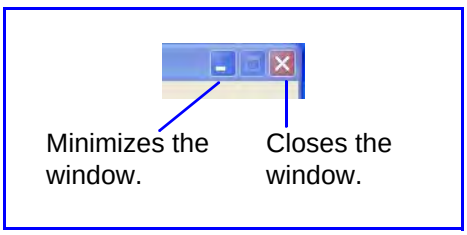
The program can be closed by any of the following methods.

Method 1: From the menu bar, click [File]-[Exit]

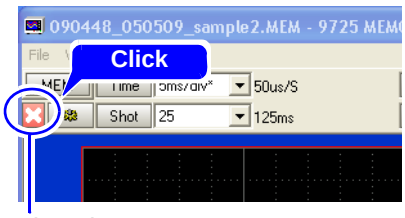


Method 2: Click the Close button at the top right corner of the window





Method 3: Click the Close button on the Waveform screen.



Close button.

Program Screens

Screen organization is almost the same as that of the instrument.
The program has three general screen types: Waveform, Settings and System screens.
The Settings and System screens each have their own settings screens selectable from the Settings menu.

Screen Organization

Waveform Screen (⇒ p.11)	Displays instrument measurement data. Memory and Recorder functions are available. To load data: "Loading Data (Waveform and Settings Files)"(⇒ p.22)		
Settings Screen (⇒ p.12)	Displays the settings screens for measurement data, such as measurement configuration, display method, calculations and other Waveform screen information.		
	Status	Status Settings Screen	Measurement configuration settings.
	Channel	Channel Settings Screen	Input channel-related settings.
	Trigger	Trigger Settings Screen	Trigger criteria settings.
	Sheet	Sheet Settings Screen	Waveform screen display-related settings.
	MemDiv	Memory Division (Mem Div) Settings Screen *	Memory Division-related settings.
	Num Calc	Numerical Calculation (Num Calc) Settings Screen *	Display-related settings for numerical calculations.
	Wave Calc	Waveform Calculation (Wave Calc) Settings Screen *	Display-related settings for waveform calculations.
	Save	Save Settings Screen	Select the data saving method.
	Print	Print Settings Screen	Select the data printing method.
System Screen (⇒ p.13)	Displays each of the System Environment settings screens.		
	Env	Environment (Env) Settings Screen	Use this screen to configure the system environment and Waveform screen layout.
	Init	Initialization (Init) Settings Screen	Initialize data.
	Config	Configuration (Config) List Screen	Displays the instrument's system configuration. No settings are available here.

* Memory function only

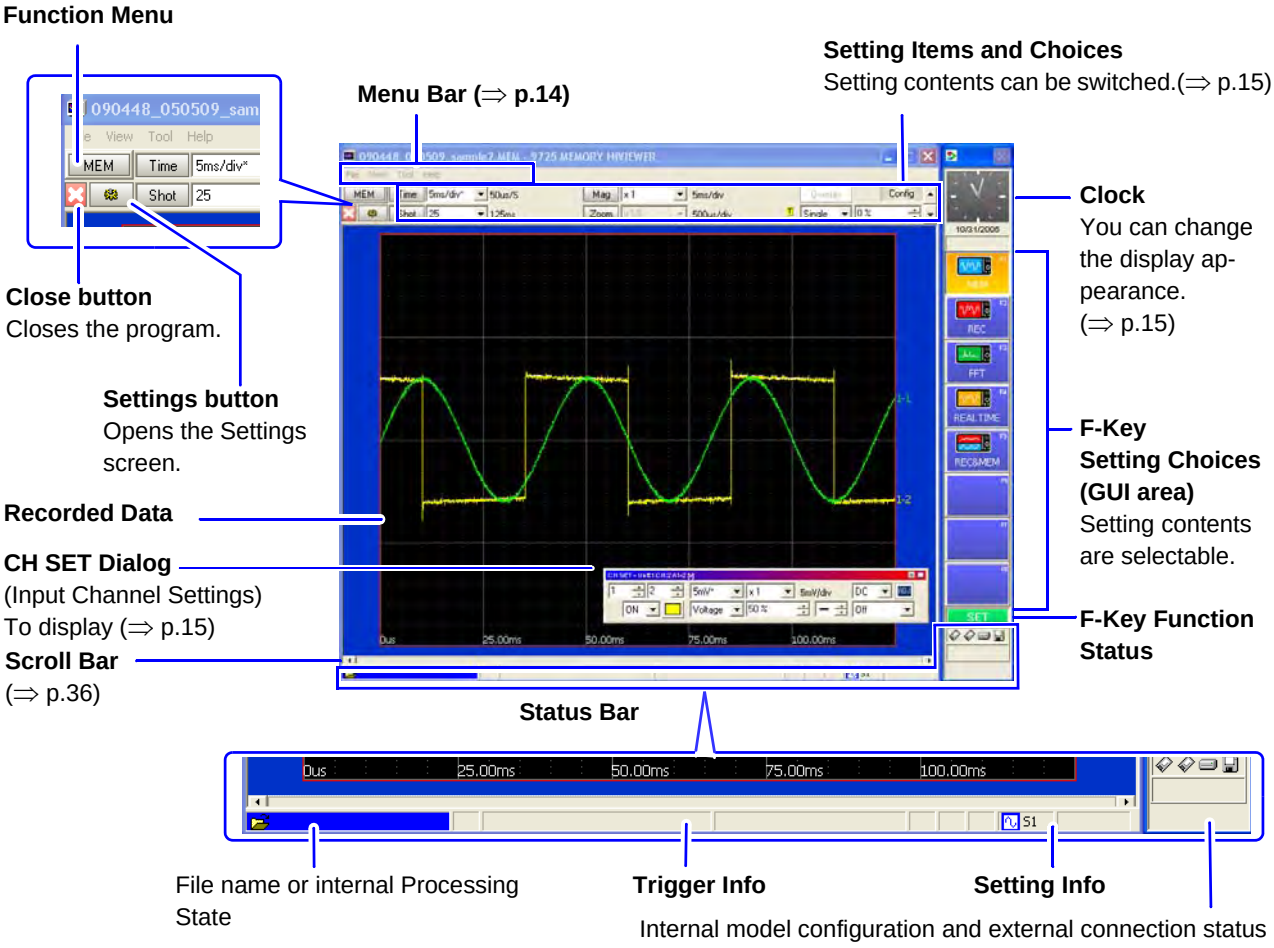
NOTE

Some of the setting screens and items displayed on the instrument are not displayed in the program. The states of non-displayed settings are retained when a settings file or measurement data is loaded by the program.
However, bear in mind that if a new settings file is created by the program and then loaded into the instrument, those screen settings and items that are not displayed in the program are set to their defaults.

Refer to the instrument's *Instruction Manual* for the setting details of each screen.
Also refer to the instrument's *Input Module Guide* for the input module settings on the Channel Settings screen.

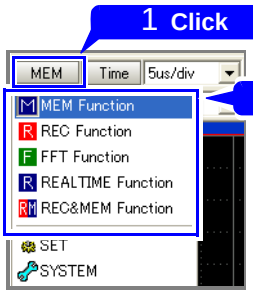
Waveform Screen

The program starts with the Waveform screen (MEM Mode: Memory Function).



Refer to "Operation-Related Displays"(⇒ p.15) for basic operations on the Waveform screen.

To switch the function

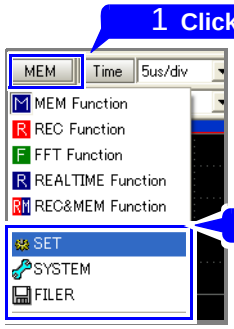


Open the Function menu.

Select a function.

- Memory Function
- Recorder Function
- FFT Function
- Real-time Function
- REC&MEM Function

To switch to another screen from the Waveform screen

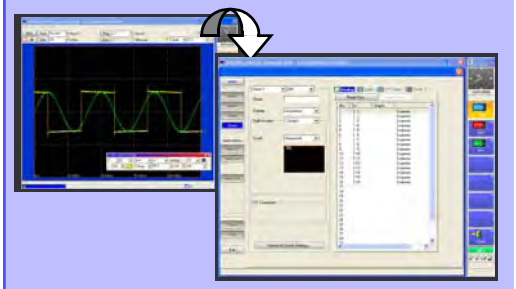


Open the Function menu.

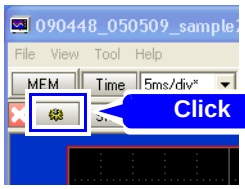
Select the screen to display.

Settings Screen

To switch to the Settings screen from the Waveform screen (Two methods are available)

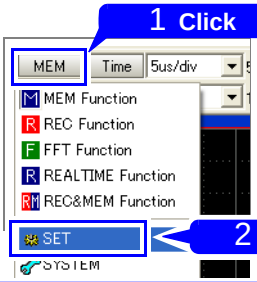


Switching with the Settings button



Click the Settings button.

Selecting from the Function menu

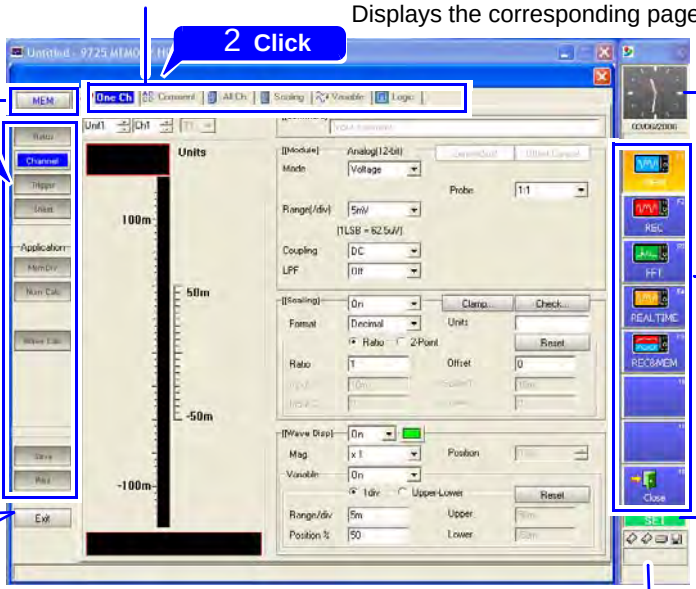


Open the Function menu.

Click **[SET]**.

Settings Screen

Page tabs (Not present on some screens. Afterwards indicated as [ ] page.)
Displays the corresponding page.



Function Menu

1 Click
Selects a menu.

Settings Menu
Clicking on a menu item displays the corresponding settings screen.

Exit
Switches back to the Waveform screen.

Example: Channel Settings Screen

Clock
You can change the display appearance. (⇒ p.15)

F-Key Setting Choices (GUI area)
Setting contents are selectable.

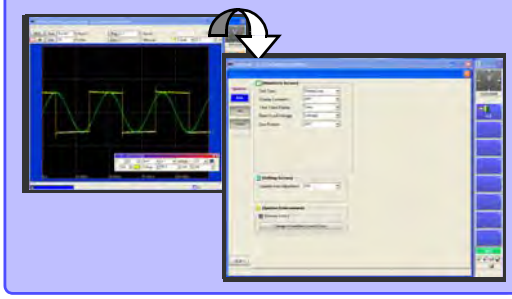
F-Key Function Status

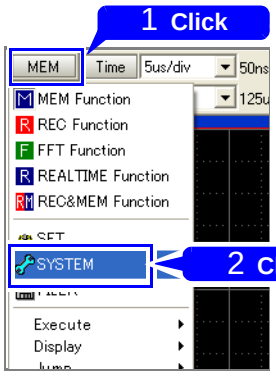
Status Bar
Internal settings according to model configuration and external connection status

Refer to "Operations on the Settings Screens"(⇒ p.17) for basic operations of the Settings screens.

System Screen

Switching from the Waveform screen to the System screen

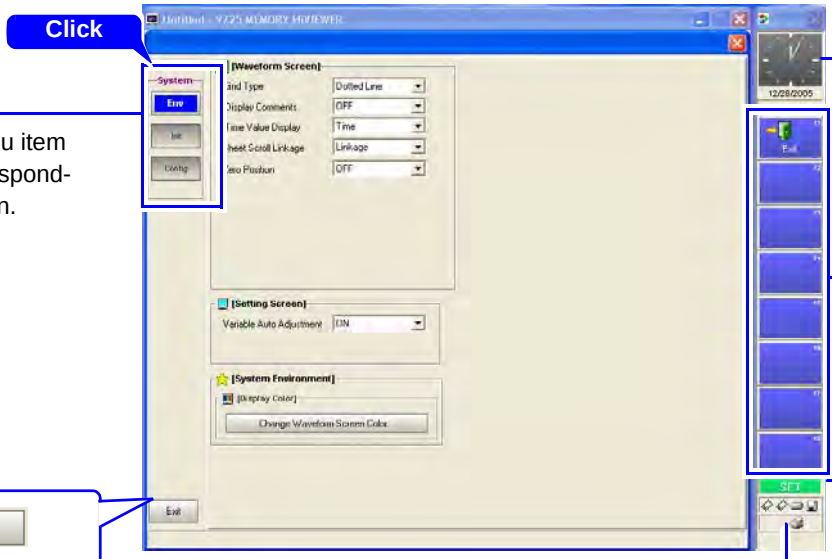




Open the Function menu.

Click **[SYSTEM]**.

System Screen



Settings Menu
Clicking on a menu item displays the corresponding settings screen.

Clock
You can change the display appearance. (⇒ p.15)

F-Key Setting Choices (GUI area)
Setting contents are selectable.

F-Key Function Status

Exit
Switches back to the Waveform screen.

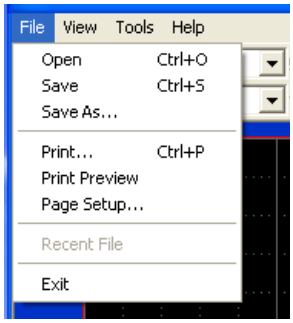
Example: Environment (Env) Settings Screen

Status Bar
Internal settings according to model configuration and external connection status.

Menu Bar Operations

[File]

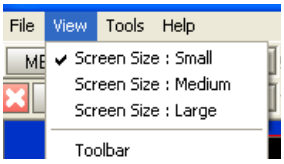
Click [File] and select from the pull-down menu.



Open	Loads a waveform or settings file.	(⇒ p.22)
Save	Saves a loaded waveform file.	(⇒ p.63)
Save As	Saves a waveform or settings file.	(⇒ p.63)
Print	Starts printing.	(⇒ p.68)
Print Preview	Displays the print preview screen.	(⇒ p.66)
Page Setup	Make print-related settings.	(⇒ p.66)
(File name)	The names of the last eight files used are retained automatically.	
Exit	Closes the program.	(⇒ p.9)

[View]

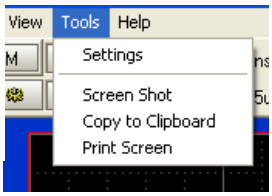
Click [View] and select from the pull-down menu.



Screen Size: Small	Selects the screen size suitable for XGA (1024 × 768) display resolution (default setting).	(⇒ p.23)
Screen Size: Medium	Selects the screen size suitable for SXGA (1280 × 1024) display resolution.	(⇒ p.23)
Screen Size: Large	Selects the screen size suitable for UXGA (1600 × 1200) display resolution.	(⇒ p.23)
Toolbar	Show/hides the toolbar.	

[Tools]

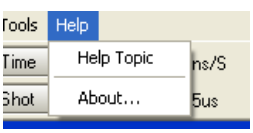
Click [Tools] and select from the pull-down menu.



Settings	Changes the model configuration settings	(⇒ p.19)
Screen Shot	Saves the displayed program screen to a file.	(⇒ p.64)
Copy to Clipboard	Copies the displayed program screen to the clipboard.	(⇒ p.23)
Print Screen	Prints the displayed program screen.	(⇒ p.68)

[Help]

Click [Help] and select from the pull-down menu.

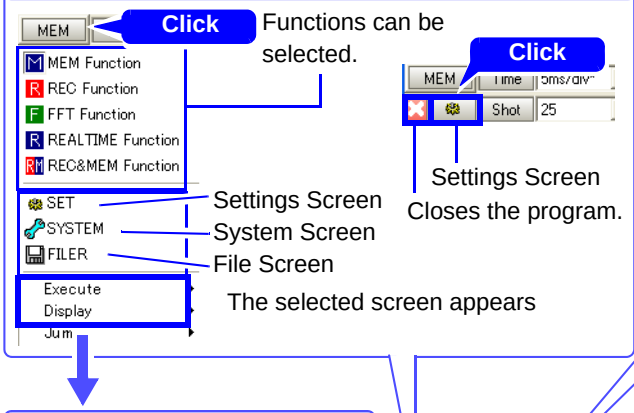


Help Topic	Displays the Help.
About	Displays the version of the program.

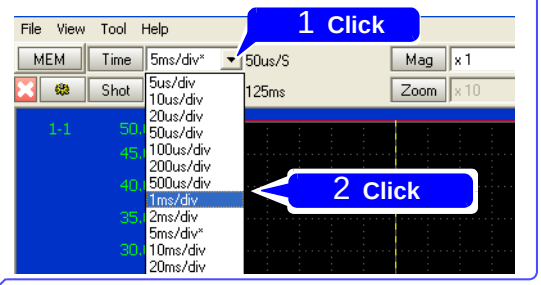
On-Screen Mouse Operations

Operation-Related Displays

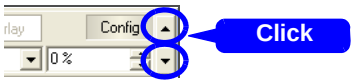
Switching Functions and Screens



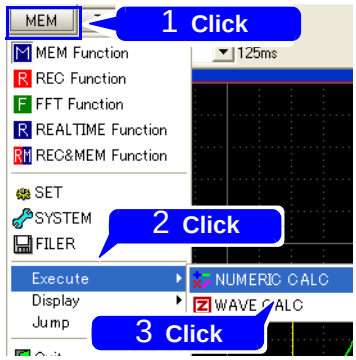
Changing Settings



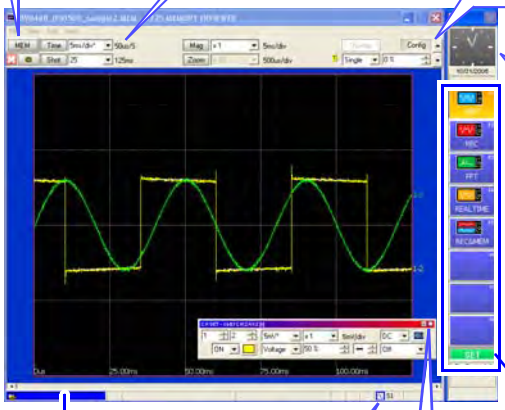
Changing Setting Items



Analysis

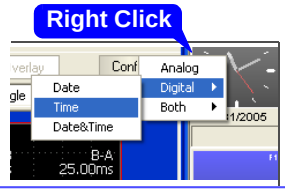


Numerical and waveform calculations are available.



Scrolling is available.

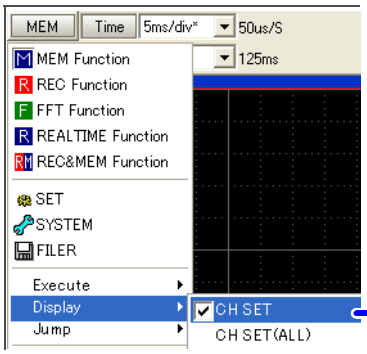
Changing the clock display



Click

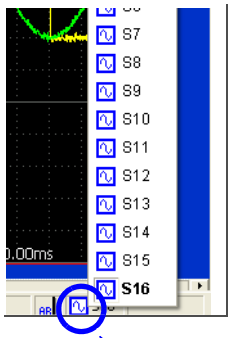
Settings can be changed.
Modes can be selected.

Dialog and Display Settings

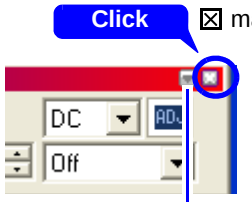


Display input channel and A/B cursor setting dialogs, and numerical values and gauges.

Changing Sheets

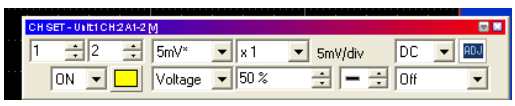


Closing Dialogs



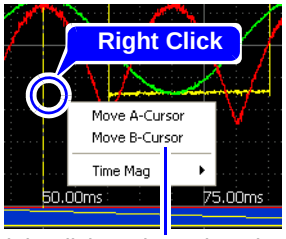
Minimize view:
Displays only the title bar when you don't need to see the whole dialog.

The Channel Setting (CH. SET) dialog appears.

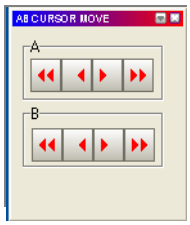


Operations on Waveform Data

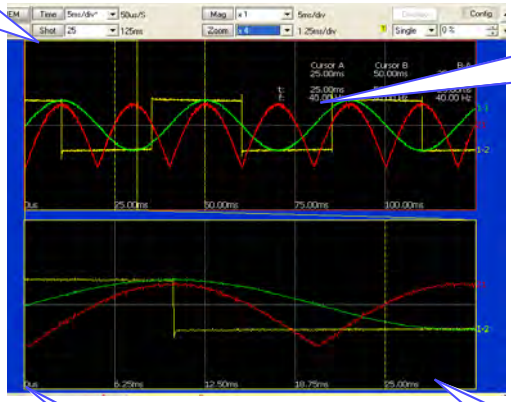
Moving the A/B cursors



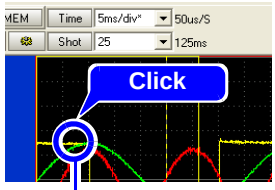
Right click at the point where you want to move the cursor, then select.
You can also move the A/B cursors by dragging horizontally.



You can move the cursors using the [AB CURSOR MOVE] dialog.
(To display the dialog, click [Display]-[AB CURSOR] from the Function menu.)

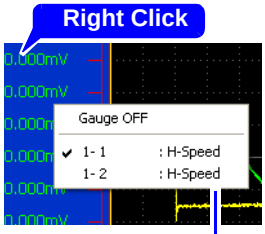


Select the area to zoom



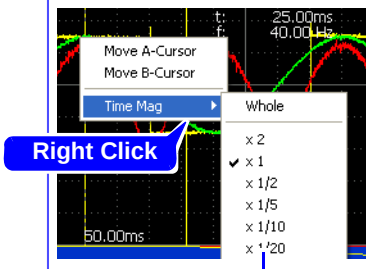
With zoom display enabled, clicking on a location causes it to appear zoomed in the lower half of the display.

Switching Gauges



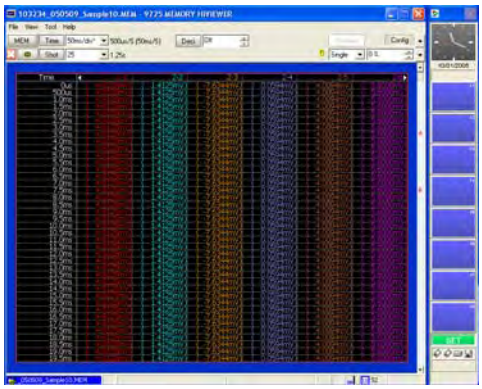
Select the gauge to display.

Changing time axis magnification

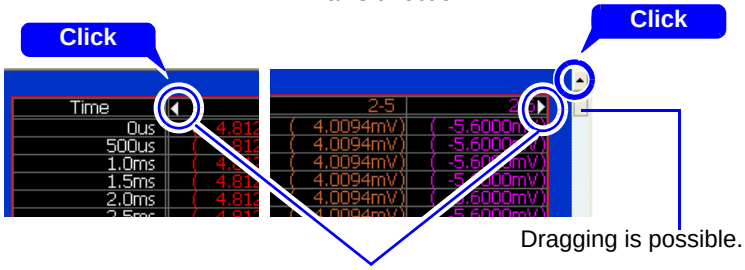


Select a magnification ratio.

Numerical Value Display Operations



The vertical scroll bar scrolls in the time axis direction.

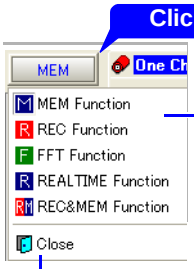


Dragging is possible.

The horizontal scroll bar scrolls through displayed channels.

Operations on the Settings Screens

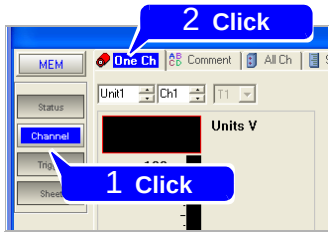
Switching Functions



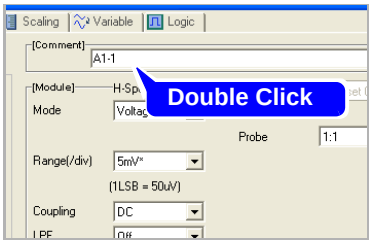
Functions can be selected.

Displays the Waveform screen.

Switching Screens and Pages

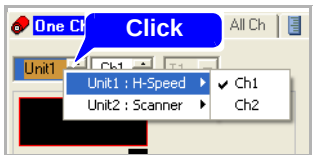


Entering Text

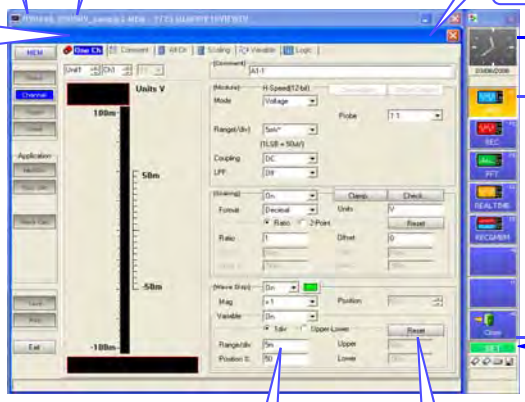


You can click directly to enter. You can also click F1 [Edit] (F keys) to enter from the virtual keyboard. (⇒ p.25)

Selecting Channels



Select unit (module) and channel numbers. (Channel Settings Screen)



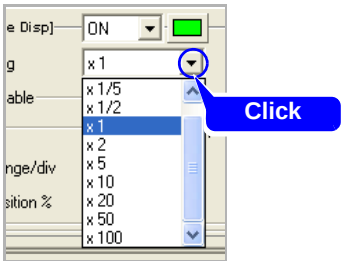
Clock setting is the same as on the Waveform screen.

Click
Settings can be changed.

Click
Modes can be selected.

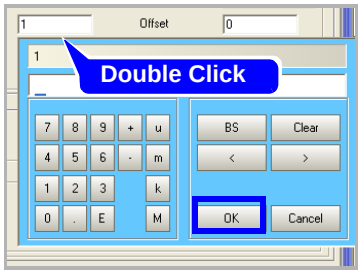
Changing Settings

Items with the ▼ mark at the right



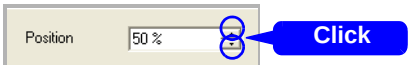
Select from the pull-down menu.

Items without a ▼ mark at the right



Entries can be made by virtual keyboard. After entering, click the **[OK]** button. (⇒ p.25)

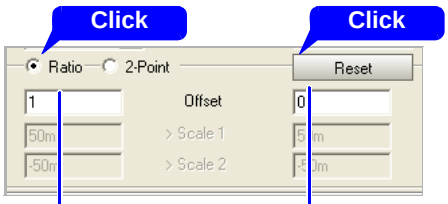
Items with the ▲▼ mark at the right



You can also double click to open the virtual keyboard and make entries.

The numerical value increments with each click.
Hold the mouse button to change the value continuously.

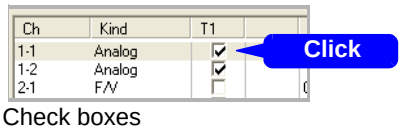
Operating Buttons



Radio buttons
Selecting one button deselects the others.

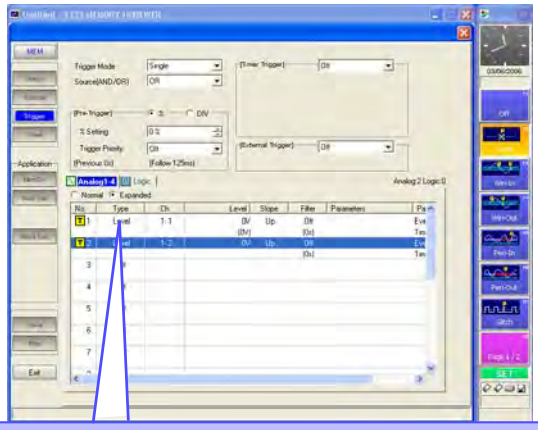
Executing buttons
Selecting this button executes this operation.
If "…" is appended, a dialog appears.

[Use Ch] page on the Status Settings screen (Memory Function)

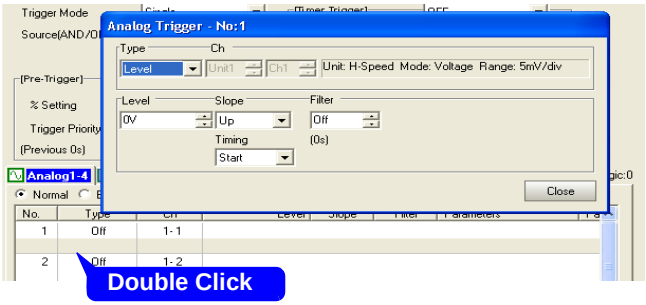


Check boxes
Toggles on (☑) and off (☐) with each click.

Pages within the Settings Screen



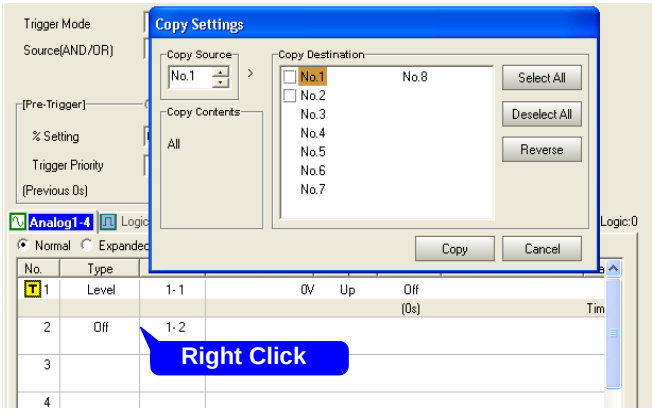
Making Dialog Settings



Settings Pages

- All except the **[One Ch]** page on the Channel Settings screen
- Trigger Settings screen
- Sheet Settings screen
- Numerical Calculation Settings screen
- Waveform Calculation Settings screen
- FFT Status Settings screen

Making Copy Settings



Settings Pages

- All except the **[One Ch]** page on the Channel Settings screen
- Trigger Settings screen
- Numerical Calculation Settings screen
- Waveform Calculation Settings screen
- FFT Status Settings screen

Basic Operations

This section describes the settings to be made when the program starts, the methods for saving and printing measurements and settings, and other basic operations.

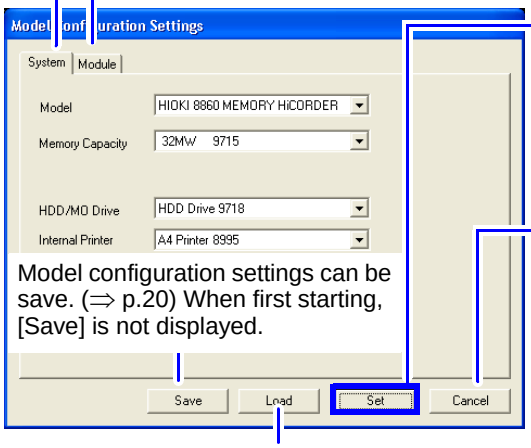
Setting the Model Configuration

Before using the program, set the model configuration of the instrument.
Model configurations can be saved and reloaded.
When the program starts the first time, the Model Configuration Settings screen is displayed automatically. This screen can also be displayed by selecting [Tools]-[Settings] from the menu bar.

The settings should match the system configuration of the instrument being used.
Setting the system configuration (especially the Memory Capacity setting) to match that of the instrument at the time measurements are made ensures that waveform measurement data will load properly later. Also, when creating a settings file, the program's system configuration settings should match those of the instrument into which the settings are to be loaded.

1 Set the system configuration of the instrument being used.

2 When creating a settings file, set the input module (Unit) configuration. (⇒ p.20)



Module configuration settings files (with ".ini" extension) can be loaded.(⇒ p.20)

3 Accept the settings and display the Waveform screen.

Attempting to accept the settings on this screen after measurement or settings data has already been loaded causes the displayed data to be reset. In this case, reload the data again.

Cancels settings and displays the Waveform screen. If you click [Cancel] after starting the program for the first time, make the following settings (initial settings).

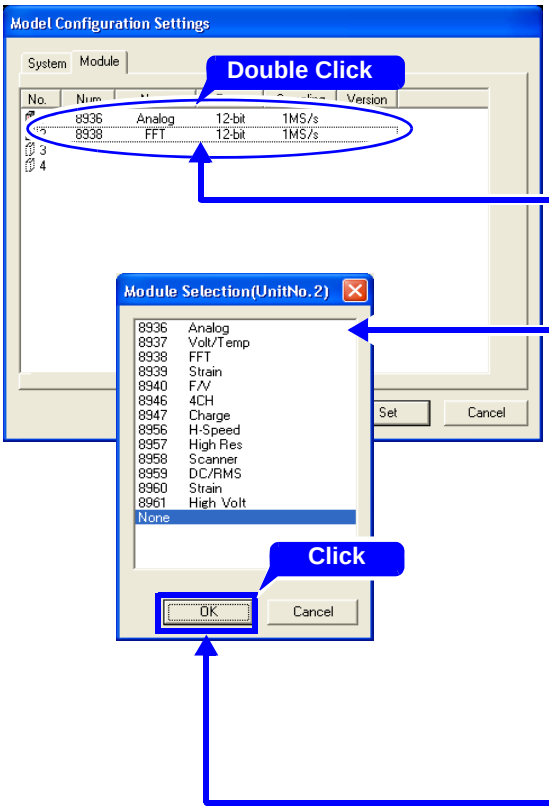
- Model: 8860
- Memory Capacity: 32 MW
- HDD/MO Drive: None
- Internal Printer: None
- Input Module Settings: (No settings)

Setting Items	Description	Selection Contents
Model	Select the instrument model.	HIOKI 8860 (or 8861, 8860-50, 8861-50) MEMORY HiCORDER
Memory Capacity*1	Select the capacity of the memory installed in the instrument (the memory capacity can be verified on the Configuration List screen of the System Settings on the instrument).	• If Model 8860 or 8860-50 is selected: 32 MW, 128 MW, 512 MW or 1 GW • If Model 8861 or 8861-50 is selected: 64 MW, 256 MW, 1 GW or 2 GW
HDD/MO Drive	Select whether the HDD or MO drive is installed in the instrument.	None, HDD Drive or MO Drive*2
Internal Printer	Select whether an internal printer is installed in the instrument.	None, A4 Printer or A6 Printer

*1 If the actual quantity of waveform data to be loaded is larger than the specified memory capacity, data is loaded up to the specified capacity.
*2 MO drive can be selected only when the Model 8860 or 8861 is selected .

Setting the Input Module (Unit) Configuration

To create a valid settings file, the input module configuration settings in the program must match the physical configuration of the instrument. No setting is necessary when loading measurement data.



When the program is started the first time, no configuration settings are present.
Once set, a list of currently installed input modules (units) is displayed.

1 **Double click the row of the input module (unit) number to be set or changed.**
The Module (Unit) Selection screen appears.

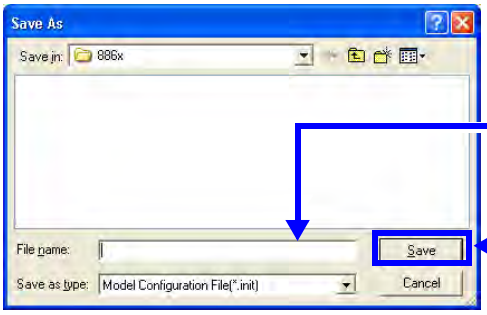
2 **Select the input module to be set.**

Available input modules

- Model 8936 Analog Unit
- Model 8937 Voltage/Temp Unit
- Model 8938 FFT Analog Unit
- Model 8939 Strain Unit
- Model 8940 F/V Unit
- Model 8946 4-Ch Analog Unit
- Model 8947 Charge Unit
- Model 8956 Analog Unit
- Model 8957 High Resolution Unit
- Model 8958 16-Ch Scanner Unit
- Model 8959 DC/RMS Unit
- Model 8960 Strain Unit
- Model 8961 High Voltage Unit
- None

3 **Accepts the setting.**

Saving Model Configuration Settings

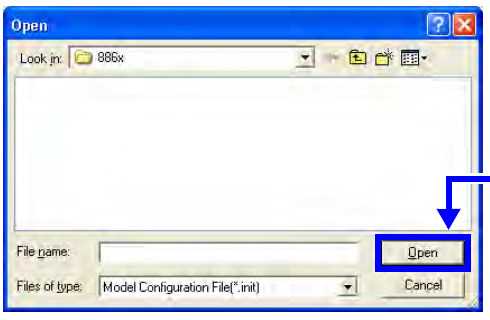


1 **Click [Save] on the Model Configuration screen.**
The [Save As] dialog box appears.

2 **Select the save destination, and enter a file name.**

3 **Click [Save].**
The model configuration file is saved with an "ini" extension.

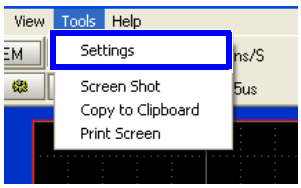
Loading Model Configuration Settings



1 **Click [Load] on the Model Configuration screen.**
The [Open] dialog box appears.

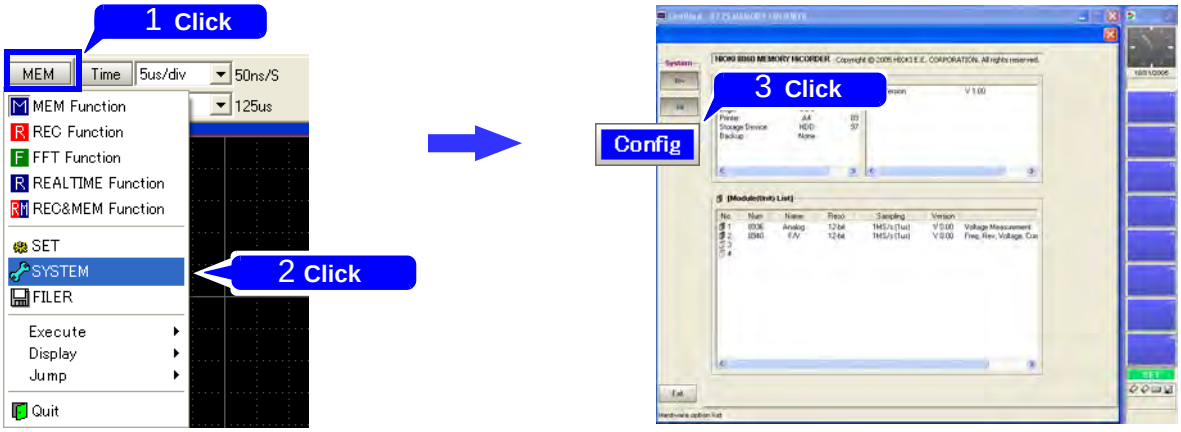
2 **Select the file to load (with "ini" extension), and click [Open].**
The loaded model configuration settings are displayed.

Verifying Current Model Configuration Settings



From the menu bar, click [Tools]-[Settings].

The settings can also be verified on the System screen.
Model configuration settings consist of the installation status of peripheral devices and input modules, and the software version information.



Loading Data (Waveform and Settings Files)

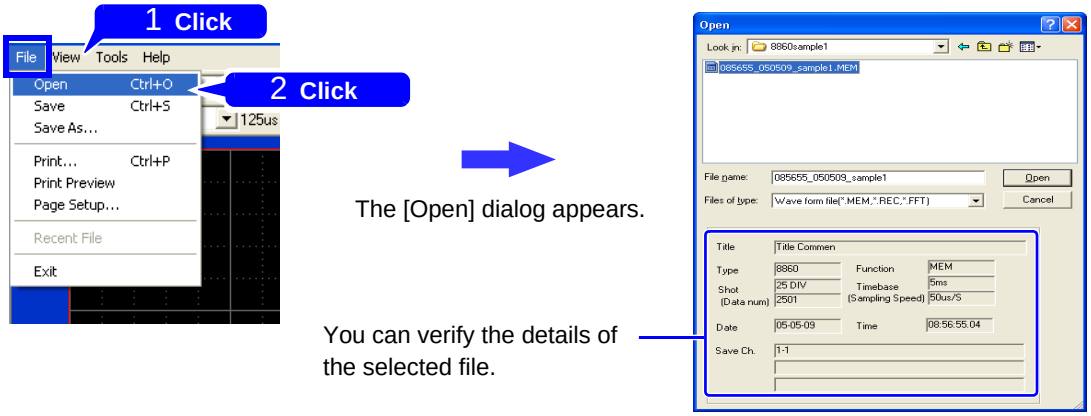
Instrument measurement data can be loaded into the program. The following types of data can be loaded.

- Memory function (".mem" file extension)
- Recorder function (".rec" file extension)
- FFT function (".fft" file extension)
- Real-time function (".rsm", ".rsr" file extension)
- Index file for memory division (".seq" file extension)
- Index file for divided saving (".idx" file extension)
- Real-time index file (".rsi" file extension)
- REC&MEM index file (".r_m" file extension)
- Settings file (".set" file extension)(⇒ p.70)

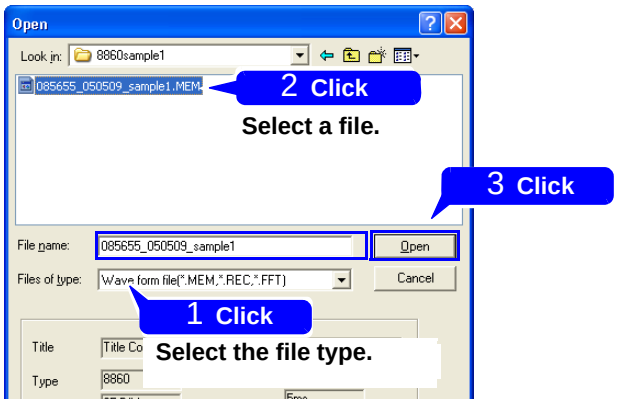
1 Display the Waveform screen.

(The Waveform screen normally appears when the program starts. If another screen is displayed, click the [Close] button to display the Waveform screen.)

2 From the menu bar, click [File]-[Open].



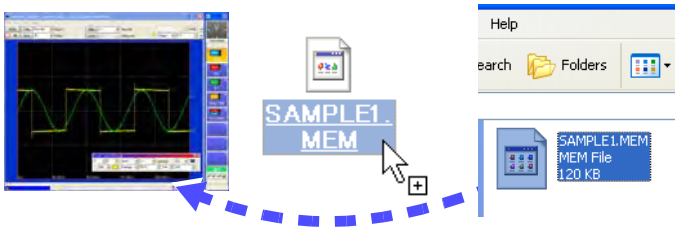
3 Select the type of data to load in the [Files of type] field, then select the file to load, and click [Open].



Select [Open].

The selected data is loaded and displayed on the Waveform screen.
Set the display method as needed.(⇒ p.30)

To load a file directly, you can drag and drop it from Windows Explorer to the Waveform screen.
(Click and hold the left mouse button while moving the file, then release the button.)



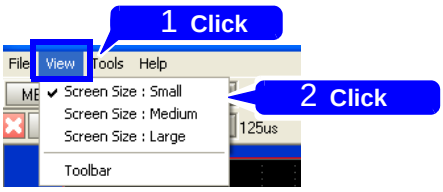
Changing Display Screen Size

The screen size can be selected from the following to suit various display resolutions.

Screen Size: Small	Selects the screen size suitable for XGA (1024 × 768) display resolution.
Screen Size: Medium	Selects the screen size suitable for SXGA (1280 × 1024) display resolution.
Screen Size: Large	Selects the screen size suitable for UXGA (1600 × 1200) display resolution.

When the program is first started, the Small screen size is selected. Subsequently, the last-used screen size is applied when the program starts.

Click any one of [Display]-[Screen Size: Small], [Screen Size: Medium] or [Screen Size: Large].

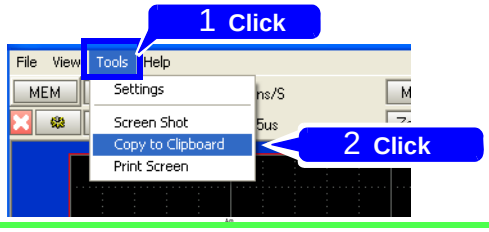


Click any one.

Copying the Displayed Screen to the Clipboard (to paste an image into another program)

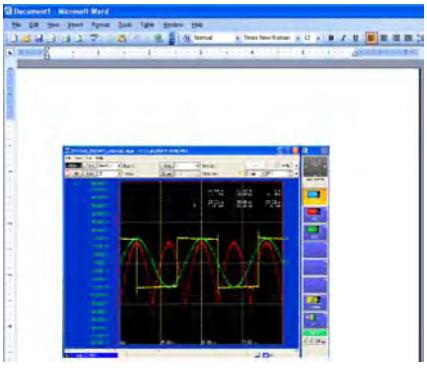
The Waveform screen can be copied to the clipboard.
Before copying, confirm that the screen you want to copy is fully visible on the monitor.

1 **From the menu bar, click [Tools]-[Copy to Clipboard].**



An image of the currently displayed screen is copied to the clipboard.

2 **Start the program such as Microsoft Word or Excel in which you want to insert the image, and paste.**



Example: an image pasted into Word

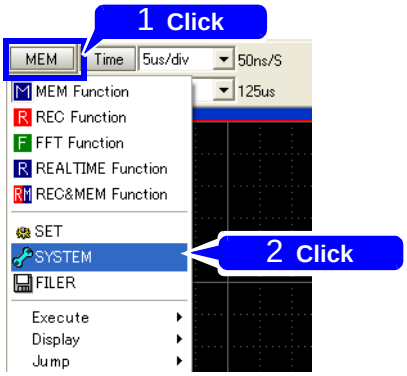
Initializing Waveform Data or Settings

Displayed waveforms and individual settings can be initialized by clicking the corresponding initialization buttons.
The following items can be initialized.

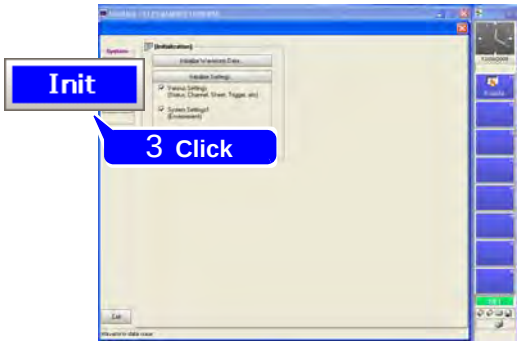
Waveform Data Initialization	Clears currently loaded waveform data.
Settings Initialization	Initializes the contents specified for the selected check box. • Various Settings: Initializes the contents of each settings screen. (Select [SET] on the Function menu to display the settings screen.) • System Settings 1: Initializes the settings on the Environment Settings screen. (Select [SYSTEM] on the Function menu to display the Environment Settings screen.)

1 Click [SYSTEM] on the Function menu, then click Init .

The Initialization Settings screen appears.

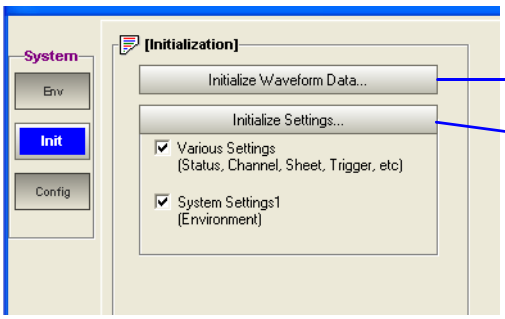


Waveform screen



Initialization (Init) Settings screen

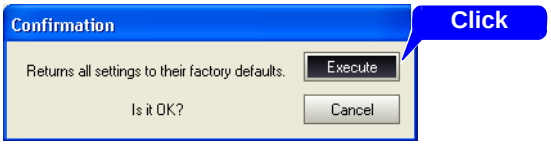
2 Click the button for the type of items to initialize.



Initialization Settings screen.

Click either button.
Initializes the waveform data.

Initializes settings.
(Before clicking this button, select the type of settings to be initialized.)



When you click a button, a [Confirmation] dialog appears.

Click [Execute] to initialize.

Entering Text and Numbers

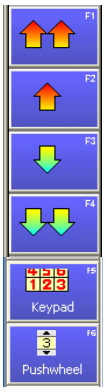
Click the setting field to enter text or numerical values. Setting contents are displayed on the F keys (GUI). Click the F key display to select a character entry method. You can also enter characters directly from the keyboard.

Entering Numbers

1 Click the setting item on the Settings screen.
(Double clicking the setting item displays the virtual keypad for making numerical entries.)

2 Select an entry method from the displayed F keys (or the corresponding F1 to F8 keys on the keyboard).

(Depending on the setting item, some choices are not displayed)



F Key Display

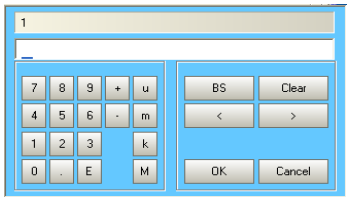
Set the numerical value directly.

↑↑	Increment numerical value.*
↑	Increment numerical value by one.
↓	Decrement numerical value by one.
↓↓	Decrement numerical value.*

*: The increment and decrement step size depends on the particular setting item.

Keypad
(⇒ p.26)

The virtual keypad is displayed for entry.
Click to enter a value using the mouse.



Pushwheel
(⇒ p.26)

The virtual pushwheel switches are displayed for numeric entry.
Numbers are set one digit at a time.

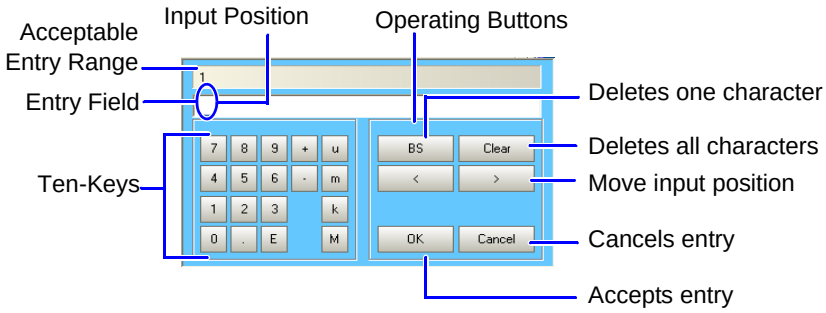
Entry by [Keypad]

F Key Display

Enter a numerical value using the virtual keypad.

Numerical values are entered by the tenkeys on the virtual keypad.

Click the operating buttons or F keys to make changes and accept your entry.

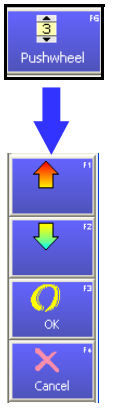


1 Click the desired numbers.

When the entry is complete

2 Accept the entry....Click [OK] or press the Enter key on your keyboard.
Cancel the entry....Click [Cancel] or press the Esc key on your keyboard.

Entry by [Pushwheel] (To Set Each Digit)

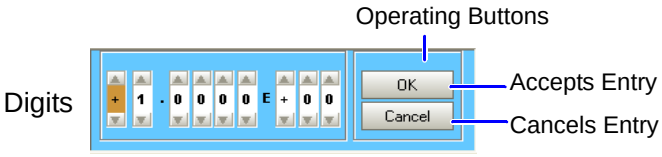


F Key Display

Enter a numerical value using the virtual pushwheel switches.

Select the desired value for each digit by clicking ▼ and ▲ on the virtual pushwheel switches, or [↑] and [↓] on the displayed F keys.

Click the operating buttons or F keys to make changes and accept your entry.



1 Click a digit to enter.

2 Value setting .....Click ▼ and ▲ or [↑] and [↓]

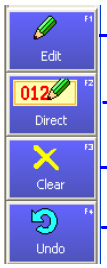
When the entry is complete

3 Accept the entry....Click [OK] or press the Enter key on your keyboard.
Cancel the entry....Click [Cancel] or press the Esc key on your keyboard.

Entering Text and Comments

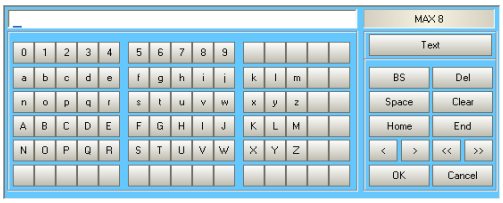
1 Click the setting item on the Settings screen.
(Double clicking the setting item displays the virtual keyboard for text entry.)

2 Select an entry method from the displayed F keys (or the corresponding F1 to F8 keys on the keyboard).



Key Display

Edit The virtual keyboard is displayed for text entry.(⇒ p.28)
Click to enter a character using the mouse.



Direct Enter text on the keyboard, and press the **Enter** key to accept.

Clear Deletes entries.

Undo Undoes the last operation.

NOTE

When entering a file name

Windows cannot handle file names containing the following characters, so they should not be used:

- ASCII: + = [ ] \ / | : * ? “ < > ; ,
- White space characters

When entering units and symbols

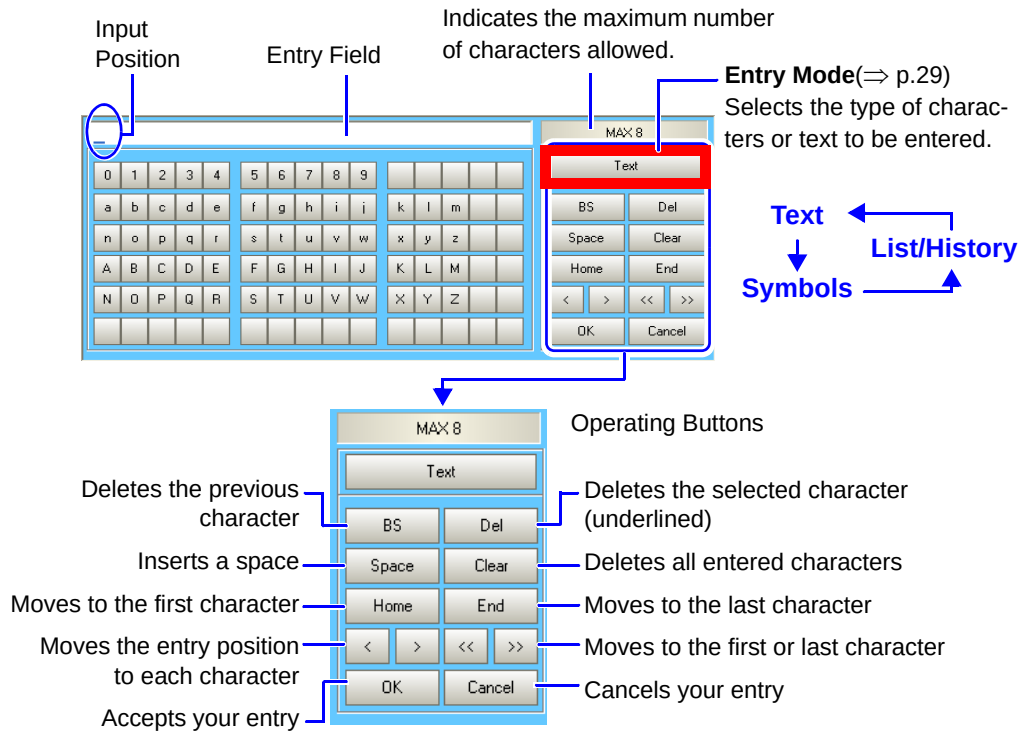
In some cases, characters entered on the instrument differ from those saved or printed:

- Printing
  $^2 \rightarrow 2$, $^3 \rightarrow 3$, $^n \rightarrow n$
- Saving (when saving numerical calculation results or in text format)
  $^2 \rightarrow$ ^2, $^3 \rightarrow$ ^3, $^n \rightarrow$ ^n, $\mu \rightarrow$ ~u, $\Omega \rightarrow$ ~o, $\varepsilon \rightarrow$ ~e, $° \rightarrow$ ~c ,
  $\pm \rightarrow$ ~+, $\mu\varepsilon$ (display only) $\rightarrow$ uE, °C (display only) $\rightarrow$ C

Using [Edit] for Entry

Enter text using the virtual keyboard for character entry.

Select a character by clicking it on the virtual keyboard.
Click the operation buttons or the F keys in the GUI area to change or accept.



1 Click on a character to enter.

In case of an entry mistake

Delete the previous character
: Click the **BS** button, [BS], or press the Backspace key on your keyboard.

Delete all
: Click the **Clear** button, [Clear] or the Delete key on your keyboard.

Move entry position
: Click the [←] or [→] keys, or the mouse buttons.

When the entry is complete

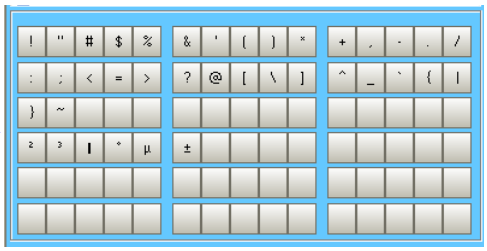
2 Accept the entry.....Click [OK] or press the Enter key on your keyboard.
Cancel the entry.....Click [Cancel] or press the Esc key on your keyboard.

Virtual Keyboard Entry Modes

Parts of the display differ according to entry position.

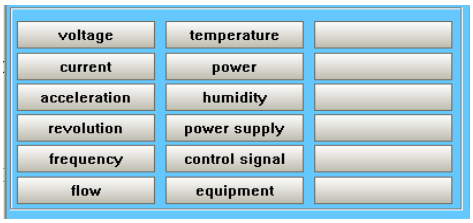
[Text]

[Symbols]

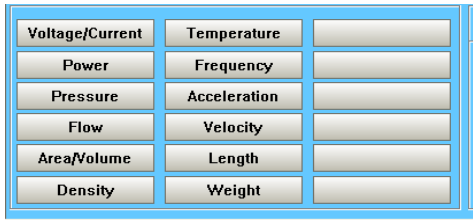


[List/History]

Preseted comments and lists of measurement units are displayed.
The display depends on the current entry position. New entries appear in empty rows as they are added to the history, and when all rows are full, the oldest entry is overwritten.

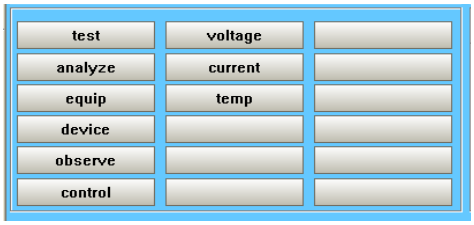


(Example 1: Analog Comment Entry)

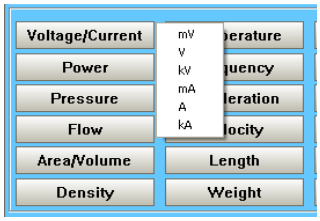


(Example 2: Scaling Unit Entry)

Click an item.



(Example 3: Sheet Name Entry)



Select the desired units from the pull-down menu.

Selecting the Measurement Data Display Method

You can change the way waveform data is displayed as needed.
The waveform display method is selected on the Settings screen.
To display the Settings screen, click **[SET]** on the Function menu of the Waveform screen, or click the [ ] (Settings) button.(⇒ p.12)

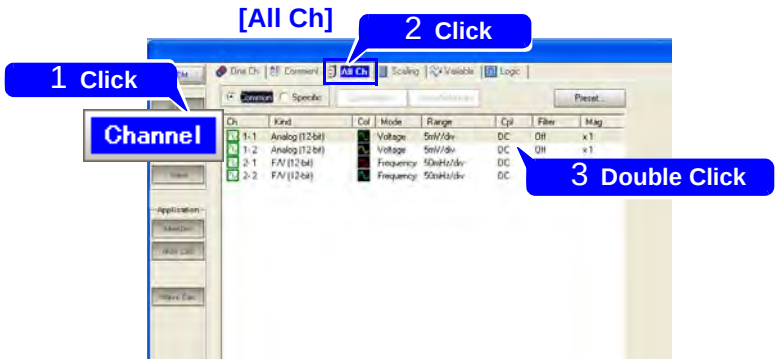
- Changing the Analog Waveform Display (⇒ p.30): Select on the [All Ch] page of the Channel Settings screen.
- Changing the Logic Waveform Display (⇒ p.31): Select on the [Logic] page of the Channel Settings screen.
- Changing the FFT Waveform Display (⇒ p.32): Select on the [Analyze] page of the Status Settings screen.
- Changing the Sheet Display (⇒ p.33): Select on the Sheet Settings screen.

Changing Analog Waveform Display Settings

MEM REC REALTIME REC&MEM

Set the analog waveform display on the [All Ch] page of the Channel Settings screen.
The following analog waveform display characteristics can be selected:
waveform display/non-display, waveform display color, waveform zero position, vertical axis display magnification

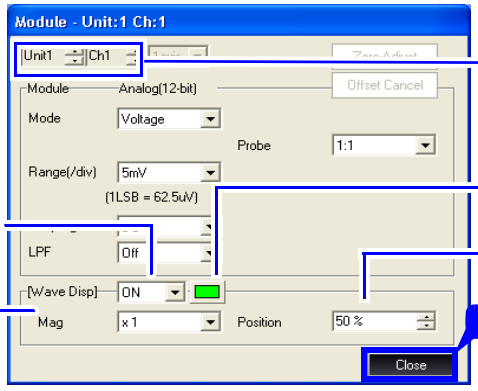
1 On the settings screen, click the Channel -[All Ch] page and double click in the list.



Double click an item in the list.
The [Module] dialog appears.

[All Ch] Page on the Channel Settings Screen

2 Click the item to change in the dialog, and select from the pull-down menu.



Select an input module (Unit) and channel.

Waveform display/ non-display

Vertical axis display magnification

Waveform display color

Waveform zero position

Click
[Close] when finished setting

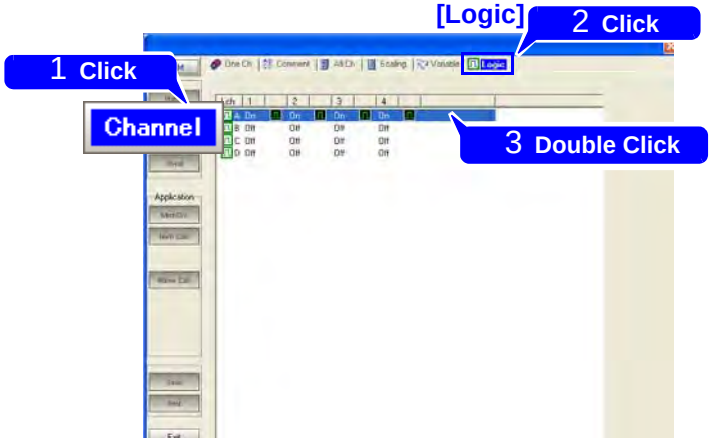
Even when waveform display is enabled, unless a channel is selected on the Sheet Settings screen for display, it does not appear on the Waveform screen. (⇒ p.33)

Changing Logic Waveform Display Settings

MEM REC REALTIME REC&MEM

Configure the logic waveform display on the [Logic] page of the Channel Settings screen. Waveform display/non-display and waveform display color can be selected for logic waveforms. Measurement data other than recorded logic waveform data is not displayed.

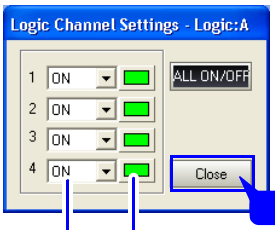
1 On the settings screen, click the Channel -[Logic] page and double click in the list.



Double click an item in the list.
The [Logic Channel Settings] dialog appears.

[Logic] Page on the Channel Settings Screen

2 Click the item to change in the dialog, and select from the pull-down menu.

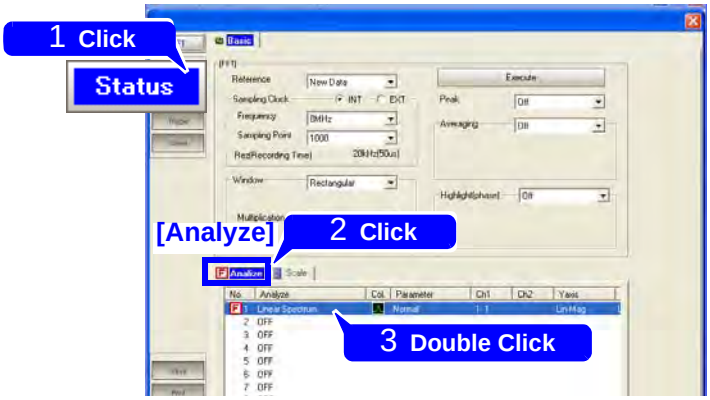


Even when waveform display is enabled, unless a channel is selected on the Sheet Settings screen for display, it does not appear on the Waveform screen.(⇒ p.33)

Changing FFT Waveform Display Settings FFT

Set the FFT waveform display on the [Analyze] page of the Status Settings screen.
The following FFT waveform display characteristics can be selected:
waveform display/non-display, waveform display color, x/y-axis display

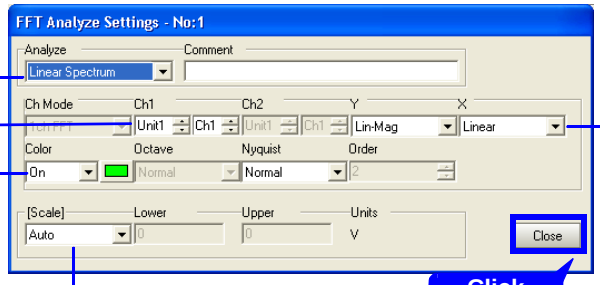
1 On the settings screen, click the Status -[Analyze] page and double click in the list.



[Analyze] Page on the Status Settings Screen

Double click an item in the list.
The [FFT Analyze Settings] dialog appears.

2 Click the item to change in the dialog, and select from the pull-down menu.



Analysis mode

Channel for analysis

Waveform display/non-display and display color

Scaling of the y-axis display

x and y axes for display of analysis results

Click **[Close]** when finished setting

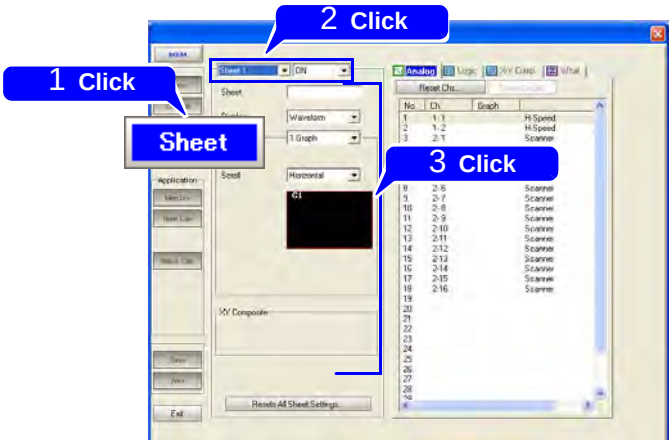
Even when waveform display is enabled, unless a channel is selected on the Sheet Settings screen for display, it does not appear on the Waveform screen.
(⇒ p.33)

Changing Sheet Display Settings

Up to 16 sheets can be displayed on the Waveform screen. The data to be displayed on each sheet can be selected on the Sheet Settings screen.

1 Click Sheet on the settings screen, and select items to change on each sheet.

Select the sheet number to change.



[Analog] Page on the Sheet Settings Screen

If a sheet name has been changed, the name is displayed on the Waveform screen.

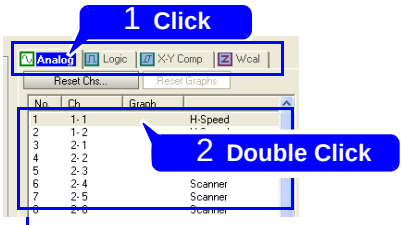
Select an item to change.

Setting Contents

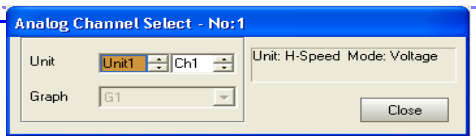
- Sheet name
- Data display format
- (Waveform, Numeric, X-Y Comp or Wave & X-Y)
- Number of screen graphs and display layout
- Data scrolling direction

Other

2 (To change the data display settings for each sheet) Click the page to change, double click in the list and set in the dialog that appears.

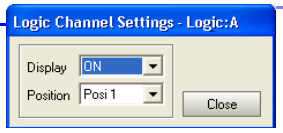


Double click an item in the list.
A dialog is displayed.
When finished making settings in the dialog, click [Close].



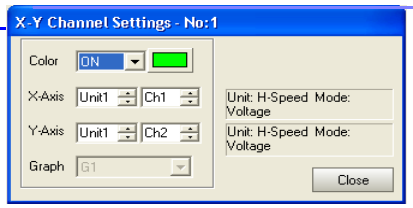
[Analog] Page

Assign analog channels and arrange graphs for split-screen display.



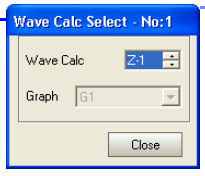
[Logic] Page

Assign logic channels and set display width and position.



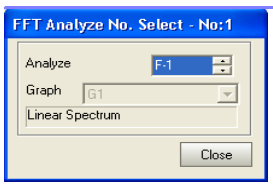
[XY Comp] Page

(When the [X-Y Comp] or [Wave & X-Y] display format is selected)
Select X-Y waveform settings and display colors, and arrange graphs for split-screen display.



[Wcal] Page

Assign waveform calculation results and split-screen arrange graphs for split-screen display.



[FFT] Page

Assigns FFT analysis results and sets graph arrangement for split-screen display.

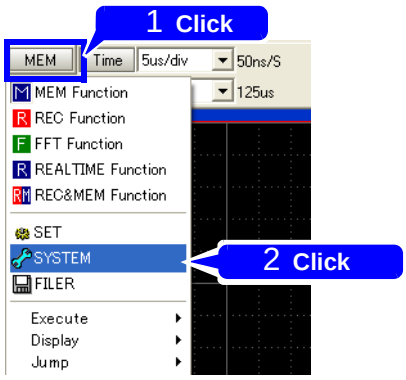
Changing the Waveform Screen Display Method

The display method of the Waveform screen can be changed from the Environment (Env) Settings screen, accessed from the System screen.
The following settings can be changed.

- Grid Type
- Display Comments
- Time Value Display
- Sheet Scroll Linkage
- Zero Position

1 Click [SYSTEM] on the Function menu, and Env on the System screen.

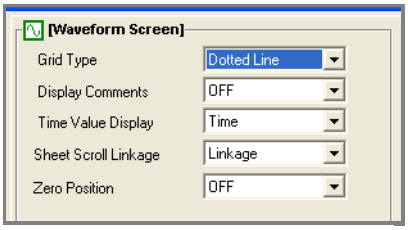
The Env Settings screen appears.



Waveform Screen

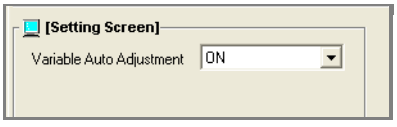
Env Settings Screen

2 Select the [Waveform Screen] items to set.



Setting Item	Select Contents
Grid Type	Off, Dotted Line, Solid Line
Display Comments	Off, On
Time Value Display	Time, Mod 60, Scale, Date, Samples
Sheet Scroll Linkage	No Linkage, Linkage
Zero Position	Off, On

3 Set the [Setting Screen] setting items.



Setting Item	Select Contents
Variable Auto Adjustment	Off, On

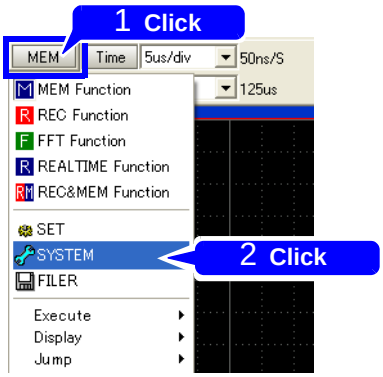
The Variable (gain) function can be used to set any display range and position.
When variable auto adjustment is enabled, the variable setting becomes linked to changes in scaling and voltage range settings.

Changing Waveform Screen Color

The color of the Waveform screen can be changed from the Environment (Env) Settings screen, accessed from the System screen.

1 Click [SYSTEM] on the Function menu, and Env on the System screen.

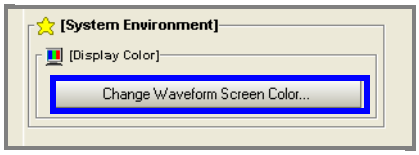
The Env Settings screen appears.

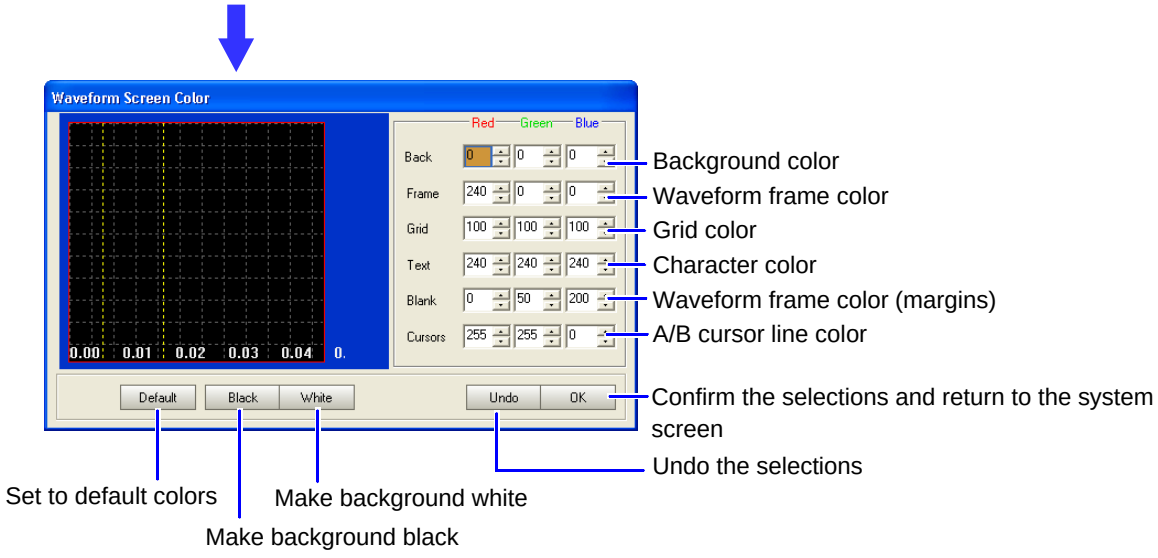


Waveform Screen

Env Settings Screen

2 Click the [Change Waveform Screen Color] button and change settings in the [Waveform Screen Color] dialog box.



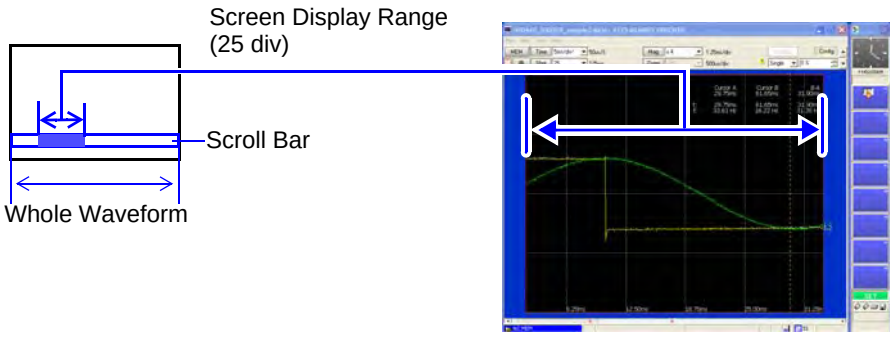


Viewing Measurement Data

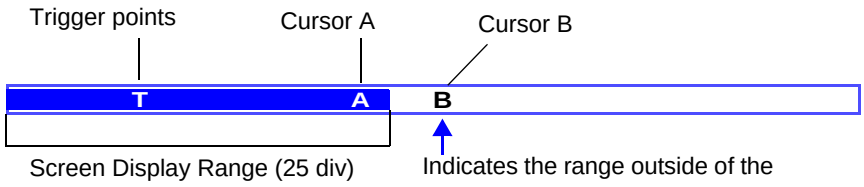
Determining Displayed Waveform Position

The scroll bar enables you to determine the relative position of the displayed portion of a waveform within the overall recorded waveform. You can also determine trigger points and A/B cursor locations.

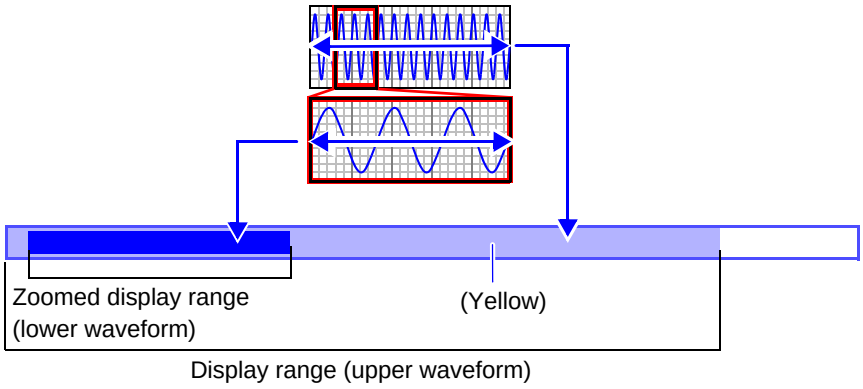
Whole Waveform and Screen Display Range



Verifying the Trigger Point and Cursor Positions on the Scroll Bar

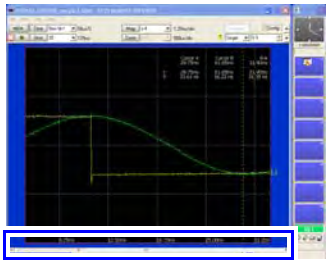


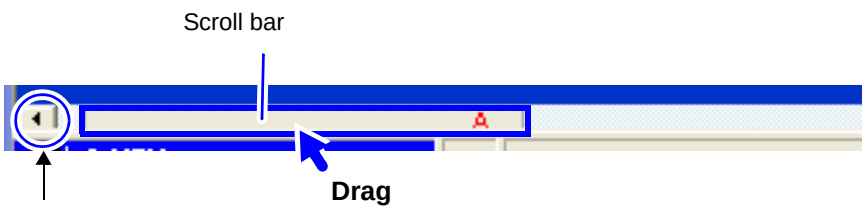
With zoomed display (⇒ p.42)



Scrolling Waveforms

Displayed waveforms can be scrolled using the scroll bar at the bottom of the waveform display. Scroll by dragging the screen display range of the scroll bar, or clicking the buttons at the left and right ends of the scroll bar.





You can also scroll by clicking here.

Drag

Click and drag the scroll bar to move the displayed portion left or right.

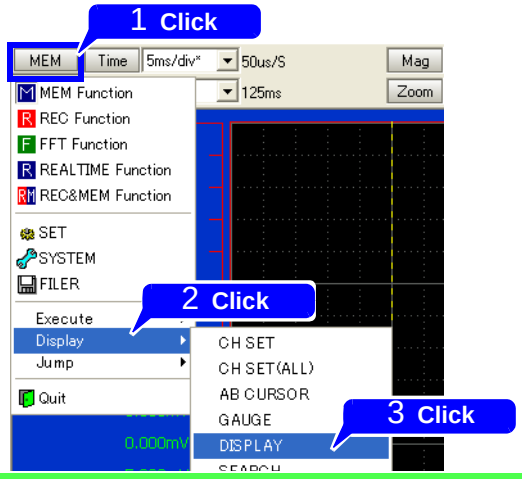
Viewing Measurement Values and Information

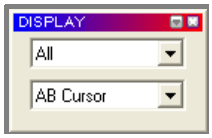
Information such as cursor values, channel settings, numerical calculation results and gauges can be displayed on the Waveform screen.

- Four display layouts are available:
  Wave, Wave+Info, Gauge+Wave, ALL (Wave + Info + Gauge)
- Information display contents are available in three general types (detailed information contents depend on the measurement setting configuration).
  A/B cursor values, channel (CH) information and numerical calculations

1 From the Function menu, click [Display]-[DISPLAY].

The [DISPLAY] dialog appears.
(It can also be displayed by switching the SET mode to FN mode, and clicking F1 [Switch Info].)

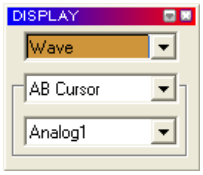




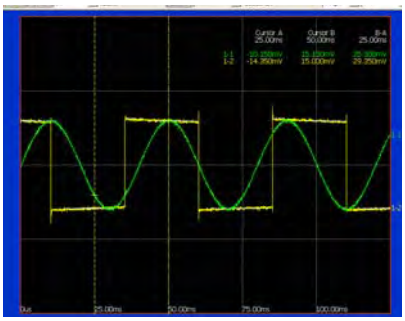
(when using the Memory function, Recorder function, Real-time function, or REC&MEM function)

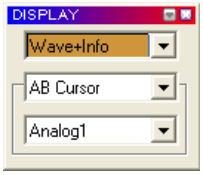
The [DISPLAY] dialog appears

2 Select the desired display layout and contents.

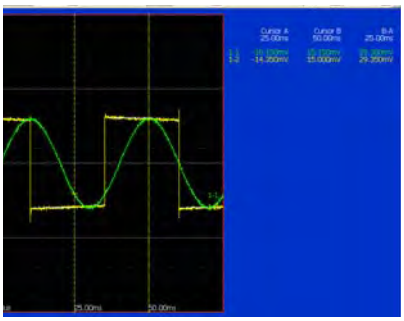


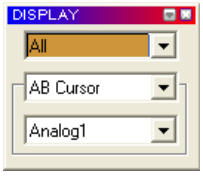
[Wave]



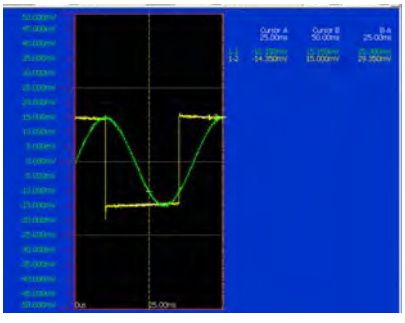


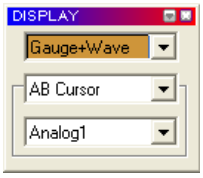
[Wave+Info]



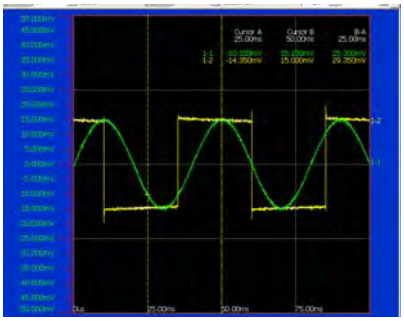


[All]





[Gauge+Wave]



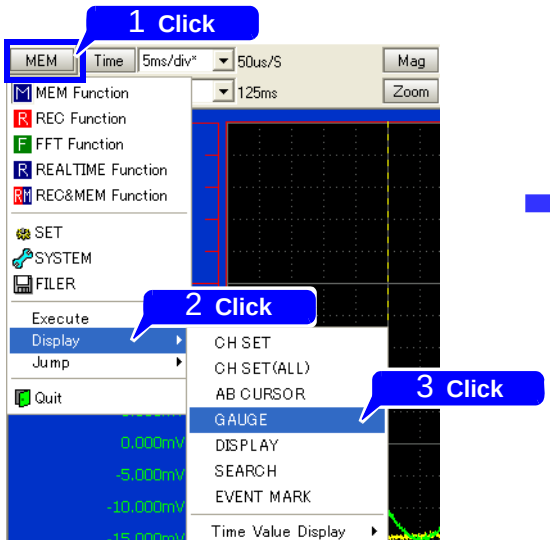
In the FFT function, [FFT] or [FFT+Info].

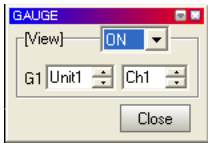
Showing and Hiding Gauges

A gauge corresponding to the measurement range of each channel can be displayed at the left side of the Waveform screen.

1 From the Function menu, click [Display]-[GAUGE].

The [GAUGE] dialog appears.
(It can also be displayed by switching the SET mode to FN mode, and clicking F2 [GAUGE].)



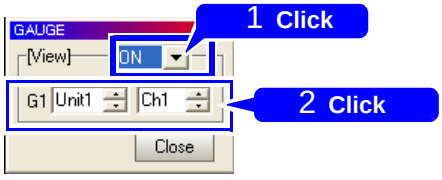


(when using the Memory function, Recorder function, Real-time function, or REC&MEM function)

The [GAUGE] dialog appears

(The [GAUGE&VALUE] dialog appears in the FFT function)

2 Select a channel for the gauge to be displayed.



GAUGE Dialog

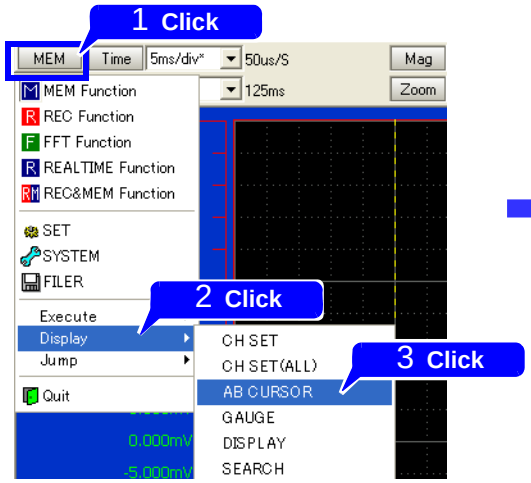
Set [View] to [ON] and select the channel to display.
The gauge for the selected channel is displayed at the left.

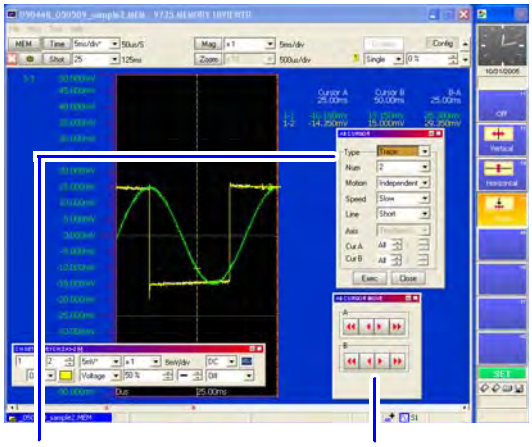
Specifying a Waveform Area

A portion of a waveform can be specified by the A/B cursors for data saving, printing and X-Y composite display. This waveform portion can also serve to specify the range for numerical and waveform calculations, and FFT analysis.

1 From the Function menu, click [Display]-[AB CURSOR].

The [AB CURSOR] dialog appears.

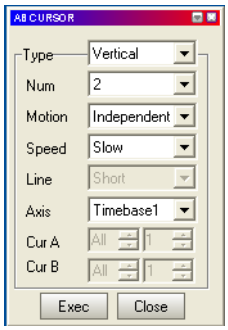




AB CURSOR Dialog
Selects the cursor type and other settings.

AB CURSOR MOVE Dialog
Use to move the cursors.

2 Select cursor settings.

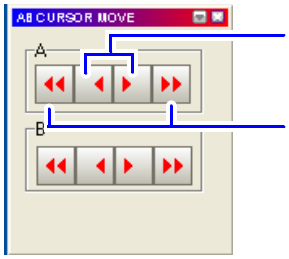


AB CURSOR Dialog

Type ..... Select the cursor type. (Vertical or Trace)
(The waveform portion cannot be specified with horizontal cursors.)
Num ..... Select the number of cursors to enable. (1 or 2) *
Motion ..... (When 2 cursors are enabled) Select the cursor motion method. (Independent or Together)
Speed ..... Select the cursor speed. (Fast, Medium or Slow)
Line ..... (When the Trace cursor is selected) Select the cursor length. (Short or Long)
Axis ..... Select the Axis to serve as the origin of cursor movement.
Region ..... Select to display cursors on the Memory or Recorder waveform. (REC&MEM function)
Cur A/ Cur B .. Select the channels for which to display cursor values.

*. If only one cursor is enabled, the specified portion will be from cursor A to the end of the data.

3 Specify the portion with the cursors.



Move by one data point at a time

Move cursor quickly according to the speed setting

AB CURSOR MOVE Dialog
(not displayed on the 8860 series)

Move cursors A and B by clicking their respective buttons.

Cursor movement speed depends on the [Speed] setting in the [AB CURSOR] dialog.

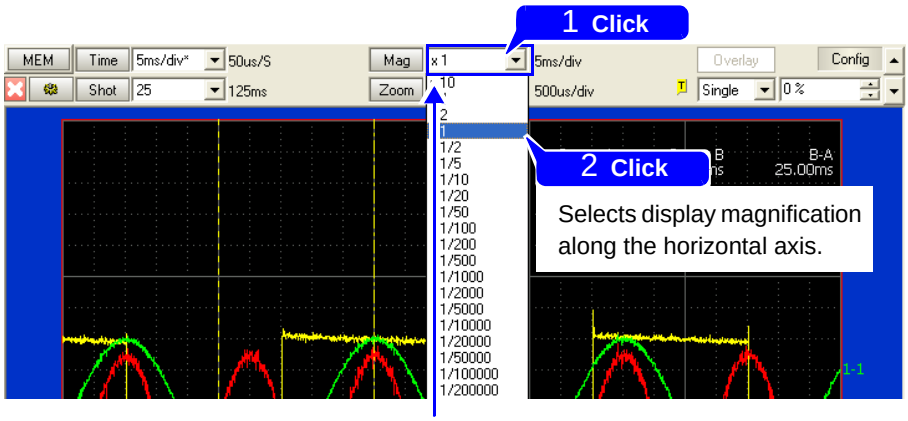
You can also move a cursor by dragging it on the screen.

Magnifying and Compressing Waveforms

You can magnify waveforms to observe data details, and compress them to quickly obtain a broad view of overall trends.

Magnifying and Compressing Horizontally

You can magnify and compress waveforms along the horizontal (time) axis. Settings are made from the Waveform screen.



To view the whole waveform

Click the **[Mag]** button to display the whole waveform.

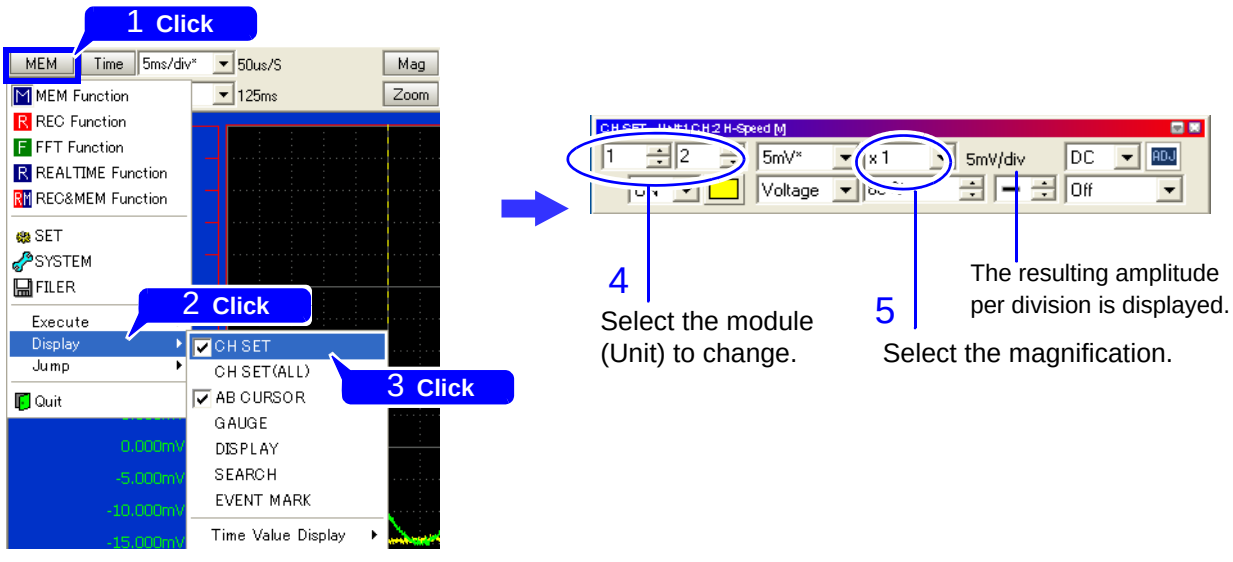
Magnifying and Compressing Vertically

You can also magnify and compress waveforms along the vertical (measurement amplitude) axis. Settings are made on the [CH SET] dialog of the Waveform screen, or on the Channel Settings screen.

Setting from the Waveform Screen

In the Function menu, click [Display]-[CH SET].

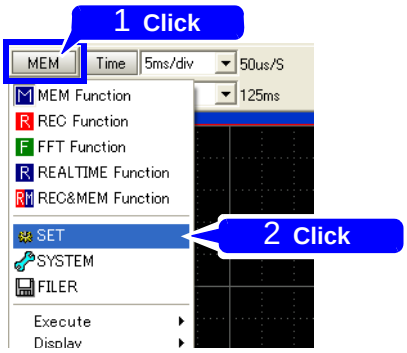
The [CH SET] dialog appears.



Setting from the Channel Settings Screen

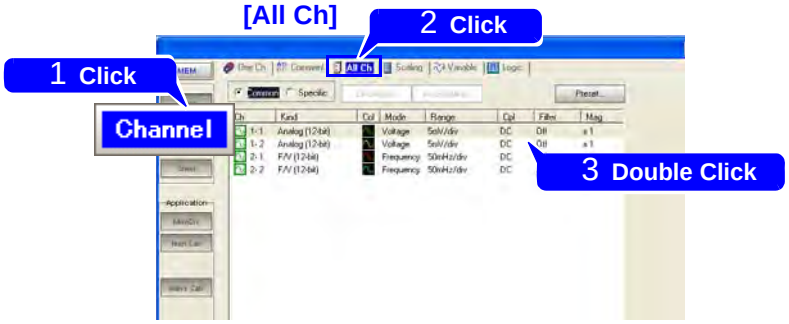
1 Click [SET] in the Function menu.

The settings screen appears.



2 Click the Channel -[All Ch] page on the settings screen, and double click in the list.

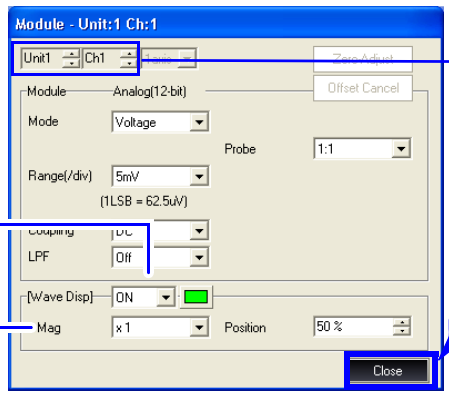
The [Module] dialog appears.



Double click an item in the list.
The [Module] dialog appears.

[All Ch] Page on the Channel Settings Screen

3 Select the channel to magnify, and set the magnification.



Select the input module (unit) and channel.

Waveform display/ non-display

Vertical axis display magnification

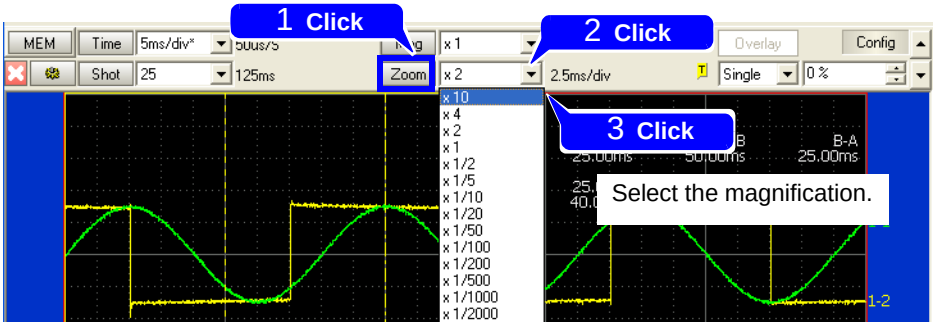
Click

[Close] when finished setting

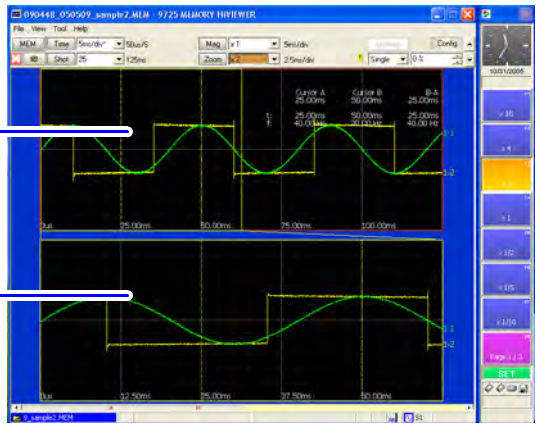
Magnifying a Section of the Horizontal Axis (Zoom)

MEM REALTIME REC&MEM

A waveform can be displayed simultaneously with any zoomed section of itself.



The zoomed screen appears.



Use the scroll bar to display the section you want to view.

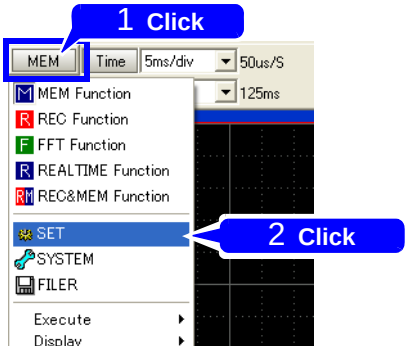
To cancel the zoomed display Click the Zoom button again.

Setting the Display Area and Vertical Axis Position (Variable Function)

The display area and position of the vertical axis can be set anywhere from the Channel Settings screen.

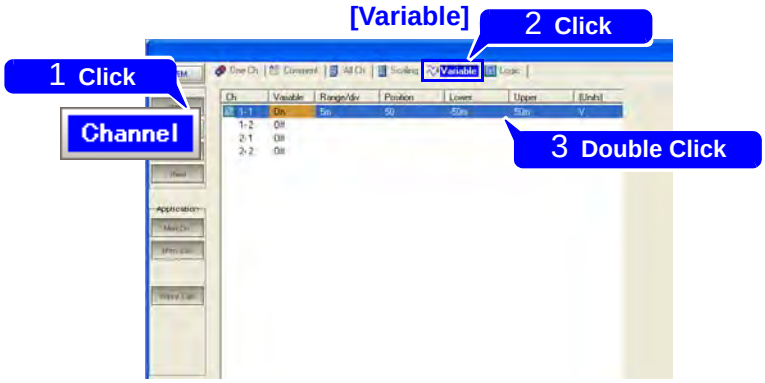
1 Click [SET] in the Function menu.

The settings screen appears.



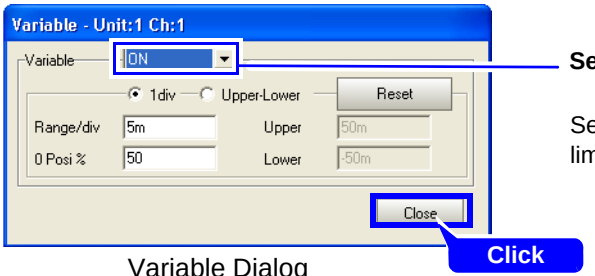
2 Click the Channel -[Variable] page on the settings screen, and double click in the list.

The [Variable] dialog appears.



[Variable] Page on the Channel Settings Screen

3 Click the item to change in the dialog, and select from the pull-down menu.



Variable Dialog

Set the waveform display Variable item to [ON].

Select either per-division ("1 div") or Upper-Lower limit setting, and enter the desired values.

[Close]
when finished setting

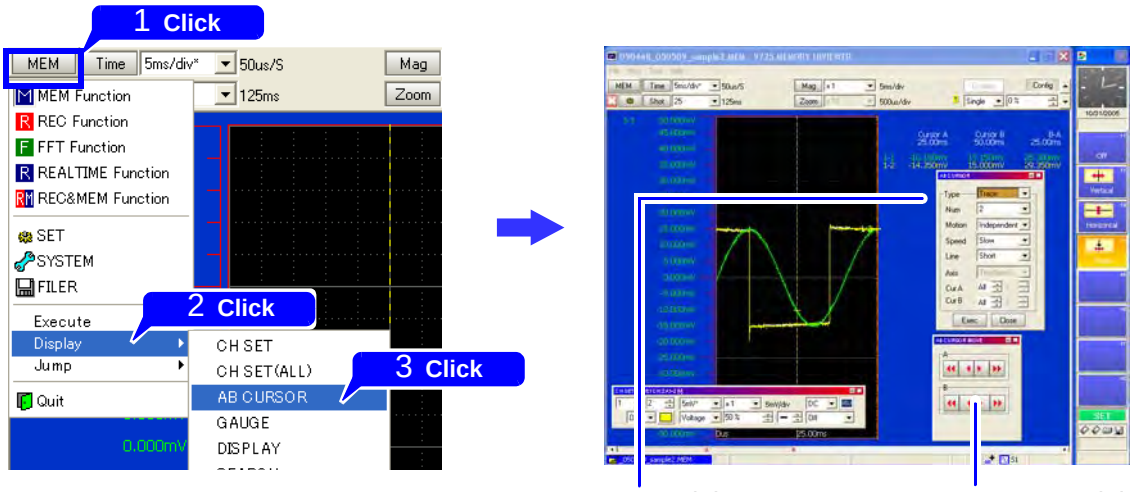
Viewing Measurement Values (Cursor Measurement)

Depending on the cursor type, the value of the waveform at the cursor position can be displayed. The cursor types are as follows:

- Vertical Cursor.....Displays time and frequency.
- Horizontal Cursor .....Displays voltage value.
- Trace Cursor .....Displays time and voltage values.

1 Click [Display]-[AB CURSOR] in the Function menu.

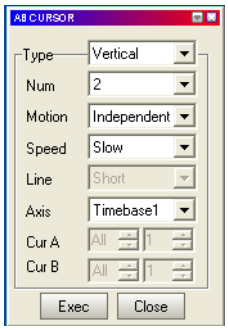
The [AB CURSOR] dialog appears.



AB CURSOR Dialog
Select the cursor type and other settings.

AB CURSOR MOVE Dialog
Use to move the cursors.

2 Make cursor settings.



AB CURSOR Dialog

Type..... Select the cursor type. (Vertical, Horizontal, Trace*)

Num..... Select the number of cursors to enable. (1 or 2)

Motion..... (When 2 cursors are enabled) Select the cursor motion method. (Independent or Together)

Speed ..... Select the cursor speed. (Fast, Medium or Slow)

Line..... (When the Trace cursor is selected) Select the cursor length. (Short or Long)

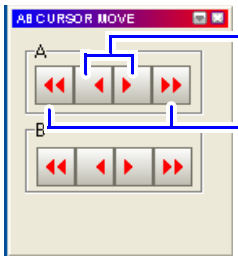
Axis..... Select the Axis to serve as the origin of cursor movement.

Region ..... Select to display cursors on the Memory or Recorder waveform. (REC&MEM function)

Cur A/ Cur B .. Select the channels for which to display cursor values.

*. Trace cursor only in the FFT function

3 Move the cursor along the waveform to view measured values.



Move one data point at a time

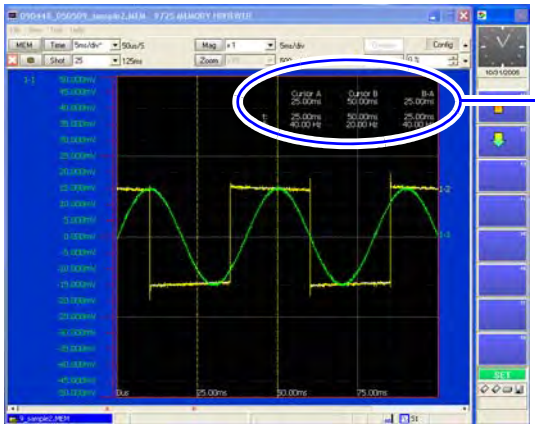
Move cursor quickly according to the speed setting

AB CURSOR MOVE Dialog
(not displayed on the 8860 series)

Move cursors A and B by clicking their respective buttons.

Cursor movement speed depends on the [Speed] setting in the [AB CURSOR] dialog.

You can also move the cursor by dragging it on the screen.

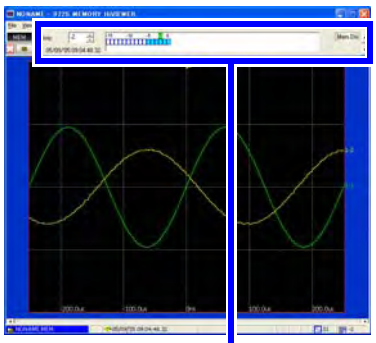


Measurement values are displayed.

Viewing Past Waveforms

MEM

By loading waveform data that was acquired with the same measurement configuration settings, up to sixteen waveform files can be displayed by switching between blocks. Each data block constitutes one waveform data file.

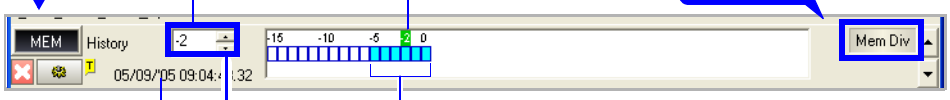


Green indicates the currently selected history block

Display the [Mem Div] setting items.

History number

1 Click



Trigger time of the data in the selected block

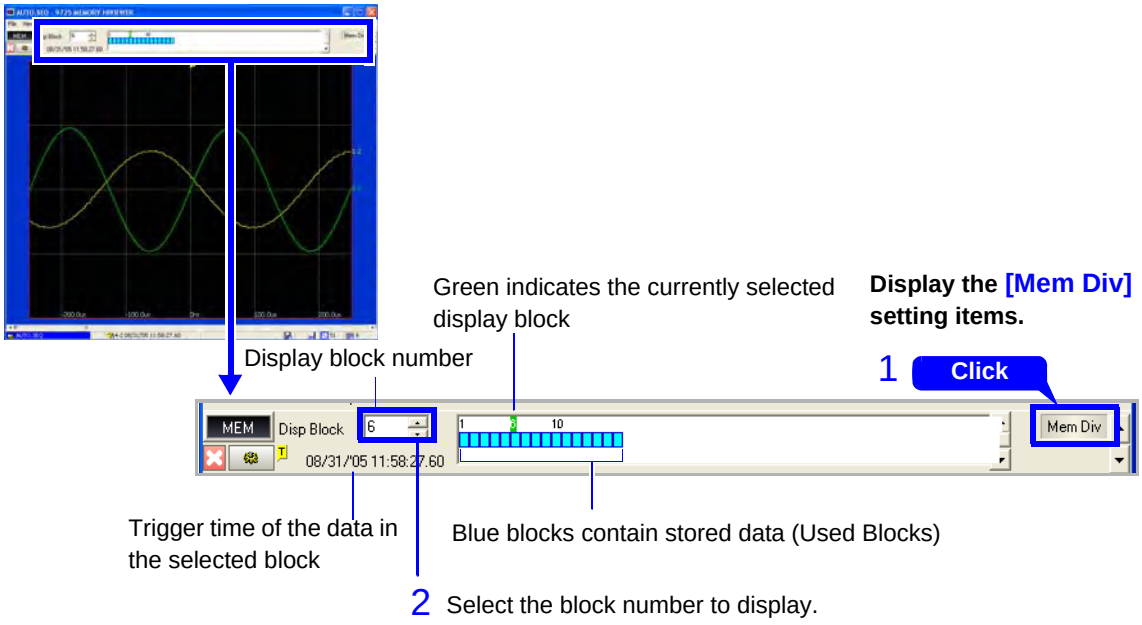
Blue blocks contain stored data (Used Blocks)

2 **Select the history number to display**

Memory blocks with no stored measurement history cannot be displayed.

Viewing Waveforms in Every Block (only for data measured using the memory division function) MEM REC&MEM

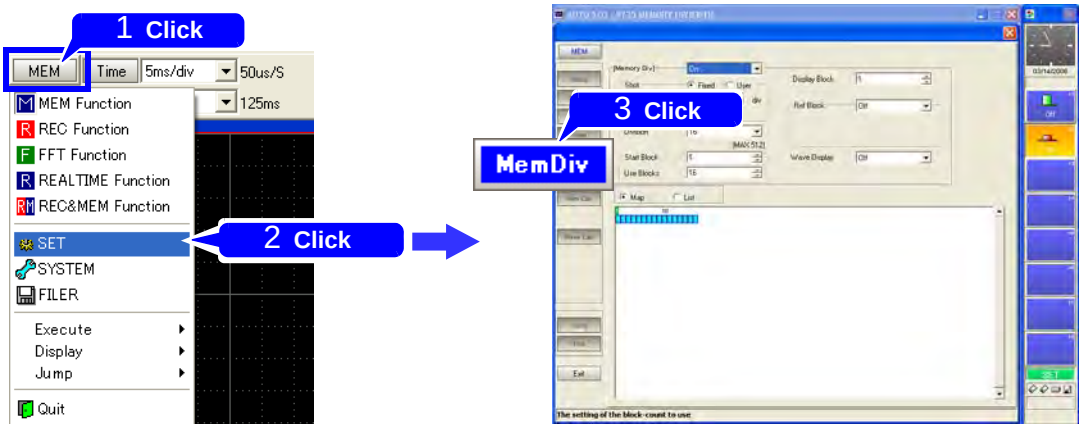
When loading waveform data that was stored using the memory division function, the usage status of blocks and waveforms stored in each block can be displayed.



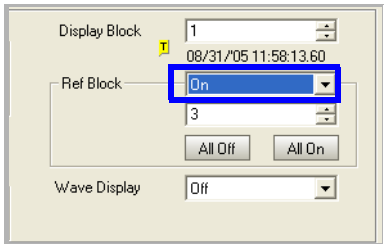
To compare with other waveforms

Any waveform can be browsed and displayed as an overlay.

1 Click [SET] in the Function menu, and MemDiv on the settings screen.

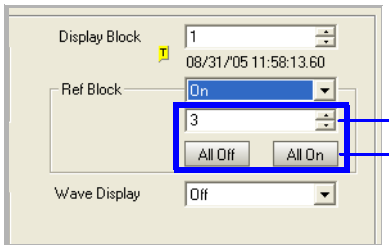


2 Set the Reference Block setting (Ref Block) to [On].



3 Select whether to reference every block.

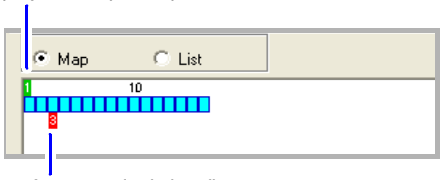
(Initially, all are set to Off.)



Select the block number
Enables (F8: On) or disables (F7: Off) reference blocks

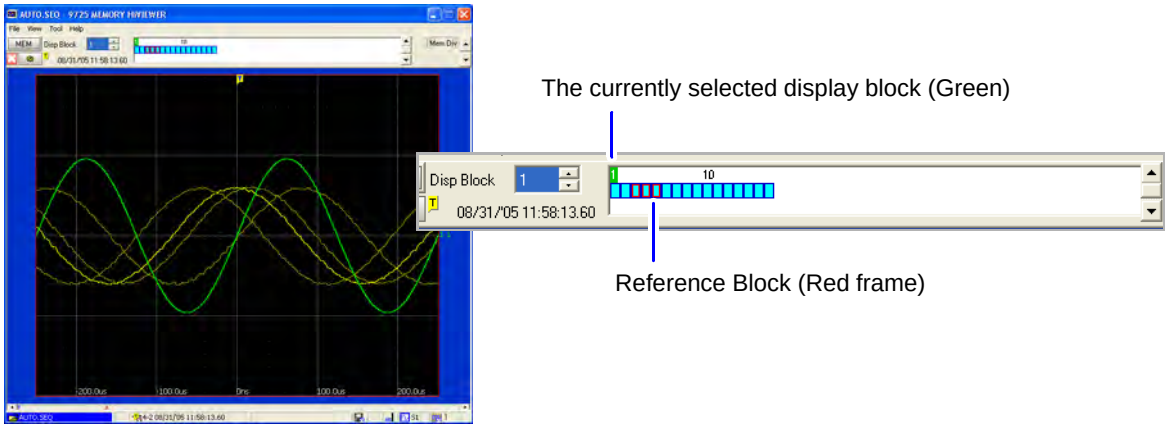
To overlay all waveforms, select the [All On] button

Display Block (Green)



Reference Block (Red)

4 Click [Close] to return to the Waveform screen.



The currently selected display block (Green)

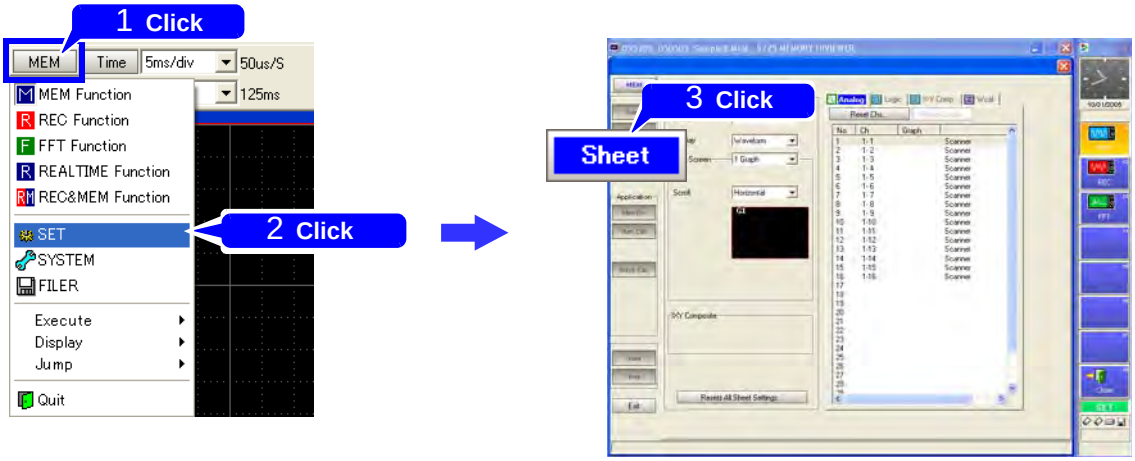
Reference Block (Red frame)

Viewing Waveforms as Numerical Values

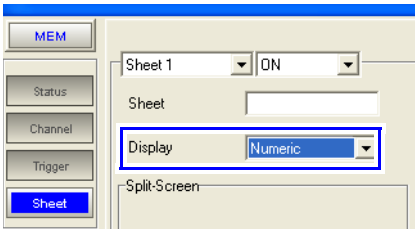
MEM REC REALTIME REC&MEM

To display waveform data as numerical values, change the Display setting on the Sheet Settings screen.
Refer to the 8860 series' *Instruction Manual* for details.

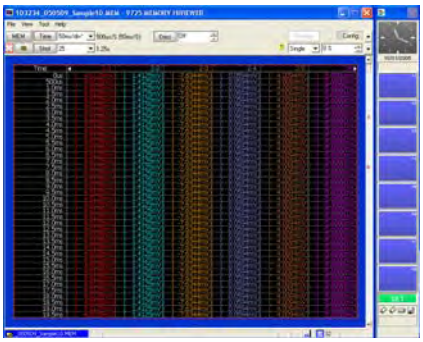
1 Click [SET] in the Function menu and Sheet on the settings screen.

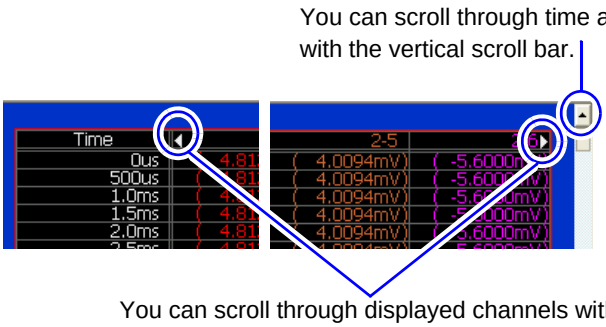


2 Select [Numeric] for the Display setting.



3 Click [Close] to return to the Waveform screen.





Calculating and Analyzing Measurement Data

You can perform numerical and waveform calculations (⇒ p.52) on waveform data loaded after measurement, and view calculation results on the Waveform screen.

Applying Numerical Calculations to Measurement Data

MEM

Procedures for Numerical Calculation

Load data for calculation → Specify calculation range → Select the calculation type → Execute calculations → Display calculation results on the Waveform screen

The following types of numerical calculation are available for analysis. Calculation results are displayed as numerical values.

- Average value
- RMS value
- Peak-to-Peak (P-P) value
- Maximum value
- Time to Maximum value
- Minimum value
- Time to Minimum value
- Period
- Frequency
- Rise Time
- Fall Time
- Standard Deviation (SD)
- Area value
- XY Area value
- Time to Specified Level
- Pulse Width
- Duty Ratio (percentage)
- Pulse Count
- Four arithmetic operations on numerical calculation results

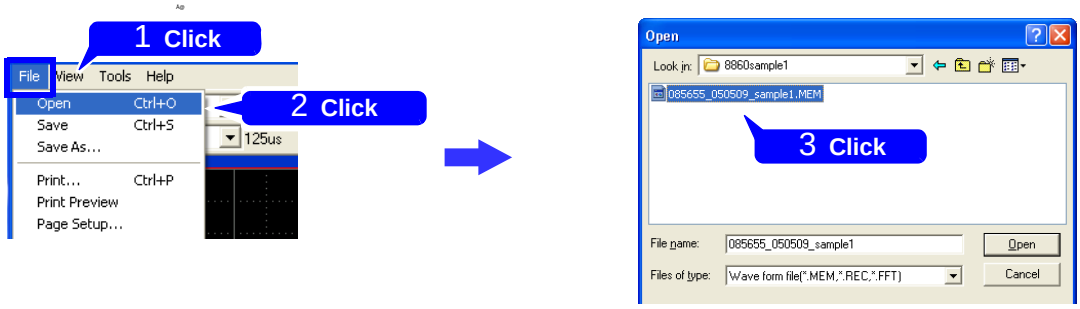
(Total: 19 types)

Calculation within the range specified by A/B cursors
Numerical calculations can be limited to the range specified by A/B cursors.

1 Load the data

To load a waveform file, from the menu bar, click [File]-[Open].

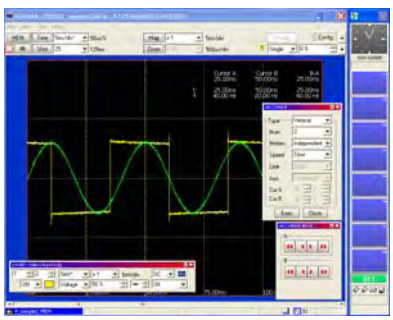
See "Loading Data (Waveform and Settings Files)"(⇒ p.22)



2 Specify the calculation range on the Waveform screen

Display the A/B cursors to specify the calculation range.

See "Specifying a Waveform Area"(⇒ p.39)



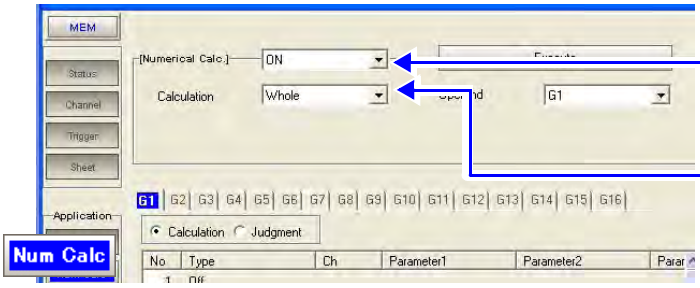
If a range is not specified with the A/B cursors, the whole waveform will be subject to calculation.
If only one cursor is enabled, the data from the cursor position to the end of the waveform will be subject to calculation.

If calculation settings have already been made (⇒ p.51)

3 Select the calculation range on the Num Calc screen

Click [SET] on the Function menu, and Num Calc on the Settings screen.

The Num Calc screen appears.

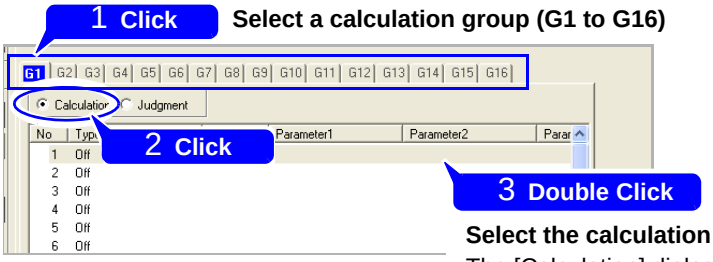


1 **Set the Numerical Calc item to [ON].**

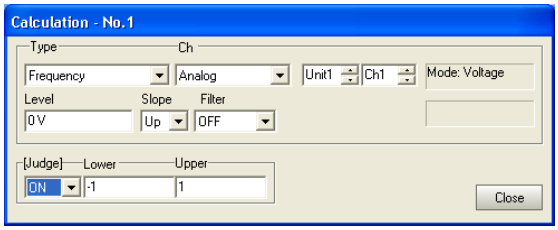
2 **Select the calculation range setting.**
Select either [Whole] for the whole waveform, or [A-B] for just a cursor-defined portion.

4 Select the calculation type

Select the [Calculation] radio button on the Num Calc screen.



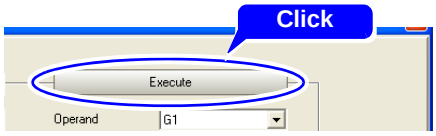
Select the calculation number (No.) to set.
The [Calculation] dialog appears.



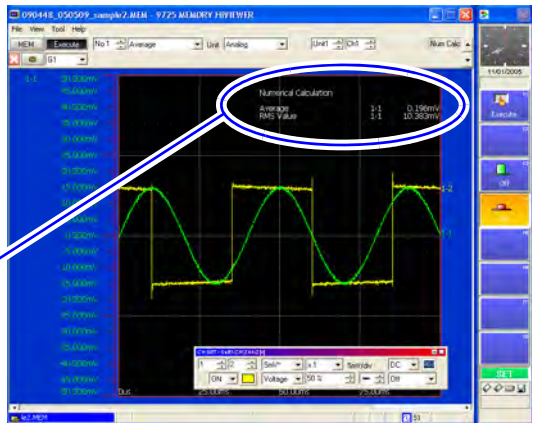
Select the calculation type and other settings.

5 Execute calculations

Select the desired calculation group, and click the [Execute] button.



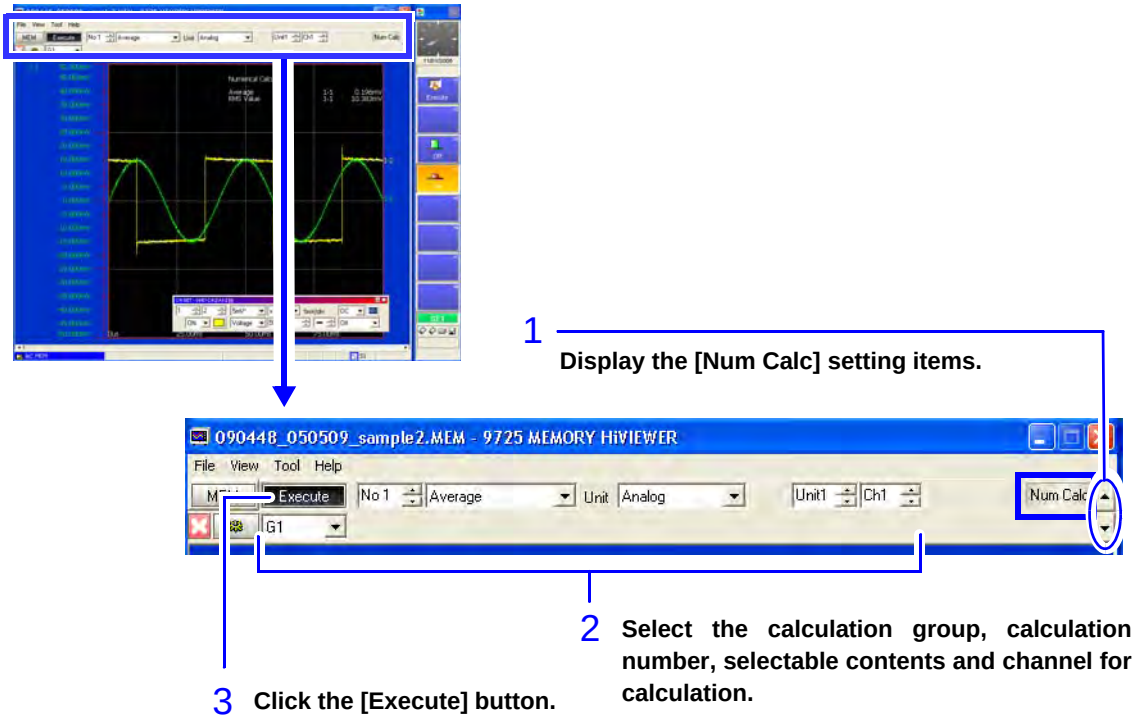
When calculation finishes, the Waveform screen is displayed with the results.
To interrupt calculations, press the F11 key to abort.



Numerical Calculation Results

To execute calculation using pre-existing numerical calculation settings, or to repeat numerical calculations

Select the pre-existing calculation settings from the Waveform screen, and calculate.



Applying Waveform Calculations to Measurement Data

MEM

Perform waveform calculations on waveform data loaded after measurement, and view calculation results as waveforms on the Waveform screen.

Procedures for Waveform Calculation

Load data for calculation → Specify calculation range → Select the calculation type → Execute calculations → Display calculation results on the Waveform screen

The following types of waveform calculation are available for analysis. Calculation results are displayed as waveforms.

- Four basic arithmetic operators (+, −, ×, /)
- Absolute value (ABS)
- Exponent (EXP)
- Common logarithm (LOG)
- Square root (SQR)
- Moving average (MOV)
- Parallel movement along the time axis
- First (DIF) and second (DIF2) differential
- First (INT) and second (INT2) integral
- Trigonometric functions (SIN, COS, TAN)
- Inverse trigonometric functions (ASIN, ACOS, ATAN)

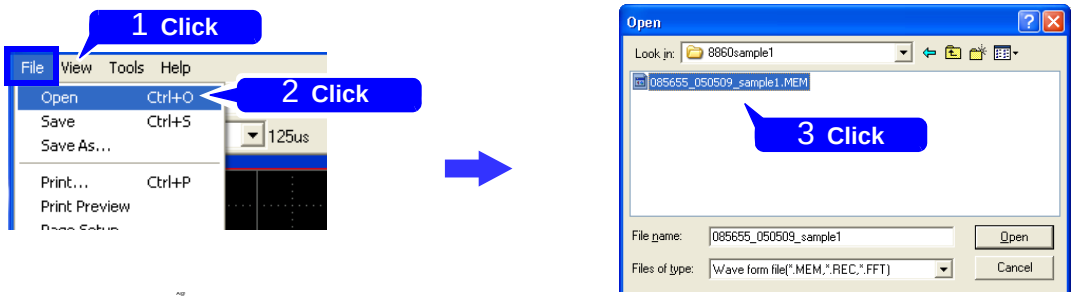
(Total: 11 types)

Calculation within the range specified by A/B cursors
Waveform calculations can be limited to the range specified by A/B cursors.

1 Load the data

To load a waveform file, from the menu bar, click [File]-[Open].

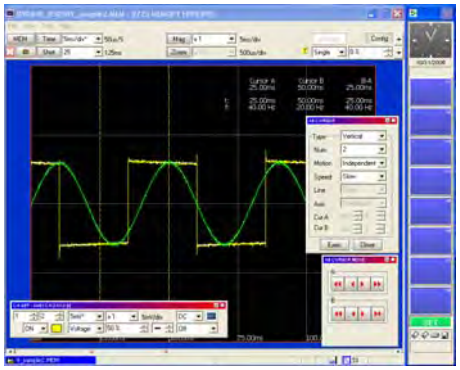
See "Loading Data (Waveform and Settings Files)"(⇒ p.22)



2 Specify the calculation range on the Waveform screen

Display the A/B cursors to specify the calculation range.

See "Specifying a Waveform Area"(⇒ p.39)



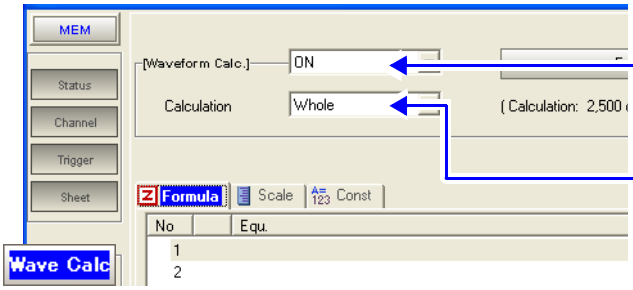
If a range is not specified with the A/B cursors, the whole waveform will be subject to calculation.
If only one cursor is enabled, the data from the cursor position to the end of the waveform will be subject to calculation.

If calculation settings have already been made
(⇒ p.54)

3 Select the calculation range on the Calculation Settings screen

Click [SET] on the Function menu, and Wave Calc on the Settings screen.

The Wave Calc Settings screen appears.

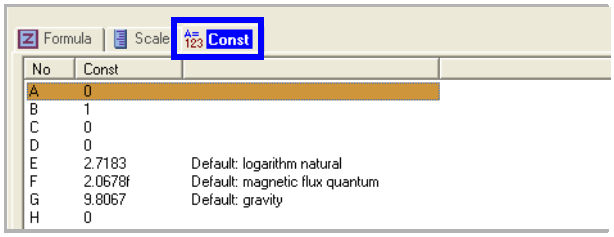


1 **Set the Waveform Calc item to [ON].**

2 **Select the calculation range setting.**
Select either [Whole] for the whole waveform, or [A-B] for just a cursor-defined portion.

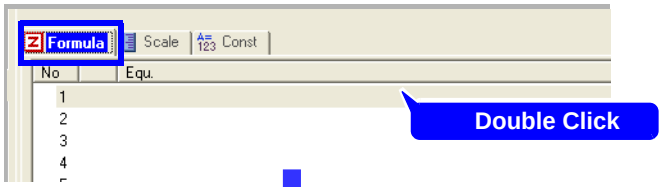
4 Register constants for the calculation formula

Click the [Const] page on the Wave Calc Settings screen, and set any constants needed for calculations.



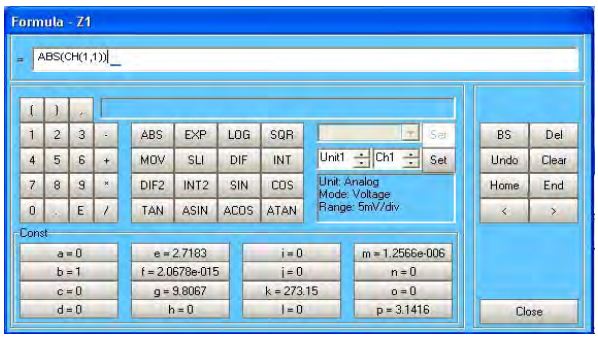
5 Enter the calculation formula

Click the [Formula] page on the Wave Calc Settings screen, and enter the calculation formula.



Select the calculation (formula) number to set from the list of waveform calculation formulas.

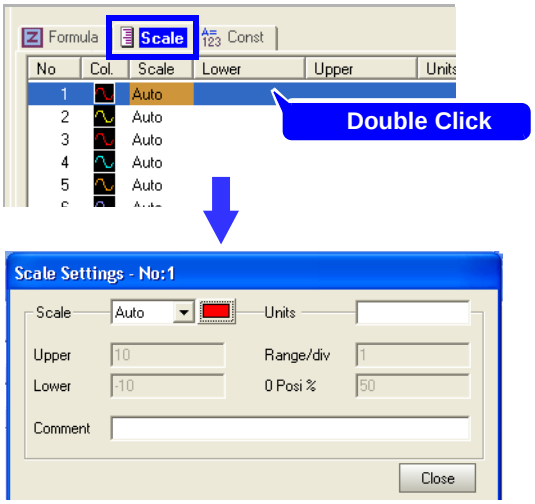
The [Formula] dialog appears.



Enter the calculation formula.

6 Select the display type for calculation results

Click the [Scale] page on the Wave Calc Settings screen and select the display color and scale for calculation results.



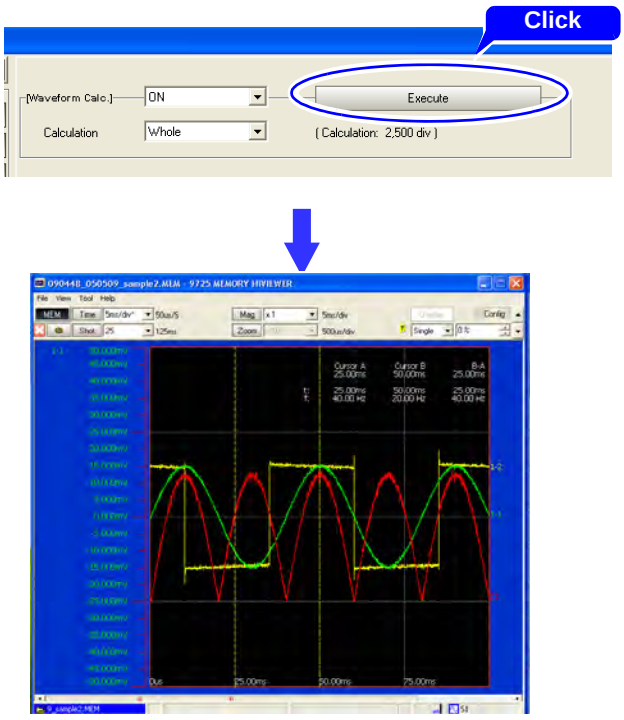
Select the formula number to change.

The [Scale Settings] dialog appears.

Select the trace color, measurement units and scaling, and enter comments.

7 Execute Calculations

Click the [Execute] button on the Wave Calc Settings screen to execute calculations.



When calculation finishes, the Waveform screen is displayed with the results.
To interrupt calculations, press the F11 key to abort.

Unless a channel is selected on the Sheet Settings screen for display, it does not appear on the Waveform screen.
(⇒ p.33)

Applying FFT Calculations to Measurement Data

MEM FFT

Only waveform data that was measured using the memory function can be analyzed.
Load data to be analyzed from either the memory function or the FFT function.

Procedures for Waveform Calculation

Load data in memory function for analysis → Select FFT function (Set the [Reference] item to [From Mem]) → Set the FFT analysis condition → Execute analysis → Display analysis results on the Waveform screen

The following types of FFT analysis are available. Calculation results are displayed as waveforms.

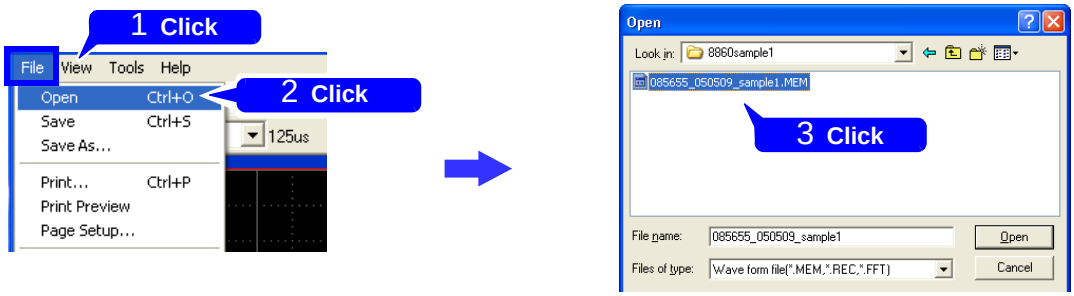
- Storage waveform
- Linear spectrum
- RMS spectrum
- Power spectrum
- Power spectrum density
- Cross-power spectrum
- Auto-correlation function
- Histogram
- Transfer function
- Cross-correlation function
- Impulse response
- Coherence function
- 1/1 Octave analysis
- 1/3 Octave analysis
- Phase spectrum
- Power spectrum density (LPC)

(16 types)

1 Load the data

To load a waveform file, from the menu bar, click [File]-[Open].

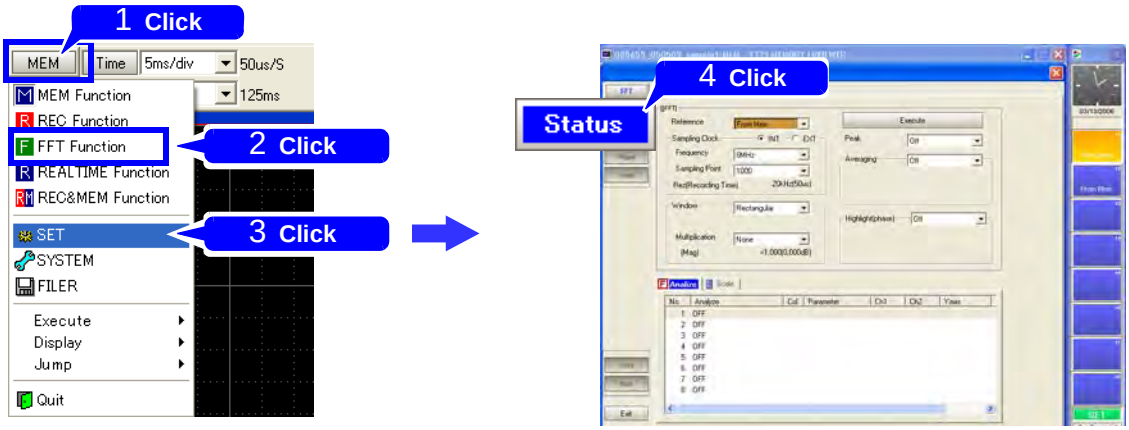
See "Loading Data (Waveform and Settings Files)"(⇒ p.22)



2 Select the FFT function Settings screen.

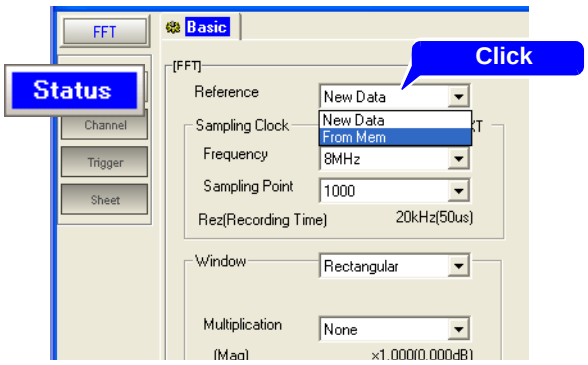
From the Function menu, click [FFT Function] and [SET], and then click Status on the settings screen.

The Status Settings screen appears.



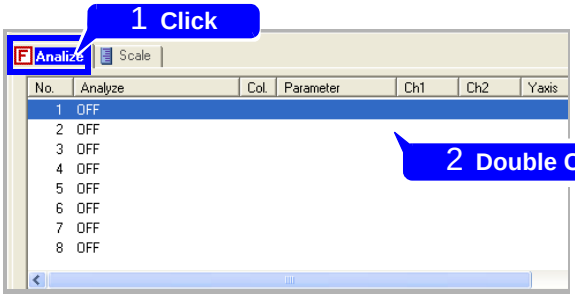
3 Set the analysis input data source to [From Mem]

From the pull-down menu of the [Reference], click [From Mem].



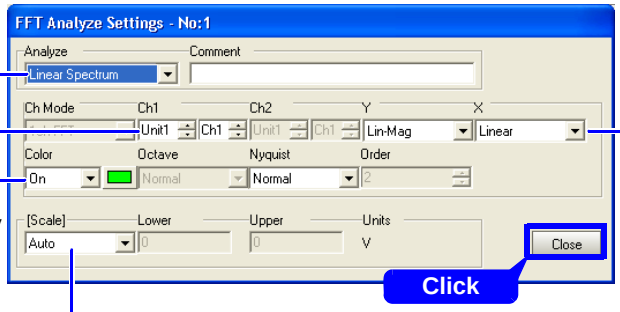
4 Set the type of the analysis

Click the [Analyze] page on the Status Settings screen, and set the type of FFT analysis.



Select the analysis number to set from the list

The [FFT Analyze Settings] dialog appears.



FFT analysis mode

Channel for analysis

Waveform display setting and color

Display range (scaling) for analysis results

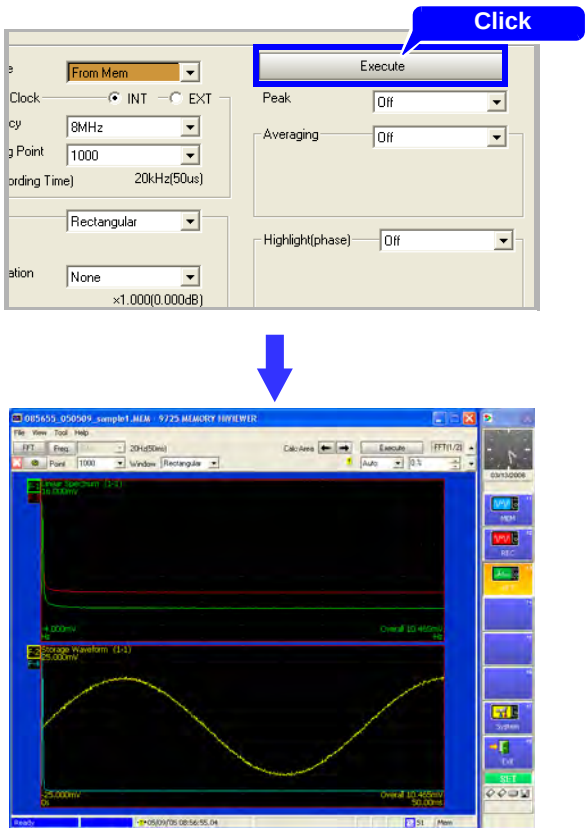
X and y axes for display of analysis results

[Close] when finished setting

Unless a channel is selected on the Sheet Settings screen for display, it does not appear on the Waveform screen. (⇒ p.33)

5 Execute calculations

Click the [Execute] button on the Status Settings screen to execute analyze.



When calculation finishes, the Waveform screen is displayed with the results.

Waveform screen

Analyzing after Specifying an Analysis Starting Point

A starting point for FFT analysis can be specified on an existing memory waveform before analyzing.

Analysis is performed once on the specified number of analysis points beginning with the specified starting point, and analysis results are displayed.
This is convenient for analyzing only a specific range. However, if averaging is enabled, analysis repeats for the specified averaging count.

The starting point can be specified by one of the following methods:

(1) Verifying the analysis starting point while viewing analysis data (⇒ p.58)

The memory waveform and analysis results are displayed at the same time on the Waveform screen (Sheet Settings screen: Display type [Wave+FFT] or [Wave+Nyquist]) and the analysis starting point is specified on the memory waveform.

(2) Performing FFT analysis after specifying a starting point on a memory waveform using the A/B cursors (⇒ p.60)

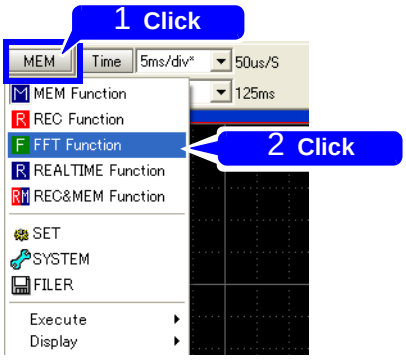
The analysis starting point is specified using the A/B cursors with the Memory function. If the cursors are not displayed, analysis begins at the start of the data.
The starting position cannot be verified while the FFT function is enabled.

Procedure 1. Verifying the analysis starting point while viewing analysis data

1 Display the waveform with the FFT function

(Ignore this step if the FFT function is already selected.)

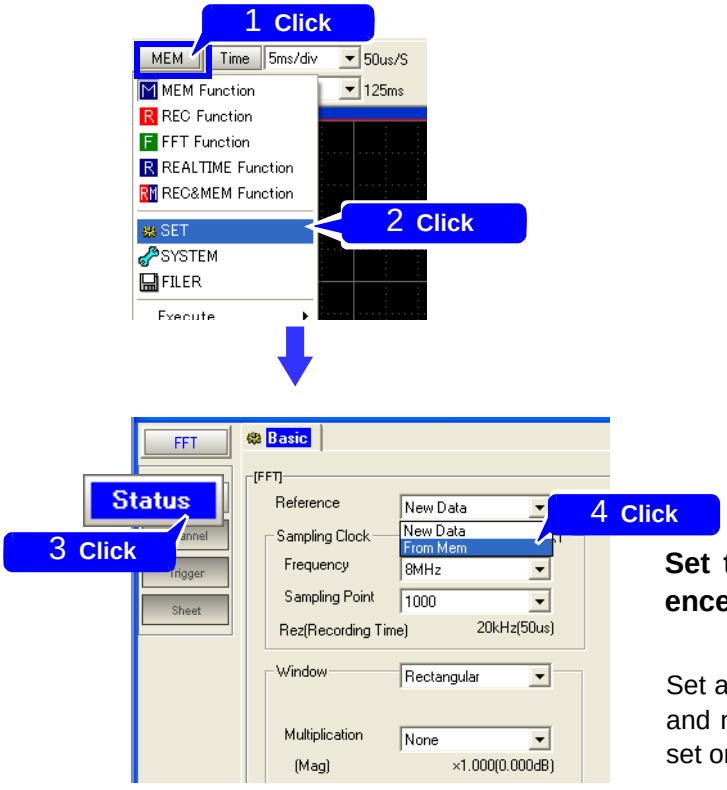
From the Function menu, click [FFT Function].



2 Set the analysis condition on the Status Settings screen in the FFT function

From the Function menu, click [SET], and then click Status on the settings screen.

The Status Settings screen appears.



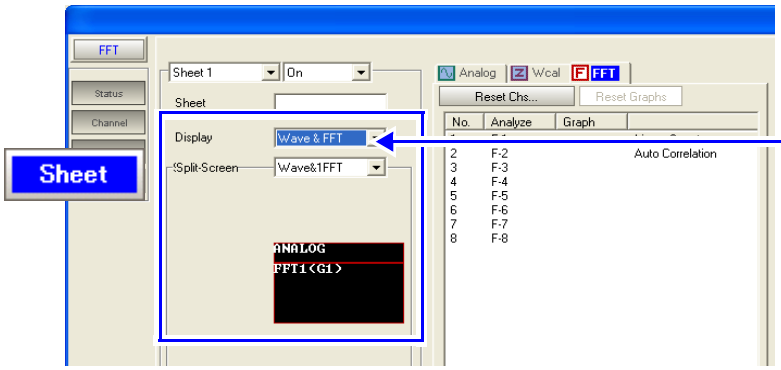
Set the analysis input data source (Reference) to [From Mem].

Set analysis conditions such as the analysis mode and number of analysis points (these can also be set on the Waveform screen).

3 Set the display methods on the Sheet Settings screen

Click Sheet on the settings screen.

The Sheet Settings screen appears.



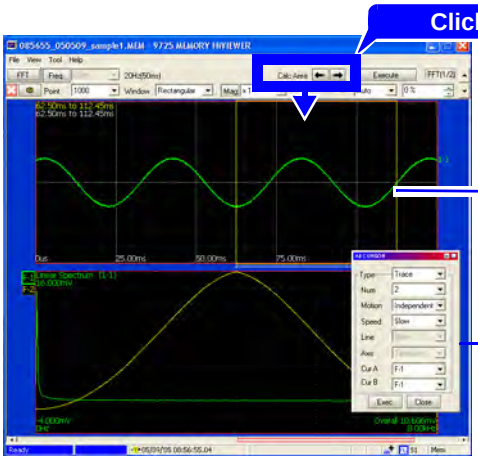
[FFT] page on the Sheet Settings screen

Set the display type to [Wave+FFT] or [Wave+Nyquist].

To use split-screen display, set graph assignments on the [FFT] page.

4 Specify the location of the analysis input data on the Waveform screen

Click the [Close] button on the settings screen to display the Waveform screen.



Specify the location of the analysis input data.

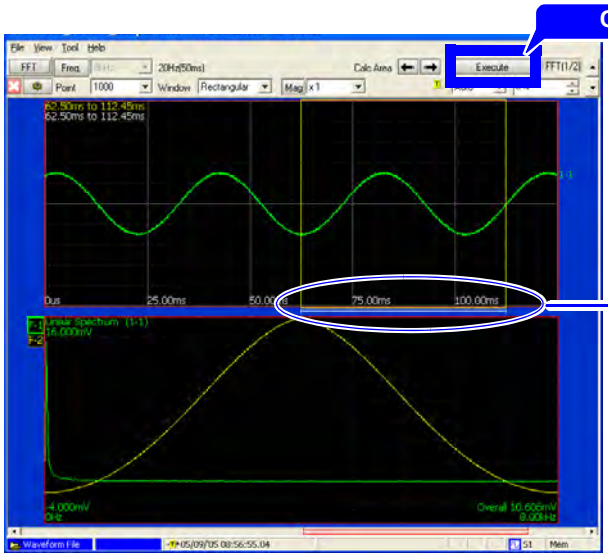
Select analysis conditions as occasion demands.

The analysis segment of the memory waveform for one pass is displayed.

You can set the scrolling speed of the calculation start point.
To display dialog: From the Function menu, click [Display]-[AB cursor]

5 Execute analysis

Click the [Execute] button on the Waveform screen to execute analyze.

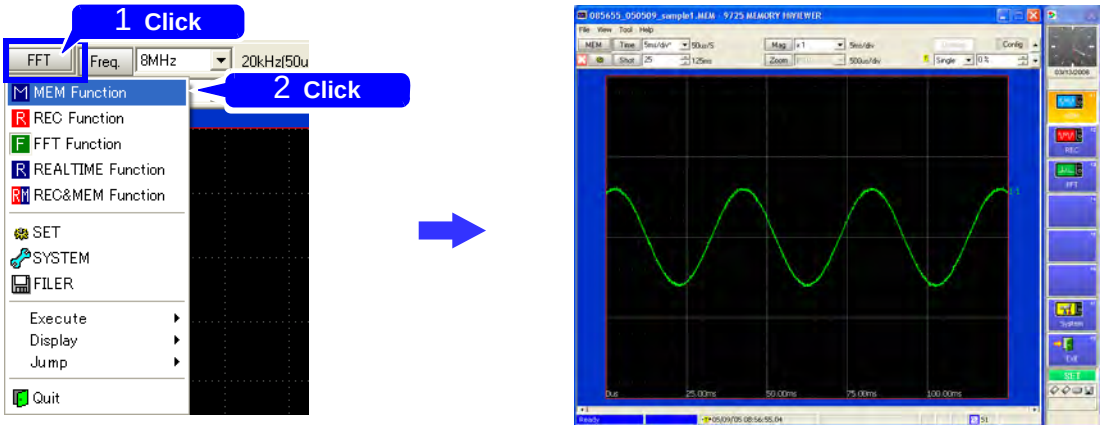


Shows the last analysis segment.

Procedure 2. Performing FFT analysis after specifying a starting point using the A/B cursors

1 Display the waveform with the Memory function

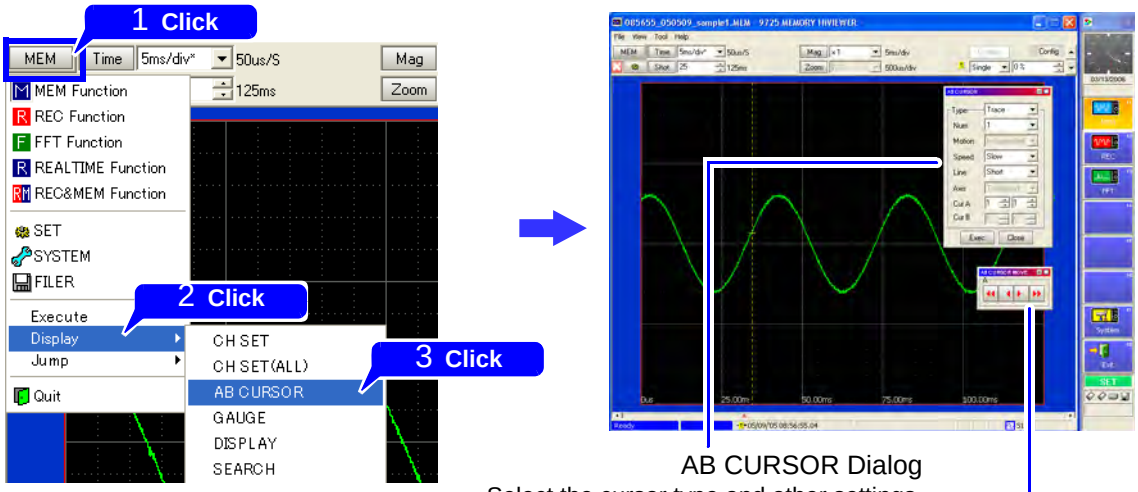
From the Function menu, click [MEM Function] and display the waveform to analyze.



2 Specify the analysis starting point with the A/B cursors

From the menu bar, click [Display]-[AB Cursor].

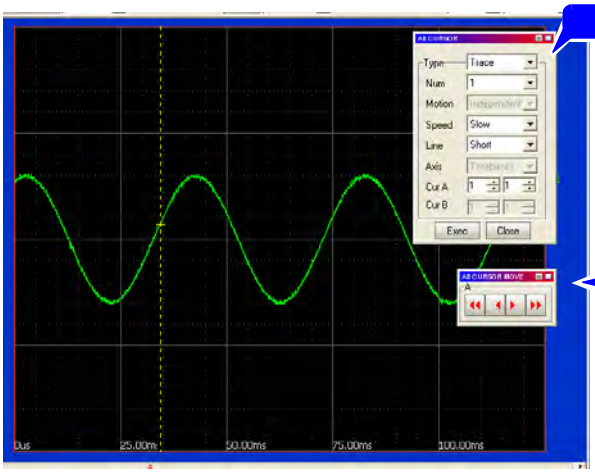
The [AB CURSOR] dialog and [AB CURSOR MOVE] dialog appear.



AB CURSOR Dialog
Select the cursor type and other settings.

AB CURSOR MOVE Dialog
Use to move the cursors.

Specify a starting point using the A/B cursors (Vertical or Trace cursor).



1 Click

Set the type of cursor of the [AB CURSOR] dialog to [Vertical] or [Trace].

2 Click

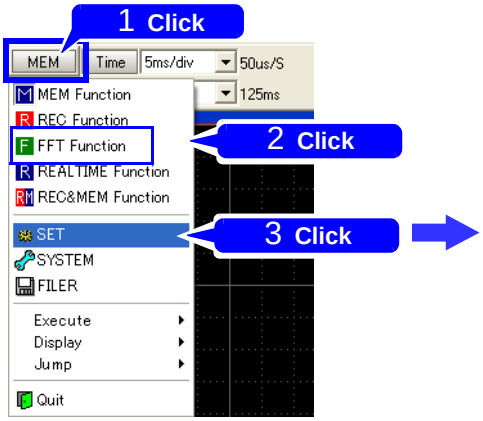
Specify the analysis starting point with the A/B cursors.

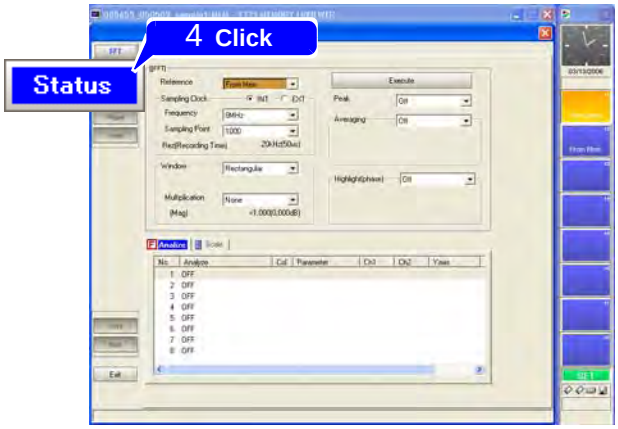
When both A/B cursors are enabled, the analysis starting point is determined by the earliest (left-most) cursor. The length of the waveform segment for FFT analysis cannot be specified using the cursors.

3 Select the FFT function to display the settings screen.

From the Function menu, click [FFT Function] and [SET], and then click Status on the settings screen.

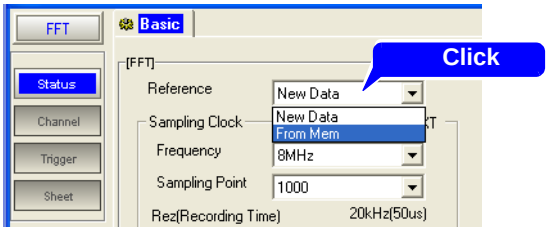
The Status Settings screen appears.





4 Set the analysis input data source to [From Mem]

From the pull-down menu of the [Reference], click [From Mem].

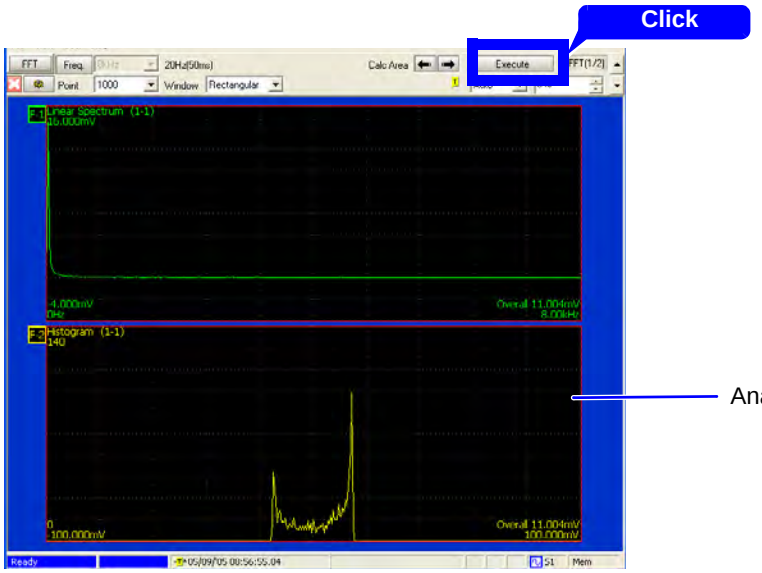


Set analysis conditions such as the analysis mode and number of analysis points (these can also be set on the Waveform screen).

Click the [Close] button to display the Waveform screen.

5 Execute analysis

Click the [Execute] button on the Waveform screen to execute analyze.

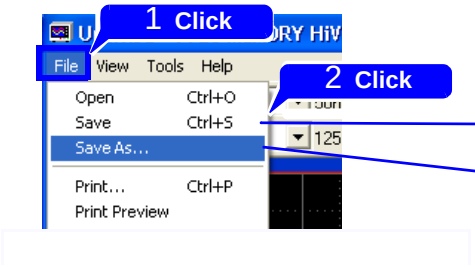


Saving and Printing Measurement Data

Saving Waveform Files

You can save currently displayed waveform data. Along with waveform data, measurement configurations can also be saved.
Files can be saved either by overwriting existing data, or saving with a specified file name. Original data is not backed up when you select [Save], so be careful not to overwrite it inadvertently.

1 From the menu bar, click [File]-[Save] or [File]-[Save As].

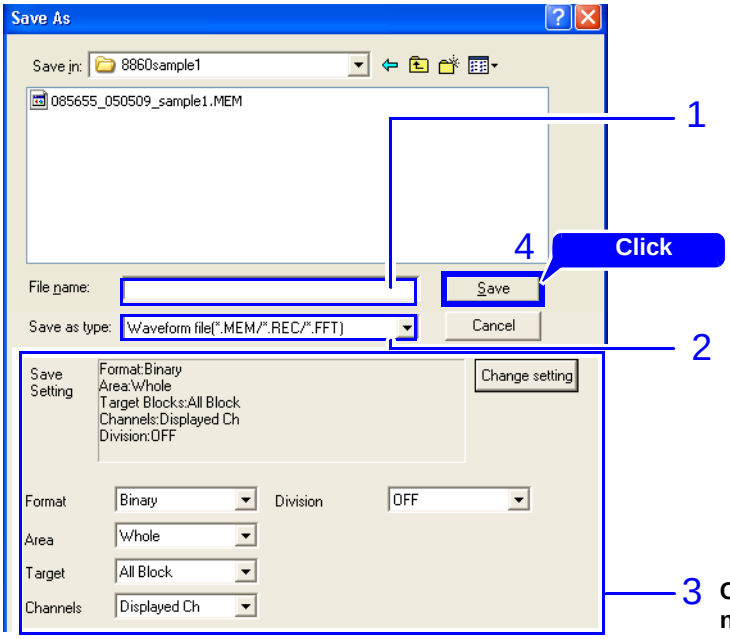


Either can be selected.
Save

Save As

The [Save As] dialog appears.

2 If you have chosen to save with a new file name, enter that file name. Confirm the save destination, and click [Save].



1 **To save with a new name: Enter the file name.**

2 **Select the file type.**

3 **Change the content to be saved as needed.**

[Format]
Binary : Select this format if waveforms are to be reloaded on the instrument or this application.
Text : Select this format if waveforms are to be read on PC.
CSV : Select this format if waveforms are to be read on PC.
Text (Space) : Select this format if waveforms are to be read on PC.
Text (Tab) : Select this format if waveforms are to be read on PC.

[Area] Select the save area.

[Channels] Select the channels to save.

When using the Memory Division function

[Target] Select the blocks to save.

When [Binary] is selected as the save format

[Division] Select whether to save divided files.

When [Text] or [CSV] is selected as the save format

[Thinning] Set the data thinning number.

[Timebase 2 Interpolation] Select whether to interpolate data.

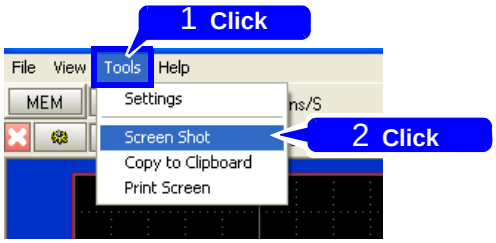
Saving the Display Screen

The Waveform screen can be saved as an image file. The image displayed in the program is saved. You can save an image file in two ways: click [Tools]-[Screen Shot] from the menu (saves only as a bmp file), or click [File]-[Save As] from the menu to save as either a bmp or png file.

Before saving, confirm that everything you want to save is visible on the screen.
The resolution of the saved image depends on the screen size setting (⇒ p.23).

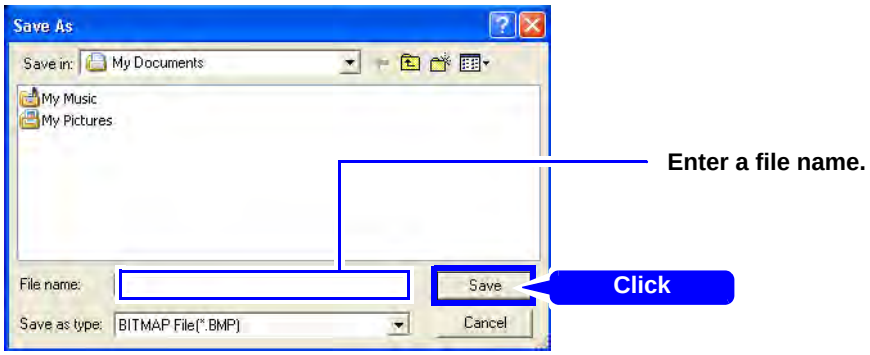
Saving a Screen Shot

1 From the menu bar, click [Tools]-[Screen Shot].



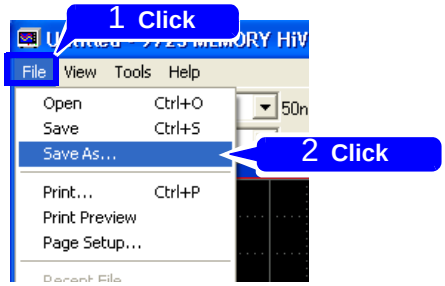
The [Save As] dialog appears.

2 Enter the file name to save, and click [Save].



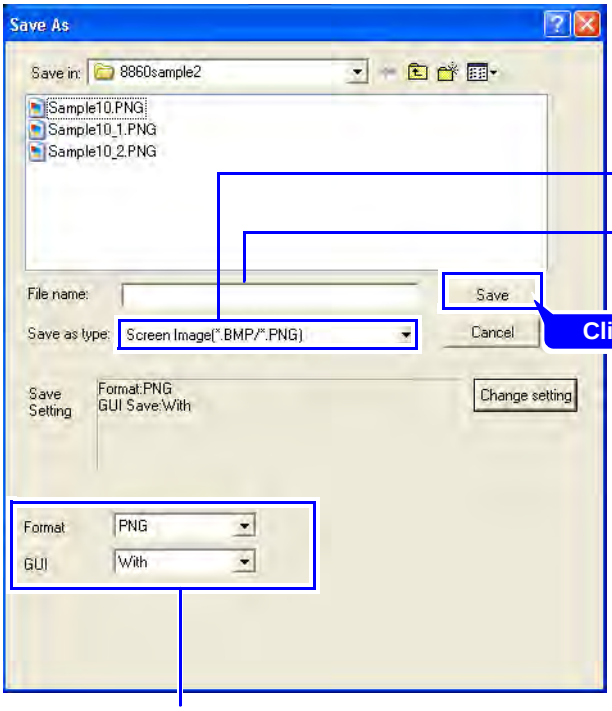
Saving a Screen Image

1 From the menu bar, click [File]-[Save As].



The [Save As] dialog appears.

2 Select [Screen Image] as the file type, and enter the file name to save.



1 **Select [Screen Image].**

2 **Enter a file name.**

4 **Click [Save].**

3 **Select the image file format to save, and whether or not to save the GUI (F-key display) area.**

Format:

BMP Color, BMP Compressed Color, BMP Grayscale or PNG

GUI:

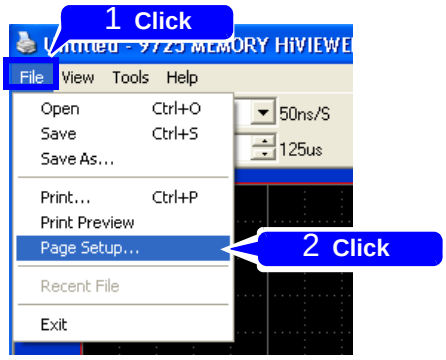
Without	Saves without the GUI area (F-key display).
With	Saves with the GUI area (F-key display).

Setting Up Printing and Confirming Printing Content (Preview)

Before printing, select printer settings such as the printer and paper to use.
Change the settings as needed.

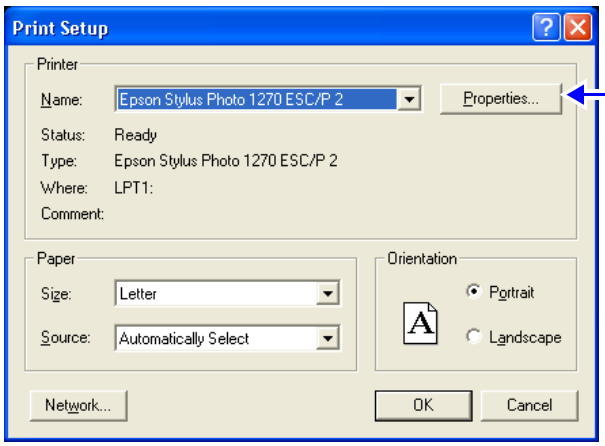
Printer Settings

1 From the menu bar, click [File]-[Page Setup].



The [Print Setup] dialog appears.

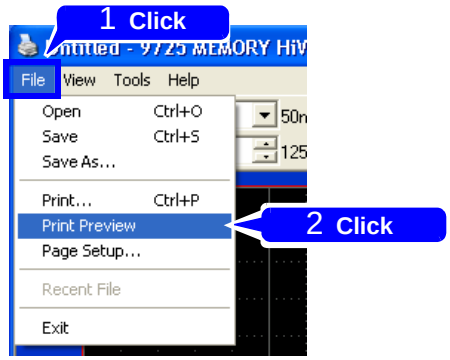
2 Select the printer and paper size to use.



To make more detailed settings click [Properties] and set as needed.

Previewing Printing Content

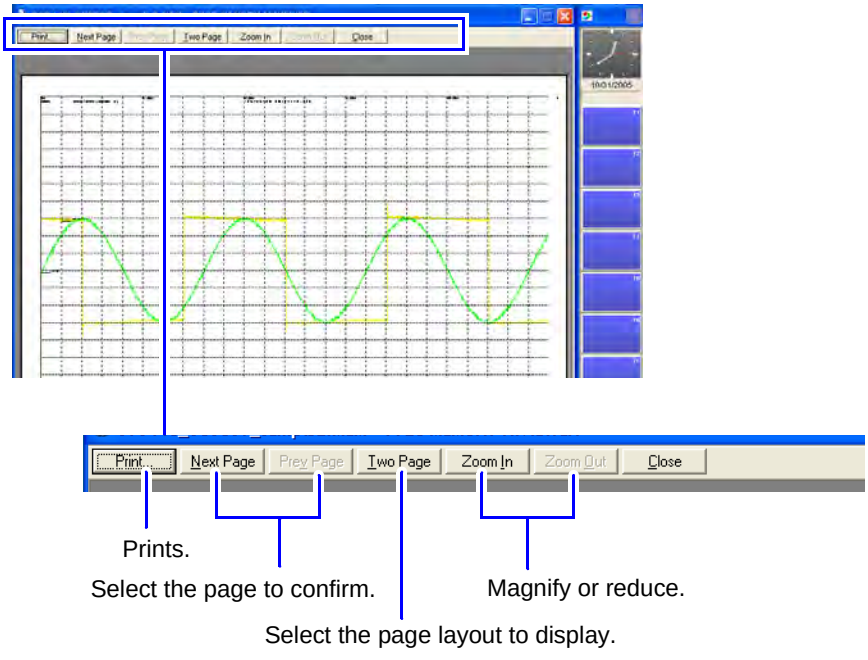
1 From the menu bar, click [File]-[Print Preview].



2 Select the printing type to preview.

Printing types:"Printing Measurement Data"(⇒ p.68)

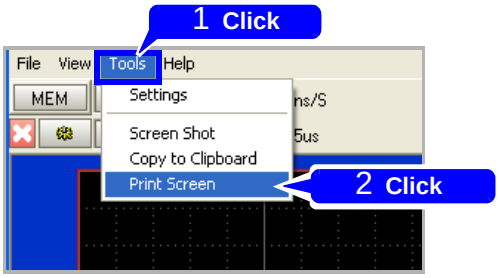
3 Confirm the print configuration, and change print settings as needed.



Printing the Display Screen

The displayed Waveform screen can be printed.
Printing uses the printer and paper size selected with [File]-[Page Setup] on the menu bar. Verify these settings before printing.
Print resolution depends on the screen size setting.(⇒ p.23)

From the menu bar, click [Tools]-[Print Screen].



The [Print] dialog appears.
The screen image is printed.

Printing Measurement Data

The following types of measurement data can be printed. Select the print format from the Print Settings screen.

Print Types

- **Whole Wave*** Prints all loaded waveform data.
  Prints the entire range of waveform data loaded from the instrument.
- **A-B Wave*** Prints the portion of waveform data between the A/B cursors.
- **Trig Wave*** Print 10 divisions of the data before and after a trigger event.
- **Report** Prints the waveform data of the displayed area on the waveform screen, upper and lower limits and analog channel settings.
- **List** Print a list of settings made in the settings screens.
- **Calc Results*** Print numerical calculation results.
- **Screen Image** Print the currently displayed screen.
  Print resolution depends on the screen size setting. (⇒ p.23)
- **Event** Print the contents of all currently set event marks.

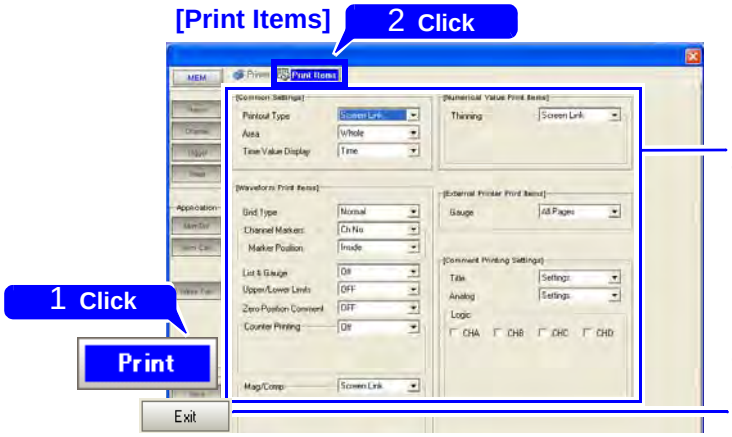
*** Printing is available for both waveforms and numerical values. Select the [Printout Type] from the [Print Items] on the Print Settings screen.**

Printing uses the printer and paper size selected with [File]-[Page Setup] on the menu bar. Verify these settings before printing.

1 (Confirming print settings before printing)

Click [SET] on the Function menu, and Print on the Settings screen.

The Print Settings screen appears.

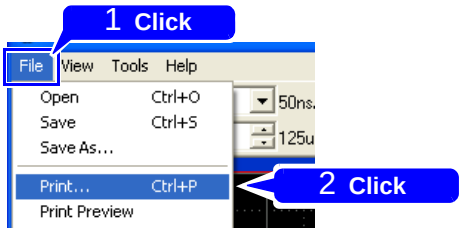


Make print-related settings such as print contents, waveform or numerical value printing selection, and printing of gauges and comments, as needed.
Setting contents are the same as on the instrument itself.
Refer to the instrument's *Instruction Manual* for setting procedure details.

When finished making settings, click [Exit] to return to the Waveform screen.

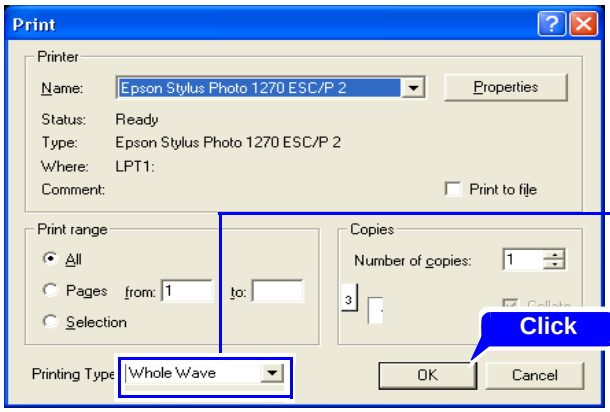
[Print Items] page on the Print Settings screen

2 From the menu bar, click [File]-[Print].



The [Print] dialog appears.

3 Select the desired Printing Type.



1 **Select the Printing Type.**

2 **Click [OK].**

If an error message appears

Printing is not available if no waveform data has been loaded, so you must load measurement data before printing.

Creating a Settings File (Setting and Saving Measurement Configurations)

Measurement configurations consisting of the settings on each setting screen can be saved as settings files. By loading such a settings file into the instrument, measurements can be made using the preset configuration.
Depending on the setting contents, some measurement configurations can also be changed on the Waveform screen.(⇒ p.71)

Procedure to Create a Settings File to Load into the Instrument

Load existing settings data (not needed when creating a new configuration or when using the same configuration as existing measurement data) → **Select the appropriate measurement configuration settings on each settings screen** → **Save as a settings file (".set" extension)** → Load the settings file into the instrument

When creating a new settings file, be certain that the model configuration of the file matches that of the instrument into which the settings will be loaded. (⇒ p.19)

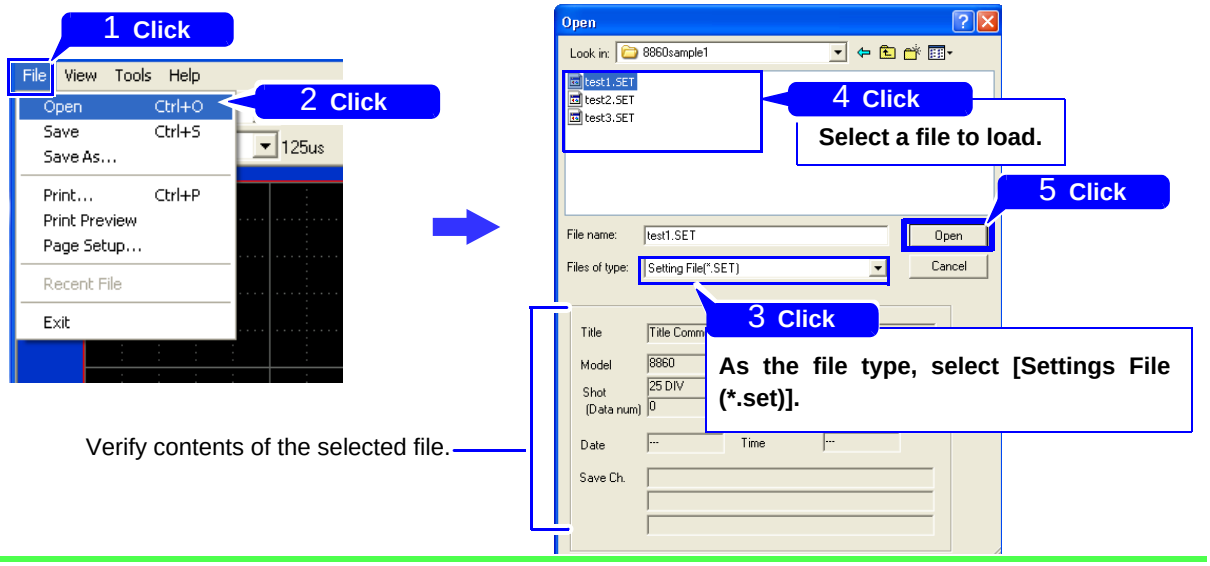
Setting the Measurement Configuration

1 Load data

From the menu bar, click [File]-[Open] and load a settings file.

Measurement data can be used as a settings file.

See "Loading Data (Waveform and Settings Files)"(⇒ p.22)



2 Select the measurement configuration settings

Setting from the Waveform screen (⇒ p.71)
Setting from the Settings screens (⇒ p.73)
Setting from the System screens (⇒ p.78)

Setting from the Waveform Screen

Make changes to the settings at the top of the Waveform screen as needed.
Settings are the same as on the instrument.

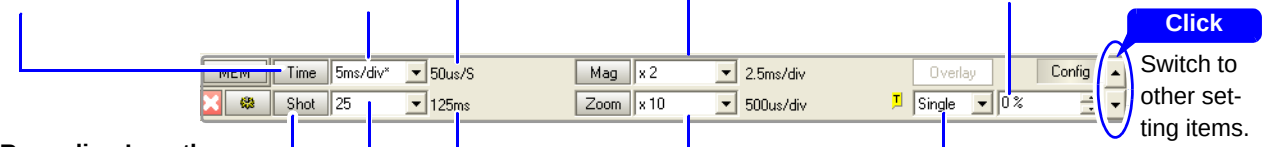
Measurement Configuration and Trigger Criteria [Config]

With the Memory Function

Timebase
Indicates the timebase (time per horizontal division) and sampling rate.
This can be set from the Status Settings screen.

Magnification
Sets the magnification and compression of the time axis (horizontal axis) for the whole waveform.
Clicking the [Mag] button causes the whole waveform to be displayed on one screen.

Pre-Trigger setting
Set to record the measurement data before or after a trigger event.



Recording Length
Indicates the recording length and duration.
Set as the number of divisions to record per unit time.
This can be set from the Status Settings screen.

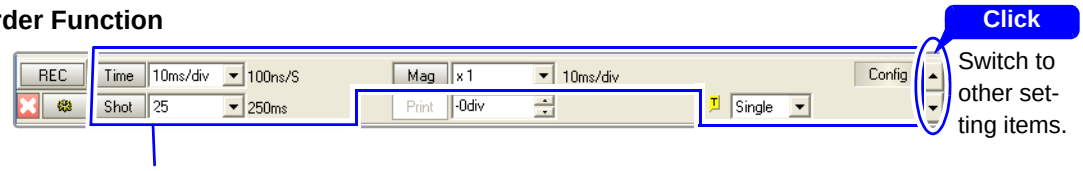
Recording Length

Recording Duration

Zoom
Sets magnification and compression of the time axis (horizontal axis) for a section of the waveform.

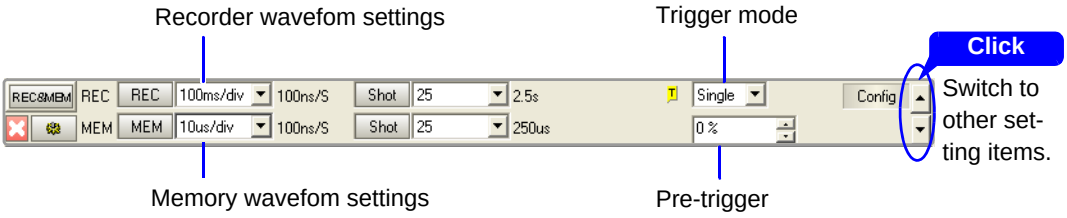
Trigger Mode setting
Sets the awaiting-trigger condition when a measurement is finished (can also be set on the Trigger Settings screen).

With the Recorder Function



Setting methods are the same as for the Memory function.
Selection contents are different.

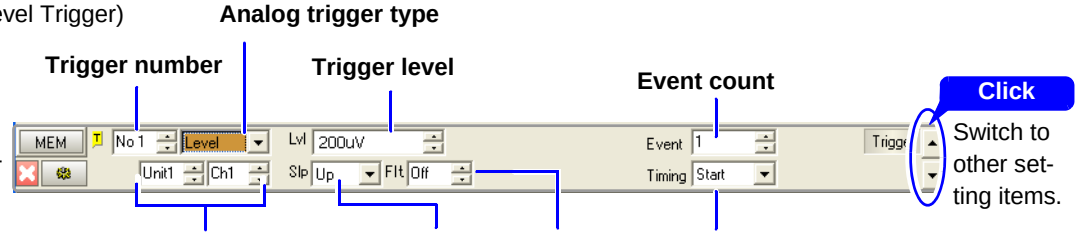
With the REC&MEM Function



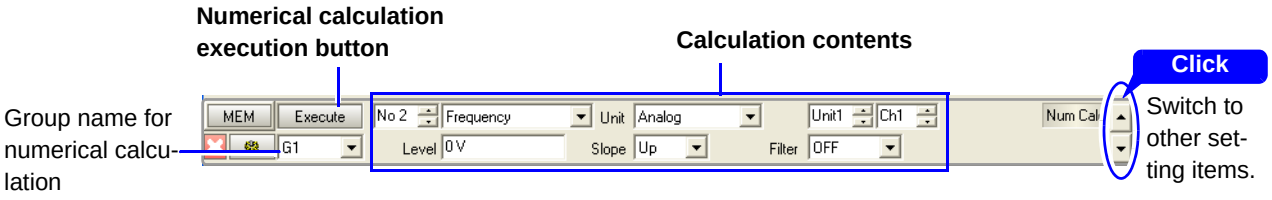
Analog Trigger Settings [Trigger]

(When using a Level Trigger)

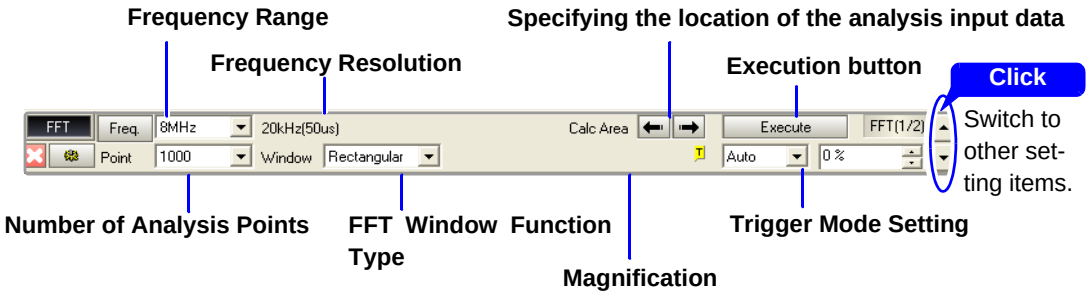
Displayed items depend on the analog trigger type.



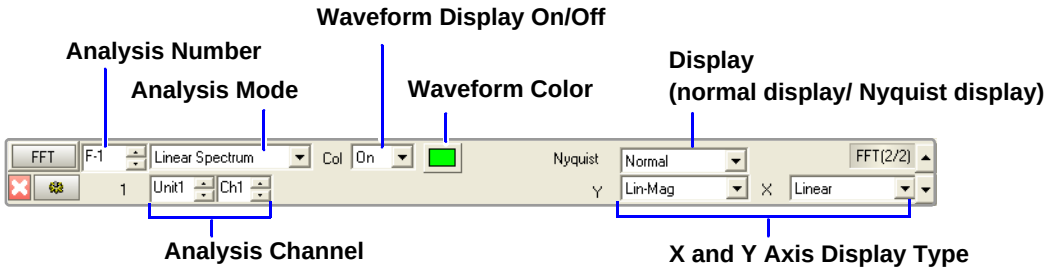
Numerical Calculation Settings MEM [Num Calc]



FFT Function Settings 1 FFT [FFT(1/2)]



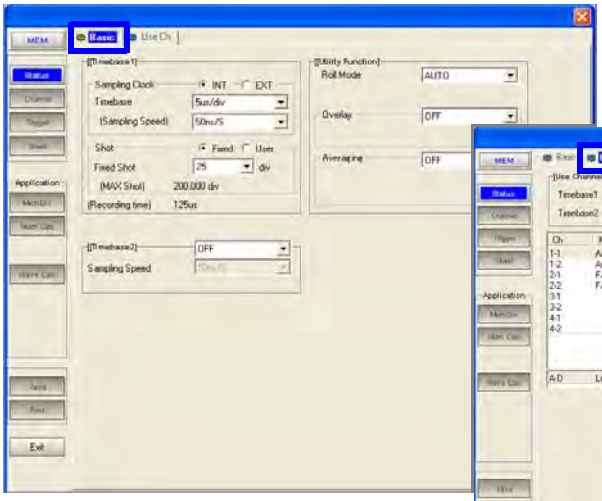
FFT Function Settings 2 FFT [FFT(2/2)]



Making Settings on the settings screens

From the Function menu, click [SET] and select each settings screen.
Settings are the same as on the instrument.

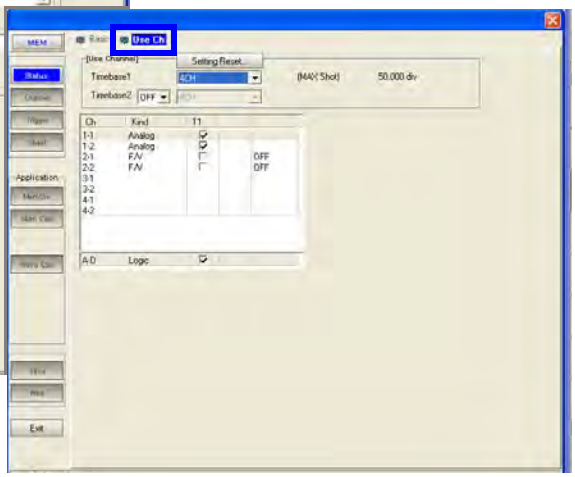
Measurement Configuration Settings (Status Settings Screen) Status



[Basic] Page

The sampling clock, timebase, recording length and Timebase-2 sampling can be set. Also, roll mode and overlay utility functions can be set.

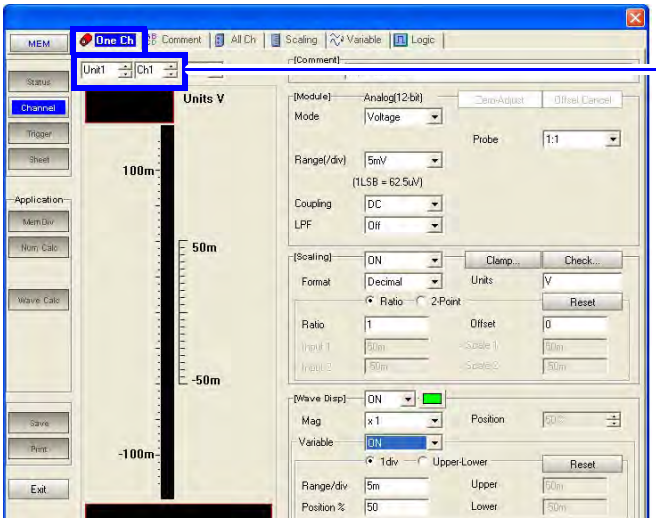
Example: Memory function settings
The [Use Ch] page is not available with other function.



[Use Ch] Page

Channel selections for Timebase-1 and Timebase-2, and logic channel selections can be made here.

Input Channel Settings (Channel Settings Screen) Channel

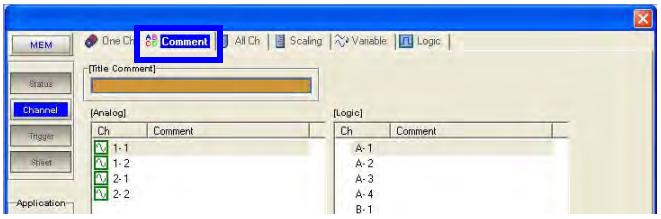


[One Ch] Page

Select the input module (unit) number and channel to be set.

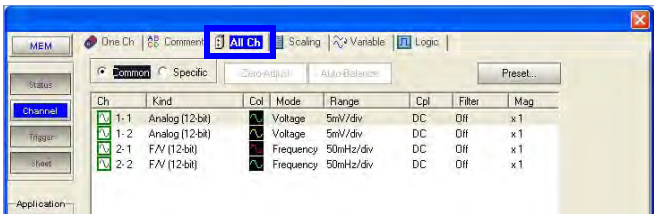
Measurement-related settings for the selected channel, and waveform-related settings such as scaling and waveform display can be made here.

The level monitor on this page is non-functional.



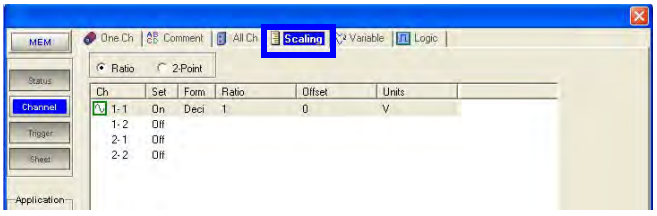
[Comment] Page

You can enter a title and comments for each analog and logic channel.
To enter from your keyboard, first click F2 [Direct].
To enter from the virtual keyboard, first click F1 [Edit].
Entering Text (⇒ p.25)
To display a dialog to copy settings from one channel to another, first click F7 [Copy].



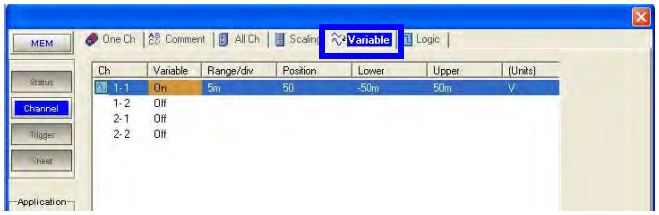
[All Ch] Page

All channel settings can be viewed as a list, from which the settings can also be changed.
Double click anywhere in the list to display a dialog for changing settings.
The display shows both common and module-specific settings.
Common settings are input module (unit)-specific settings, waveform trace, measurement mode and range, input coupling, low-pass filtering, magnification and zero position.
Module-specific settings depend on the type of installed input module (unit).



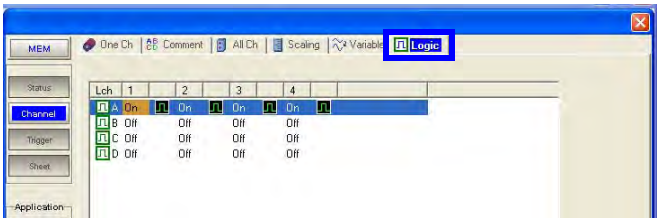
[Scaling] Page

By setting a measurement scaling value for each channel, converted values can be displayed on the Waveform screen.
Scaling can be set by one of two methods: conversion ratio or two-point setting.
Double click anywhere in the list to display a dialog for changing settings.



[Variable] Page

The waveform position and magnification in the vertical direction can be optionally set.
The Variable function can be turned on or off for each channel.
Double click anywhere in the list to display a dialog for changing settings.

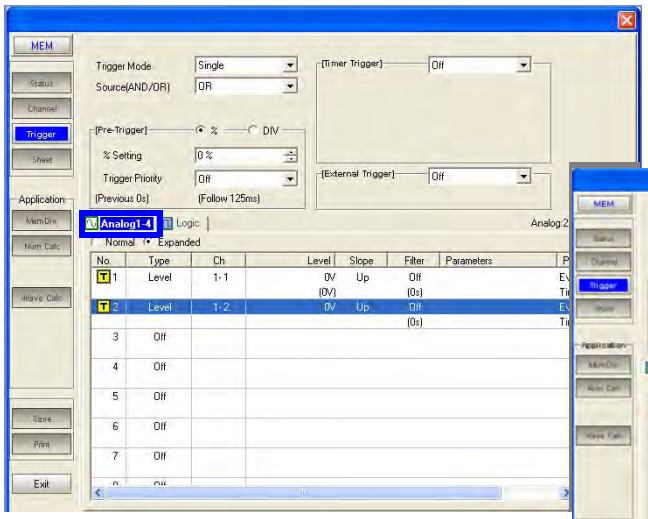


[Logic] Page

Logic waveform display/non-display and waveform display colors can be set for each channel.

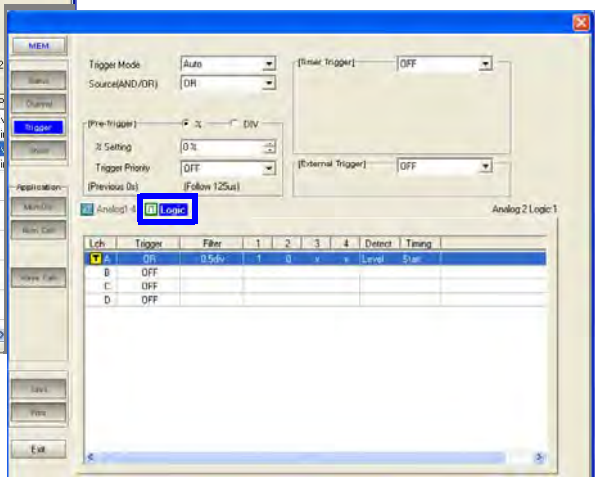
Trigger Settings (Trigger Settings Screen)

Trigger



[Analog] Page

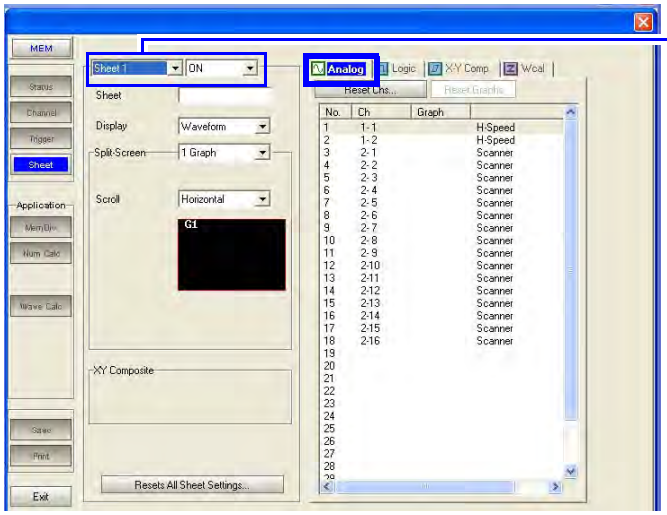
The following trigger settings can be made: trigger mode, trigger source, pre-trigger, timed trigger, external-trigger related settings, analog channel triggering and logic channel triggering.



[Logic] Page

Sheet Display Settings (Sheet Settings Page)

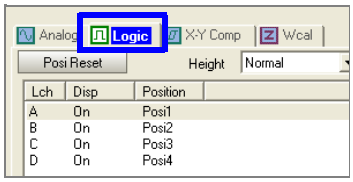
Sheet



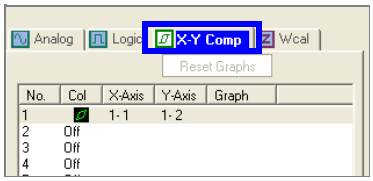
[Analog] Page (Example: Memory Function)

Select the sheet to set.

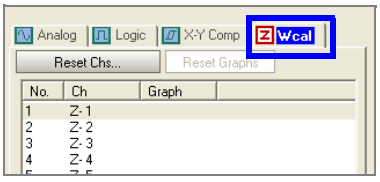
You can set the sheet name, waveform or numerical value display type and display formats such as split-screen or X-Y composite waveforms.
Also, for each page, you can select what is displayed on the selected sheet.



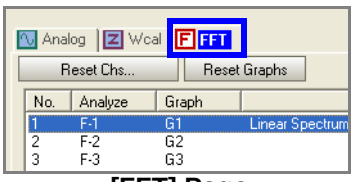
[Logic] Page



[XY Comp] Page



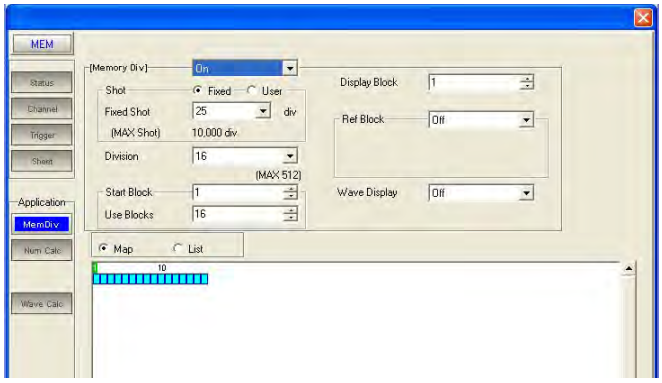
[Wcal] Page



[FFT] Page

Memory Division Settings (MemDiv Settings Screen)

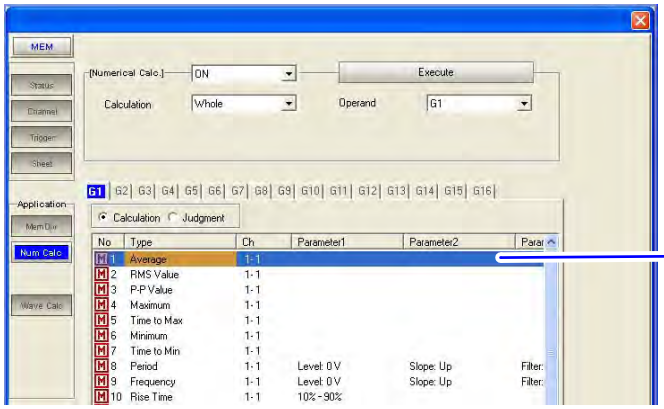
MEM | MemDiv



Partitions internal memory space into multiple blocks. You can select whether to divide memory into multiple blocks and specify how many and which blocks to use for recording.
Also you can select blocks for display and reference on the Waveform screen and enable (On) to display the waveform each time a block is acquired.

Numerical Calculation Settings (Num Calc Settings Screen)

MEM | Num Calc

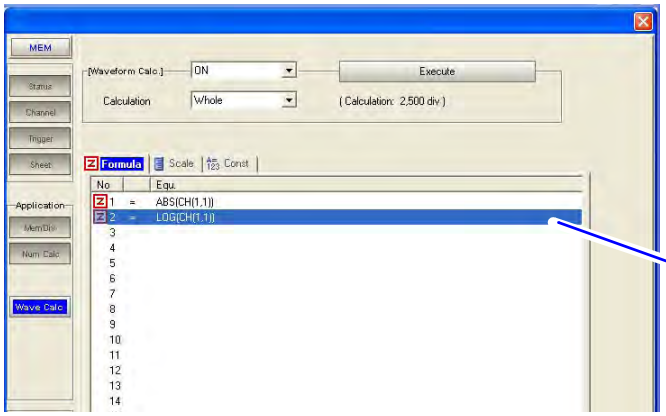


Numerical calculations or judgments can be applied to measurement data, with calculation results displayed on the Waveform screen.

You can set numerical calculation on or off, and specify the calculation range, type and judgment criteria.
Double click anywhere in the list to display a dialog for changing settings.

Waveform Calculation Settings (Wave Calc Settings Screen)

MEM | Wave Calc



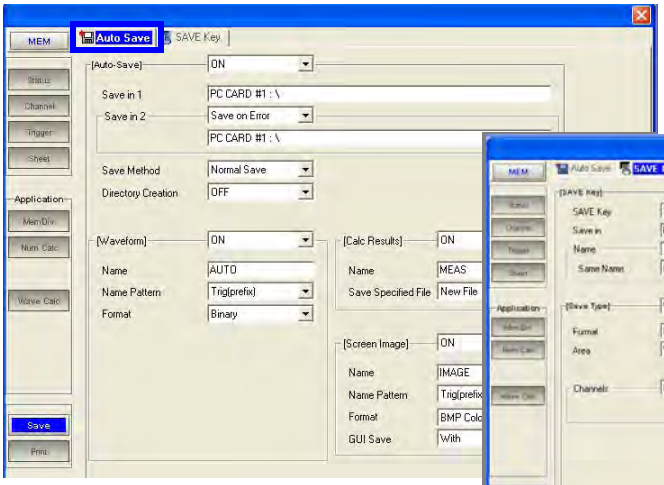
Waveform calculations can be applied to measurement data, with calculation results displayed on the Waveform screen.

You can set waveform calculation on or off, and specify the calculation range.

Select the calculation formula
Double click anywhere in the list to display a dialog for changing settings.
Constants to be used for calculation formulas can be registered on the [Const] page.
Calculation waveform colors and display method can be set on the [Scale] page.

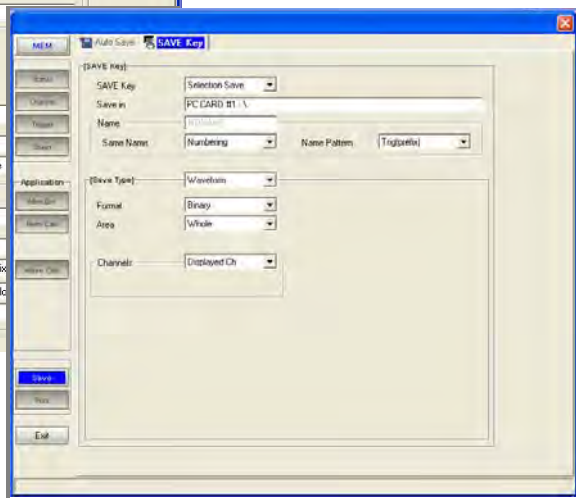
Saving Settings (Save Settings Screen)

Save



[Auto Save] Page

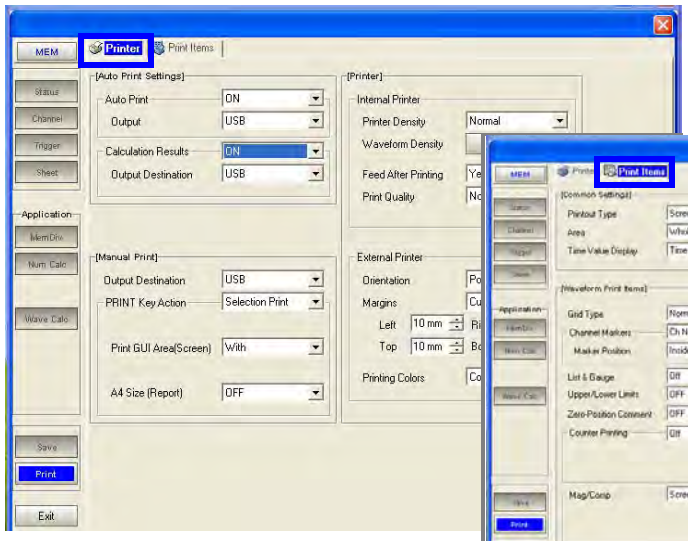
You can select which setting contents are to be saved by the instrument during auto or manual saving.
The contents selected here do not affect saving from the program.



[SAVE Key] Page

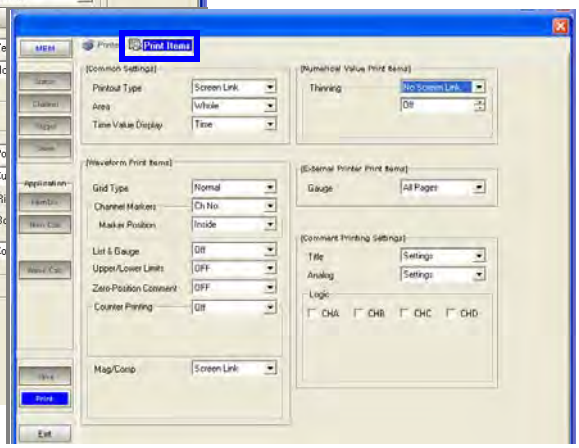
Print Settings (Print Settings Screen)

Print



[Printer] Page

You can select the contents to be printed when printing on the instrument.
Settings on the [Print Items] page also apply when printing from the program.

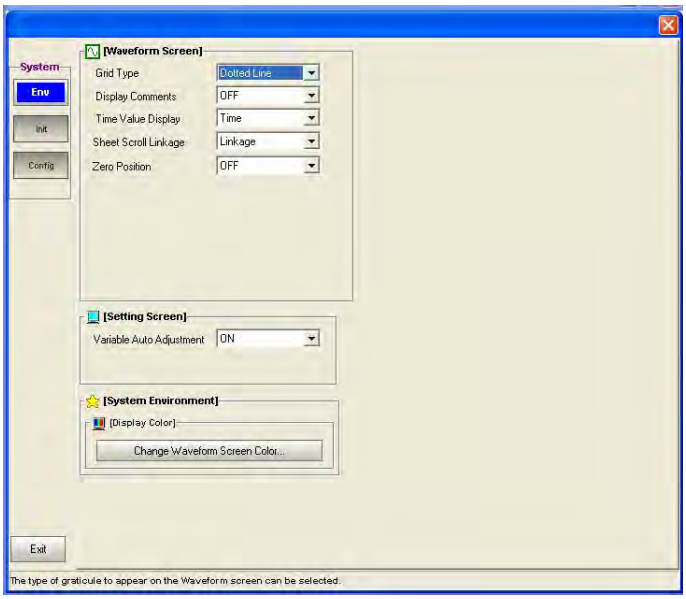


[Print Items] Page

System Screen Settings

To make settings on the System Settings screen, click [SYSTEM] from the Function menu. Settings are the same as on the instrument.

System Environment Settings (Env Settings Screen) Env



You can set Waveform screen appearance.

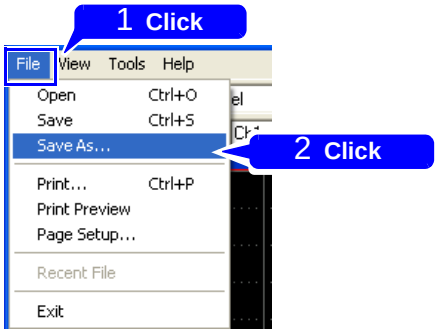
See "Changing the Waveform Screen Display Method"(⇒ p.34)

Saving Settings

Settings such as measurement configurations can be saved as settings files (“.set” extension).
Saved files can be loaded into the instrument via network or on removable media such as a PC Card.

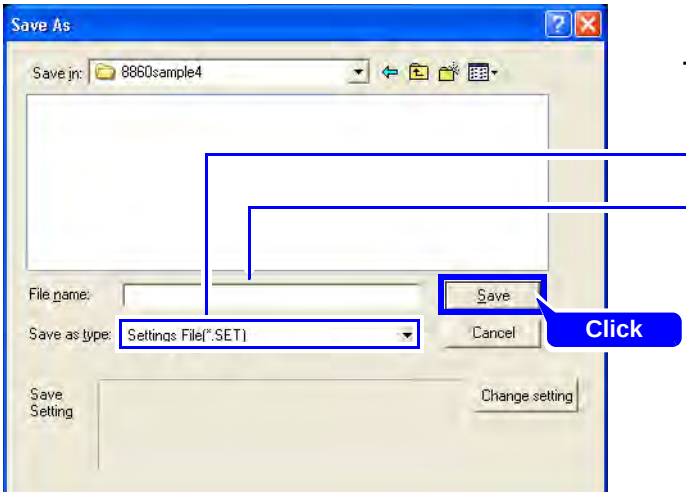
Before saving, verify the current measurement configuration is what you want to save.

1 From the menu bar, click [File]-[Save As].



The [Save As] dialog appears.

2 For the [Save as type] item, select Settings file (.set), enter the file name, and click the Save button.



To enter a file name.

1 **Select [Settings File].**

2 **Enter the file name.**

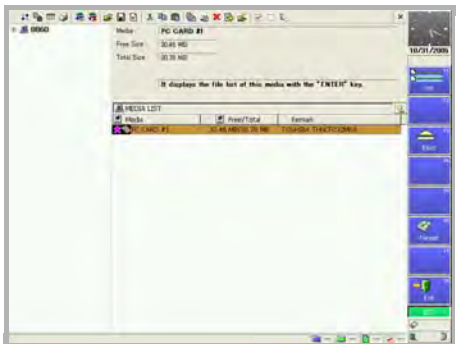
3 **Click [Save].**

Loading a Settings File on the Instrument

A saved settings file can be loaded into the instrument via network or on removable media such as a PC Card.
Loading a settings file from the instrument's File screen resets the measurement configuration of the instrument to match the settings file.
Example: Loading a settings file from a PC Card into the instrument.

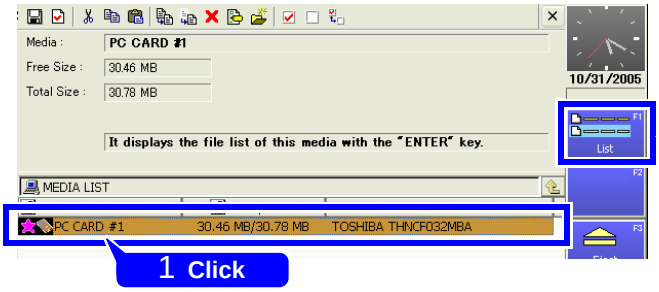
1 Insert the PC Card into the instrument, and press the FILE key.

The File screen appears.

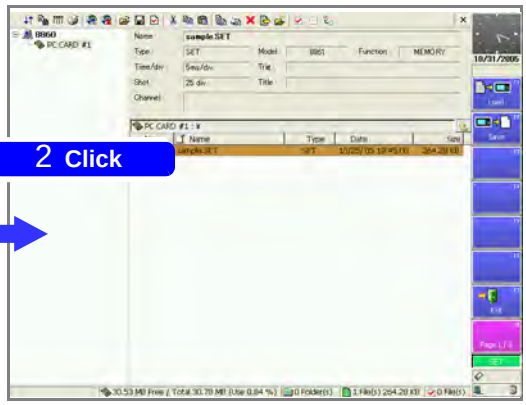


2 From the [MEDIA LIST], select PC CARD#1, and select F1 [List].

The file contents appear.



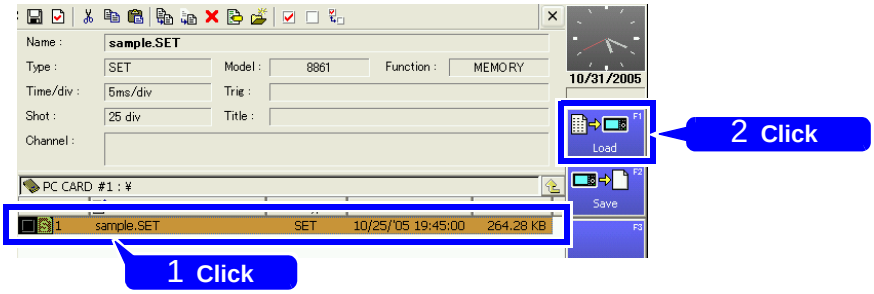
Media List



File List

3 Select the settings file saved by the program, and click F1 [Load].

The settings file is loaded into the instrument.

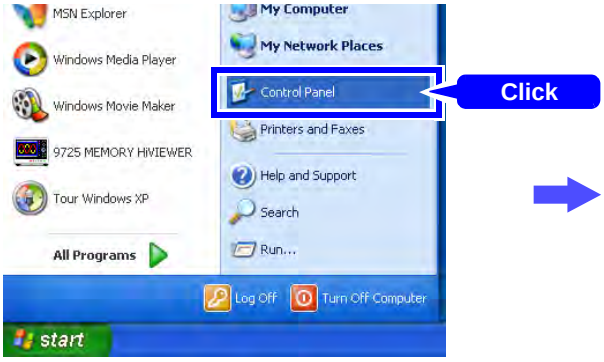


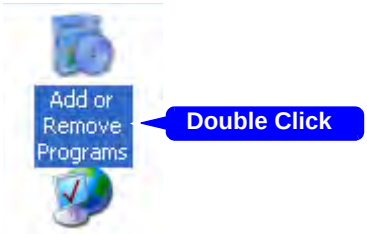
Refer to the instrument's *Instruction Manual* for details about the data loading method.

Uninstalling the Program

Use the following procedure to uninstall the program.

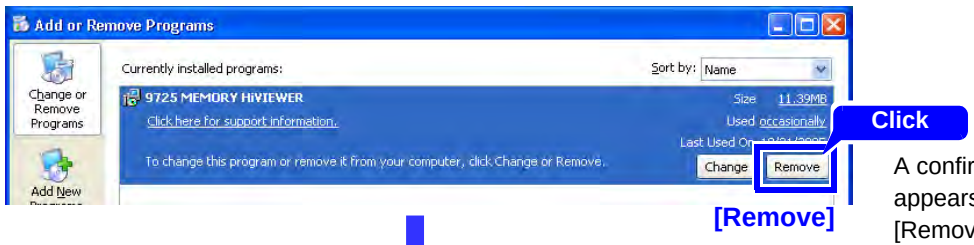
1 From the Windows Start menu, select the [Control Panel], and double click [Add or Remove Programs].



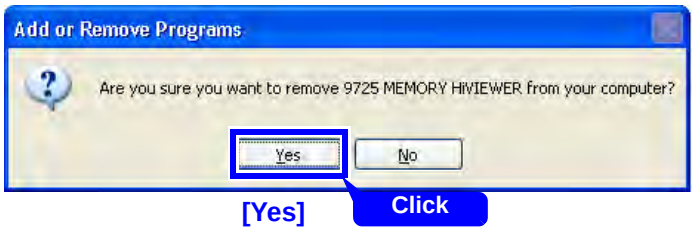


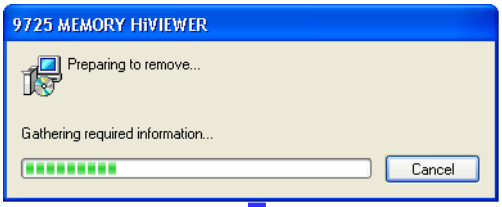
The [Add or Remove Programs] screen appears.

2 From the list of installed programs, select 9725 Memory HiViewer, and remove it.



A confirmation dialog appears when you click [Remove].





The uninstall process begins.
The uninstall progress status is displayed.

Uninstall is finished

You are returned to the [Add or Remove Programs] screen.
Settings files are not deleted during uninstall, so if no longer needed, delete them manually.

Specifications

General Specifications

Compatible Measurement Instruments	Model 8860/ 8861/ 8860-50/ 8861-50 Memory HiCorders	
Compatible Input Modules (Units)	• Model 8936 Analog Unit • Model 8937 Voltage/Temp Unit • Model 8938 FFT Analog Unit • Model 8939 Strain Unit • Model 8940 F/V Unit • Model 8946 4-Ch Analog Unit • Model 8947 Charge Unit	• Model 8956 Analog Unit • Model 8957 High Resolution Unit • Model 8958 16-Ch Scanner Unit • Model 8959 DC/RMS Unit • Model 8960 Strain Unit • Model 8961 High Voltage Unit

Functions

File Loading	Loadable Data Formats	Proprietary-format files for the Model 8860, 8861, 8860-50, and 8861-50 Memory HiCorders • Memory Function (“.mem” extension) • Recorder Function (“.rec” extension) • FFT Function (“.fft” extension) • Real-time Function (“.rsm” and “.rsr” extensions) • Memory division index file (“.seq” extension) • Divided saving index file (“.idx” extension) • Real-time index file (“.rsi” extension) • REC&MEM index file (“.r_m” extension) • Settings Files (“.set” extension)
	Maximum Loadable Data Size	2 GW
File Saving	Saving Contents	• Measurement Data (Binary and ASCII) (partial saving between A/B cursors is possible) • Setting Configuration • Screen Images (BMP and PNG) • Calculation Results

Functions (*: when the model 8860-50 or 8861-50 is selected for the model configuration setting)

Display	Waveform Display	1, 2, 3, 4, 6 or 8 split screens Horizontal scrolling, vertical scrolling, continuous Scrolling available along the time axis Magnification and reduction available along the time axis Zero position movement and magnification and reduction for each channel Variable setting available for each channel
	X-Y Composite Display (Memory function only)	1, 2 or 4 split screens Dot or Line Interpolation Composition range can be specified
	FFT Display Format	1, 2, or 4 screen display, Nyquist display Display scale: Linear scale, Log scale, Phase
	Numerical Value Display	Numerical waveform data values can be displayed
	Displayable Sheets	16 Sheets
	Displayable Channels (per Sheet)	Analog: 32 channels Logic: 16 channels Waveform calculations: 16 calculations X-Y Composites: 8 composites (16 composites*) FFT: 8 analysis (16 analysis*)
	Cursor Functions	Vertical, horizontal and trace cursors 2 cursors (A and B) Time value, voltage value display
	Clipboard Copy	Waveform screen image can be copied to the clipboard
Numerical Calculations (Memory Function)	Calculation Types	Average value, RMS value, P-P value, Maximum value, Time-to-Maximum value, Minimum value, Time-to-Minimum value, Period, Frequency, Rise Time, Fall Time, Area value, X-Y Area value, Standard Deviation, Time-to-Specified Level, Pulse Width, Duty Ratio, Pulse Count, Four Arithmetic Operators
	Calculation Range	The whole range, or that between A/B cursors can be specified
Waveform Processing Calculations (Memory Function)	Calculation Types	Up to 16 custom calculation expressions Four arithmetic operators, absolute value, exponent, common logarithm, square root, moving average, differential calculus (first and second derivatives), integral calculus (first and second integrals), transposition on the time axis, trigonometric functions (sin, cos, tan) and inverse trigonometric functions (asin, acos, atan)
	Calculation Range	The whole range, or that between A/B cursors can be specified

Functions (*: when the model 8860-50 or 8861-50 is selected for the model configuration setting)

FFT analysis (FFT Function)	FFT Analysis Mode Setting	Storage waveform, Linear spectrum, RMS spectrum, Power spectrum, Power spectrum density, Cross-power spectrum, Auto-correlation function, Histogram, Transfer function, Cross-correlation function, Impulse response, Coherence function, 1/1 Octave analysis, 1/3 Octave analysis, Phase spectrum, Power spectrum density (LPC)
	Number of Sampling Points	1000, 2000, 5000, 10000, 20000*
	Window Function	Rectangular, Hanning, Exponential, Hamming, Blackman, Blackman-Harris, Flat top
	Averaging Function	Simple averaging on timebase, Exponential averaging on timebase, Simple averaging on frequency axis, Exponential averaging on frequency axis, Peak hold on frequency axis (settable from 2 to 10,000 counts)
Printing	Compatible Printers	Printers supported by the PC's operating system
	Print Formats	Waveform images (1, 2, 3, 4, 6, 8 or 16 traces), numerical value printing, report format, list print, calculation results, screen image
	Print Range	Whole range, or between A/B cursors
	Print Preview	Supported

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