

# SONY®

Advanced Data Acquisition and Analysis System  
i.LINK Interface Unit

# EX-UT10

Read all the instructions in the manual carefully before use and strictly follow them.  
Keep the manual for future references.

# *PCscan IV STD*

## Software Instruction Manual

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## Note

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# 1. Outline

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## 1-1. Introduction

PCscan IV STD is an application software for EX series, an advanced data acquisition and analysis system designed and produced by Sony Manufacturing Systems Corporation. By i.LINK interface, the software makes it easy to set up EX series, transfer data, monitor signals and analyze in real-time, convert data file formats.

## 1-2. Application Software Configurations

Model	Software	Description
EX-RS10	PCscan IV STD	Online software (Attachment to EX-UT10) Control and set up EX series, carry out data acquisition, monitor signals from computer.
EX-RS40	PCscan IV RTA	Realtime analysis software (Option) Carry out real-time FFT analysis or octave analysis while making data acquisition.
EX-RS20	PCscan IV ADV	Post-processing analysis software (Option) Carry out FFT analysis on data acquired with PCscan IV STD, visualize the results by advanced graphics.
EX-RS30	PCscan IV PRO	Post-processing analysis software (Optional Module) Add on applications to PCscan IV ADV General Purpose FFT Analysis Order-tracking Analysis Octave Analysis Wavelet Analysis Kalman Filter

In this instruction manual, descriptions are almost related to PCscan IV STD only. For more information about the PCscan IV RTA real-time analysis software and the PCscan IV ADV and PCscan IV PRO post-processing analysis software, refer to the respective instruction manuals.

## 1-3. Functions of PCscan IV STD

### Setting up of various modules

- Set up by units of measurement groups, measurement modules and channels.
- Copy setting by units of item or channel and paste to groups.

## **Calibration**

- Value calibration
- DC calibration
- Frequency calibration

## **Trigger**

- Input : By the trigger input channel of EX-UT10 and channels of input measurement modules
- Start : Level, edge, AND, OR among channels, pre-trigger and post-trigger
- Stop : Specified number of data or time

## **Comprehensive Real-time Monitoring**

- Signals from any consecutive 16 channels of 24 channels
- FFT up to 4 channels

## **Real-time Signal Display**

- Signals from any 4 channels
- Scale X and Y axes
- Markers for 2 positioned cursors

## **Frequency Display**

- FFT, Octave analysis
- Averaging
- Number of spectrum lines : 64 to 65536
- Time window : Rectangular, Bartlet, Hamming, Welch, Hanning, Blackmann, Kaiser, Flattop
- Overlap

## **Save and Replay of Acquired Data**

- Save and replay of acquired measurement data
- Save and replay of voice annotation data via MIC/EAR

## **Post-processing**

- Display of acquired data
- Data file import and export in specified formats
- Data abstract
- Acoustic data playback

## 2. Operating Environment and Setup

---

### 2-1. Required System Environments for PCscan IV

#### 2-1-1. EX Series Hardware

##### Interface Unit

EX-UT10      i.LINK interface unit.

##### Input Modules and Function Modules

EX-MI10	IEPE/Direct module
EX-MM10	Microphone module
EX-MC10	Charge module
EX-MG10	DC Strain module
EX-MP10	Pulse/FV module
EX-FA10	Analog output module

## 2-1-2. Computer Environment

Computer	IBM/PC-AT personal computer or compatible
Operating System (OS)	Windows2000 Professional, Windows XP Professional/ Home edition, of Japanese or English versions.
CPU*	<When used for a single measurement group> Celeron 500 MHz or more (Recommended: Pentium III 1 GHz or higher) <When used for multiple measurement groups> A computer with specifications of PentiumIV 2.4 GHz or higher (or PentiumM 1.4 GHz or higher for a notebook computer) is recommended.
Memory	<When used for a single measurement group> 128 MB or more (Recommended: 256 MB or more) <When used for multiple measurement groups> 768 MB or more of memory is recommended.
Hard Disk Drive (HDD)	Enough free space at rate 4.2 MB/s for highest bandwidth
CD-ROM Drive	For software installation
Display	1024 × 768 or more, 65536 color or more
Input Devices	Mouse and keyboard of Windows compatible. However wheel scrolling operation is not supported.
LINK Port (IEEE1394)	OHCI complied
Recommended i.LINK IEEE1394 Card	Manufactured by RATOC System, Inc. PCIFW3U, REX-PFW4H (PCI, Low Profile PCI) for Desktop Computer CBFW3U (Card Bus) for Notebook Computer
Sound Card and Speakers	Acquired acoustic data can be playbacked and confirmed in PCscan IV. Windows compatible sound card and speakers are required.

\* Neither multiprocessor operation based on a multiple number of CPUs nor Hyper Threading technology is supported. Refer to the instruction manual accompanying your computer, and disable these functions.



### **Note**

#### **Hard disk**

If the hard disk has low writing performance\*, the computer may not be able to keep up with the processing, depending on the number of measurement channels and settings used.

- \* Increased fragmentation on the hard disk:

..... This may reduce the speed at which data is written onto the hard disk.

Use of a small notebook computer:

..... The writing speed of the computer's hard disk may be slow.

#### **Software running concurrently**

- Since other software running concurrently will interfere with real-time processing, do not start up or close other software while measurements are underway. Also disable any screen savers and power-saving modes.
- The real-time monitoring functions of anti-virus software may downgrade the PCscan IV analysis operation and reduce the speed at which data is written onto the hard disk, and they may make it impossible for the computer to keep up with the processing.\*

#### **[Action to take when the computer fails to keep up with processing]**

It may not be possible to perform normal measurements if the computer is failing to keep up with processing. When the "Processing Error" message appears, it means that the computer is not keeping up with the processing, when displaying waveforms or recording data.

When this error has occurred, proceed to reset, and then reduce the CPU load and total data transfer speed.

#### **Reset method**

On the "Home" screen, click the "Pol Again" button.

Alternatively:

Restart the PCscan IV online processing.

#### **How to reduce the CPU load and total data transfer speed**

On the "FFT Setup" screen, reduce the number of lines (Number of Spectral Lines) and channels (MG, Channel) of the data to be processed.

On the "Setup" screen, reduce the number of channels targeted for measurement and/or reduce the sampling frequency.

## 2-2. Install and Uninstall PCscan IV STD

There are two steps in the installation of PCscan IV STD, one is for the online-process and the other is for the post-process.

It is necessary to install the post-process to display and analyze acquired data.

### Note

Prior to installing, make sure to uninstall the same software of older version.

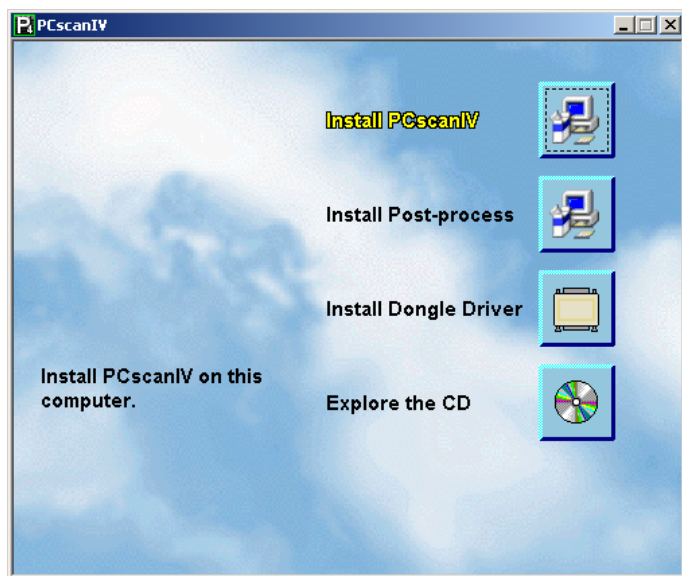
Prior to installing, make sure to exit all other running software.

The administrator authority is required for users to install driver.

### 2-2-1. Installation Screen

The moment the PCscan IV CD is put into the CD-ROM drive, the installer starts up with a installation screen.

If the installer does not start up automatically, it can be started up manually. Open the Explorer and from there open the folder of PCscan IV CD, double click "CDAutostart.exe" to start, then the installation screen is displayed.



### **Install PCscan IV**

This is to install the online-process of PCscan IV STD.

The online-process of PCscan IV STD, with EX series being connected the computer, is capable of setting up, data acquisition and monitoring.

### **Install Post-process**

This is to install the post-process of PCscan IV STD.

Install the post-process if acquired data are to be displayed and analyzed.

It is not necessary to connect EX series to computer to run post-process.

### **Install Dongle Driver**

This is to install a dongle driver.

The dongle driver is required for PCscan IV RTA, PCscan IV ADV and PCscan IV PRO to validate the license code with a hardware key referred as dongle. It is not necessary for PCscan IV STD.

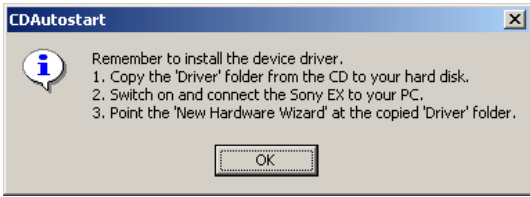
### **Explore the CD**

The contents on the CD can be viewed with the Explorer.

## 2-2-2. Install Online Process

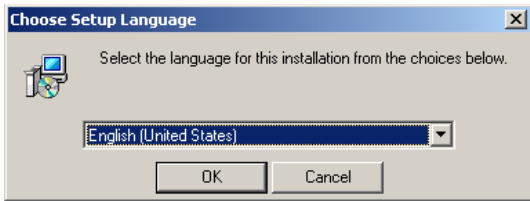
The online-process needs i.LINK driver to work with. So after the installation of online-process, the i.Link driver has to be installer as well. The complete installing procedure is described below.

- 1 Click the "Install PCscan IV" button.  
"CDAutostart" window is displayed.

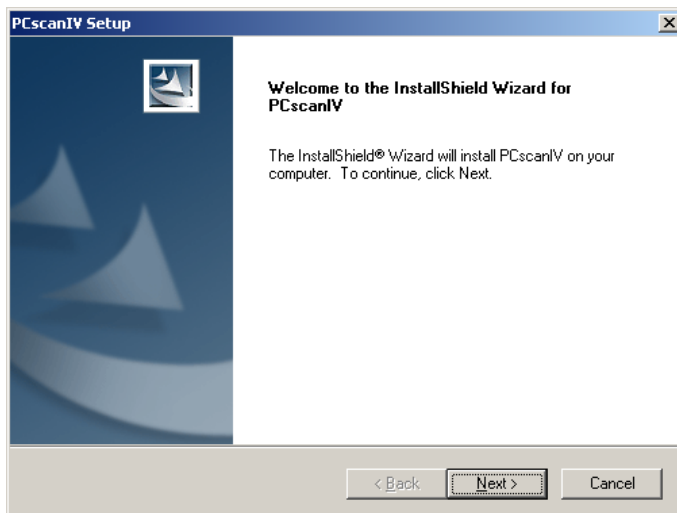


The description on the window is to prompt to install the driver for EX series and present a short guide to do.  
The driver could be installed later so click the "OK" button to go to the next.

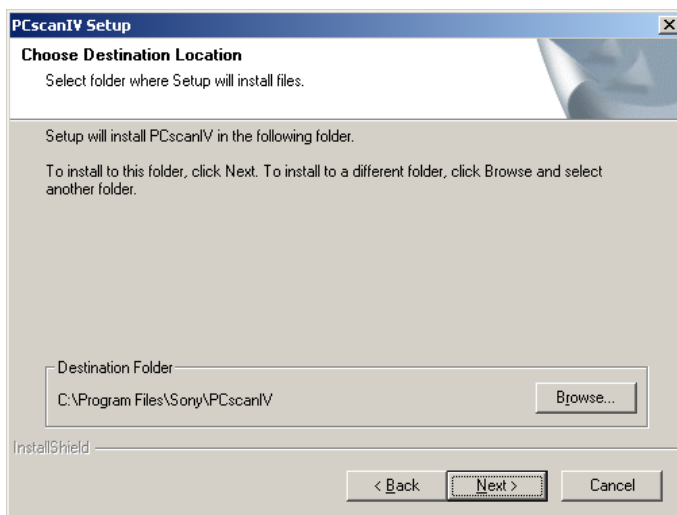
- 2 Specify the used language for installation.  
Specify "English (United States)" for languages other than Japanese.



- 3 Click the "OK" button.  
"Welcome to the InstallShield Wizard for PCscan IV" window is displayed.



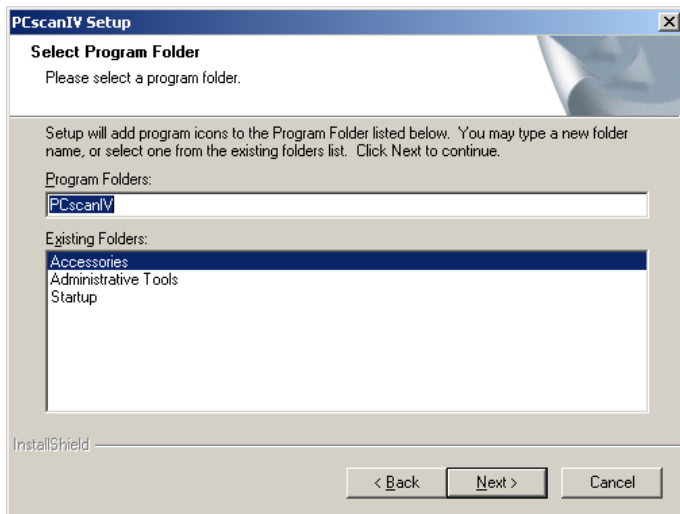
- 4 Click the "Next" button.  
"Choose Destination Location" window is displayed.



- 5 Click the "Next" button.  
"Select Program Folder" window is displayed.

**Note**

It is not possible to change the folder name.



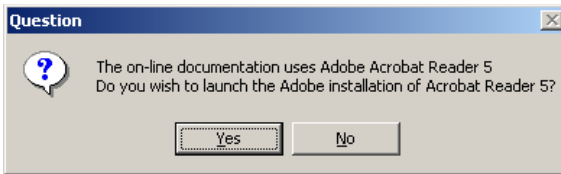
**6** Click the "Next" button.

**[Either Acrobat or Acrobat Reader has been installed in the computer]**

The installer starts to install PCscan IV. It returns to the state of "2-2-1. Installation Screen" after the installation of PCscan IV is finished.

**[Neither Acrobat nor Acrobat Reader has been installed in the computer]**

The following window is displayed to confirm whether to install Acrobat Reader (English Version) or not.



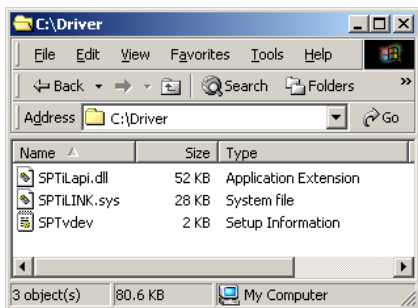
Click the "Yes" button to start to install PCscan IV.

As soon as the installation of PCscan IV is finished, the installer starts installation of Acrobat Reader (English Version).

Install Acrobat Reader following prompted installing instructions.

It returns to the state of "2-2-1. Installation Screen" after the installation of "Acrobat Reader" is finished.

- 7** Copy the "Driver" folder from the PCscan IV CD onto the computer hard disk.  
For instance, copy it to C drive, then driver folder is as follows.



- 8** Turn power on to EX-UT10.
- 9** Connect EX-UT10 to the computer with the i.LINK cable.  
For details, refer to "2-3. Connect EX System".
- 10** As soon as the Step **9** is finished, "Found New Hardware Wizard" window is displayed.  
The description of "Welcome to the Found New Hardware Wizard" is displayed.



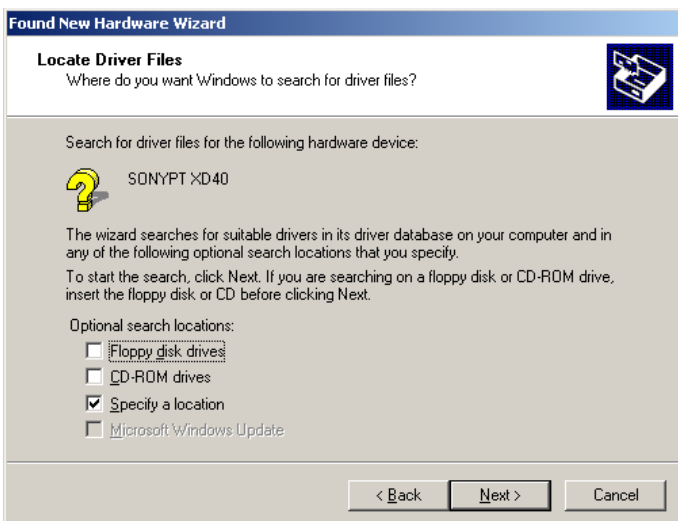


- 11** Click the "Next" button.  
The description of "Install Hardware Device Drivers" is displayed.



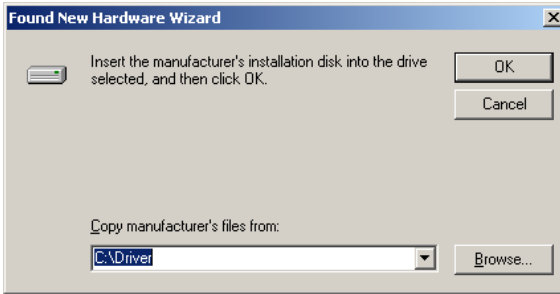
- 12** Check the "Search for a suitable driver for may device [recommended]" radio button and click the "Next" button.  
The description of "Locate Driver Files" is displayed.

- 13** Check the "Specify a location" checkbox only and click the "Next" button.

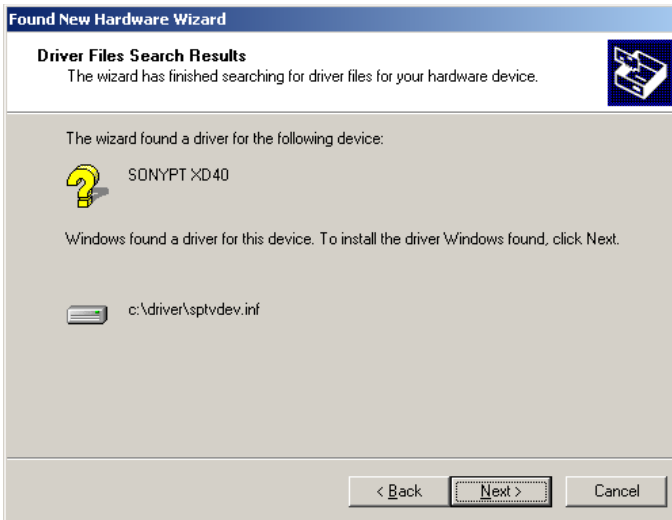


The window for specifying a path is displayed.

- 14** Click the "Browse..." button and specify the path where driver is copied in Step 7, it is "C:/Driver" for that instance.

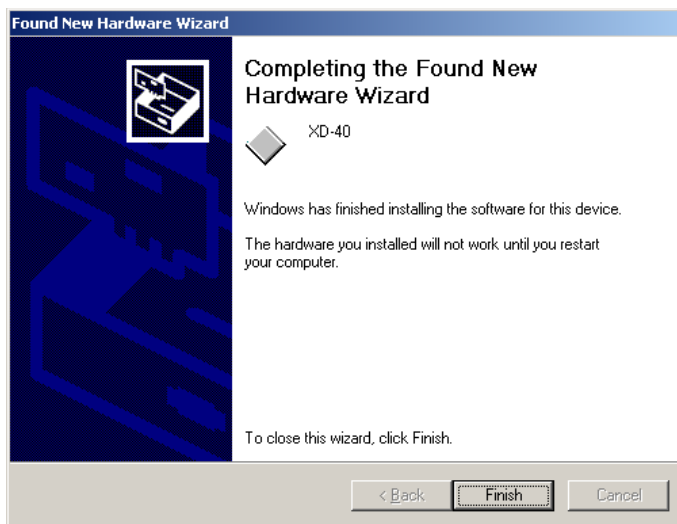


- 15** Click the "OK" button.  
The description of "Driver Files Search Results" is displays.



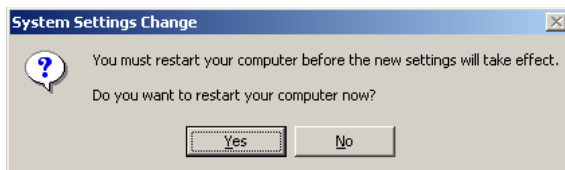
**16** Click the "Next" button.

The description of "Completing the Found New Hardware Wizard" is displayed and i.LINK device driver installation is finished.



**17** Click the "Finish" button.

"System Settings Change" window is displayed.

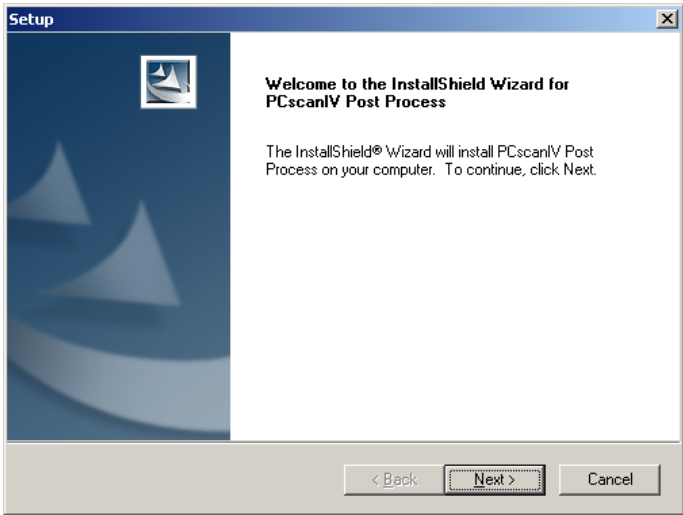


**18** Click the "Yes" button to reboot the computer.

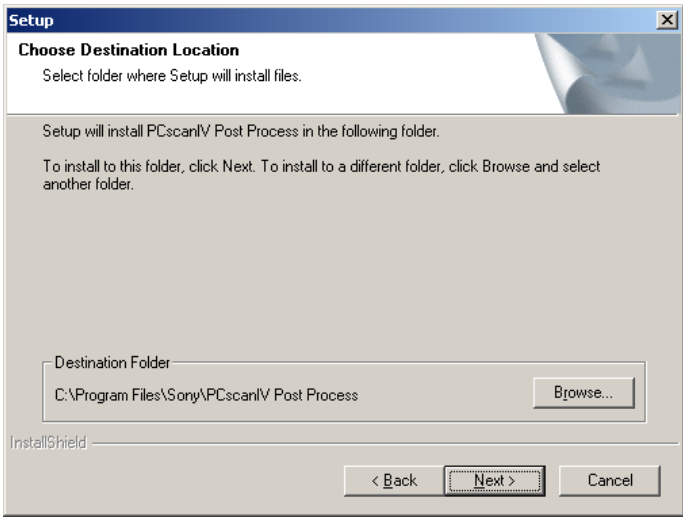
After the reboot, the installed driver becomes effective.

## 2-2-3. Install Post-process

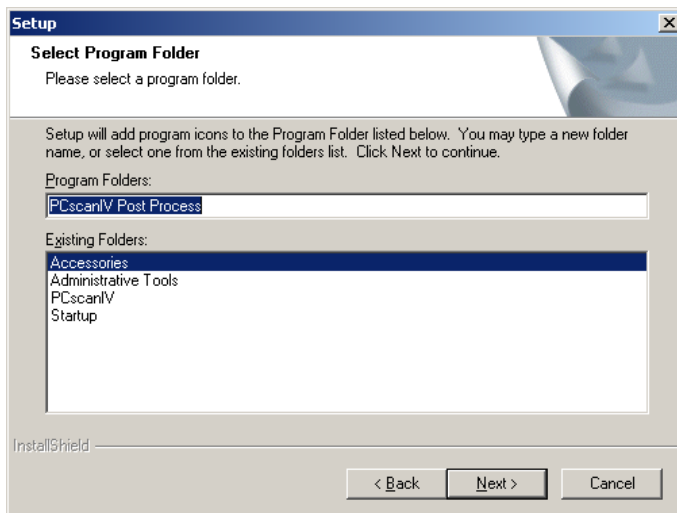
- 1 Click the "Install Post-process" button on the installation screen.  
"Welcome to the InstallShield Wizard for PCscanIV Post Process" is displayed.



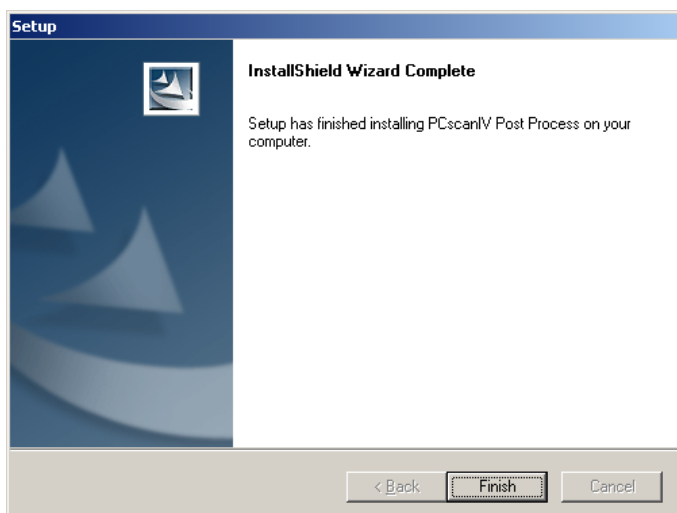
- 2 Click the "Next" button.  
Installing destination folder is displayed.  
The installation destination folder is not supposed to change.



- 3 Click the "Next" button.  
"Select Program Folder" window is displayed.



- 4 Click the "Next" button.  
Installation of "Post-process" begins.  
"InstallShield Wizard Completed" window is displayed as soon as the installation is finished.

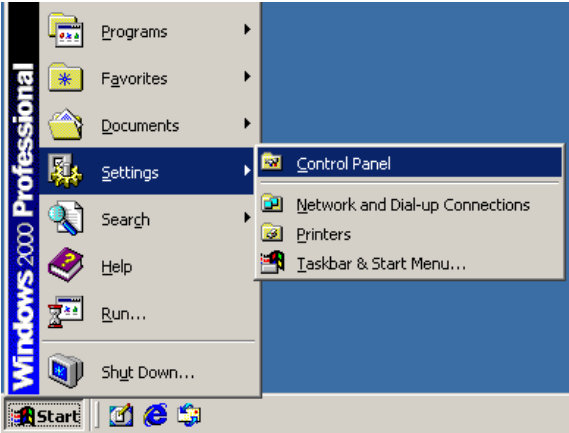


- 5** Click the "Finish" button.  
Installation screen is displayed.
- 6** Click the "[X]" on the right top of the screen.  
Installation is finished and the installation screen disappeared.

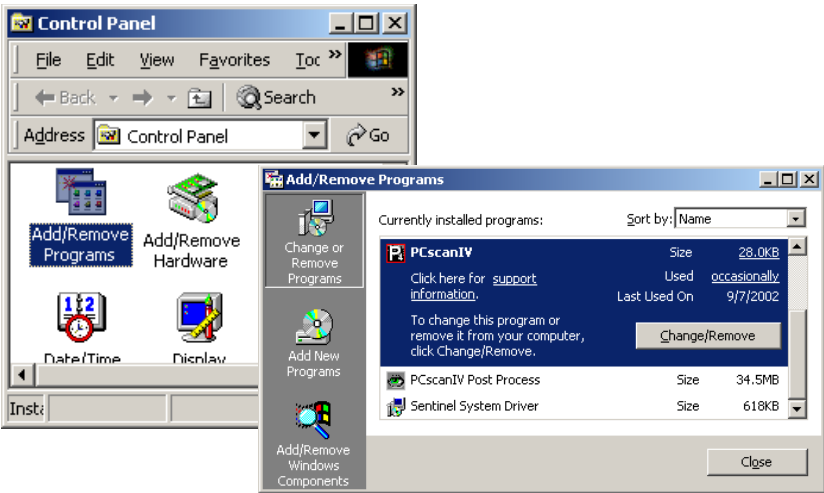
## 2-2-4. Uninstall

The following procedure is to be used to uninstall the installed software.

- 1 Click the "Start" button on the task bar and slide the cursor onto "Settings" and click the "Control Panel" item on the pop up submenu.

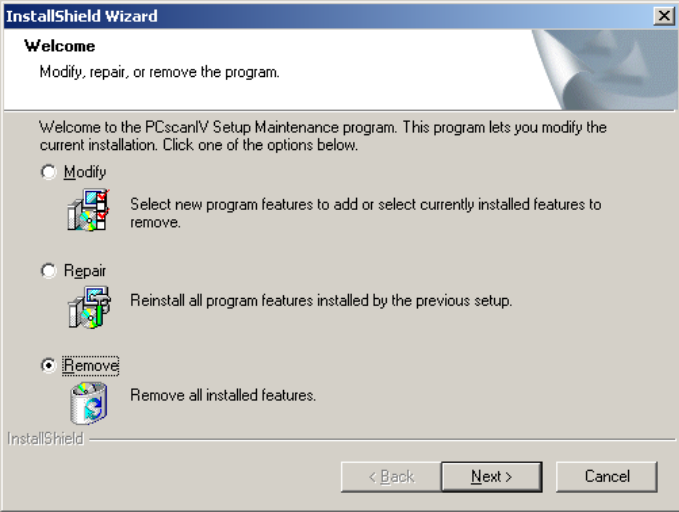


- 2 Double-click the "Add/Remove Programs" icon on the "Control Panel" window. The "Add/Remove Programs" window is displayed.



**3** To remove PCscan IV online-process or PCscan IV post-process, click "PCscan IV" or "PCscan IV Post Process".  
The specified program is deep colored.

**4** Click the "Change/Remove" button.  
The window for modifying, repairing and removing is displayed.



**5** Check the "Remove" radio button and click the "Next".

Thereafter, follow the displayed instructions to finish uninstallation.

**Note**  
The following files created in an installation will not be removed by the uninstallation. Use Explorer to remove those files.

Program	File
Online-process	Data files, setting and workspace files
Post-process	Data files and workspace files



## 2-3. Connect EX System

### 2-3-1. Connecting a Measurement Group

Connect EX-UT10 to computer with a i.LINK cable by the following way.

First, insert the bigger female connector of the cable into the NETWORK connector of EX-UT10.

Second, insert the small female connector of the cable into the i.LINK connector of computer.

The type of i.LINK cable depends on the type of computer i.LINK connector.

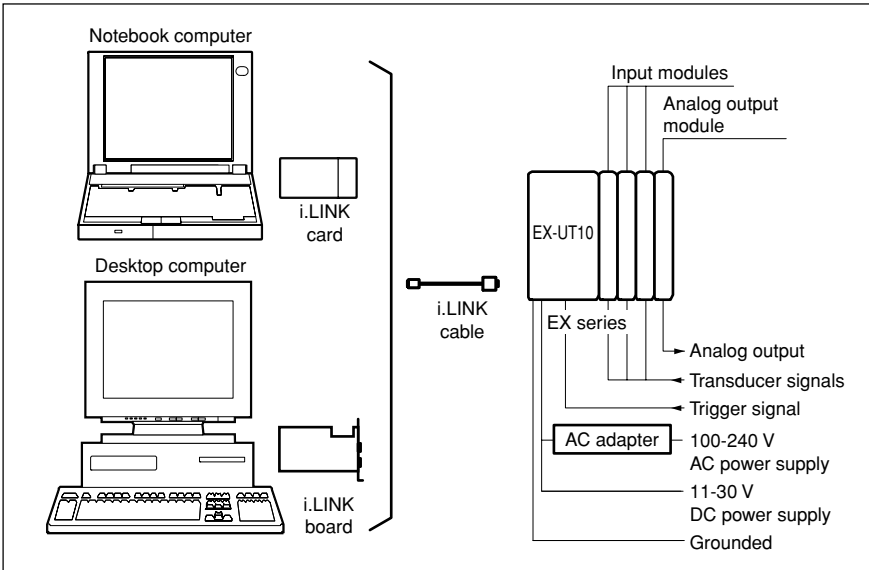
Type of computer i.LINK connector	i.LINK cable
6 pin	Attachment cable to EX-UT10
4 pin	i.LINK cable EX-DK11 (Option)

If i.LINK(IEEE 1394) is not supported and there is no i.LINK connector on the computer, recommended i.LINK cards are to be used. (Refer to 2-1. Required System Environments for PCscan IV)

Regarding the installations of the i.LINK cards, refer to their instruction manuals, respectively.

#### Note

- It is possible to connect/disconnect i.LINK cable to/from a operation computer for Plug & Play is supported by the i.LINK for EX series.
- Connection/disconnection of i.LINK cable or switch of power on/of for EX-UT10 should be carried out after exiting PCscan IV STD online-process.



### **2-3-2. Connecting Multiple Measurement Groups (Synchronous Operation)**

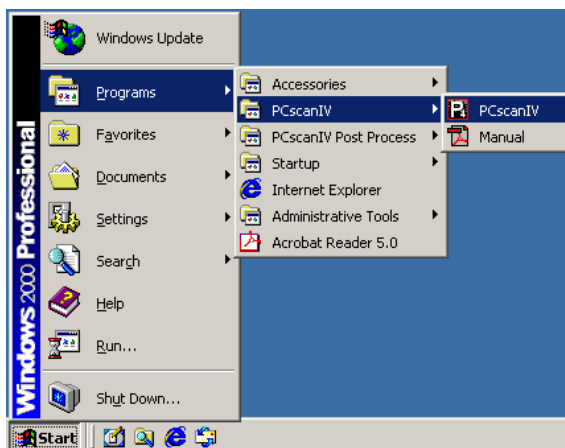
Connections can be made to Measurement Groups 2 to 8 for enabling synchronous operation. For information about connecting multiple Measurement Groups, refer to the EX-AD10 instruction manual.

## 3. Start and Exit

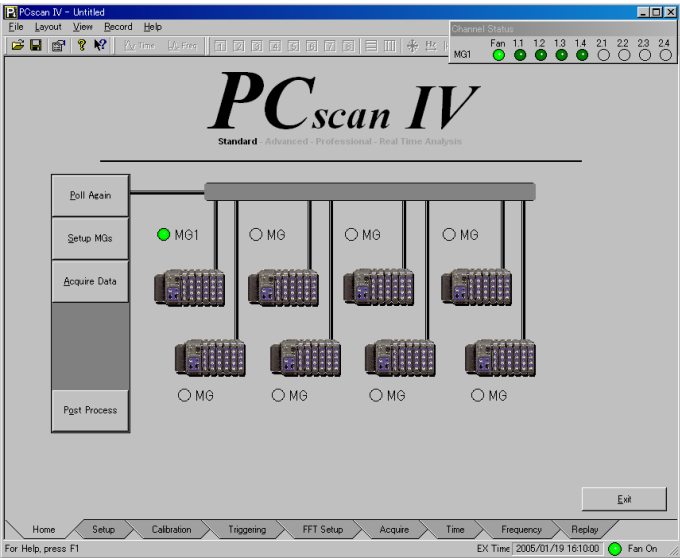
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### 3-1. Start Online-process

- 1 Check if EX-UT10 is connected to the computer and both EX-UT10 and computer is powered on.
- 2 Click the "Start" button in the taskbar to display the menu. Slide the mouse cursor to "Programs", then to its submenu "PCscan IV" and finally click "PCscan IV" to start online-process.

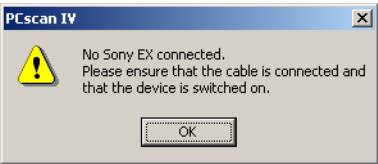


Online-process is starting up.



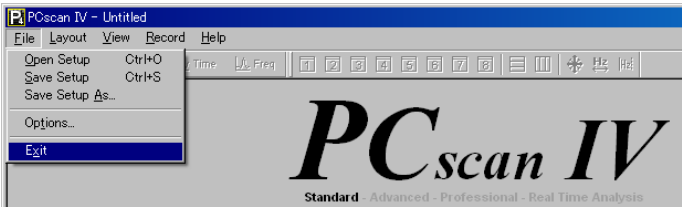
"Home" screen for online-process

If EX-UT10 is not connected to the computer, or EX-UT10 has not been powered on, an error message will be displayed. Click the "OK" button and restart from Step 1.



### 3-2. Exit Online-process

Pull down the "File" menu and click "Exit" to exit online-process.



There are other ways to exit online-process, by clicking [X] on the upper right of the "Home" screen, or by clicking the "Exit" button at the bottom right of the same screen.

### 3-3. Start Post-process

- 1 Click the "Start" button in the taskbar to display the menu. Slide the mouse cursor to "Programs", then to its submenu "PCscan IV Post Process" and finally click the "Post Process" to start post-process.

\* "Key Upgrade" is only for PCscan IV RTA, ADV and PRO.



The post-process starts up, displaying the "PCscan IV Startup Options" window.

Click the "Post Process" button on the "Home" screen of online-process can start post-process as well. (Refer to "4-1. Check Connected Measurement Groups ("Home" screen)")

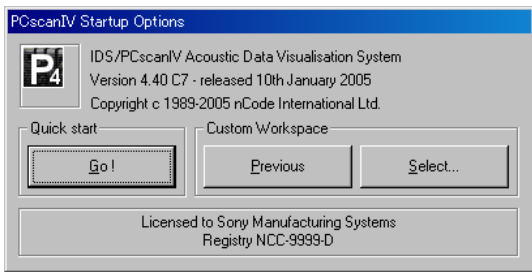
- 2 Click the button on the "PCscan IV Startup Options" window from which one is would like to start.

**Normal start**

Click the "Go!" button.

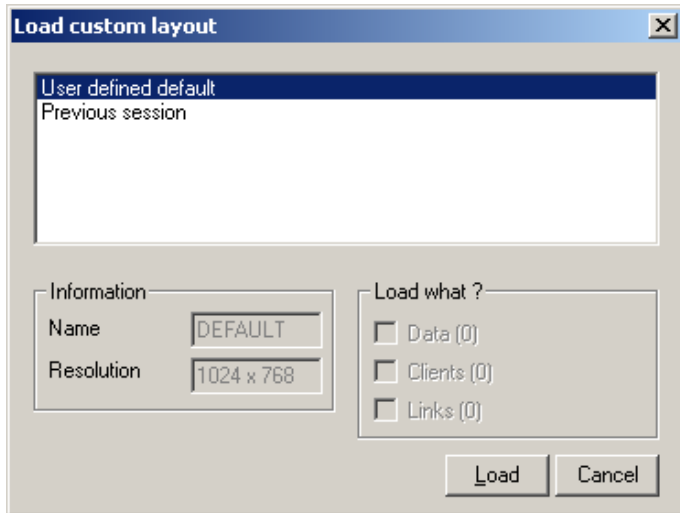
**Start from the previous Exit**

Click the "Previous" button.

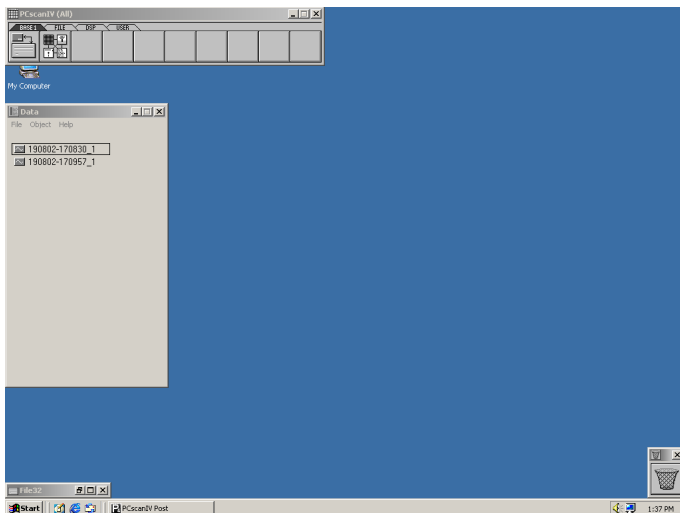


### Start from the previously saved layout

1. Click the "Select..." button.
2. "Load custom layout" window is displayed.

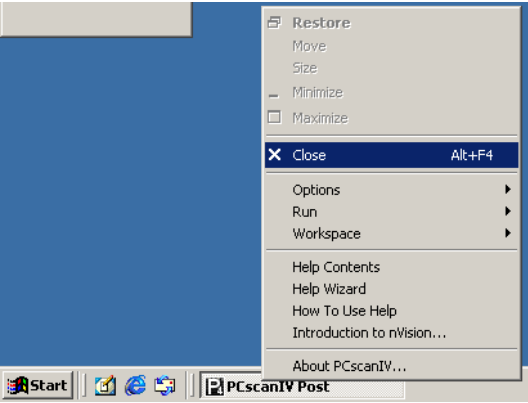


3. Select one of saved layouts and click the "Load" button.  
"Home" screen for post-process is displayed.



### 3-4. Exit Post-process

Right-click the "PCscan IV Post" button on the taskbar first and click "Close" in the pop-up menu then to exit post-process.





## 4. Online-process

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Below is the list of functions of the online-process.

- Setting up EX series
- Calibration
- Setting up trigger
- Setting up averaging for FFT and Octave
- Real-time signal monitoring
- FFT and Octave analysis
- Data acquisition

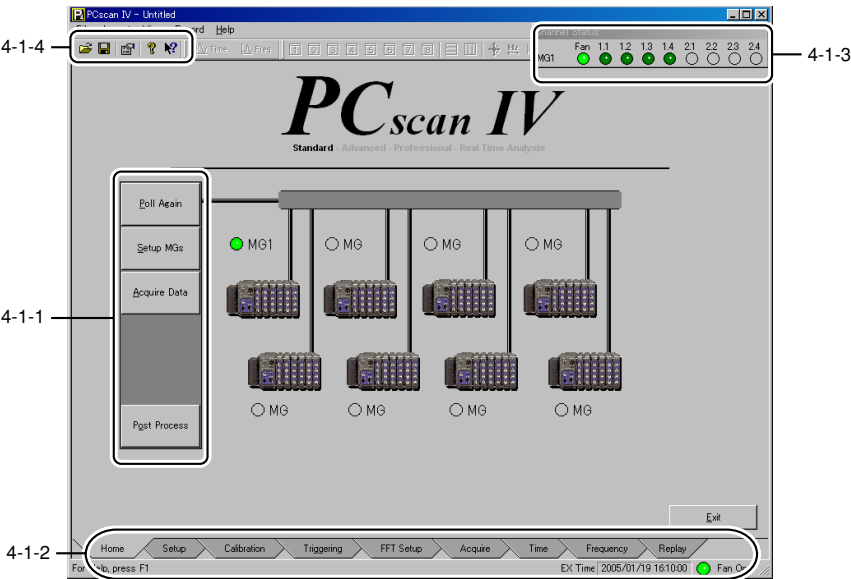
\* The internal memory transfer is not supported with the software.

Explanations will be given to the functions and their screens below.

## 4-1. Check Connected Measurement Groups ("Home" Screen)

The "Home" screen is the screen displayed when online-process is started. (Refer to "3-1. Start Online-process")

It is also possible to display the "Home" screen from other setting or display screens by clicking the "Home" tab.



It is possible to check Measurement Groups (referred as MG below) connected to the computer, both directly and indirectly on the "Home" screen.

The indicator for the connected MG lights green when the EX-UT10 is connected correctly to the computer and the power of both the EX-UT10 and the computer is turned on.

### 4-1-1. Buttons

There are four buttons on the left of the "Home" screen. Basic operations can be done with those buttons, but tabs are to be used for detailed operations.

Button	Description
Poll Again	Check and update connection of EX-UT10.
Setup MGs	Display setting up hardware screen
Acquire Data	Display comprehensive real-time monitoring screen
Post Process	Start post-process

There is an "Exit" button at the bottom right of the screen.

Button	Description
Exit	Exit PCscan IV online-process

### 4-1-2. Tabs and Their Screens

In PCscan IV STD, screens are switched by the tabs at their bottom. Switch screens after they are completely displayed.

Tab	Screen	Purpose
Home	Home	Check the status of connecting MGs Switch screens to perform basic operations with the four buttons on the left.
Setup	Setup hardware	Setup connencted EX series.
Calibration	Calibration	Measure and setup the sensor calibration values
Triggering	Setup trigger	Setup Start/Stop conditions for data acquisition.
FFT Setup	FFT Setup	Carry out basic setup and averaging channel setup (Cumulative) for FFT and Octave display.
Acquire	Comprehensive real-time monitoring	<ul style="list-style-type: none"><li>• Monitor simultaneous signals up to any 16 consecutive channels from maximal 24 channels in one module.</li><li>• Maximum four-channel FFT display</li><li>• Start and stop data acquisition.</li></ul>
Time	Real-time signal monitoring	<ul style="list-style-type: none"><li>• Monitor signals up to any 4 channels.</li><li>• Scale X and Y axes.</li><li>• Start and stop data acquisition.</li></ul>
Frequency	Analysis display of FFT, Octave	<ul style="list-style-type: none"><li>• Monitor FFT or Octave up to any 4 channels.</li><li>• Start and stop data acquisition.</li></ul>
Replay	Replay	Replay of acquired data saved on HDD

### 4-1-3. "Channel Status" Window

There is a "Channel Status" window displayed on the top right by default when online-process of PCscan IV STD is started.

The statuses of cooling fan and signal levels for input modules can be checked with the window.

Indicator	Description		
Fan	Fan status Indicate the status of EX-UT10 cooling fan Red : stopping fan Green : working fan		
1.1 - 6.4	Input signal level indicators Color changes depends on the input signal level. LSB is used in the following table for explanation of indicator color. (Refer to the Hardware on the "Options" window in "4-11-2. File")		
	Color	Signal level for 16 bits as applied	Signal level for 24 bits as applied
	Deep green	0 to 1 bits	0 to 9 bits
	White	2 to 6 bits	10 to 14 bits
	Green	7 to 13 bits	15 to 21 bits
	Yellow	14 to 15 bits	22 to 23 bits
	Red	16 bits (over load)	24 bits (over load)

### 4-1-4. Standard Toolbar



Functions of the icons in the standard toolbar are described in the following table.

Icon	Description
	Load the saved setup file to setup Pcscan IV. It is the same with the "File/Open Setup" menu item.
	Save the setup file in the "Home Directory". It is the same with the "File/Save Setup" menu item.
	Display the "Options" window for initial setup. It is the same with the "File/Option" menu item.
	Display the "About Pcscan IV" for version description. It is the same with the "Help/About Pcscan IV" menu item.
	It is the mini help.

(Refer to section 4-11)

## 4-2. Setup EX Series Hardware

Setup of the EX series hardware is divided into 4 stages based on the setup basic level.

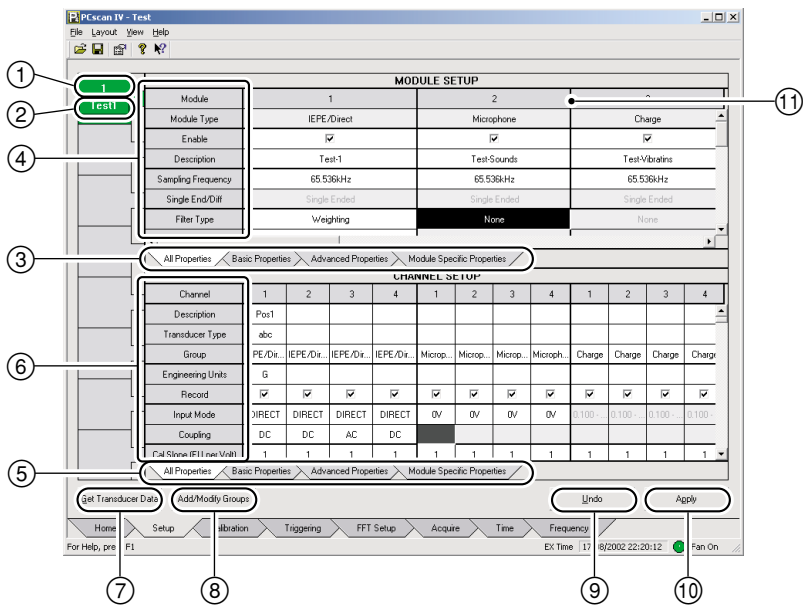
Setup stage	Setup location	Setup example
1. Setup EX System	"Options" window	Sampling frequency type, quantization number, etc.
2. Setup Measurement Groups	"Setup" screen	Specify Measurement Groups, Groupname
3. Setup Module	"Setup" screen	Sampling frequency, filter, etc.
4. Setup Channel	"Setup" screen	Range, Coupling, etc.

Normally, the setup should be carried out in order from [1. Setup EX system] to [4. Setup Channel]. The system setup carried out in the "Options" window is the basic properties for the EX system. Make the necessary settings. For more information, refer to "File-Options-Hardware" on page 4-67.

The settings in the "Setup" screen are properties that change frequently due to measurements. All properties can be displayed and set in the "Setup" screen.

## 4-2-1. Description of "Setup" Screen

Setup for Measurement Groups, Modules, and Channels is carried out in the "Setup" screen.



"Setup" screen

## 4-2-2. Setup Measurement Groups

This carries out setup for each Measurement Group.

- ① **Measurement Group (MG) Number**  
The number of the Measurement Group (MG) is displayed.  
The "Setup" screen is set and displayed for each MG. Click the MG number. The selected MG number changes to green.
- ② **Description of MG**  
Names can be assigned for each MG.  
Any numbers or alphabets can be inputted for reference purpose.

### 4-2-3. Setup Module

This carries out setup for each module.

③ **Setup Type of Module Properties**

Select the setup type of module properties. There are four setup types.

All Properties ..... All of the properties are capable of setting

Basic Properties ..... Basic properties are capable of setting

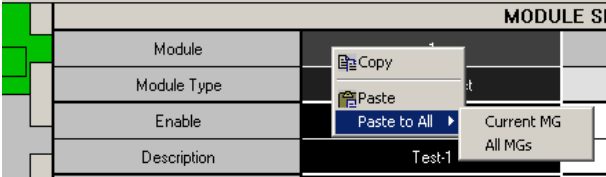
Advanced Properties ..... Advanced properties are capable of setting

Module Specific Properties ..... Module specific properties are capable of setting

Property	Setup type of module properties			
	All	Basic	Advanced	Specific
Module	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Module Type	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Description	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sampling Frequency	<input type="radio"/>	<input type="radio"/>		
Single End/Diff	<input type="radio"/>	<input type="radio"/>		
Filter Type	<input type="radio"/>		<input type="radio"/>	
Filter	<input type="radio"/>			
Pol Voltage	<input type="radio"/>			<input type="radio"/>
EtoE Source	<input type="radio"/>			
Bridge Excitation Voltage	<input type="radio"/>			<input type="radio"/>
Pulse Mode/Channels	<input type="radio"/>			<input type="radio"/>
Pulse Time Accuracy	<input type="radio"/>			<input type="radio"/>
Pulse Per Rev	<input type="radio"/>			<input type="radio"/>
Pulse Max RPM	<input type="radio"/>			<input type="radio"/>
Pulse Min RPM	<input type="radio"/>			<input type="radio"/>
Pulse Divide [1-999]	<input type="radio"/>			<input type="radio"/>
Pulse Interval Time	<input type="radio"/>			<input type="radio"/>
Pulse Average Count [1-16]	<input type="radio"/>			<input type="radio"/>
Pulse Chattering Suppression	<input type="radio"/>			<input type="radio"/>
Pulse Frequency Prediction	<input type="radio"/>			<input type="radio"/>
Generator Type	<input type="radio"/>			<input type="radio"/>
Generator Sweep Type	<input type="radio"/>			<input type="radio"/>
Generator Burst Type	<input type="radio"/>			<input type="radio"/>
Generator Burst Length	<input type="radio"/>			<input type="radio"/>
Generator Burst Period	<input type="radio"/>			<input type="radio"/>

④ **Module Properties**

Setup properties for each module.

Property	Setup/display
Module	Indication of module number, from 1 to 6
Module Type	[Indication of module type] Model                   Type of Module EX-MI10               IEPE/Direct EX-MM10               Microphone EX-MC10               Charge EX-MG10               DC Strain EX-MP10               Pulse/FV EX-FA10               Analog Output
Enable	[Enable or disable connected modules] Enable : Check the checkbox Disable : Discheck the checkbox * Data from disabled modules are not transferred.
[Copy of Module Properties (by unit of MG)] * Copy of module properties to others of the same type. Procedure 1. <b>Select Copy Source</b> First, select the module column of copy source and click. Then, right-click to display popup menu. Finally, click "Copy" from the popup menu. 2. <b>Paste to Specified Measurement Modules</b> First, point the cursor to the module column of paste destination and click to select. Then, right-click to display popup menu. Finally, click "Paste" from the popup menu. <b>Paste to Measurement Groups</b> First, point the cursor to the module column of paste destination and click to select. Then, right-click to display popup menu. Finally, slide the cursor to "Paste to All" in the popup menu and click "Current MG" or "All MGs".	
	
Copy will be applied to chosen measurement groups.	
Description	[Input module name] Module name can be any numbers or letters.



Property	Setup/display
Sampling Frequency	[Specify sampling frequency by unit of measurement module] Type1 : selectable from 25 Hz to 51.2 kHz Type2 : selectable from 8 Hz to 65.536 kHz Type3 : selectable from 10 Hz to 10 kHz * Refer to Page 4-13 for selectable sampling frequency and its bandwidth.
Single End/ Diff	[Specify type of input] <IEPE/Direct module> Single Ended : Number of input channels 4 Differential : Number of input channels 2 * During balanced input, channel 1 (Sig+) is paired with channel 2 (Sig-), and channel 3 (Sig+) is paired with channel 4 (Sig-).
Filter Type	[Specify type of filter] <IEPE/Direct and Microphone modules> A few digital filtering functions are available. None : No filter Weighting : Weighting filter Enable filter property. It applies only when sampling frequency is specified as 51.2 kHz or 65.536 kHz. High Pass : High pass filter of 20 Hz cutoff frequency * Refer to the "Coupling" in "Ⓒ Channel Properties"
Filter	[Specify the type of weighting filter] <IEPE/Direct and Microphone modules> Weighting filters are used for acoustic compensation. A Type : A weighting filter B Type : B weighting filter C Type : C weighting filter
Pol Voltage	[Specify pole voltage] <Microphone module> Specify pole voltage that is supplied to microphone. 0 V, 200 V
EtoE Source	[Specify source module for analog output] <Analog output module> The default is "None" when the online-process is started. For EtoE, Specify the input module whose signals is to be outputted with Analog output module. None, 1, 2, 3, 4, 5, 6 (Choices depend on system configuration)
Bridge Excitation Voltage	[Specify the bridge voltage] <DC Strain module> Specify the bridge voltage to be supplied to the strain gauge. DC 2.5 V, DC 5.0 V

Property	Setup/display
Pulse Mode/ Channels	<p>[Specify the measurement mode] &lt;Pulse/FV module&gt;</p> <p>F to V 1 Channel : FV mode (Measure the frequency/RPM) Convert frequencies (0.01 Hz to 500 kHz) of pulse train signal into Voltages. Available number of channels: 1</p> <p>Digital 1 Channel : Digital bitstream mode Sample digital bitstream data with the module's internal clock. Available number of channels: 1</p> <p>Digital 2 Channels : Digital bitstream mode Available number of channels: 2</p> <p>Digital 4 Channels : Digital bitstream mode Available number of channels: 4</p> <p>Time 1 Channel : Periodic time mode Measure and record the time between the "High" and "Low" levels of the pulse signal. Available number of channels: 1</p> <p>Time 2 Channels : Periodic time mode Available number of channels: 2</p> <p>Time 4 Channels : Periodic time mode Available number of channels: 4</p>
Pulse Time Accuracy	<p>[Specify the accuracy of the periodic time measurement] &lt;Pulse/FV module periodic time mode&gt;</p> <p>Specify the accuracy (resolution) of the measurement time. 25 n, 50 n, 100 n, 200 n, 400 n, 800 n, 1600 n, 3200 n, 6400 ns</p>
Pulse Per Rev	<p>[Input the number of pulse per revolution] &lt;Pulse/FV module FV mode&gt;</p> <p>Input the value for the number of pulses per revolution. This value is used to calculate the number of revolutions. Also, the settings for "Pulse Max RPM" and "Pulse Min RPM" vary based on the number of pulses per revolution.</p>
Pulse Max RPM	<p>[Specify the maximum RPM (upper frequency limit)] &lt;Pulse/FV module FV mode&gt;</p> <p>Specify the maximum RPM [r/min]. The upper frequency limit is 500 kHz.</p>
Pulse Min RPM	<p>[Specify the minimum RPM (lower frequency limit)] &lt;Pulse/FV module FV mode&gt;</p> <p>Specify the minimum RPM [r/min]. The lower frequency limit is 0.01 Hz. Specify the Min RPM with some value less than the "Pulse Max RPM".</p>
Pulse Divide [1-999]	<p>[Input Pulse Divide] &lt;Pulse/FV module FV mode&gt;</p> <p>Input the number of pulses per revolution. This is set when the pulse intervals per revolution are not equal. It can be set separately from the revolution fluctuation. The Pulse Divide operation uses software-based divisions, and so set the frequency before division as the frequency upper limit.</p>

Property	Setup/display
Pulse Interval Time	[Specify the interval time of converted voltage] <Pulse/FV module FV mode> Specify the conversion time for calculating the frequency data. 1 m, 2 m, 5 m, 10 m, 20 m, 50 m, 100 m, 200 m, 500 m, 1, 2, 5, 10, 20, 50 s
Pulse Average Count [1-16]	[Input the number of voltage data for moving average] <Pulse/FV module FV mode> Input the average number for calculating the data for the number of revolutions. Example : The average of the past 15 data entries and the current entry is taken as the measurement value for each data calculation.
Pulse Chattering Suppression	[Specify if chattering is to be suppressed or not] <Pulse/FV module FV mode> On or Off If On is specified, frequency of higher than 100 Hz is not capable of being measured.
Pulse Frequency Prediction	[Specify if pulse frequency is to be predicted or not] <Pulse/FV module FV mode> Off : No pulse frequency prediction. Infinite : Predict frequency based on frequency input up to the moment. 8 Times, 6 Times, 4 Times, 3 Times, 2 Times, 1.5 Times: Predict frequency with the specified number of pulses up to the moment.
Generator Type	[Specify the output signal type] <Analog output module> Analog output mode Analog-Output : Plays back the analog signal or E-E output of the input module. Function generator mode (FG mode) Gen DC : DC signal Gen Sine : Sine signal Gen Sweep Sine : Sweeping sine signal Gen White Noise : White noise signal Gen Pink Noise : Pink noise signal FG mode recording start synchronized output In synchronization with the recording/E-E start, signals are output from all Analog Out. Gen DC [Sync] : DC signal Gen Sine [Sync] : Sine signal Gen Sweep Sine [Sync] : Sweeping sine signal Gen White Noise [Sync] : White noise signal Gen Pink Noise [Sync] : Pink noise signal
Generator Sweep Type	[Specify the steps for increases in frequency of the sweeping sine signal] <Analog output module FG mode> Linear : Linear Log : Logarithmic

Property	Setup/display
Generator	[Specify the FG output state]
Burst Type	<Analog output module FG mode> This can be set for the sweeping sine, white noise, and pink noise signals. Off : Continuous output On [Rect Windows] : Burst output No window function On [Hanning Window] : Burst output Hanning window function processing
Generator	[Input the burst signal output length]
Burst Length	<Analog output module FG mode Burst output> Input a value for the length that the signal is output.
Generator	[Input the burst period]
Burst Period	<Analog output module FG mode Burst output> Input a value for the burst period combining the burst signal output length and signal output mute time.

## Sampling frequency

Bandwidth: Max. 25.6 kHz (based on sampling frequency)

Sampling frequencies and bandwidths

Type1 : 51.2 k - 25 Hz 1/2<sup>n</sup> step

Type2 : 65.536 k - 8 Hz 1/2<sup>n</sup> step

Type3 : 10 k - 10 Hz 1, 2, 5 step

Type1		Type2		Type3	
Sampling frequency (Hz)	Bandwidth (Hz)	Sampling frequency (Hz)	Bandwidth (Hz)	Sampling frequency (Hz)	Bandwidth (Hz)
51.2 k	20.48 k	65.536 k	25.6 k	10 k	4 k
25.6 k	10.24 k	32.768 k	12.8 k	5 k	2 k
12.8 k	5.12 k	16.384 k	6.4 k	2 k	800
6.4 k	2.56 k	8.192 k	3.2 k	1 k	400
3.2 k	1.28 k	4.096 k	1.6 k	500	200
1.6 k	640	2.048 k	800	200	80
800	320	1.024 k	400	100	40
400	160	512	200	50	20
200	80	256	100	20	8
100	40	128	50	10	4
50	20	64	25		
25	10	32	12.5		
		16	6.2		
		8	3.1		

### Notes

- Bandwidths (BW) for Type 1 and Type 3 are calculated by dividing sampling frequency with 2.5 <BW = F(s) / 2.5> (dividing by 2.56 for Type 2) in the above table, their values are expressed only to one decimal place.
- The type of sampling frequency is common to the whole system.
- Different but same type sampling frequencies can be specified to modules.
- Digital filtering and decimating is applied for sampling frequencies below 1 kHz.

**Sampling Frequencies for Pulse/FV Module Used in Digital Bitstream Mode**

When the Pulse/FV module is used in digital bitstream mode, signal to the module is sampled as digital bitstream at different sampling frequencies from those for other modules in the EX series.

Sampling Frequencies (Hz)

Mode of 1 Channel

Type1		Type2		Type3	
24 bit	16 bit	24 bit	16 bit	24 bit	16 bit
6.5536 M	3.2768 M	8.388608 M	4.194304 M	1.28 M	640 k
3.2768 M	1.6384 M	4.194304 M	2.097152 M	640 k	320 k
1.6384 M	819.2 k	2.097152 M	1.048576 M	256 k	128 k
819.2 k	409.6 k	1.048576 M	524.288 k	128 k	64 k
409.6 k	204.8 k	524.288 k	262.144 k	64 k	32 k
204.8 k	102.4 k	262.144 k	131.072 k	25.6 k	12.8 k
102.4 k	51.2 k	131.072 k	65.536 k	12.8 k	6.4 k
51.2 k	25.6 k	65.536 k	32.768 k	6.4 k	3.2 k
25.6 k	12.8 k	32.768 k	16.384 k	2.56 k	1.28 k
12.8 k	6.4 k	16.384 k	8.192 k	1.28 k	640
6.4 k	3.2 k	8.192 k	4.096 k		
3.2 k	1.6 k	4.096 k	2.048 k		
		2.048 k	1.024 k		
		1.024 k	512		

Mode of 2 Channels

Type1		Type2		Type3	
24 bit	16 bit	24 bit	16 bit	24 bit	16 bit
3.2768 M	1.6384 M	4.194304 M	2.097152 M	640 k	320 k
1.6384 M	819.2 k	2.097152 M	1.048576 M	320 k	160 k
819.2 k	409.6 k	1.048576 M	524.288 k	128 k	64 k
409.6 k	204.8 k	524.288 k	262.144 k	64 k	32 k
204.8 k	102.4 k	262.144 k	131.072 k	32 k	16 k
102.4 k	51.2 k	131.072 k	65.536 k	12.8 k	6.4 k
51.2 k	25.6 k	65.536 k	32.768 k	6.4 k	3.2 k
25.6 k	12.8 k	32.768 k	16.384 k	3.2 k	1.6 k
12.8 k	6.4 k	16.384 k	8.192 k	1.28 k	640
6.4 k	3.2 k	8.192 k	4.096 k	640	320
3.2 k	1.6 k	4.096 k	2.048 k		
1.6 k	800	2.048 k	1.024 k		
		1.024 k	512		
		512	256		

Mode of 4 Channels

Type1		Type2		Type3	
24 bit	16 bit	24 bit	16 bit	24 bit	16 bit
1.6384 M	819.2 k	2.097152 M	1.048576 M	320 k	160 k
819.2 k	409.6 k	1.048576 M	524.288 k	160 k	80 k
409.6 k	204.8 k	524.288 k	262.144 k	64 k	32 k
204.8 k	102.4 k	262.144 k	131.072 k	32 k	16 k
102.4 k	51.2 k	131.072 k	65.536 k	16 k	8 k
51.2 k	25.6 k	65.536 k	32.768 k	6.4 k	3.2 k
25.6 k	12.8 k	32.768 k	16.384 k	3.2 k	1.6 k
12.8 k	6.4 k	16.384 k	8.192 k	1.6 k	800
6.4 k	3.2 k	8.192 k	4.096 k	640	320
3.2 k	1.6 k	4.096 k	2.048 k	320	160
1.6 k	800	2.048 k	1.024 k		
800	400	1.024 k	512		
		512	256		
		256	128		

**Measurable Scopes of Periodic Time for Pulse/FV Module Used in Periodic Time Mode**

When the Pulse/FV module is used in periodic time mode, its measurable scopes of periodic time depend on specified conditions for "Measurement Accuracy", "Channel Mode" and "Data Bits". Refer to the Instruction Manual for EX-MP10 for the details.



### 4-2-4. Setup Channel

This carries out the settings for the channels.

⑤ **Setup Type of Channel Properties**

Specify the setup type of channel properties.

All Properties ..... All of the properties are capable of setting

Basic Properties ..... Basic properties are capable of setting

Advanced Properties ..... Advanced properties are capable of setting

Module Specific Properties .... Module specific properties are capable of setting

Property	Setup type of channel properties			
	All	Basic	Advanced	Specific
Channel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Description	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transducer Type	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engineering Units	<input type="radio"/>	<input type="radio"/>		
Record	<input type="radio"/>	<input type="radio"/>		
Input Mode	<input type="radio"/>		<input type="radio"/>	
Coupling	<input type="radio"/>		<input type="radio"/>	
Cal Slope [EU per Range Units]	<input type="radio"/>		<input type="radio"/>	
Cal Offset	<input type="radio"/>		<input type="radio"/>	
Auto Range	<input type="radio"/>		<input type="radio"/>	
Range	<input type="radio"/>		<input type="radio"/>	
Auto Range Headroom [dB]	<input type="radio"/>		<input type="radio"/>	
Auto Offset	<input type="radio"/>		<input type="radio"/>	
Offset	<input type="radio"/>		<input type="radio"/>	
Direction	<input type="radio"/>		<input type="radio"/>	
Position	<input type="radio"/>		<input type="radio"/>	
dB Reference	<input type="radio"/>		<input type="radio"/>	
TEDS Type	<input type="radio"/>		<input type="radio"/>	
TEDS Set Cal Slope	<input type="radio"/>		<input type="radio"/>	
TEDS Serial Number	<input type="radio"/>		<input type="radio"/>	
TEDS Sensitivity	<input type="radio"/>		<input type="radio"/>	

Property	Setup type of channel properties			
	All	Basic	Advanced	Specific
TEDS Calibration Date	<input type="radio"/>		<input type="radio"/>	
Pulse Type	<input type="radio"/>			<input type="radio"/>
Pulse Threshold	<input type="radio"/>			<input type="radio"/>
Generator Amplitude	<input type="radio"/>			<input type="radio"/>
Generator Phase	<input type="radio"/>			<input type="radio"/>
Generator Offset	<input type="radio"/>			<input type="radio"/>
Generator Start Frequency	<input type="radio"/>			<input type="radio"/>
Generator Stop Frequency	<input type="radio"/>			<input type="radio"/>
Generator M-Sequence	<input type="radio"/>			<input type="radio"/>
Generator Tap ID	<input type="radio"/>			<input type="radio"/>
Generator Random Type	<input type="radio"/>			<input type="radio"/>
Generator Output Range	<input type="radio"/>			<input type="radio"/>
Generator Fade Setting	<input type="radio"/>			<input type="radio"/>

⑥ **Channel Properties**

Setup properties by unit of channel.

Property	Setup/display
Channel	[Indication of channel number, from 1 to 4]
Description	[Input channel name] Channel name can be any numbers or letters.
Transducer Type	[Input transducer type] Transducer type can be any numbers or letters.
Group	[Select group name] IEPE/Direct, Microphone, Charge, DC Strain, Pulse/FV, Thermocouple, Analog Output, Function Generator Any names can be specify for groups by clicking the "Add/Modify Group" button. (For details, refer to ⑨)

Property	Setup/display
Engineering Units	[Input Engineering Units] Input any numbers or letters for the engineering units of the input signal.
Record	[Specify whether use the channel to record data or not] Record : Check the checkbox. Not Record : Uncheck the checkbox.
Input Mode	[Specify input mode] <IEPE/Direct and DC strain modules> IEPE/Direct modules IEPE : Input sensor with embedded amplifier The power for the amplifier is supplied to the sensor. Direct : For voltage input DC Strain Module Full Bridge : Full bridge input Half Bridge : Half bridge input Full Bridge EVC : Full bridge input (Bridge voltage compensation) Half Bridge EVC : Half bridge input (Bridge voltage compensation)
Coupling	[Specify input coupling] <IEPE/Direct module> DC : DC coupling AC : AC coupling Primary RC filter of 0.5 Hz cutoff frequency * Refer to the "Filter Type" in "(4) Module Properties"
Cal Slope [EU per Range Units]	[Input calibration slope] The sensor signal is converted to an accurate physical value. Input a value for the slope of "Engineering Units" per one range unit.
Cal Offset	[Input calibration offset] Calibrate the offset of the sensor signal. Input a value for the offset.
Auto Range	[Specify range mode] Measure the peak level of the input signal and then automatically set the suitable input range. The channels specified as auto range will be the objects of "AutoRange" operation on the "Acquire" screen. (Refer to 4-6 section)
Range	[Specify range for input or output channel] Manually specify the range for the input/output modules. Remove the check mark from "Auto Range". IEPE/Direct IEPE : $\pm 0.1$ Vpk, $\pm 0.2$ Vpk, $\pm 0.5$ Vpk, $\pm 1$ Vpk, $\pm 2$ Vpk, $\pm 5$ Vpk, $\pm 10$ Vpk Direct : $\pm 0.1$ Vpk, $\pm 0.2$ Vpk, $\pm 0.5$ Vpk, $\pm 1$ Vpk, $\pm 2$ Vpk, $\pm 5$ Vpk, $\pm 10$ Vpk, $\pm 20$ Vpk Microphone : $\pm 7.071$ mV, $\pm 22.36$ mV, $\pm 70.71$ mV, $\pm 223.6$ mV, $\pm 707.1$ mV, $\pm 2.236$ V, $\pm 7.071$ V Charge : 1, 3.16, 10, 31.6, 100, 316, 1000, 3160, 10000 pC DC Strain : $\pm 0.2$ , $\pm 0.5$ , $\pm 1.0$ , $\pm 2.0$ , $\pm 5.0$ , $\pm 10$ mV/V Analog Out : 0.0 V to $\pm 5.0$ V (Specify by the unit of 0.1 V)
Auto Range Headroom [dB]	[Input auto range headroom to the current range] When "Auto Range" is carried out, apply a specified margin to the peak level of the input signal, and set the input range. Input a value [dB] for the margin.

Property	Setup/display
Auto Offset	[Specify offset mode] <IEPE/Direct module> The input signal is offset and automatically moves to the center of the input range. The + peak level and – peak level of the input signal are measured to find the average, and this is taken as the offset. The channels specified as auto offset will be the objects of "Auto Offset" operation on the "Acquire" screen. (Refer to 4-6 section)
Offset	[Input auto range offset] <IEPE/Direct module> Offset the input signal. The offset is entered as a value from –100 % to +100 % in 1 % steps. Remove the check mark from "Auto Offset".
Direction	[Specify sensing direction for transducer] +X, –X, +Y, –Y, +Z, –Z
Position	[Input transducer position] Input the value of position where transducer is installed.
dB Reference	[Input dB reference value] Input the reference value as an actual value when using the dB scale.
TEDS Type	[Display TEDS transducer Model] <IEPE/Direct and Microphone modules> Indicate the sensor model name that was read from TEDS. Valid : Model Invalid : None (TEDS is an abbreviation for "Transducer Electronic Data Sheet". It records sensor-specific information to nonvolatile memory in the sensor.)
TEDS Set Cal Slope	[Specify Cal Slope input based on TEDS] <IEPE/Direct and microphone modules> Automatically calculate the calibration slope based on the sensitivity that is read from TEDS. Use Cal Slope Input : Insert a check mark in the check box. Do Not Use Cal Slope Input : Remove the check mark from the check box.
TEDS Serial Number	[Display Sensor Serial Number] <IEPE/Direct and microphone modules> Display the serial number that was read from TEDS.
TEDS Sensitivity	[Display Sensor Sensitivity] <IEPE/Direct and microphone modules> Display the sensor sensitivity that was read from TEDS.
TEDS Calibration Date	[Display Sensor Calibration Date] <IEPE/Direct and microphone modules> Display the sensor calibration date that was read from TEDS.

Property	Setup/display
Pulse Type	<p>[Specify Pulse Type] &lt;Pulse/FV module&gt;</p> <p>Specify the type of input signal level. EX selects the High level or Low level based on the threshold value. If a hazard ringing is included in the input pulse and a malfunction occurs, this sets to a suitable variable threshold value.</p> <p>Input signal level    Threshold  TTL                    : Approx. 2 V  Bipolar                : Approx. 0 V  Variable               : Specified threshold value setting  Threshold value is entered at "Pulse Threshold".</p>
Pulse Threshold	<p>[Input Pulse Threshold] &lt;Pulse/FV module&gt;</p> <p>Enabled when "Variable" is specified for "Pulse Type". Input as a value from -100 % to +100 % in 1 % steps. The input range is <math>\pm 10 \text{ V} = \pm 100 \%</math>.</p>
Generator Amplitude	<p>[Input FG Peak Level] &lt;Analog output module&gt;</p> <p>Sine and sweeping sine signals The peak level of the output signal is input at a percentage of the Generator Range. Example : <math>[\text{Peak Level}] = [\text{Generator Range}] \times [\text{Generator Amplitude}]</math>  <math>= \pm 5 \text{ V} \times 50 \% = \pm 2.5 \text{ Vpk}</math></p> <p>White noise signal The level (actual value) of the output signal is input at a percentage of the Generator Range. Input of values exceeding 50% will clip the output signal. Example : <math>[\text{Actual Value}] = [\text{Generator Range}] \times [\text{Generator Amplitude}] \times [\text{Coefficient}]</math>  <math>= \pm 5 \text{ V} \times 50 \% \times 0.62</math>  <math>= \pm 1.55 \text{ Vrms}</math></p>
Generator Phase	<p>[Input FG Phase] &lt;Analog output module Sine and sweeping sine signals&gt;</p> <p>This sets the phase for other channels. This is input in degree (°) or radian (rad) units. Degrees                : Input from -180° to +180° in 1° steps. For more information about the unit settings, refer to "(8) Phase in Degrees" on page 4-66.</p>
Generator Offset	<p>[Input FG DC Level] The DC level of the output signal is input at a percentage of the Generator Range. Example : <math>[\text{DC Level}] = [\text{Generator Range}] \times [\text{Generator Offset}]</math>  <math>= \pm 1 \text{ V} \times -10 \% = -0.1 \text{ V}</math></p>

Property	Setup/display
Generator Start Frequency	[Input FG start frequency] <Analog output module Sine and sweeping sine signals> This sets the frequency of the sine signal or the start frequency of the sweeping sine signal. The frequency ranges that can be set for each sampling frequency type are shown below. Number of effective digits: Up to 5 digits can be entered. Type1: 0.5 to 20 kHz / Type2: 0.5 to 25 kHz / Type3: 0.5 to 4 kHz
Generator Stop Frequency	[Input FG stop frequency] <Analog output module Sweeping sine signal> The frequency ranges that can be set for each sampling frequency type are shown below. Number of effective digits: Up to 5 digits can be entered. Type1: 0.5 to 20 kHz / Type2: 0.5 to 25 kHz / Type3: 0.5 to 4 kHz
Generator M-Sequence	[Input FG M-sequence] <Analog output module White noise and pink noise signals> This inputs the bit length that generates random noise. It is entered in 1-bit steps from 8 to 32 bits. A longer bit length results in a longer period cycle for random noise. The period cycles for the sampling frequency types at 32 bits are shown below. Type1: 60 minutes / Type2: 45 minutes / Type3: 300 minutes
Generator Tap ID	[Specify FG M-sequence tap ID] <Analog output module White noise and pink noise signals> The random noise characteristics are specified using the ID number. To output random noise with different characteristics for each channel, change the ID number for each channel. The ID number can be selected from 8 types ranging from 0 to 7.
Generator Random Type	[Specify FG random type] <Analog output module White noise and pink noise signals> This specifies the repeat state for the random noise characteristics during burst output. Pseudo : The same random noise characteristics are repeatedly output for each burst output. Pure : Different random noise characteristics are output for each burst output.
Generator Output Range	[Specify FG output range] <Analog output module> This specifies the maximum signal level of the output signal. $\pm 1$ , $\pm 2$ , $\pm 5$ V
Generator Fade Setting	[Input FG fade] <Analog output module> The fade-in/fade-out times for the output signal are entered in 0.1-second steps from 0 to 5 seconds. The fade-in fluctuates from the 0 % to 100 % signal level, and the fade-out fluctuates from the 100 % to 0 % signal level based on the entered time. This is used to prevent a sudden transient from occurring when signal output is started or stopped. This is used for the signal source in vibration generators.

## 4-2-5. Copy Channel Setting

This copies a selected channel setting to another channel.

### 1 Select the channel for the copy source.

Left-click to select the channel number for the copy source ⇒ Right-click ⇒ Left-click "Copy".

### 2 Copy to the desired channel.

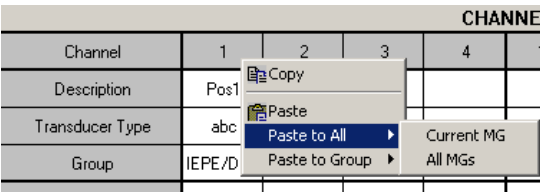
Left-click to select the channel number to be set ⇒ Right-click ⇒ Left-click "Paste".

### 3 Copy to selected MGs

Left-click to select the channel number for the copy source ⇒ Right-click ⇒ Move the mouse over "Paste to All" ⇒ Left-click "Current MG" or "All MGs".

Current MG : This copies the setting to MGs having the copy source channel only.

All MGs : This copies the setting to all MGs operating in synchronization.



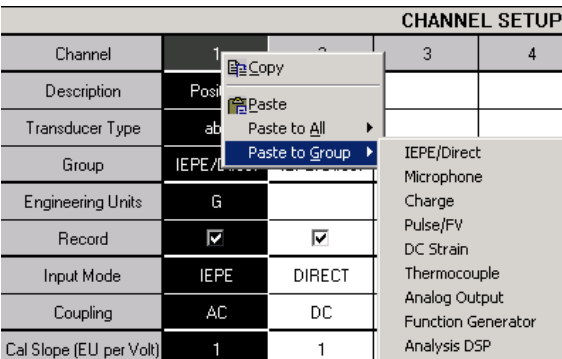
Copy will be applied all measurement groups.

### Paste to Selected Measurement Group

First, select the "Channel" number of paste destination and click.

Then, right-click to display popup menu.

Finally, slide the cursor to "Paste to Group" in the popup menu and click the group to that the paste is to made.



Copy will be applied to all measurement groups.

## 4-2-6. TEDS Data Reading and Setup

### ⑦ Get Transducer Data

By clicking this button the TEDS data is read and input to the corresponding properties. This is effective for reducing the setup time by setting the required sensor information in a single operation.

Connect the TEDS sensor when starting online process.

The TEDS data that is read is input to the following properties.

- "Engineering Units",
- "Cal Slope [EU per Range Units]",
- "TEDS Type",
- "TEDS Set Cal Slope",
- "TEDS Serial Number",
- "TEDS Sensitivity",
- "TEDS Calibration Date"

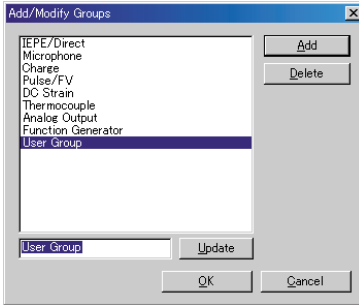
Group	IEPE/Direct
Engineering Units	M/S^2
Record	<input checked="" type="checkbox"/>
Input Mode	IEPE
Coupling	AC
Cal Slope (EU per Range Units)	103.668
Cal Offset	0
Auto Range	<input checked="" type="checkbox"/>
Range	+/-1.0V
Auto Range Headroom (dB)	20
Auto Offset	<input checked="" type="checkbox"/>
Offset	0
Direction	+X
Position	0
dB Reference	1
TEDS Type	333B
TEDS Set Cal Slope	<input checked="" type="checkbox"/>
TEDS Serial Number	17651
TEDS Sensitivity	0.00964614
TEDS Calibration Date	03-Apr-2001



## 4-2-7. Customizing Group Names

### ⑧ Add/Modify Groups

Click this button to carry out Add, Delete and Edit group on the displayed "Add/Modify Groups" window. However it is not possible to delete default groups.



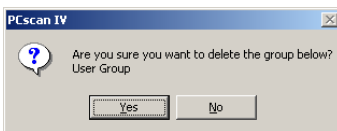
"Add/Modify Groups" window

### (Add Groups)

- 1 Click the "Add" button  
"User Group" is pre-set in the text input area.
- 2 Input any group name in the text input area and click the "Update" button.  
The inputted group name is added to the list of group.  
\* "User Group" is added in the example window.

### (Delete Group)

- 1 Specify a group from the list on the "Add/Modify Groups" window.
- 2 Click the "Delete" button.  
A confirming window is displayed.
- 3 Click the "Yes" button.  
The specified group is deleted.



Group Delete confirming window

## **(Modify Groups)**

- 1** Specify a group from the list on the "Add/Modify Groups" window.
- 2** Modify the group name in the text input area and click the "Update" button.  
The list of group is renewed with the modified group name.

### **To cancel the operation of Add/Delete/Modify**

Click the "Cancel" button then the "Add/Modify Groups" window disappears and return to the "Setup" screen.

### **To apply the operation of Add/Delete/Modify**

Click the "OK" button then the "Add/Modify Groups" window disappear and return to the "Setup" screen.

- ⑨ Undo**  
Click this button to return to the previous setting before modifying.

- ⑩ Apply**  
Click this button to apply the current setting.

#### **Reference**

The "SAVE Setup" button can be used to apply setting as well.

- ⑪ Change the width of property column**  
The column width can be changed by pointing the cursor to where indicated with ⑪ and dragging the cursor to left or right while pushing the left button down.

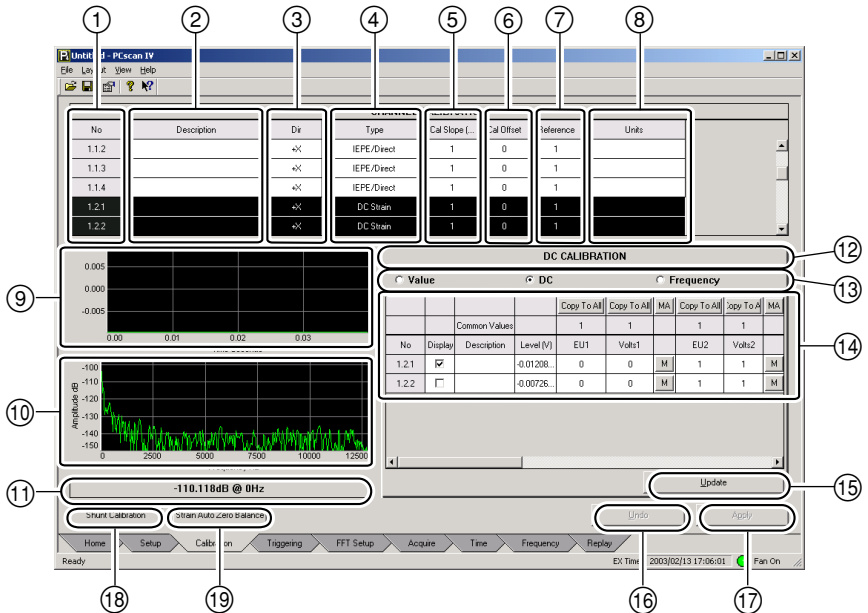
### 4-3. Calibrate ("Calibration" Screen)

The PCscan IV STD online process enables sensor calibration for each channel. Calibration is used to convert the sensor signals to accurate physical values. In calibration, the sensor is connected to the EX series to measure the sensor signal when a reference physical value is applied to the sensor, and then the calibration values (calibration slope and offset) are calculated. If the calibration values of the sensor are already known, the calibration values can be entered directly at this screen. Calibration is possible at the input modules except for the pulse/FV modules.

There are three types of calibration.

Type	Description
Value Calibration	Input calibration values (calibration slope and offset) directly.
DC Calibration	Measure the reference physical values for two points and calculate the calibration slope and offset.
Frequency Calibration	Measure the reference physical value and calculate the calibration slope.

#### 4-3-1. Explanations of "Calibration" Screen



## CHANNEL CALIBRATION

The information related to calibration for each channel is displayed on the screen. Manual inputs are not accepted on this screen.

- ① **No.**  
Indicate channel number. Click "No." to switch order in increment or decrement.  
Select channel or channels from this column for calibration. Selected channel or channels are deep colored.  
Select a channel : Click channel number  
Select multiple channels : Click channel numbers one by one while pushing the Ctrl key down  
Select multiple consecutive channels: Click the beginning and ending channel numbers while pushing the Shift key down
- ② **Description**  
Indicate channel name.  
The channel name inputted in the "Setup" screen is displayed. (Refer to 4-2 ⑥)
- ③ **Dir**  
Indicate sensing direction of transducer.  
The sensing direction specified in the "Setup" screen is displayed. (Refer to 4-2 ⑥)
- ④ **Type**  
Indicate module type.
- ⑤ **Cal Slope [EU per Range Units]**  
Indicate the calibration slope (slope of "Engineering Units" per input range unit)  
Its initial value is the one inputted at the "Setup" screen. (Refer to 4-2 ⑥)  
It is updated by calibrating.
- ⑥ **Cal Offset**  
Indicate the calibration slope (slope of "Engineering Units" per input range unit)  
Its initial value is the one inputted at the "Setup" screen. (Refer to 4-2 ⑥)  
It is updated by calibrating.
- ⑦ **Reference**  
Indicate the reference value for dB scaling.
- ⑧ **Units**  
Indicate the engineering unit.  
The unit inputted at the "Setup" screen is displayed. (Refer to 4-2 ⑥)

## Display

### ⑨ Signal Display

Signal is displayed in graph.

Only signal from the specified channel with the "Display" checkbox checked is displayed in DC/Frequency calibration.

### ⑩ FFT Display

Display FFT power spectra.

The setting of calibration can be confirmed with this display.

For detailed confirmation, turn to the "Frequency" screen.

### ⑪ Frequency and Magnitude

Click any where in "⑩ FFT Display" graph then a line cursor is display at the cursor position. The frequency element and power spectrum amplitude are indicated here.

## CALIBRATION (Refer to sections from 4-3-2 to 4-3-4)

The following items are used for setting.

### ⑫ Calibration Name

This is displayed according to specified type of calibration.

### ⑬ Value/DC/Frequency

Specify the calibration type.

Click the radio button to specify.

### ⑭ Set Table

Various setting of calibration is carried out here.

The channel or channels indicated here are those specified in "① No."

The contents of setting depend the type of calibration.

### ⑮ Update

Click this button to start calibration after finishing setting. Refer to each calibration mode for the details.

## Buttons

### ⑯ Undo

Click this button to cancel all of setting and return to the previous.

### ⑰ Apply

Click this button to apply the current setting.

### ⑱ Shunt Calibration

Carry out shunt calibration in the DC strain module. To carry out shunt calibration, select "DC Calibration".

### ⑲ Strain Auto Zero Balance

Carry out balance adjustment in the DC strain module. Offset occurring during sensor installation can be cancelled. To carry out balance adjustment, select "DC Calibration".

## 4-3-2. Value Calibration

Directly enter the Slope and Offset to carry out sensor calibration. Use the sensitivity contained in the sensor data sheet and the calibration values that were measured beforehand. Calibration is carried out only to the channel or channels specified in the "Calibration" screen. (Refer to 4-3-1 ①)

- 1 Specify channel or channels for calibration in the "Calibration" screen.  
(Refer to 4-3-1 ①)
- 2 Check the "Value" radio button in the "Calibration" screen.  
It is now in the value calibration mode.

VALUE CALIBRATION

☒ Value    ☐ DC    ☐ Frequency

		Copy To All	Copy To All
	Common Values	2	0.1
No	Description	EU Per Range Units	EU At 0[Range Units]
1.1.1	ABC	1	0
1.1.3	ABC	1	0

Update

**3** Input calibration value as follows.

In case each channel has its own calibration values

1. Input cal slope into the "EU Per Range Units" column at channel row.  
The Slope is the slope of "Engineering Units" per input range unit.
2. Input cal offset into the "EU At 0[Range Units]" column at channel row.

In case all channels have the same calibration values

1. Input the cal slope into the "EU Per Range Units" column on the "Common Values" row.
2. Input the cal offset into the "EU At 0[Range Units]" column on the "Common Values" row.
3. Click the "Copy To All" buttons on the "EU Per Range Units" and "EU At 0 [Range Units]" columns to copy the common values to all currently specified channels.

VALUE CALIBRATION					
<input checked="" type="radio"/> Value		<input type="radio"/> DC		<input type="radio"/> Frequency	
		Copy To All		Copy To All	
Common Values		2		0.1	
No	Description	EU Per Range Units	EU At 0[Range Units]		
1.1.2	ABC	2	0.1		
1.1.3	ABC	2	0.1		
<input type="button" value="Update"/>					

Example: In case the sensor sensitivity is used

1. Calculate the sensitivity reciprocal contained in the sensor data sheet.  
For a sensor sensitivity of 100 mV/g, the result is 10 g/V.
2. Enter the sensitivity reciprocal into the "EU Per Range Units" column.

**4** Click the "Update" button.

The inputted values are applied and indicated in CHANNEL CALIBRATION.

**5** Click the "Apply" button on the "Calibration" screen.

The calibration values are applied.

It can be confirmed on the "Setup" screen that calibration values have been renewed.

### 4-3-3. DC Calibration

Connect the sensor and then measure the reference physical values for two points to carry out calibration. The Slope and Offset are calculated from the measurement results of the two points.

In DC calibration, signal from channel with checked the "Display" checkbox can be confirmed in graph.

Note

In the IEPE/Direct module, DC calibration cannot be used when the coupling is AC. For channels with AC coupling, an error message is to be displayed if DC calibration is selected.



Error message

- 1
- Specify channel or channels for calibration in the "Calibration" screen.  
(Refer to 4-3-1 ①)
- 2
- Check the "DC" radio button in the "Calibration" screen.  
It is now in the DC calibration mode.

DC CALIBRATION

☐ Value ☒ DC ☐ Frequency

				Copy To All	Copy To All	MA	Copy To All	Copy To All	MA
		Common Values		1	1		1	1	
No	Display	Description	Level (V)	EU1	Volts1		EU2	Volts2	
1.1.1	<input checked="" type="checkbox"/>	Cal TEST	1.0082	0	0.0006420...	M	1	1.00824	M

Update



- 3** Input a value for EU1 as the first for current channel or channels. (If it is 0 V, input 0)
- Reference**
- In case the same signal is used for multiple channels, copy the value into "Common Values" and click the "Copy To All" button.
- 4** Input the signal corresponding to the value EU1 in Step **3** and click the "M" button for a channel or click "MA" button for multiple channels.
- The measured value or values are indicated. (0.0006420 in the sample screen)
- 5** Input another value for EU2 as the second for current channel or channels. (If it is 1 V, input 1)
- Reference**
- In case the same signal is used for multiple channels, copy the value into "Common Values" and click the "Copy To All" button.
- 6** Input the signal corresponding to the value EU2 in Step **5** and click the "M" button for a channel or click the "MA" button for multiple channels.
- The measured value or values are indicated. (1.00824 in the sample screen)
- 7** Click the "Update" button.
- The inputs for EU1 and EU2 are transferred into calibration slope and offset, which are displayed in CHANNEL CALIBRATION.
- 8** Click the "Apply" button on the "Calibration" screen.
- Apply the calibration slope and offset.

It can be confirmed on the "Setup" screen that calibration values have been renewed.

### 4-3-4. Frequency Calibration

As its name implies that frequency calibration is carried out with value at frequency domain, usually the FFT power spectrum, which is different from DC calibration. It is the best used method for sound and vibration applications.

By installing transducer into a calibrator and inputting its reference signal into a channel, frequency calibration is carried out and the calibration slope is calculated.

In Frequency calibration, signal from a channel with checked "Display" checkbox can be confirmed in graph (on the left of screen).

- 1
- Specify channel or channels for calibration on the "Calibration" screen.  
(Refer to 4-3-1 ①)
- 2
- Check the "Frequency" radio button on the "Calibration" screen.  
It is now in the frequency calibration mode.

FREQUENCY CALIBRATION

☐ Value☐ DC☒ Frequency

			Copy To All
Common Values			
No	Display	Description	Freq (Hz)
1.1.1	<input checked="" type="checkbox"/>	Pos1	1
1.1.2	<input type="checkbox"/>		1

Update

- 3
- Input a reference signal into the specified channel or connect the transduce installed into a calibrator to the specified channel and turn on the calibrator.
- 4
- Click the "M" button corresponding the specified channel.  
The frequency element of maximum magnitude is measured and displayed in the Freq [Hz] column. (1992 Hz in the sample screen)
- 5
- Input the EU value equivalent to reference or calibrator signal into the Level [EU] column.

Reference

To copy a measured frequency to all channels, copy it into the "Common Values" column first and then click the "Copy To All" button.

- 6 Input the error range into the "Stability" column. (2 % in the sample screen (step 7))

**Reference**

To copy a measured frequency to all channels, copy it into the "Common Values" column first and then click the "Copy To All" button.

- 7 Click the "Update" button.

Calibration starts and the calibration slope is renewed in CHANNEL CALIBRATION as it finishes.

**Note**

During calibrating, only the "Cancel" button is active on the screen.

Click the "Cancel" button to stop calibrating.

FREQUENCY CALIBRATION					
Value		DC		Frequency	
			Copy To All	MA	Copy To All
		Common Values	1000	1	2
No.	Display	Description	Freq (Hz)	Level (EU)	Stability (%)
1.1.1		Cal TEST	1992	2	2
1.1.2			1992	1	2

Cancel

- 8 Click the "Apply" button on the "Calibration" screen.

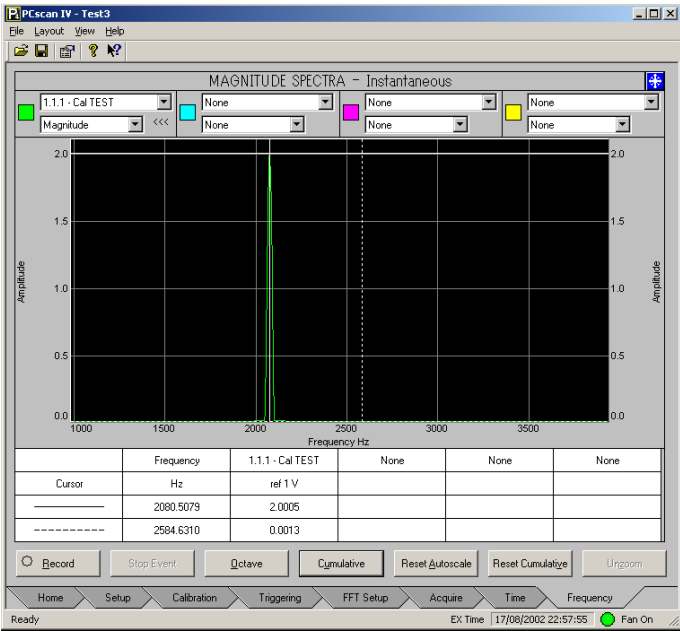
Apply the calibration slope and offset.

No	Description	Dir	Type	Cal Slope ...	Cal Offset	Reference
1.1.1	Cal TEST	↕	IEPE/Direct	1.94665	0	1
1.1.2		↕	IEPE/Direct	733.856	0	1
1.1.3		↕	IEPE/Direct	1	0	1
1.1.4		↕	IEPE/Direct	1	0	1
1.2.1		↕	Microphone	1	0	1

The effect for calibration can be confirmed on the "Frequency" screen.

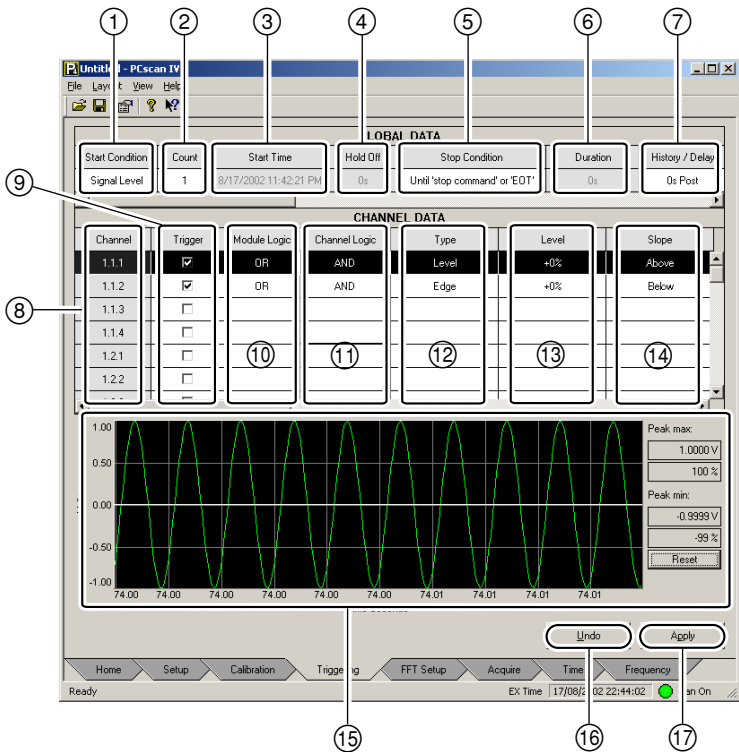
Example

In the following screen the power spectra of channel 1.1.1 is displayed for the same reference signal as the input. It is verified that the peak is 2 in linear scaling. (6 dB in case of log scaling.)



# 4-4. Set Start/Stop Conditions for Recording ("Triggering" Screen)

Setting start/stop conditions for recording is carried out on the "Triggering" screen. Both the trigger input of EX-UT10 and any channel of input modules can be used as trigger sources. Channels of the Pules/FV module cannot be treated as trigger ones. Click the "Apply" button after finishing setting to apply the setting.



## GLOBAL DATA

### ① Start Condition

Specify start condition as the trigger.

Manual : No trigger

Time : Trigger by date and time

"Count", "Start Time", "Hold Off", "Stop Condition", "History/Delay" are valid.

Signal Level : Trigger by condition specified in CHANNEL DATA (From ⑧).

"Count", "Stop Condition", "History/Delay", "CHANNEL DATA" are valid.

### ② Count

Input repeat counter (from 1 to 1000).

### ③ Start Time

Input date and time as the timing to start recording.

It is valid when "Time" is specified in "① Start Condition".

Example

In case to start recording from 10 clock 23 minute 50 second, July 15, 2002, 2002/07/15 10:23:50 is to be inputted.

### ④ Hold Off

Specify recording duration by unit of second, from 0 to 86400 seconds.

It is valid when "Time" is specified in "① Start Condition".

### ⑤ Stop Condition

Specify stop condition.

Until 'stop command' or 'EOT' : Continue recording until it is stopped or there is no free space left in the recording media

Until specific 'time' : Record for a specified duration (Refer to ⑥)

### ⑥ Duration

Input duration by unit of second (from 1 to 3600).

It is valid when "Until specific 'time' " is specified in "⑤ Stop Condition".

## ⑦ History/Delay

Specify pre-trigger or post-trigger time to start recording by unit of second.  
It is valid only when "Signal Level" is specified for "① Start Condition".

0s Post	Normal trigger	Record from the triggering point
1s Pre to 10s Pre	Pre-trigger	Record from the point prior to the trigger point by the specified seconds
1s Post to 10s Post	Post-trigger	Record from the point post the trigger point by the specified seconds

Examples

0s Post : Record from the very data when trigger turns on

10s Pre : Record from the data 10 seconds before trigger turns on

10s Post : Record from the data 10 seconds after trigger turns on

## CHANNEL DATA

### ⑧ Channel

Indicate the trigger input channel on EX-UT10 front panel and input channels of docked input modules (from 1.1.1 to 1.6.4).

Only those channels that belong to enabled modules specified on the "Setup" screen (Refer to 4-2 ④) are displayed.

Click this column to specify channel for signal graph (⑤).

The row of specified channel is deep colored.

Channel Selection: Click channel number

### ⑨ Trigger

Check the checkbox for trigger channel.

### ⑩ Module Logic

Specify logic type between modules.

It is referred only when trigger channels are among multiple modules.

AND : When trigger conditions are satisfied by all of the modules with trigger channel or channels

OR : When any of trigger conditions is satisfied by one of the modules with trigger channel or channels

### ⑪ Channel Logic

Specify logic type between channels.

It is referred only when there are multiple trigger channels in the same module.

AND : When trigger conditions are satisfied by all of the trigger channels

OR : When any of trigger conditions is satisfied by one of the channels

⑫ **Type**

Specify type for trigger condition.  
Level : trigger by input level  
Edge : trigger by slope for specified input trigger level (⑬), either up or down

⑬ **Level**

Input trigger level by percentage of full range between -100 to +100.

⑭ **Slope**

Specify trigger condition for specified input trigger level (⑬).

Level (Type)	
Above	Above trigger level
Below	Below trigger level

Edge (Type)	
Up Trigger	Up slope above trigger level
Down Trigger	Down slope below trigger level

⑮ **Display Signal**

Signal from currently specified channel (⑧) is displayed in graph.  
Click on the graph, a horizontal line is displayed at the clicked position and its level is taken as the trigger level for the channel.  
Y axis ... The unit specified for "Engineering Unit" (Refer to 4-2 ⑥) on the "Setup" screen is displayed.  
Scaling indicators depend on specified range.  
X axis ... Time seconds.  
Scaling is in unit of second.  
Peak max : Maximum and its percentage of full range  
Peak min : Minimum and its percentage of full range

**Button**

⑯ **Undo**

Click this button to cancel all of setting and return to the previous.

⑰ **Apply**

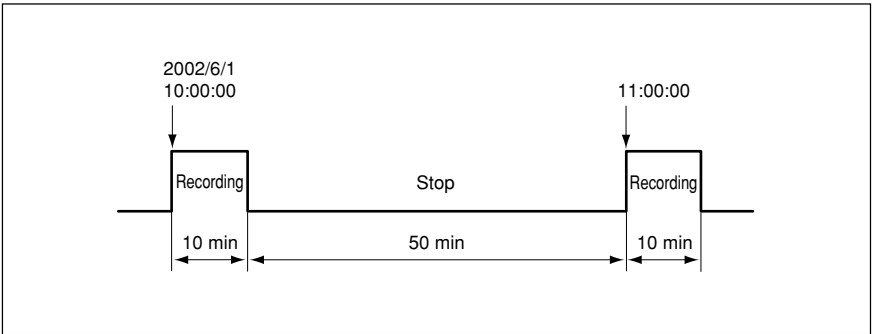
Click this button to apply the current setting.



### Setting Up On Time Data Acquisitions

It is possible to carry out on time data acquisition by specifying "Time" trigger in "① Start Condition".

(Example)

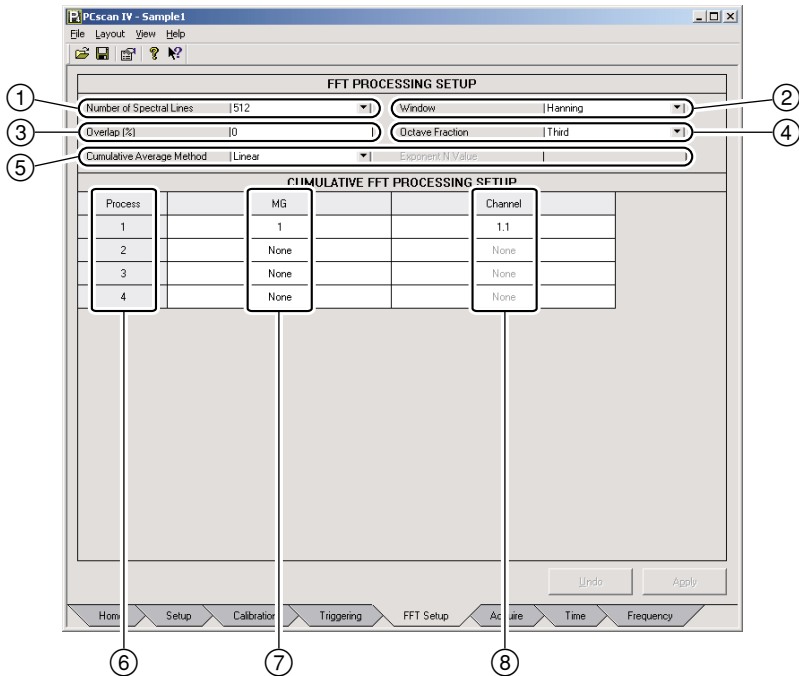


The following setting is for a data acquisition by On Time trigger mode, which acquires 10 minutes of data starting at the very beginning of every hour for 24 hours.

Item	Setting
Start Condition	Time
Count	24
Start Time	2002/06/01 10:00:00
Hold Off	3000 s
Stop Condition	Until specified 'time'
Duration	600 s

## 4-5. Setup FFT/Octave Monitoring ("FFT Setup" Screen)

Setting up for FFT/Octave monitoring is specified on the "FFT Setup" screen.  
Click the "Apply" button to apply the specifying after finishing setting.



"FFT Setup" screen

**Note**  
Error message "Processing Error" might be displayed if specified parameters make the software have too heavy processing burden. In that case, parameters, such as the Number of Spectral Lines, the Number of Channel for averaging processing, are expected to modify suitably to lighten the processing task.

### FFT PROCESSING SETUP

- ① **Number of Spectral Lines**  
Specify the spectral lines for FFT monitoring.  
Choices  
64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768, 65536

② **Window**

Specify time window function for FFT monitoring.

Choices:

Rectangular, Bartlet, Hamming, Welch, Hanning, Blackmann, Kaiser, Flattop

A short explanation on time window is given below.

FFT analysis assumes that every frame data it process is one cycle of data cut out from an endless periodical signal series. If there is no periodicity in the series of frame data, FFT analysis is not capable of precisely measuring frequency characteristics, which is known as the "leakage" phenomenon. Time window functions are designed to prevent the phenomenon. Almost all of the window functions have the shape of a mountain, higher in the middle and zero at each side. Multiplying a time window with frame data at time domain makes series of windowed frame data be closer to the assumption of periodicity at each side, therefore more precise analysis becomes possible.

Due to the diversification of data from various phenomena, purposes and focus, requirements of analyzed results are different, for instance, one could demand higher frequency resolution and another would require more precise amplitude, more than a dozen of time window functions with different characteristics have been designed to meet these requirements.

Since multiplying a time window to a frame of signal at the time domain is equivalent to multiply the frequency spectra of the time window to the those of the frame signal at frequency domain, selection of time window function should be made based on its frequency characteristics such as peak sidelobe (its attenuation comparing with mainlobe), sidelobe rolloff (dB/Octave) and mainlobe width (equivalent line bandwidth) according to specific purpose.

In the following table, frequency characteristics for well used time window functions are provided for reference.

Time Window	Peak Sidelobe (dB)	Sidelobe Rolloff (dB/Octave)	Mainlobe Equivalent Bandwidth (Line)	Maximum Amplitude Error (dB)
Rectangular	-13	-6	1.0	3.9
Bartlet	-27	-12	1.33	3.07
Hamming	-43	-6	1.36	3.1
Hanning	-32	-18	1.5	3.18
Blackmann	-58	-18	1.73	3.47
Kaiser	-82	-6	1.93	3.74
Flattop	-44	0	2.96	0.001

Below, major characteristics and suitable applications for the time window functions supported in PCscan IV STD are given for reference.

#### Rectangular

Although it does not have large sidelobe attenuation, it maintains original frequency characteristics perfectly.

It is suitable for signals whose frequency elements cover whole bandwidth, such as shock and burst signals.

#### Bartlet

It has the narrower mainlobe equivalent bandwidth than any others except rectangular only.

It is suitable for applications requiring higher frequency distribution originality.

#### Hamming

It not only has large sidelobe attenuation, but has narrow mainlobe equivalent bandwidth as well. However, its sidelobe rolloff is too gentle to have a wider dynamic range than 60 dB. It is suitable for applications to measure frequency distribution. But it is not suitable to applications requiring higher dynamic range.

#### Welch

It is mainly used in PSD applications.

#### Hanning

Although it does not have large sidelobe attenuation, it has narrower equivalent bandwidth and steeper sidelobe rolloff. Due to its best balance of the three characteristics, it is best used time window function almost applying to all kinds of applications. For applications requiring both higher frequency distribution resolution and less amplitude error, hanning window is the best choice.

#### Blackmann

Although its sidelobe rolloff and mainlobe equivalent bandwidth are not better than those for hanning time window function, it has steeper sidelobe rolloff than hanning. It is especially recommended for applications requiring higher frequency distribution resolution.

#### Kaiser

It has almost the same sidelobe rolloff as hamming time window, but more largest sidelobe attenuation.

It is suitable for applications of clearer frequency distribution in place of hamming time window.

#### Flattop

In addition to its large sidelobe rolloff attenuation, it has a flattest mainlobe, which makes it possible to have most precise amplitude of frequency element for frame data lacking integral periodicity cut from continuous signal (non-burst).

It is suitable for applications requiring amplitude originality. But it is not suitable to distinguish close frequency elements.

③ **Overlap**

Input a percentage (from 0 to 99) for overlapping consecutive frames in FFT analysis. If too many spectral lines is specified and not enough computer performance is available, frames of data might lose its continuity. In that case, the specified overlap is not referred.

Example

0 : No overlap

50 : The later half of the current frame of data will be combined with half frame of new data to serve as the next frame for FFT analysis.

④ **Octave Function**

Specify bandwidth for Octave analysis.

Full : 1/1 octave bandwidth

Third : 1/3 octave bandwidth

⑤ **Cumulative Average Method**

Specify averaging type for "Cumulative" processing on the "Frequency" screen.

Linear : Arithmetic averaging

Exponent N : Exponent averaging. Specify N in "Exponent Value"

Time Decay : Time averaging. Specify time in "Averaging Time" by unit of second.

## CUMULATIVE FFT PROCESSING SETUP

⑥ **Process**

Indicate the number (from 1 to 4) of cumulative process.

⑦ **MG**

Specify groups of channels to carry out cumulative.

Specify "None" if averaging is not to be carried out.

⑧ **Channel**

Specify channel or channels from the groups specified in ⑦.

## Buttons

⑨ **Undo**

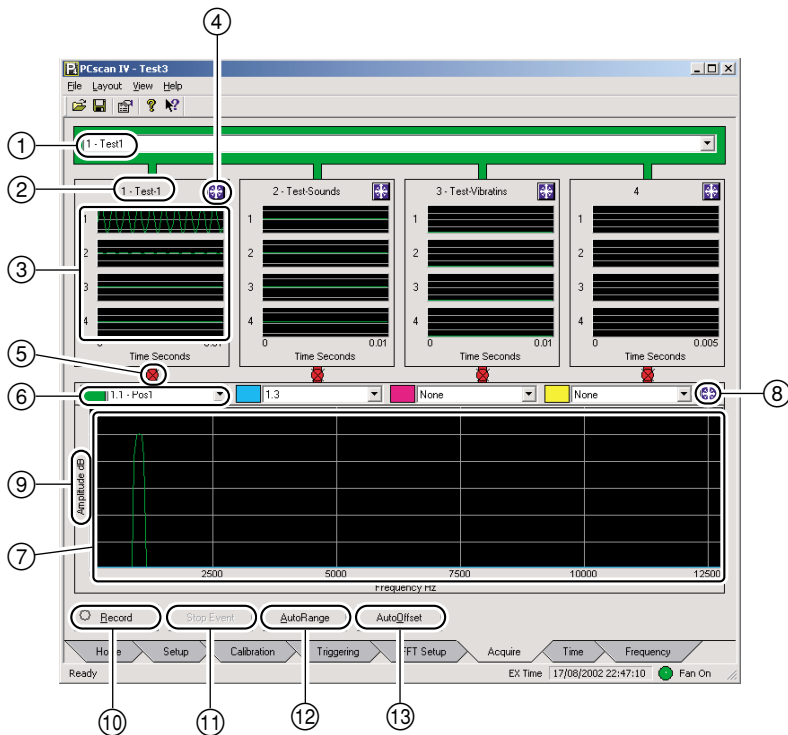
Click this button to cancel all of setting and return to the previous.

⑩ **Apply**

Click this button to apply the current setting.

# 4-6. Comprehensive Real-time Monitor/Data Acquisition ("Acquire" Screen)

Signals from all channels of the same group can be monitored on the "Acquire" screen. In addition to signals from 16 channels and FFT power spectra of 4 channels, data acquisition can be carried out on the same screen.



"Acquire" screen

- ① **Measurement Group Number and Name**  
Indicate measurement group number and name (Refer to 4-2 ②).
- ② **Measurement Module Number and Name**  
Indicate measurement module number and name (Refer to 4-2 ④).

### ③ **Monitor Signals from Measurement Modules**

Signal monitoring graph for channels of the same module are displayed in a sub window on the "Acquire" screen. Any consecutive 4 windows can be displayed at the same time. To shift windows for monitoring in case there are more than 4 measurement modules are connected, pull down the "Layout" menu and click "Previous Page" or "Next Page", or push F7 or F8 key.

Example

Current Display	Operation	Display
Modules 1, 2, 3, 4	→ Previous Page (F7)	→ Modules 6, 1, 2, 3
Modules 1, 2, 3, 4	→ Next Page (F8)	→ Modules 2, 3, 4, 5

### ④ **Button to Freeze Signal Monitoring**

Click the button to freeze the signal monitoring for a module, which makes it possible to have close view on some specific module. Click the button again to continue monitoring.

### ⑤ **Pipe Button**

Click the button to have FFT power spectra monitoring (⑦) for all 4 channels of the corresponding module.

### ⑥ **FFT Monitoring Channel**

Specify channel for FFT power spectra monitoring.

Up to 4 channels can be specified for FFT power spectra monitoring from the maximum configuration of 24 channels in one group.

Specifying channel here will release the monitoring from "⑤ Pipe Button".

### ⑦ **FFT Power Spectra Monitoring**

Power spectra of specified channels are displayed here.

The bandwidth for X axis depends on the sampling frequency of module enabled on the "Setup" screen.

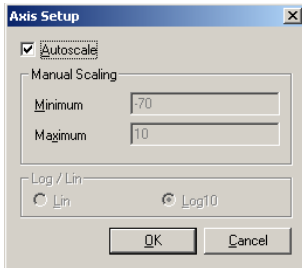
Click the pipe button ⑤ will display 4 channel power spectra from the corresponding module; Specify FFT monitoring channels ⑥ display the power spectra for specified channels.

### ⑧ **Button to Freeze Power Spectra Monitoring**

Click the button to freeze the monitoring. Click again to continue monitoring.

⑨ **Amplitude dB (Axis Setup)**

Right-click the area of "Amplitude dB" to scale Y axis on the displayed "Axis Setup" window.



"Axis Setup" window

**Autoscale**

Check the checkbox to have automatic scaling for Y axis. Discheck the checkbox to enable "Manual Scaling".

**Manual Scaling**

Input low and high scaling values into Minimum and Maximum, respectively.

**OK**

Click the button to apply the current setting.

**Cancel**

Click the button to cancel the current setting and maintain the previous.

⑩ **Record**

Click the button to start data acquisition. Click again to stop.

**Reference**

The starting or stopping operations for data acquisition can be arranged to some specific keys. (Refer to 4-11-2)

⑪ **Stop-Event**

Click the button to stop triggered data acquisition.

The button is only active when some kind of trigger condition is set for data acquisition.



## ⑫ **AutoRange**

Click the button to start auto range. The caption for the button turns to be "Stop" as soon as auto range starts. Clicking the "Stop" button stops evaluating signals and sets best suited ranges according to the signals.

Auto range is carried out only to those channels with "Auto Range" checked on the "Setup" screen. (Refer to 4-2 ⑥)

If "Auto Range Headroom" is specified with a non-zero value, the value, as a headroom, will be added to the automatic range to serve as the final range to set.

### **Note**

It is recommended to click the "Stop" button to stop the operation more than two seconds after peak signals have been inputted into related channels.

## ⑬ **AutoOffset**

Click the button to start auto offset. The caption for the button turns to be "Stop" as soon as auto offset starts. Clicking the "Stop" button stops evaluating signals and sets offsets that makes A/D data have 0 offsets.

Prior to carrying out auto offset, auto range has to be implemented first.

Auto offset is carried out only to those channels with "Auto Offset" checked on the "Setup" screen. (Refer to 4-2 ⑥)

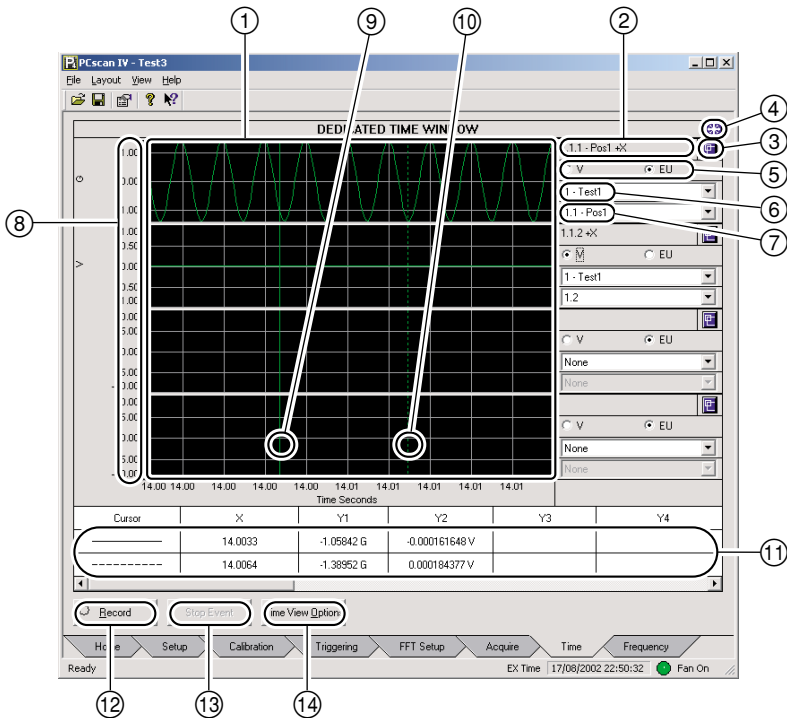
The zero balance of DC Strain module is to be carried out at the "Calibration" screen.

### **Note**

- It is recommended to click the "Stop" button to stop the operation more than two seconds after peak signals have been inputted into related channels.
- Auto offset does not apply to DC Strain module.

# 4-7. Any Specified 4 Channel Real-time Monitor/Data Acquisition ("Time" Screen)

On the "Time" screen, signals from up to 4 any specified channels can be monitored. It is possible to scale X and Y axes and display values for markers on the "Time" screen. Data acquisition can be carried out while monitoring signals.

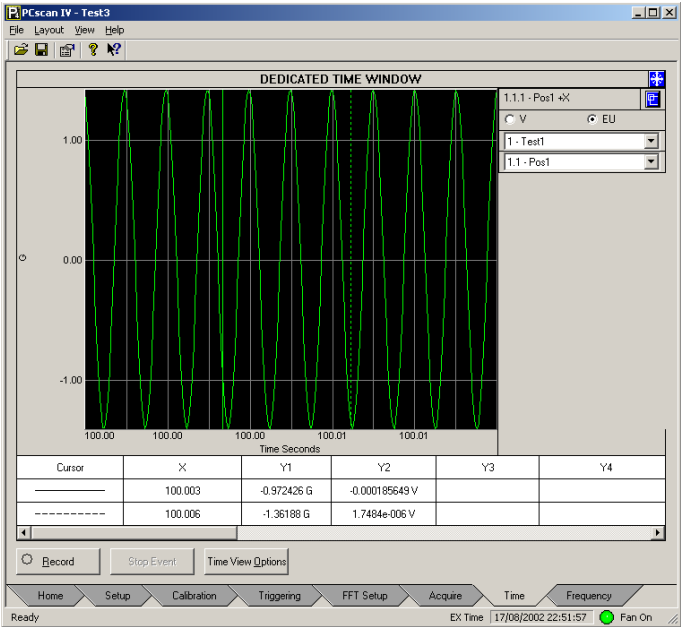


"Time" screen

- ① **Signal Display**  
Signals from specified channels are displayed.
- ② **Channel Number and Name, Sensing Direction of Transducer**  
Channel number and name (4-2 ⑥), sensing direction of transducer are displayed (Refer to 4-2 ⑥).

③ **Button to Expand Signal Display**

Click the button to expand signal display of a channel to full size.



Signal channel display screen

④ **Button to Freeze Signal Monitoring**

Click the button to freeze signal monitoring, which makes it possible to have close view on some seccific channel.

Click the button again to continue monitoring.

⑤ **Unit**

Specify Y-axis units for signal monitoring.

When "V" is specified, units corresponding to used modules are displayed.

Module and Mode	Unit
IEPE/Direct	V
Microphone	V
Charge	pC
DC Strain	mV/V
Pulse/FV FV Mode	r/min
Pulse/FV Digital Mode	Non
Pulse/FV Time Mode	Non

When "EU" is specified, units specified for "Engineering Units" at the "Setup" screen are displayed. (Refer to 4-2 ⑥)

⑥ **Measurement Group Number and Name**

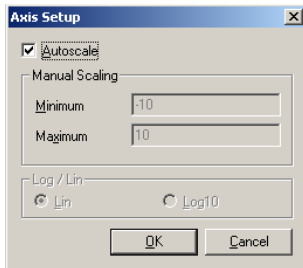
Measurement group number and name (Refer to 4-2 ②) are displayed.

⑦ **Channel Number and Name**

Channel number and name (Refer to 4-2 ⑥) are displayed.

⑧ **Axis Setup**

Right-click the title area for Y axis to scale Y axis on the displayed "Axis Setup" window.



"Axis Setup" window

**Autoscale**

Check the checkbox to have automatic scaling for Y axis.

Discheck the checkbox to enable "Manual Scaling".

**Manual Scaling**

Input low and high scaling values into Minimum and Maximum, respectively.

**OK**

Click the button to apply the current setting.

**Cancel**

Click the button to cancel the current setting and maintain the previous one.

⑨ **Line Cursor**

Click any where in the graph then a line cursor is displayed at the cursor position. The timing and signal level at the position are indicated (⑩).

⑩ **Dot-line Cursor**

Right-click any where in the graph then a line cursor is displayed at the cursor position. The timing and signal level at the position are indicated (⑪).

⑪ **Display Cursor Values**

The timings and signal levels for cursors (⑨, ⑩) are indicated.

The indicated cursor values of the upper row are for the line cursor, and those of the bottom row are for the dot-line cursor.

This marker function is supposed to be carried out on the freezed "Time" screen.

## Buttons

### ⑫ Record

Click the button to start data acquisition. Click again to stop.

#### **Reference**

The starting or stopping operations for data acquisition can be arranged to some specific keys. (Refer to "③ Record keys" in 4-11-2)

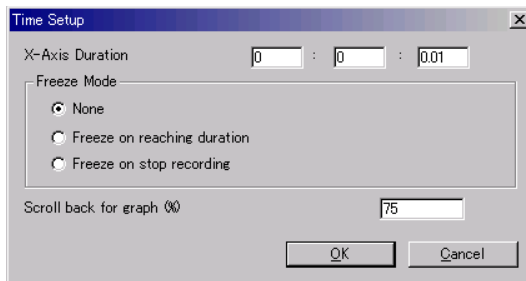
### ⑬ Stop-Event

Click the button to stop triggered data acquisition.

The button is only active when some kind of trigger condition is set for data acquisition.

### ⑭ Time View Options

Click the button to display the "Time Setup" window.



#### **X-Axis Duration**

Specify the duration in HH:MM:SS.

#### **Freeze Mode**

Specify freezing mode for signal monitoring.

None : No freeze

Freeze on reaching duration : Freeze signal monitoring when data of specified duration are completely displayed.

Only when specified X-Axis Duration is equal to or longer than one second is signal monitoring carried out.

Freeze on stop recording : Freeze as soon as stop data acquisition

#### **Scroll back to graph (%)**

Input the percentage of monitoring data to be scrolled back for the next display.

It applies only when specified X-Axis Duration is equal to or longer than one second.

#### **OK**

Click the button to apply the current setting.

#### **Cancel**

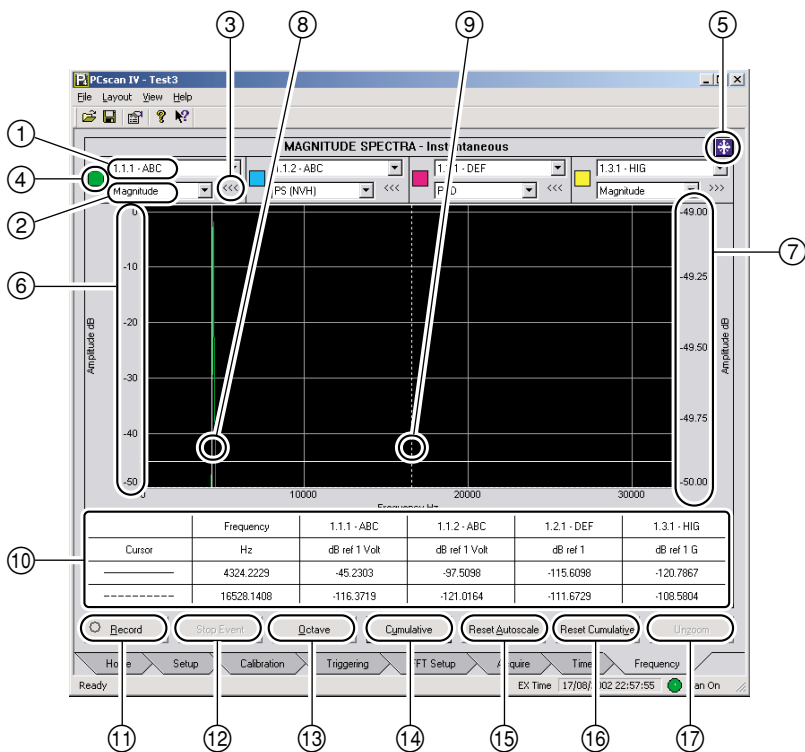
Click the button to cancel the current setting and maintain the previous.

# 4-8. Real-time FFT or Octave Monitor/Data Acquisition ("Frequency" Screen)

On the "Frequency" screen, real-time FFT power spectra or Octave band spectra can be monitored.

Setting for FFT or Octave analysis can be carried out on the "Options" "FFT" tabbed screen displayed from the "File" menu. And cumulative channels can be specified at the "FFT Setup" screen (Refer to 4-5).

Data acquisition can be carried out while monitoring FFT power spectra or Octave band spectra. The monitor of FFT or Octave does not apply to cases that sampling frequencies are under 400 Hz.



"Frequency" screen

## ① Channel

Specify a channel for monitoring.

There is no monitoring if None is specified. Measurementgroup number, module number, channel number and name (Refer to 4-2 ⑥) are displayed.

## ② **FFT Type**

Specify a monitoring type of FFT.

Some short explanations are made below regarding types of FFT and their well used applications.

**Magnitude** : This is generally used to measure the amplitude for some specific frequency elements and in RMS measurement

**PS [NVH]** : This is well used in sound and vibration applications to measure energies or engineering values of frequency elements

**PSD** : This is usually used for shock or random signals that have continuous frequencies over the whole bandwidth to measure the energy distribution characteristics over frequency bandwidth.

## ③ **Switch Y Axis Scale**

Click the button to switch axis from the left to the right, and vice versa.

## ④ **Button to Specify Color**

Click to display the color edit window and specify color for the corresponding channel.



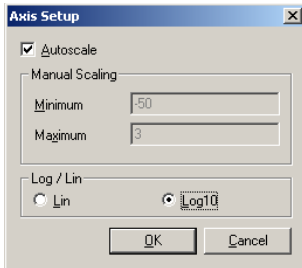
## ⑤ **Button to Freeze Monitoring**

Click the button to freeze the monitoring.

Click again to continue monitoring.

## ⑥ Scale Left Axis

Right-click the title area of left Y axis to scale the axis on the displayed the "Axis Setup" window.



"Axis Setup" window

### Autoscale

Check the checkbox to have automatic scaling for Y axis.

Discheck the checkbox to enable "Manual Scaling".

### Manual Scaling

Input low and high scaling values into Minimum and Maximum, respectively.

### Log/Lin

Specify the scaling type for Y axis by checking one of two radio boxes.

Lin : Linear scaling

Log10 : Logarithmic scaling

### OK

Click the button to apply the current setting.

### Cancel

Click the button to cancel the current setting and maintain the previous.

## ⑦ Scale Right Axis

Right-click the title area of right Y axis to scale the axis on the displayed "Axis Setup" window.

The setting of "Axis Setup" is the same as in "⑥ Scale Left Axis".

## ⑧ Line Cursor

Click anywhere in the graph then a line cursor is displayed at the cursor position. The frequency element and its amplitude at the position are indicated (⑩).



⑨ **Dot-line Cursor**

Right-click any where in the graph then a line cursor is displayed at the cursor position.  
The frequency element and its amplitude at the position are indicated (⑩).

⑩ **Display Cursor Values**

The frequency elements and their amplitude for cursors (⑧, ⑨) are indicated.  
The indicated cursor values of the upper row are for the line cursor, and those of the bottom row are for the dot-line cursor.

## **Buttons**

⑪ **Record**

Click the button to start data acquisition.

Click again to stop.

**Reference**

The starting or stopping operations for data acquisition can be arranged to some specific keys. (Refer to 4-10-2)

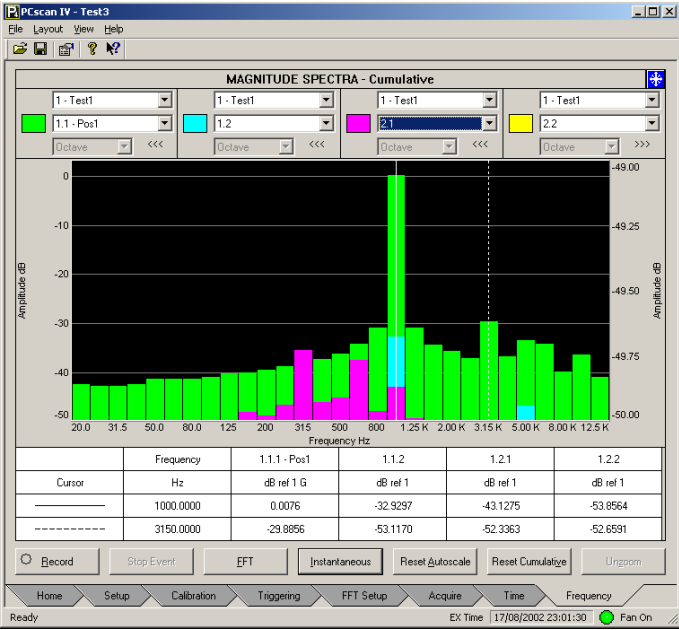
⑫ **Stop-Event**

Click the button to stop triggered data acquisition.

The button is only active when some kind of trigger condition is set for data acquisition.

⑬ **Octave/FFT**

Click the button to switch from FFT to Octave monitoring, and vice versa.



"Frequency" octave screen

⑭ **Cumulative/Instantaneous**

Click the button to switch from cumulative to instantaneous monitoring, and vice versa.

Cumulative : Monitor averaged analysis (only to channels specified on the "FFT Setup" screen)

Instantaneous : Monitor instantaneous analysis.

⑮ **Reset Autoscale**

Click the button to refresh automatic scaling (⑥, ⑦).

⑯ **Reset Cumulative**

Click the button to refresh averaging.

This applies only for cumulative monitoring (⑭).

⑰ **Unzoom**

Click the button to release zooming.

**Reference**

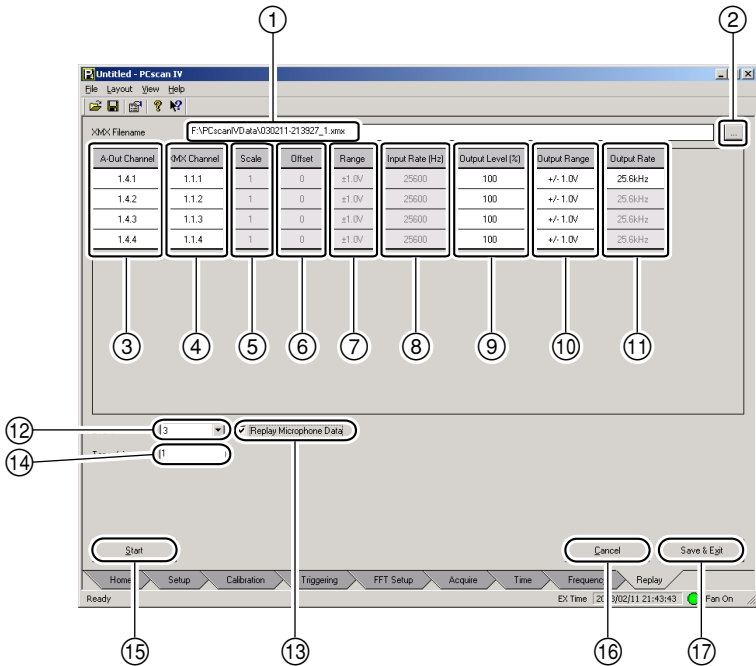
Click on the graph and drag the cursor while pushing down the left mouse button to specify the zoom object. Release the button to zoom.

# 4-9. Replay of Acquired Data ("Replay" Screen)

The acquired data, both signals and voice annotation, can be replayed via the "Replay" screen. Acquired data for replay through Analog Output module can be selected by the unit of input module.

**Note**

Data acquired via PCscan IV with versions older than 1.5.0 are not capable of replaying.



- ① **XMX Filename**  
Input data file to replay. Data file specified through the browser button is also displayed here.
- ② **Browser Button**  
Click the button to display the file dialog and specify the data file to replay.
- ③ **A-Out Channel**  
Specify replaying channel numbers of Analog Output module.

④ **XXM Channel**

Specify the channel numbers in the data file whose data are to be replayed. Click here to display channel numbers with data for replaying. Specify the channel numbers to replay by unit of input module. Data from one input module cannot be replayed via multiple Analog Output modules at the same time.

⑤ **Scale (Cal Slope)**

Display the scales used in the data acquisition.

⑥ **Offset (Cal Offset)**

Display the offsets used in the data acquisition.

⑦ **Range**

Display the ranges used in data acquisition.

⑧ **Input Rate (Hz)**

Display the sampling frequency used in data acquisition.

⑨ **Output Level [%]**

Input the output levels for the replay.

Levels between  $-100\%$  and  $+100\%$  at the step of  $1\%$  can be inputted.

⑩ **Output Range**

Specify the output ranges.

Ranges between  $\pm 0.1\text{ V}$  and  $\pm 5.0\text{ V}$  at the step of  $0.1\text{ V}$  can be specified.

⑪ **Output Rate**

Specify the sampling frequency for the replay. Sampling frequency of the type currently specified on the "Options" window can be specified.

Type1 : 51.2 k, 25.6 k, 12.8 k, 6.4 k, 3.2 k, 1.6 k, 800, 400, 200, 100, 50, 25 [Hz]

Type2 : 65.536 k, 32.768 k, 16.384 k, 8.192 k, 4.096 k, 2.048 k, 1.024 k, 512, 256, 128, 64, 32, 16, 8 [Hz]

Type3 : 10 k, 5 k, 2 k, 1 k, 500, 200, 100, 50, 20, 10 [Hz]

⑫ **Event**

It is used to replay data acquired at retrigger mode with equal to or more than 2 repeat for the "Count" on the "Triggering" screen.

Data corresponding to the event of specified number are replayed. Valid number should not be larger than the count used for the trigger data acquisition.

Example: To replay the data of No. 3 event, 3 has to be specified.

⑬ **Replay Microphone Data**

If the checkbox is checked, the voice annotation data is replayed through the earphone connected to the MIC/EAR terminal on the interface unit.

It is effective only when there are voice annotation data acquired along with other measurement data.

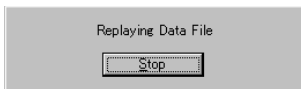
⑭ **Taper [s]**

Specify the duration by unit of second for fade-in at the beginning and fade-out at the end for the replay. Valid duration has to be equal to or longer than one second.

⑮ **Start**

Click the button to start the replay.

Click the "Stop" button during the replay to stop.



⑯ **Cancel**

Click the button to cancel the specified data file at ② and setup for the replay on the screen.

⑰ **Save & Exit**

Click the button to apply the current setting for the replay.

## 4-10. Files Created in PCscan IV Online-process

The following types of file are created in PCscan IV STD online-process.

(1) Data File (Extension: xmx)

Data file or files are created every time data acquisition is carried out by clicking the "Record" button to start and the "Stop" button to stop on the "Acquire", "Time", "Frequency" screens.

(2) Setup File (Extension: xsu)

Pull down the "File" menu and clicking "Save Setup" item to save setting into a file with "xsu" extension. (Refer to "4-11-2. File")

Pull down the "File" menu and clicking "Open Setup" item to read previously saved setting files and restore.

(3) Workspace File (Extension: xlo)

It is the file to save workspaces for the "Acquire", "Time" and "Frequency" screens.

Pull down the "Layout" menu and click the "Save" item to create a workspace file.

# 4-11. Menu Bar

## 4-11-1. Configuration of Menu Bar Tree

File (Refer to 4-11-2)

Open Setup	Ctrl + O
Save Setup	Ctrl + S
Save Setup As...	

---

Options...

---

Exit

Layout (Refer to 4-11-3)

Load	Ctrl + L
Save	Ctrl + A

---

Default	Ctrl + D
Last	

---

Previous MG	F3
Next MG	F4
Previous Page	F7
Next Page	F8

View (Refer to 4-11-4)

Channel Status

---

Toolbars

Standard

Status Bar

Help (Refer to 4-11-5)

Manual

---

About PCscan IV...

## 4-11-2. File

Setting and layout for the "Setup", "Trigger", "FFT Setup" and "File-Options..." windows can be saved into a file and read to restore.

### Open Setup (Extension: xsu)

Read a saved setup file to setup PCscan IV STD.

### Save Setup (Extension: xsu)

Save the current setting into the default setup file in the Home directory.

If there is no user specified file having been created yet, the operation is the same as "Save Setup as...".

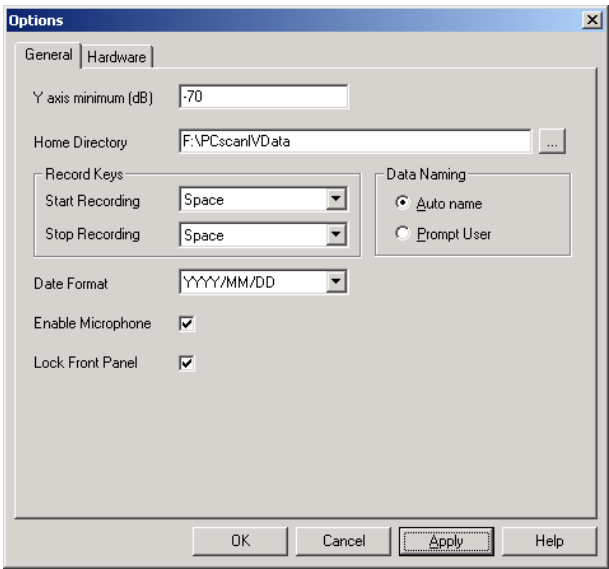
Every time the "Apply" button is clicked to apply on the "Setup" screen, the setup file is renewed with the current setting.

### Save Setup as... (Extension: xsu)

Save the current setting with a specified name.

## File-Options-General

Customize operations mainly related data acquisition.



"Options"-General window

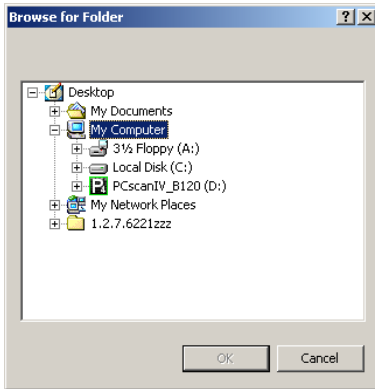
### (1) Y axis minimum (dB)

Input the lowest scale for Y axis in FFT or Octave monitoring.



(2) Home Directory

Specify the directory to save files for data acquisition by clicking the browse button on the right of the edit box. Existing directory is expected to specify. It is also possible to directly input a path into the edit box.



(3) Record Keys

Arrange keys for start / stop operations in data acquisition.

Start Recording : Specify a start key

None, Space, Enter, Page Up, Page Down, Home, End, Insert, Delete  
(None means no key is arranged)

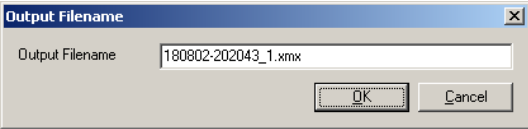
Stop Recording : Specify a stop key

None, Space, Enter, Page Up, Page Down, Home, End, Insert, Delete  
(None means no key is arranged)

**Reference**

The start and stop of data acquisition can be carried out by clicking the "Record" button on various screens.

- (4) Data Naming
- Specify the operation of handling file name for acquired data.
- Auto name : Files will be automatically named by PCscan IV STD
- Prompt User : Prompt user with the "Output Filename" window, letting user name file himself or herself.



"Output Filename" window

**Text Input of Output Filename**

Input a file name here.

**OK**

Click the button to create a file or files with the inputted file name for the acquired data.

**Cancel**

Click the button without creating a file or files for the acquired data and abandoning the data.

- (5) Date Format
- Files of data acquired with online-process are created with names of the dates and times when data acquisitions were started.
- "Date Format" is used to specify the format used in naming files.

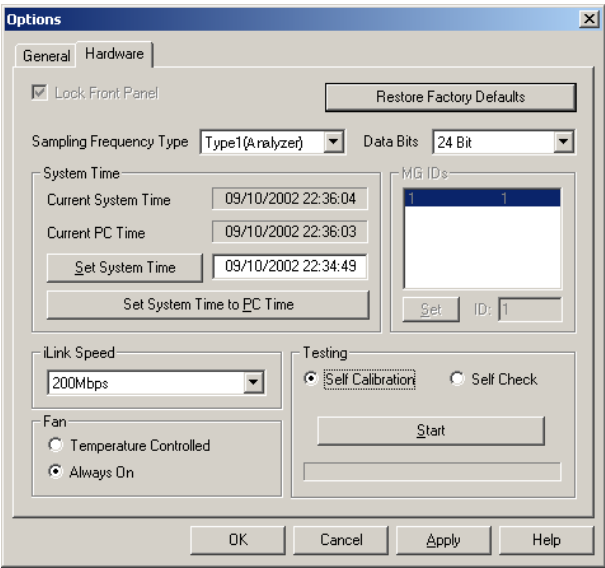
The following is an example of data acquisition which started at 10 clock 30 minutes 40 seconds in the evening, June 1, 2002.

Date Format	File Name
YYYY/MM/DD	020601-223040_1.xmx
DD/MM/YYYY	010602-223040_1.xmx
MM/DD/YYYY	060102-223040_1.xmx

- (6) Enable Microphone
- Check the checkbox to acquire the voice annotation data from earphone connected to the MIC/EAR terminal on the interface unit.
- (7) Lock Front Panel
- Check the checkbox if the setting keys on the Interface Module are to be locked.
- (8) Phase in Degrees
- This sets the phase display units. Insert a check mark for Degrees (°). Remove the check mark for Radians (rad).

**File-Options-Hardware**

Carry out initial setting or maintenance for EX series hardware mainly.



**"Options"-Hardware window**

- (1) Lock Front Panel  
Indicate panel lock status.  
Panel are always locked during PCscan IV STD online-process in process.
- (2) Restore Factory Defaults  
Click the button to restore the factory default setting, and then click the "Cancel" button.  
The window of "Options"-Hardware is not updated even after finishing the Restore Factory Defaults operation.  
The measurement group identification (MG ID) is not included in the restoring.
- (3) Types of Sampling Frequency  
Anyone of the three sampling frequency types can be selected according to specific needs. It is a parameter applied to the whole system.

Type1 (Analyzer)	51.2 kHz types	selectable from 25 Hz to 51.2 kHz
Type2 (Acoustic)	65.536 kHz types	selectable from 8 Hz to 65.536 kHz
Type3 (Special)	10 kHz types	selectable from 10 Hz to 10 kHz

- (4) Number of Applied Bits  
 Either 16 bits or 24 bits can be selected, although analog input signals are quantized in 24 bits in EX series. The MSB 16 bits among the 24 bits are used if the number of applied bits is specified to be 16.
- (5) System Time  
 Current System Time : Indicate EX series internal clock by dd/mm/yy hh:mm:ss format.  
 Current PC Time : Indicate computer clock by dd/mm/yy hh:mm:ss format.  
 Set System Time Button : Click the button to set the inputted date and time in the left edit box to the connected EX series.  
 Set System Time to PC Time Button : Click the button to set the date and time of the connected EX series to the computer.
- (6) MG IDs  
 Indicate the valid measurement group numbers.
- (7) i.LINK Speed  
 Specify i.LINK speed.  
 Choices:  
 For normal operation, use the initial setting.  
 100 Mbps, 200 Mbps, 400 Mbps
- (8) Fan  
 Specify a fan operation mode.  
 Prior to setting the fan mode, check its current mode on the "Channel Status" or Status Bar at the bottom of the screen.  
 Temperature Controller : Operating or not, automatic controlled by EX series temperature (Operate at high temperature and stop at low temperature)  
 Always On : Always operating

(9) Testing

Specify a test mode.

Self Calibration : Carry out calibration (offset and gain) on all connected modules.

The calibration result will be saved in the flash memory.

**Note**

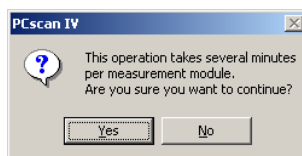
- To prevent the calibration from drift due to different temperature, it is recommended to carry out calibration fifteen minutes after switching power on to EX series.
- It is also recommended to carry out calibration on site.

Self Check : Carry out self check.

"SC" is indicated on the interface unit during self checking.

Content for Self Check : Memory check for interface unit  
Condition check for self calibration for modules (Calibration is not actually carried out)

Start Button : Click the button then the following window is displayed.



Yes : Click it to start the specified test

No : Click to cancel

(10) OK Button

Click the button to apply the current setting and finish the window.

(11) Cancel Button

Click the button to cancel the current setting and finish the window.

(12) Apply Button

Click the button to apply the current setting. The "Options" window remains displayed.

(13) Help Button

It is not supported with the software.

### 4-11-3. Layout

Layout for the "Acquire" and "Time", "Frequency" screens can be saved into a file and read to restore.

These operations are only available at the "Acquire", "Time" and "Frequency" screens. The status of pipe button on the "Acquire" screen is not to be saved.

- (1) Load  
Load a saved workspace file (with xlo as its extension) and restore its setting.  
If the update of layout corresponding to the loaded layout file does not happen right away, update the expected layout manually by switching to any other screen and returning.
- (2) Save (Extension: xlo)  
Save the current workspace into a file.
- (3) Default  
Make the current workspace be the default.
- (4) Last  
Return to the workspace when last "Load" or "Save" was carried out. The consequence would be the initial workspace of online-process if no "Load" or "Save" is carried since start up.

#### Previous Next

On the "Acquire" screen, the initial signal monitoring graphs are for the first four consecutive input modules. If the connected EX system has more than 4 input modules, pull down the "Layout" menu and click "Previous Page" or "Next Page" to shift the graphs to cover the left or right module by circular means.

Current Display	Operation	Display
Modules 1, 2, 3, 4	→ Previous Page (F7)	→ Modules 6, 1, 2, 3
Modules 1, 2, 3, 4	→ Next Page (F8)	→ Modules 2, 3, 4, 5

Previous MG, Next MG: It is not supported with the software.

## 4-11-4. View

Switch display on or off for the following objects.

(1) Channel Status

Switch the "Channel Status" display on or off.



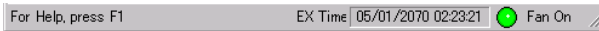
(2) Toolbars - Standard

Switch the "Standard Toolbar" display on or off.\*



(3) Status Bar

Switch the "Status Bar" (at the bottom of the main screen) display on or off.\*



- \* Switching these items on or off might possibly deform the screen at corresponding area. In that case, flash the screen by resizing it or by closing and then reopening it to get rid of the deformation.

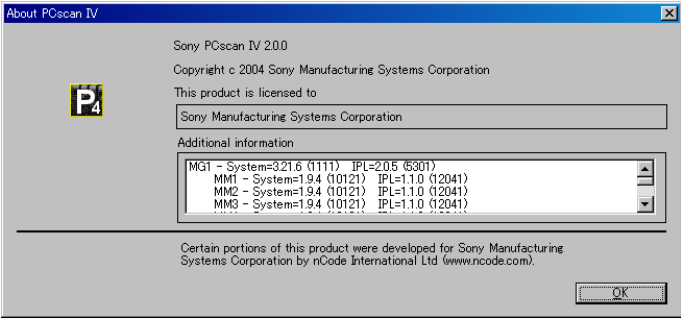
# 4-11-5. Help

(1) Manual

The PDF instruction manual can be read with Acrobat Reader.  
The PDF instruction manual has be created in "\PDF\E\PCscan IV.pdf" on the CD-ROM.

(2) Help - About PCscan IV...

Display the software version. Firmware versions for all of connected modules are displayed here as well.





# 5. Post-process

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The main features of PCscan IV STD post-process are described below.

## **Save Workspace**

Layout of windows and data files loaded into the software can be saved in a workspace file and read to store. Therefore it is possible to have most suitable workspace to any purposes.

## **Display Acquired Data**

Data Acquired by Online-process (Extension ".xmx") can be displayed in graphs. Interested data can be zoomed to have a close view or abstracted for further analysis.

## **Playback Acoustic Data**

Whole or specified part of data could be played back by one clicking.

## **Abstract Data**

Interested data can be easily specified and abstracted into a new data file on data graphs.

## **Import Data**

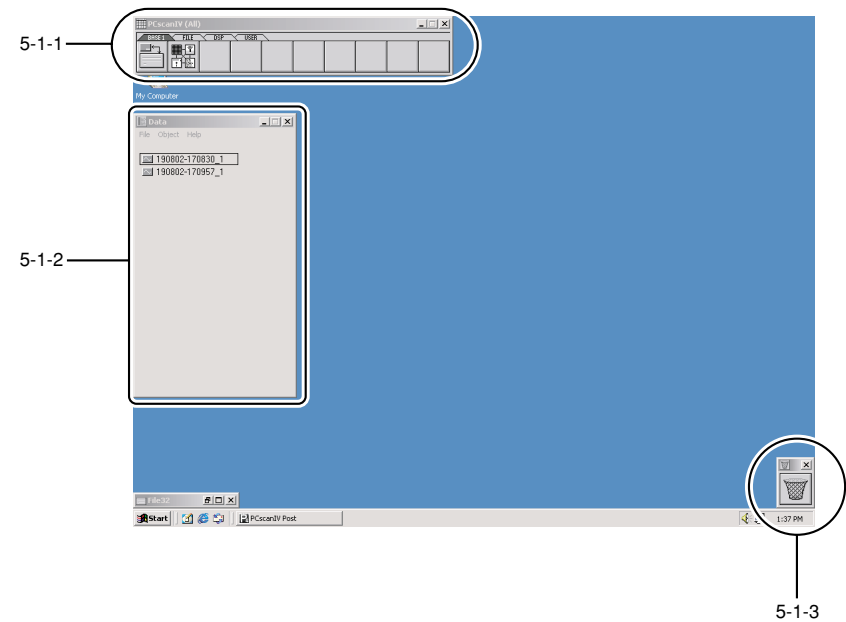
Data files of non-original well used formats can be easily imported.  
Supported formats: Binary, ASCII, Wave, EZ File, SDF, UFF, nSoft, MATLAB

## **Export Data**

Export data acquired by PCscan IV STD online-process can be exported in other formats.  
Supported formats: Binary, ASCII, Wave, EZ File, SDF, UFF, nSoft, MATLAB

# 5-1. Basic System Windows

The basic system windows are displayed when post-process is started. (Refer to "3-3. Start Post-process")



## 5-1-1. Toolbars

In toolbars there a number of icons for starting various function modules of the software. There are a few ways to start function modules. The most direct way is to double-click their corresponding icons to start. If there has been some data files loaded into the software, dragging and dropping the data file to be processed on the icon to use is really a short cut to go.

### ① Basic Modules (BASE1)

1	File32	Load signal data or analyzed results
2	Exchange32	Import and export data files Import: Binary, ASCII, Wave, EZ File Export: Binary, ASCII, Wave, EZ File

② **File Handling Modules (FILE)**

1	SDF32	Import and export SDF format files Extension: SDF
2	UFF32	Import and export UFF format files Extension: UFF
3	nSoft32	Import and export data files of the following formats Extension    File Type dac           Time series cyn           Rainflow rmn           Range mean mkv           Markov rph           Range pair mdf           Paired X-Y asd           Auto Spectrum tlv           Time at level pdd           Probability density distrib
4	Dadisp32	It is not supported with the software.
5	MatLab32	Export MATLAB format files

③ **Display Module (DSP)**

1	Trace32	Display data acquired by PCscan IV online-process Extension: xmx
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④ **User**

Icons for all of the modules available to PCscan IV STD are arranged here.

**5-1-2. Data Window**

Data files loaded into the post-process software are listed on the "Data" window. There are a few ways to load data into the software, depending on types of data file formats. The data acquired with PCscan IV STD online-process can be loaded via the "File32", other formats, for example Binary and Wave formats, can be loaded with the "Exchange32" module. (Refer to "5-1-1. Toolbars")

If the "Data" window is by chance closed by clicking the [X] on the top right of the window, exit first and then restart the post-process.

Click the "Go" button on the starting "PCscan IV Startup Options" window then the "Data" window is reopened with the company of "Toolbars".

**5-1-3. Trash Box**

It is used to unload data files from the software.

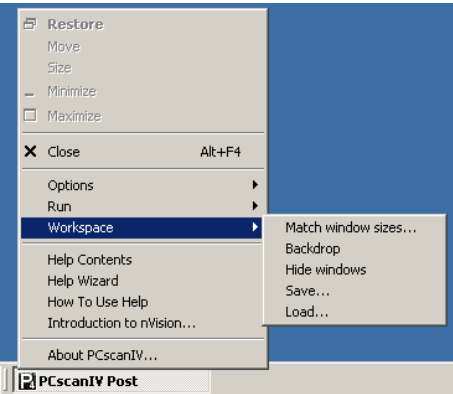
To unload unnecessary data files, drag a file from data window and drop it on the trash box, one by one.

## 5-2. Workspace

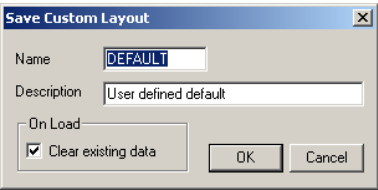
In post-process, layout of windows, loaded data files and links of data files on the data window can be saved into a layout file. Since links of data files can also be saved, the layout file applies to data files on networked hard disks. It is possible to carry out various analyses efficiently only to make full use of workspace.

### 5-2-1. Save Workspace

Right-click "PCscan IV Post" on the taskbar and slide the cursor onto "Workspace" and click "Save..." on the pop up submenu.



"Save Custom Layout" window is displayed.



#### Name

Input a name for the layout file.

#### Description

Input some remarks here to feature the layout file.

## OK

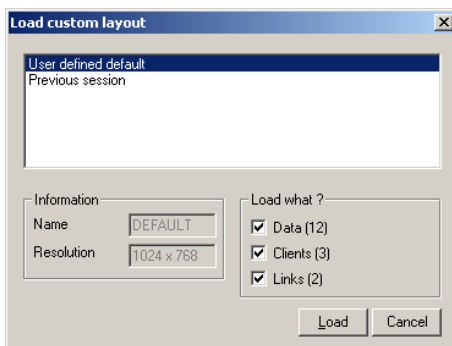
Click the button to save the layout for currently displayed windows, data files and links of data files to loaded data files.

## Cancel

Click the button to cancel.

## 5-2-2. Load Workspace

Right-click "PCscan IV Post" on the taskbar and slide the cursor onto "Workspace" and click "Load..." on the pop up submenu. Then the following "Load Custom Layout" window is displayed.



Click the interested layout file from the list on the window to select.

### Information

Name

Indicate the layout file name.

Resolution

Indicate the resolution of window when the layout was saved.

### Load what?

Check or uncheck those checkbox to specify loading objects.

Numbers in [ ] indicate the number of the corresponding objects.

Data [12] : Data files loaded (then referred as data objects) (Refer to "5-4. Load Data") into the software indicated on "Data" window (Refer to 5-1-2)

Client [3] : Module windows except toolbar and trash box

Links [2] : Links of data objects displayed in graph windows

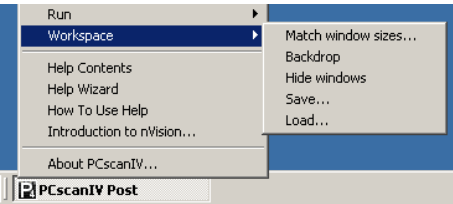
## 5-2-3. Workspace Options

### Hide Screens of Other Applications

To hide screens of other applications, right-click "PCscan IV Post" on the taskbar and slide the cursor onto "Workspace" and click "Backdrop" on the pop up submenu, and vice versa.

### Hide Screens of Post-process

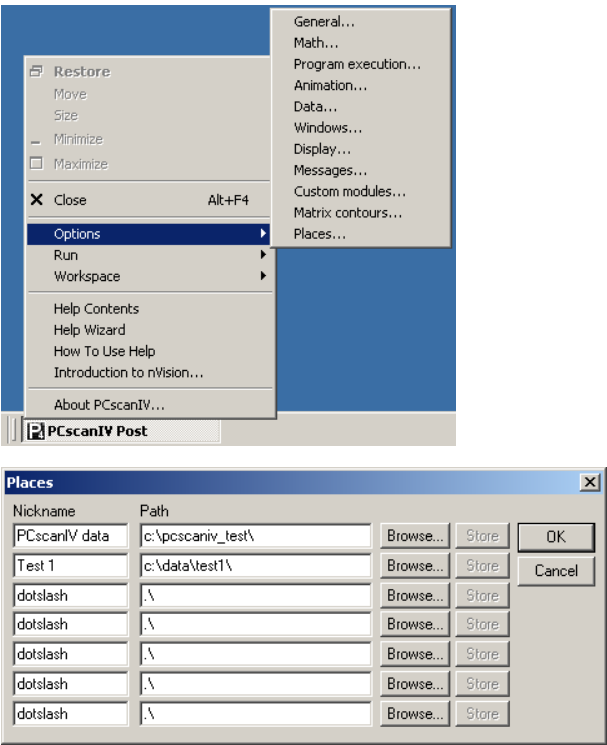
To hide screens of post-process, right-click "PCscan IV Post" on the taskbar and slide the cursor onto "Workspace" and click "Hide windows" on the pop up submenu, and vice versa.



### 5-3. Specify Data Path

Directory or path to load or save data files can be specified and saved, which provides a shortcut to these operations.

Right-click "PCscan IV Post" on the taskbar and slide the cursor onto "Options" and click "Places..." on the pop up submenu. Then the "Places" window is displayed.



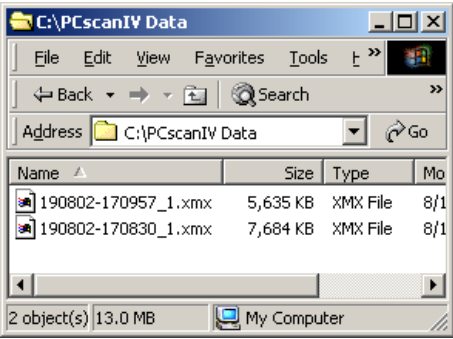
Setting on the "Places" Window

Object	Description
Nickname	Input a name for the path on the right
Path	Specify a path either by direct inputting or clicking the "Browse..." button to browse and select
Browse...	Click the button to display the "Browse" window. On the window browse and specify the path. Click the "OK" button to finish browsing. The specified path is displayed in the edit box for path
Store	Click the button to apply the path
OK	Click the button to apply all of the current setting and finish
Cancel	Click the button to finish, maintaining the previous setting.

# 5-4. Load Data


In post-process, it is necessary to load data prior to displaying or processing.

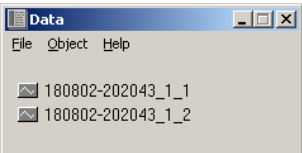
- 1 From the Explorer open the directory where data files were created by online-process.



- 2 Select the data file to load and then drag and drop it on the "Data" window. (Refer to 5-1-2)

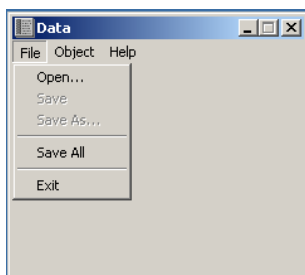
As soon as the loading finished, a new icon for the loaded data file is displayed on the "Data" window.

Data files loaded on the "Data" window are referred as data objects. Data files created by online-process are time series data, they are referred as signal objects and indicated with icon .



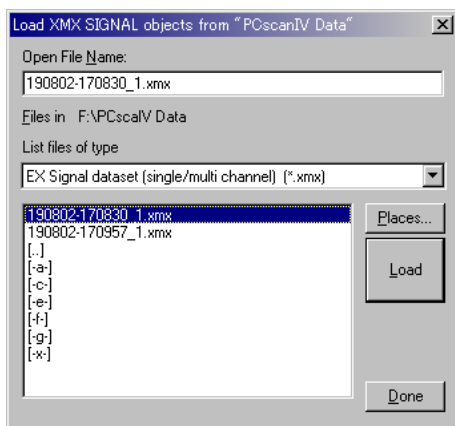


- 3** Load data files via the "Load" window
- Pull down the "File" menu from menu bar on the "Data" window and click the "Open..." item.



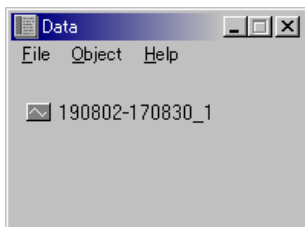
"Load" window is displayed.\*1

Refer to "5-3. Specify Data Path" concerning "Open File Name".



- 4** Specify "EX Signal dataset [single / multi channel] (\*.xmlx)" in the "List files of type" list.
- 5** Click the interested file name to specify in the list.
- 6** Click the "Load" button to load.

- 7** Click the "Done" button to close the "Load" window.  
It can be confirmed from the object list on the "Data" window that the data file has been loaded.



**\*1 Concerning Data Path**

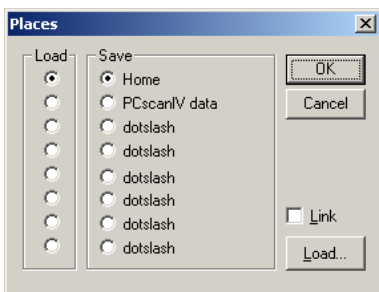
Directory browsed on the "Load" window can be specified.

Click the "Places..." button to display the "Places" window.

Specify load and save pathes on the "Places" window.

Load: Specify load path by checking the corresponding radio button.

Save: Specify save path by checking the corresponding radio button.



Refer to "5-3. Specify Data Path" concerning path names used here.

# 5-5. Display Data

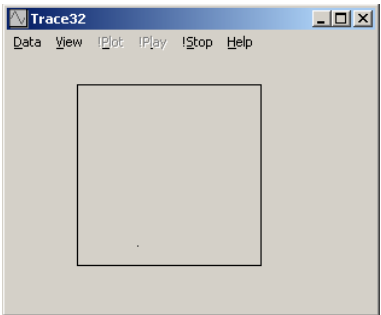
Display data loaded into the software and listed on the "Data" window in graph. It is possible to zoom and abstract interested data on the graph window.

## Start Graph Module

- 1 Click the "DSP" tab on the toolbar. (Refer to 5-1-1)

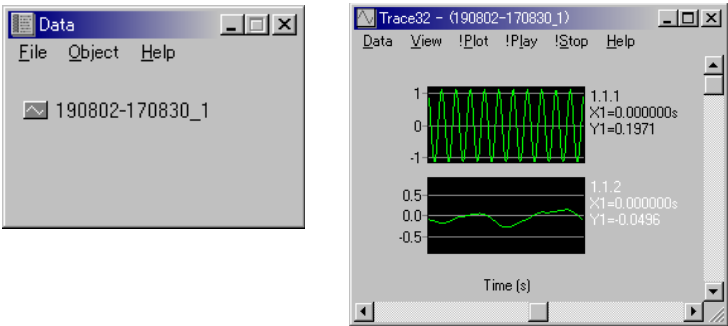


- 2 Double-click the icon for the graph module "Trace32" to start.



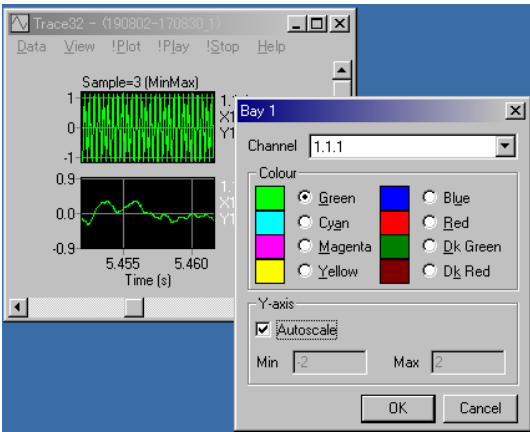
### Display Data

- 3 Click the interested signal object on the "Data" window to select. Drag and drop the object onto the "Trace32" window, data are displayed in zoomed graphs.



### Specify Color and Scale Y Axis

- 4 Click the area right to the graphs on the "Trace32" window. The "Bay" window is displayed.



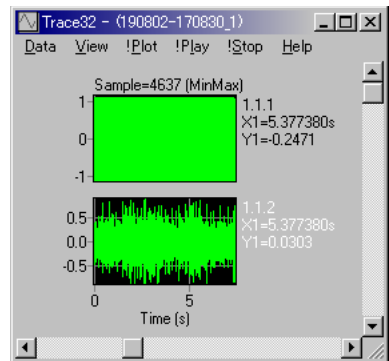
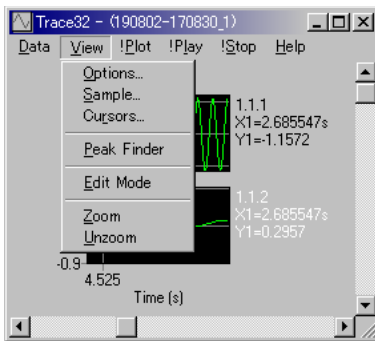
- 5 Specify the channel (1.1.1 to 1.6.4) whose color is to be changed from the channel list on the "Bay" window. (the number of channels depends the connected modules.)
- 6 Specify the color to be used by clicking its radio button in the color area on the "Bay" window.  
Choice Green, Cyan, Magenta, Yellow, Blue, Red, Dk Green, Dk Red

- 7** Check the "Autoscale" checkbox in the Y-axis area on the same window, then the scale for Y axis will automatically change according to the amplitude of signal object. Uncheck the "Autoscale" checkbox, "Min" and "Max" become active and are capable of being set.

Input minimum and maximum values into the "Min" and "Max" edit boxes respectively.

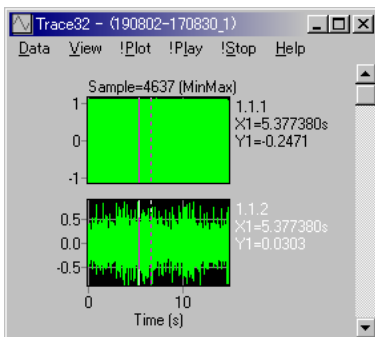
## **8** Zoom

**Unzoom:** Pull down the "View" menu from the menu bar and click the "Unzoom" item to release zooming and display the whole data.



**Zoom:** Specify the scope of data to zoom by left-clicking the beginning and right-clicking the end, then dot-line and line cursors are displayed.

Pull down the "View" menu from the menu bar and click the "Zoom" item to zoom.

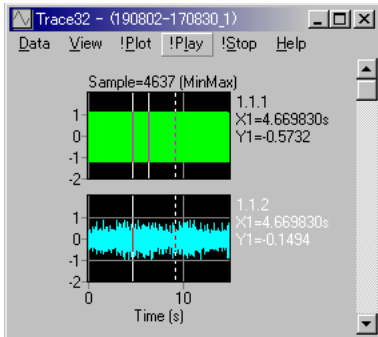


Drag and Drop the interested data on the "Trace32" window bring the same consequence.

## 5-6. Playback Acoustic Data

On the "Trace32" graph window specified acoustic data can be played back via computer sound devices.

No need to say that functioning sound devices are required to playback.

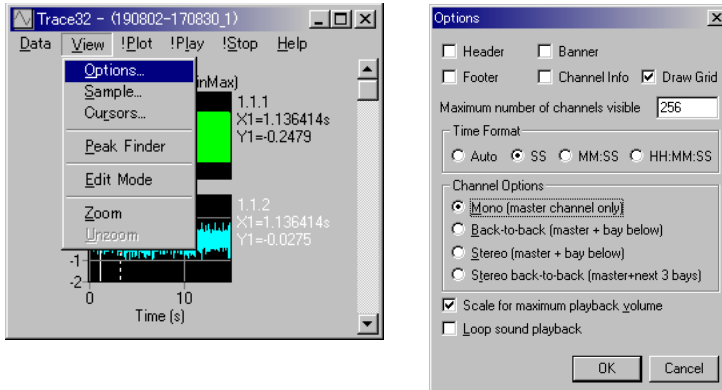


- 1** Left-click and then right-click on the graph to specify data for playback.  
Specified data on the graphs are marked between two vertical cursors, one is a line and the other a dot-line.
- 2** Click the "!"Play" button on menu bar to start playback.
- 3** Acoustic signals from specified channel or channels is played back, therefore can be confirmed.  
Click the "!"Stop" button on the menu bar to stop playback during playback.

## Options

Pull down the "View" menu on the menu bar and click the "Options..." item to display the "Options" window.

On the "Options" window playback can be set.



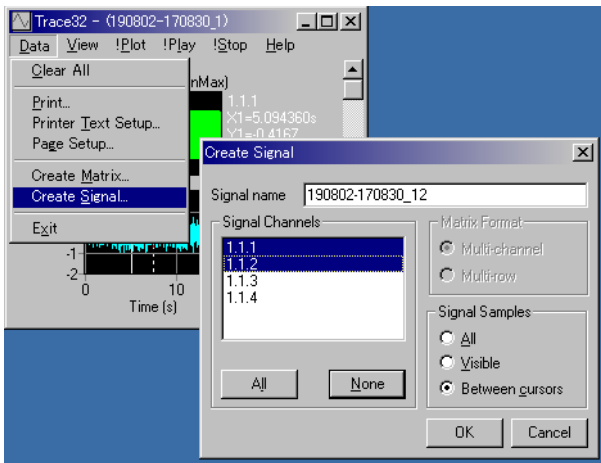
## Specify Number of Channels and Sound Effect for Playback

- |  |  |
|--|--|
| Mono [master channel only]                 | : Playback signals only from the specified channel   |
| Back-to-back [master + bay below]          | : Playback signals from both the specified channel and the next one  |
| Stereo [master + bay below]                | : Playback signals in stereo with the specified channel for left and the next one for right  |
| Stereo back-to-back [master + next 3 bays] | : Playback signals in stereo with the specified channel for left and the next one for right first.<br>And then continue to playback the signals from the 2 channels next to the next channel |
| Scale for maximum playback volume          | : Playback signals by the volume scaled according to the signals   |
| Loop sound playback                        | : Playback is loopbacked. Click the "!"Stop" button to stop  |

## 5-7. Abstract Data

Interested data can be abstracted and save into a new file on the "Trace32" window.

- 1 Left-click and then right-click on the graph to specify data for abstract.  
Specified data on the graphs are marked between a line cursors and a dot-line cursor.
- 2 Pull down the "Data" menu on the menu bar and click the "Create Signal..." item to display the "Create Signal" window.



- 3 Input a file name in the "Signal name" edit box.
- 4 Specify channels on the "Signal Channels" list.
  - All : Click the "All" button to specify all channels
  - Channels : Click the "None" button first and then specify channels one by one for abstract
- 5 Check the "Signal Samples" checkboxes to specify the abstracting scopes
  - All : Check the checkbox to abstract all
  - Visible : Check the checkbox to abstract only the visible
  - Between cursors : Check the checkbox to abstract between cursors

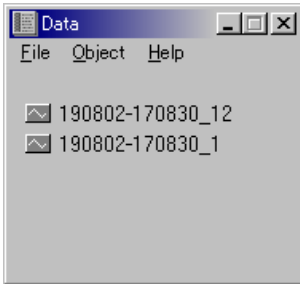


- 6** Click the "OK" button to apply the setting and start abstract.

As soon as the abstract finished, the abstracted signal object is displayed in the list on the "Data" window. It can be confirmed that "190802-170830\_12" abstracted signal object is created.

**Note**

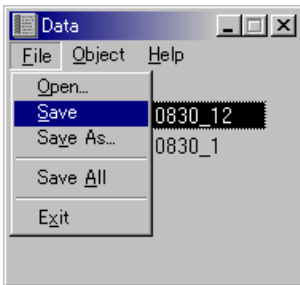
Instead of clicking the "OK" button, Click the "Cancel" button to cancel the current setting.



- 7** Pull down the "File" menu on the menu bar and click the "Save" item to save the abstracted signal object onto hard disk with extension "SI".

**Note**

Abstracted signal object has not been saved onto hard disk prior to Step 7.



# 5-8. Import Data

Data files of some other than PCscan IV general formats can be loaded into the post-process and displayed on the "Data" window. The loaded data can also be displayed in graphs via the "Trace32" as the general format data do.

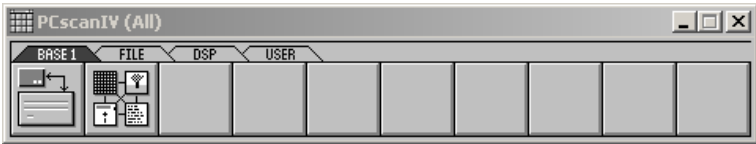
The supported file formats for import are Binary, ASCII, Wave and EZ File, SDF, UFF and nSoft.

## 5-8-1. Import Binary, ASCII, Wave, EZ File

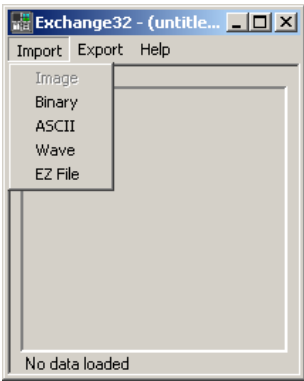
Data files of Binary, ASCII, Wave, EZ File formats can be imported with the Exchange32 module.

### Start Exchange32 Module

- 1 Click the "BASE1" tab on toolbar.



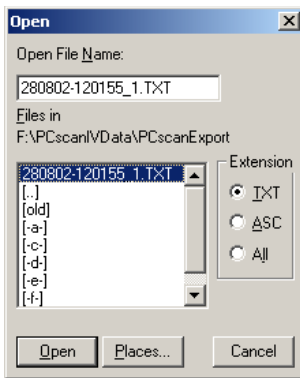
- 2 Double-click the "Exchange32" icon to start the "Exchange32" module.
- 3 Pull down the "Import" menu to specify an import format.



### (Example)

#### Import ASCII Format Data File

- 4 Pull down the "Import" menu on menu bar and click the "ASCII" item to display the "Open" window.
- 5 Specify an ASCII file to import.



#### Note

Click the "Places..." button to display the "Places" window.

Specify load and save pathes on the "Places" window.

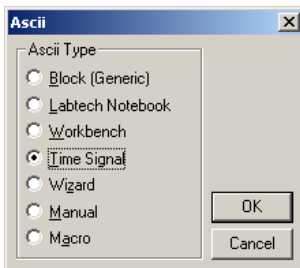
Load : Specify load path by checking the corresponding radio button.

Save : Specify save path by checking the corresponding radio button.

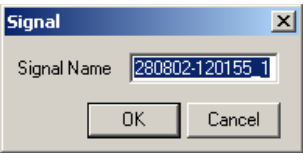
Refer to "5-3. Specify Data Path" concerning path names used here.

Click "Cancel" button to cancel the current setting.

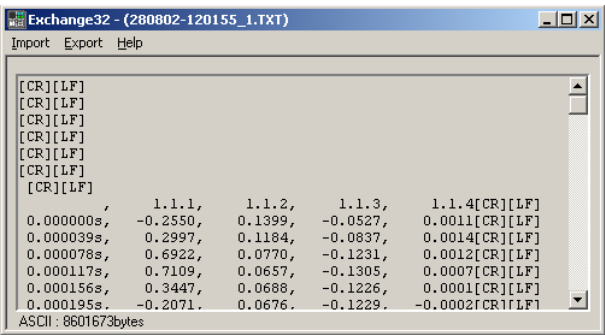
- 6 Click the "Open" button.  
The window for specifying ASCII type is displayed.  
If exported file in section 5-9 is to be imported, "Time Signal" is to be specified since it is time series data.



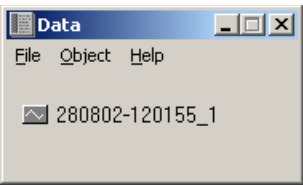
- 7** Click the "Open" button.  
The window for confirming file name is displayed.



- 8** Click the "Open" button to start conversion.  
As soon as the conversion finished, the converting contents are displayed in the "Exchange32" window.



Converted data file is loaded and displayed on "Data" window.

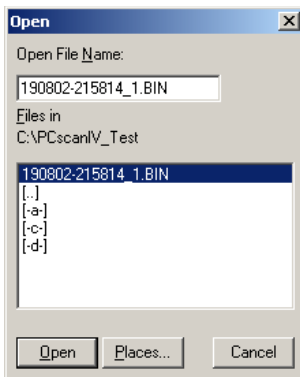


- 9** Pull down the "File" menu on the menu bar and click the "Save" item to save the imported data onto hard disk.

**(Example)**  
**Import Wave Format Data File**

The steps 1, 2, 3 are the as those in "Import ASCII Format Data File"

- 4** Pull down the "Import" menu on menu bar and click the "Wave" item to display the "Open" window.
- 5** Specify a Wave file to import.



**Note**

Click the "Places..." button to display the "Places" window.

Specify load and save pathes on the "Places" window.

Load : Specify load path by checking the corresponding radio button.

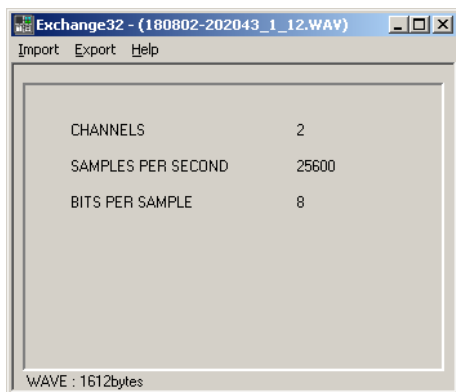
Save : Specify save path by checking the corresponding radio button.

Refer to "5-3. Specify Data Path" concerning path names used here.

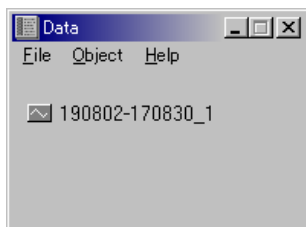
Click the "Cancel" button to cancel the current setting.

**6** Click the "Open" button to start conversion.

As soon as the conversion finished, the converting contents are displayed in the "Exchange32" window.



Imported signal object is loaded and displayed on the "Data" window.



**7** Pull down the "File" menu on the menu bar and click the "Save" item to save the imported data onto the hard disk.

## 5-8-2. Import SDF, UFF and nSoft Format Data Files

Below importing procedure is described mainly regarding SDF32 format. Imports of other formats can also be carried out with their corresponding modules.

### Start Import Module

- 1 Click the "FILE" tab on the toolbar.

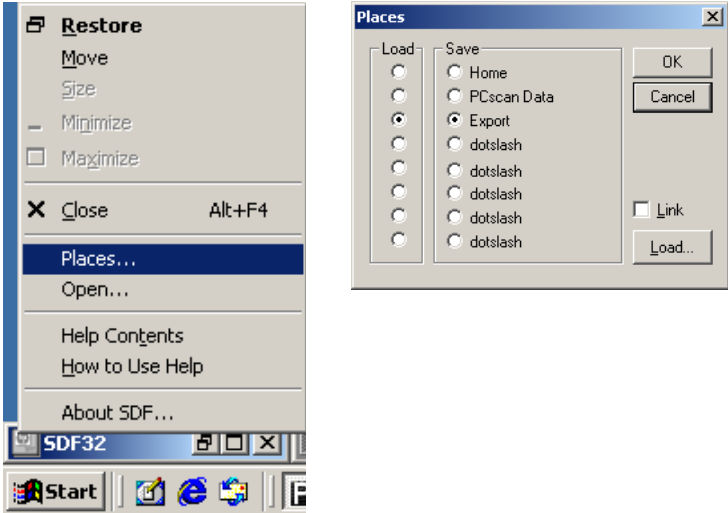


- 2 Double-click the "SDF32" icon to start "SDF32" module.  
The following menu bar is displayed on the bottom left of the desktop.



## Specify Load and Save Paths

- 3** Right-click the "SDF32" menu bar and click the "Places..." item on the pop up menu to display the "Places" window.



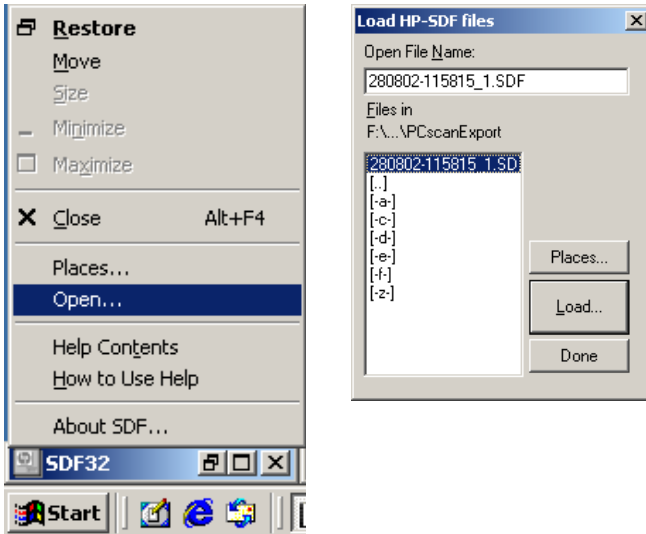
- 4** Specify load and save paths on the "Places" window.  
Load : Specify load path by checking the corresponding radio button.  
Save : Specify save path by checking the corresponding radio button.  
Refer to "5-3. Specify Data Path" concerning path names used here.

The load and save paths are specified in modules under the "File" tab. Once they are specified, these paths are applicable to all modules.



## Carry Out Import

- 5 Right-click the "SDF32" menu bar and click the "Open..." item on the pop up menu to display the "Load HP-SDF files" window.



- 6 Specify a file to import by clicking it.

**7** Click the "Load..." button.

The "28080-data" window is displayed, on which converting parameters can be specified channel by channel.

**28080 - data**

Measurement

Title:

Type:

Data

Title:

Type:

Domain:

Y is complex:  Y is power data:

Conversion

☒ Real ☐ Mag (Lin) ☐ Mag (dB) ☐ Intensity

☐ Function (select/edit below)

Function to convert data (V) from Volts to new units:

Units:

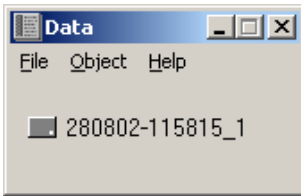
**8** Click the "OK" button after setting.

Data are loaded as soon as setting for all channels is finished.



**9** Click the "Done" button.

The "Load HP-SDF files" window is closed.

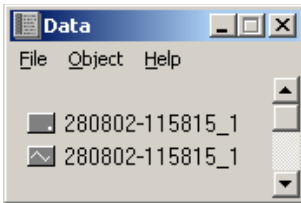
Imported data file is loaded and displayed on the "Data" window.



### Reference

Imported SDF format data files are treated as matrix objects (Array) and indicated by  icon. Dragging and dropping an object of this kind on the "Trace32" creates a signal object with the same name and displays the data in graph. (Created signal objects are indicated by  icon.)

Imported matrix objects of other than SDF formats are not capable of being displayed in "Trace32" graph module.



## 5-9. Export Data

Data acquired with online-process saved in its generic format can be converted into other formats for analysis software.

The supported export file formats are Binary, ASCII, Wave, EZ File, SDF, UFF, nSoft, MATLAB. In case of SDF, UFF, nSoft, MATLAB formats, it is easy to convert generic format to any one of them only by dragging and dropping data object from the "Data" window onto the corresponding module.

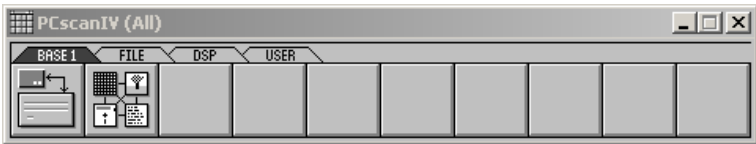
### 5-9-1. Export Binary, ASCII, Wave, EZ File format Data Files

With the "Exchange32" module, data can be converted form one format into others to export. The supported file formats for export are Binary, ASCII, Wave and EZ File.

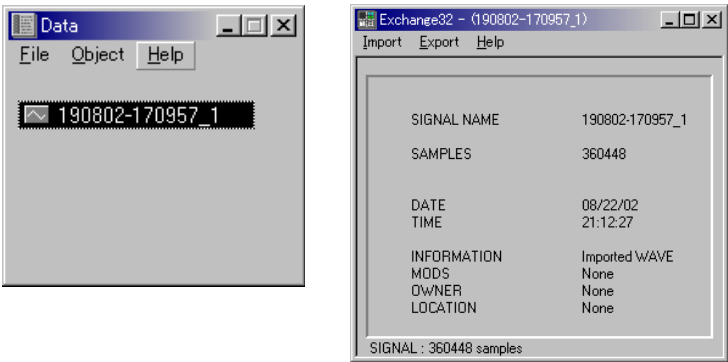
Note

When data files created with PCscan IV are to be exported in Binary format, "4 byte float" should be specified.

- 1
- Click the "BASE1" tab on toolbar.

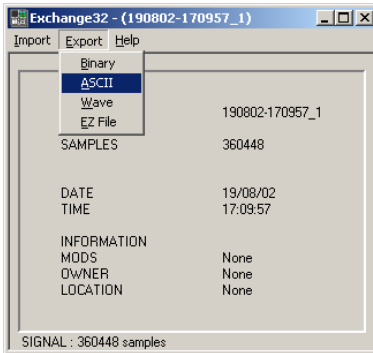


- 2
- Double-click the "Exchange32" icon to start the "Exchange32" module.
- 3
- Click the data to export on the "Data" window and drag and drop it onto the "Exchange32" window.
- The information on the data file are displayed on the "Exchange32" window.

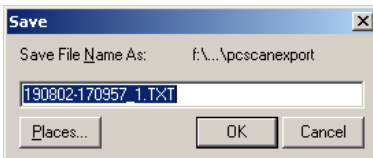


**(Example)**  
**Export ASCII Format Data File**

- 4** Pull down the "Export" menu to specify an export format.  
(Example: Specify "ASCII")



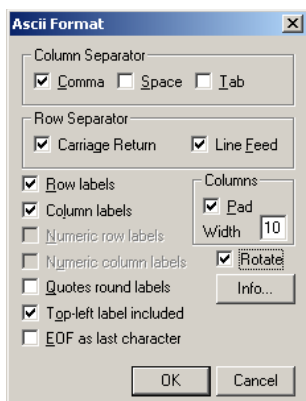
- 5** Click the "ASCII" item then the "Save" window is displayed.  
Input a file name into the edit box.



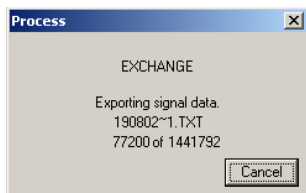
**Note**

Click the "Places..." button to display the "Places" window.  
Specify load and save paths on the "Places" window.  
Load : Specify load path by checking the corresponding radio button.  
Save : Specify save path by checking the corresponding radio button.  
Refer to "5-3. Specify Data Path" concerning path names used here.  
Click the "Cancel" button to cancel the current setting.

- 6** Click the "OK" button on the "Save" window to display "Ascii Format" window.  
The setting on the following window is recommended if exported data file is to be used with Excel.



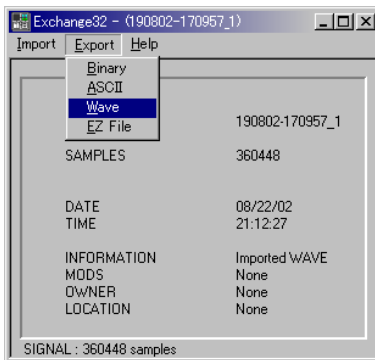
- 7** Click the "OK" button to start export.  
The exported data are saved in WAVE format on the hard disk.  
The "Process" window is displayed during converting. Click the "Cancel" button on the window to stop exporting.



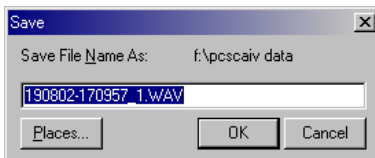
**(Example)**  
**Export Wave Format Data File**

(The steps 1, 2, 3 are the as those in "Import ASCII Format Data File".)

- 4** Pull down the "Export" menu to specify an export format.  
(Example: Specify "Wave")



- 5** Click the "Wave" item then the "Save" window is displayed.  
Input a file name into the edit box.

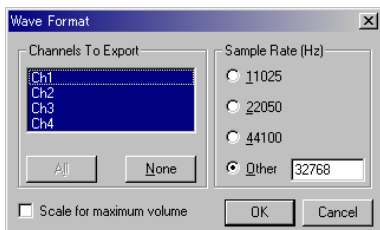


**Note**

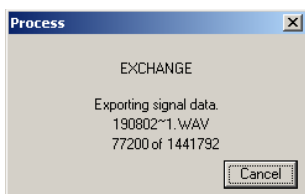
Click the "Places..." button to display the "Places" window.  
Specify load and save paths on the "Places" window.  
Load: Specify load path by checking the corresponding radio button.  
Save : Specify save path by checking the corresponding radio button.  
Refer to "5-3. Specify Data Path" concerning path names used here.  
Click the "Cancel" button to cancel the current setting.

- 6** Click the "OK" button on the "Save" window to display the "Wave Foarmat" window.

- 7** Specify details for export format on the "Wave Format" window.
- Channels To Export : Specify channels to export
- Sampling Rate [Hz] : Specify or input the sampling frequency for original data
- Scale for maximum volume : Check the checkbox if maximum volume is intended



- 8** Click the "OK" button to start export.
- The exported data are saved in WAVE format on the hard disk.
- The "Process" window is displayed during converting.
- Click the "Cancel" button on the window to stop exporting.





## 5-9-2. Export SDF, UFF, nSoft and MATLAB Format Data Files

Below exporting procedure is described mainly regarding SDF32 format.  
Exports of other formats can also be carried out with their corresponding modules.

### Start Export Module

- 1 Click the "FILE" tab on the toolbar.

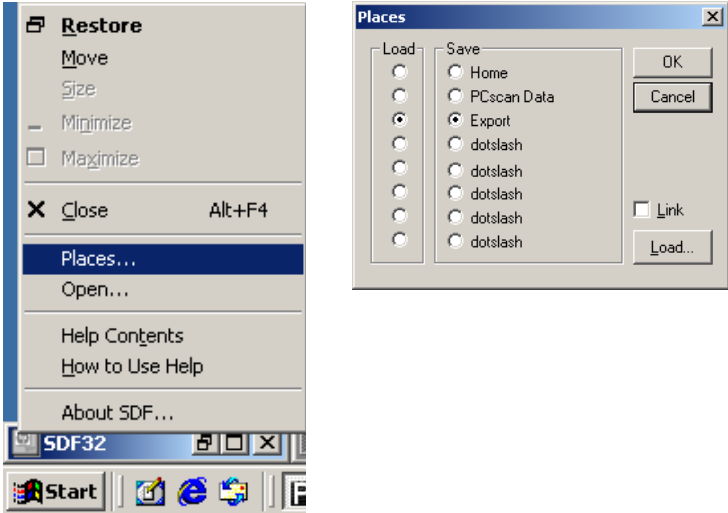


- 2 Double-click the "SDF32" icon to start the "SDF32" module.  
The following menu bar is displayed on the bottom left of the desktop.



### Specify Load and Save Paths

- 3** Right-click the "SDF32" menu bar and click the "Places..." item on the pop up menu to display the "Places" window.



- 4** Specify load and save paths on the "Places" window.  
Load : Specify load path by checking the corresponding radio button.  
Save : Specify save path by checking the corresponding radio button.  
Refer to "5-3. Specify Data Path" concerning path names used here.

Load and save paths can also be specified from modules under the "File" tab.  
Once they are specified from any of those modules, paths are applicable to all other modules.

Carry Out Export

- 5 Click the "FILE" tab on the toolbar.



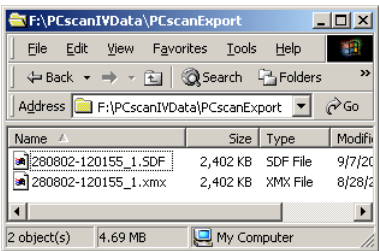
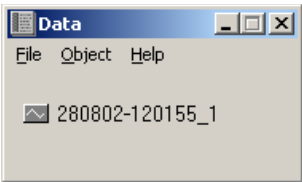
- 6 Drag and drop a data file from the "Data" window onto each of the "SDF32", "UFF32" and "nSoft32" modules to start format conversions.

Converted data files are created in the specified path on the "Places" window.

**Note**

Make sure that modules used to export are not running already prior to carrying out export.

Export to any of the above formats is not to be carried out if the module is already running.





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