



**Data analysis software Manual**

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# Introduction

## Trademark

Microsoft, Windows is the registered brand or trademark of Microsoft Corporation located in the United States for the United States and other countries. Official name of Windows is Microsoft Windows Operating System.

Pentium, Core Duo, Core 2 Duo, Atom Core i3, Core i5 and Core i7 are the registered brand of Intel Corporation and its subsidiaries for the United States and other countries.

## Disclaimer

We would like you to understand in advance that we are not responsible for the damage which is caused by use or unusable this product or attached software to customers or the third party. We also have no legal responsibilities for the damaged which is caused by negligent use, use without paying attention to descriptions in caution or warning or act of providence. Even though we are informed such usage in advance, we are not responsible for the damage.

Screen of PC in this English manual is different from the actual one in some cases. We do not compensate the damage resulting from wrong descriptions in this manual.

Introduction

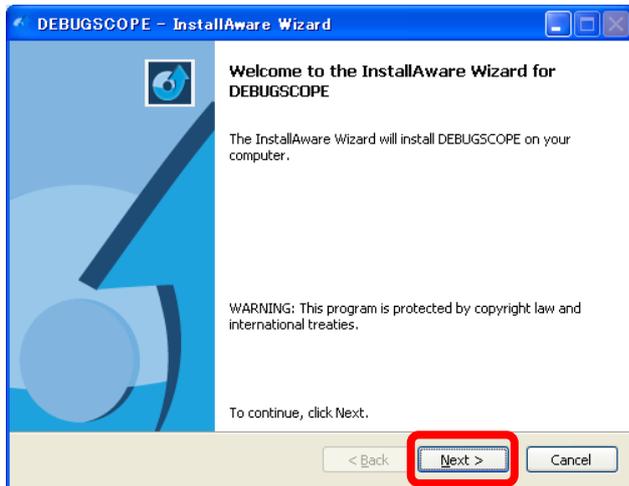
# Installation of software

## Installation of software

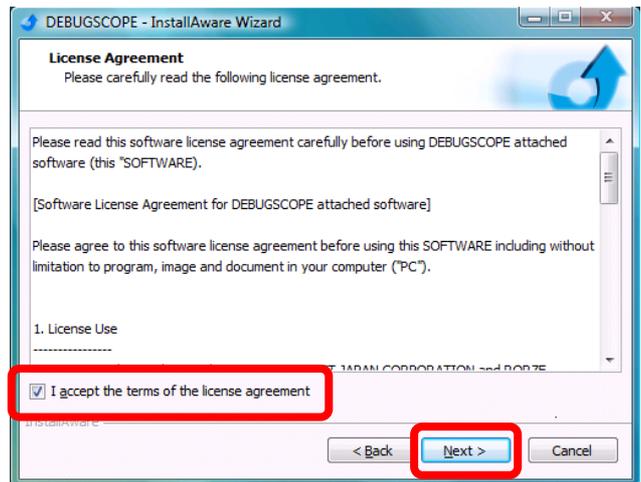
Insert an installation CD in CD-ROM drive. If CD is inserted, installation is started automatically. If it is not started automatically, open the CD-ROM and execute setup.exe file in CD-ROM to start installer.



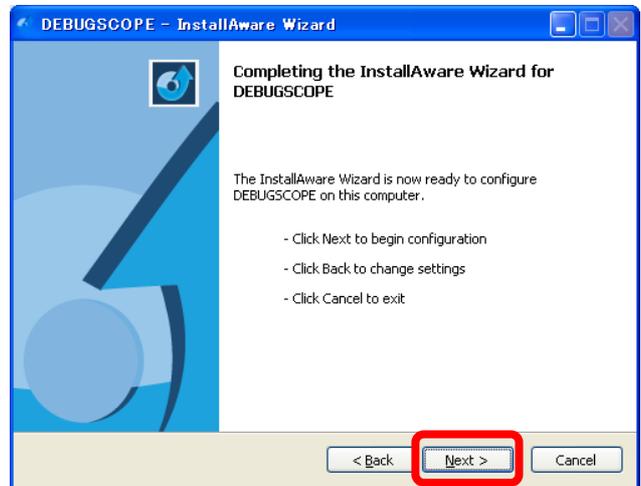
- Select the language in accordance with environment in use and click "OK" button.



- Click "Next >" button.



- Tick the box located left below of the license agreement and click "Next >".

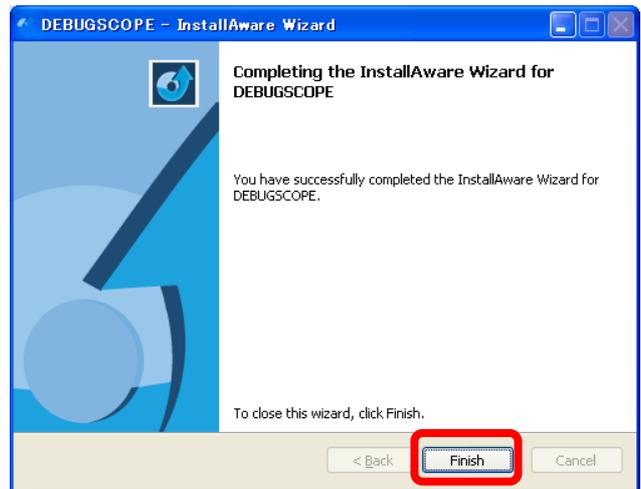


- After information of installation is confirmed, Click "Next >" button.

## Introduction



- The software is installed.



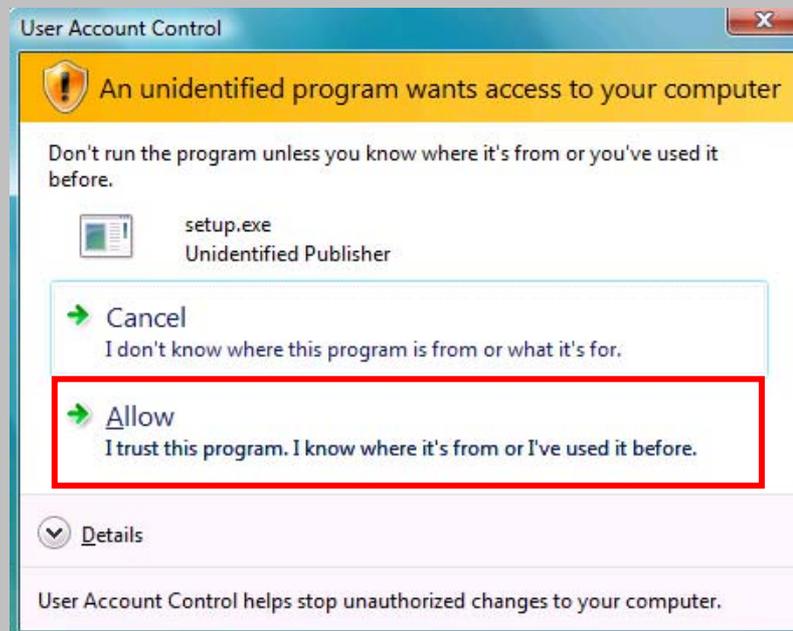
- After installation is completed, the above message is shown. Click "Finish" button to close window.



### About the influence of User Account Control (Windows Vista/7)

When you enable User Account Control (UAC) on Windows Vista/7, the following screen is displayed after double-clicking Setup.exe.

When the following screen is displayed, click "Allow" and continue installation.



Basic operation

# Basic operation

Waveform data which is imported to the hard disk of PC by "Data logging function" or "Pre-trigger function" (-> Refer to the **DEBUGSCOPE Instruction Manual**) of DEBUBSCOPE is reproduced by the data analysis software. The data analysis software is available whether the main body is connected or not.

## Start software

### Method to start

- 1 To start the software, select "Start" -> "All programs" -> "DEBUGSCOPE" -> "Analyzer".



### Dialogue to select the language at initial startup

- Dialogue to select the language is shown at initial startup. Select the language in



accordance with environment in use.

Basic operation

# Description of oscilloscope mode screen



Main screen (when data file is played)

- |  |  |
|--|--|
| <p><b>1</b> • Version<br/>Show this software version</p> <p><b>2</b> • Menu<br/>Make setting</p> <p><b>3</b> • Display of measurement range<br/>Display setting of voltage range and so on at logging</p> <p><b>4</b> • Voltage position<br/>Display voltage position at logging</p> <p><b>5</b> • Trigger position<br/>Display trigger point</p> <p><b>6</b> • Tracking bar<br/>Scroll data file</p> <p><b>7</b> • Control tab<br/>Switch each tab</p> <p><b>8</b> • "Play", "Pause" button<br/>Play data/Pause</p> | <p><b>9</b> • Display of file name<br/>Display file name which is being opened</p> <p><b>10</b> • Display of trigger level<br/>Display trigger level voltage</p> <p><b>11</b> • Trigger level<br/>Set trigger level</p> <p><b>12</b> • Cursor<br/>Display voltage/time cursor</p> <p><b>13</b> • "STOP" button<br/>Stop data play and display position returns to the top of the data</p> <p><b>14</b> • IFFT setting<br/>Set waveform when IFFT is on</p> <p><b>15</b> • Trigger control panel<br/>Set conditions for trigger</p> <p><b>16</b> • Speed<br/>Set play speed</p> |
|--|--|

Basic operation

# Read of data file

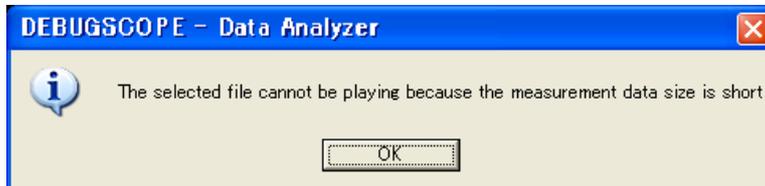
## Operation

- 1 Click "File" -> "Open" in menu. Or hold "Ctrl" button and press "O".  
Select data file. When it is read properly, recorded waveform is shown.



In case that the measurement data size is not enough for one screen (1024 points or less), the following message is shown.

In this case, data play and trigger retrieval are not available.



\* When pre-trigger data is read, "pre-trigger" is displayed on the title bar as shown in the figure below. When the data logger data is read, it is not displayed.



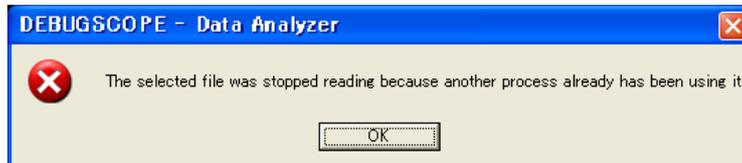
## Basic operation

If the following error is shown, check a data file which was selected.

- If the selected data file does not exist, the following message is shown.  
Check the name of data file.



- If the selected data file is being opened by other software, the following message is shown.  
Data file should not be edited. There is a possibility that the file is damaged.  
When a data file is read by PC other than PC in use (by LAN and so on), the following message is shown in some cases. The data file should be read by PC in use.



- If a data file which was completed without start trigger working within the time limit by data logging function was selected, the following message is shown.



- If a data which was acquired by data logger function is abnormal, the following message is shown. A data file cannot be read in this case.



- If a data file which is acquired by neither data logger function nor pre-trigger function was selected, the following message is shown. Select a data file which was acquired by this product only.



Basic operation

# Display of data file properties

Setting information when "Data logging function" or "Pre-trigger function" of DEBUGSCOPE is used can be displayed.

## Operation

Click "Info" tab in the main screen. The following is setting information of measurement done by "Data logging function".

Measurement		Markers	Info
CH1 Position	4.00 V	Measurement time	8.63 Sec
CH2 Position	-3.94 V	Sampling	10us (100 KSa/s)
Trigger Setting	Start & end trigger	Measurement Status	Ended with trigger
Start trigger CH	CH1	End trigger CH	CH2
Start trigger Edge	RISE	End trigger Edge	RISE
Start trigger Level	2.44V	End trigger Level	2.31V

The following is the setting information of measurement done by "Pre-trigger function".

Measurement		Markers	Info
CH1 Position	2.03 V	Measurement time	5.24 Sec
CH2 Position	-1.97 V	Sampling	10us (100 KSa/s)
Trigger Setting	--	Measurement Status	--
Start trigger CH	--	End trigger CH	--
Start trigger Edge	--	End trigger Edge	--
Start trigger Level	--	End trigger Level	--

### Control of properties display (○: Display —: Nondisplay)

Name of property	Data logging	Pre-trigger
CH1 Position	○	○
CH2 Position	○	○
Trigger Setting	○	—
Start trigger CH	○	—
Start trigger Edge	○	—
Start trigger Level	○	—
Measurement time	○	○
Sampling	○	○
Measurement Status	○	—
End trigger CH	○	—
End trigger Edge	○	—
End trigger Level	○	—

**Basic operation**

The following table describes the description of each property name in "Info" tab.

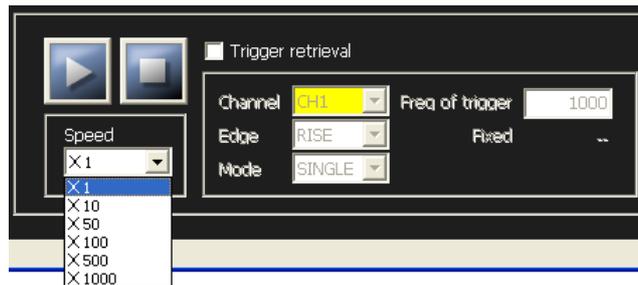
CH1 position	Display voltage position of CH1
CH2 position	Display voltage position of CH2
Trigger Setting	Display logging pattern which was used in "Data logging function" <ul style="list-style-type: none"> <li>● Time measurement</li> <li>● Start trigger</li> <li>● End trigger</li> <li>● Start &amp; end trigger</li> </ul>
Start trigger CH	Display a channel of start trigger If logging patter is "Start trigger" or "Start & end trigger", one of "CH1", "CH2" or "EXT" is shown.
Start trigger Edge	Display edge f start trigger If logging pattern is "Start trigger" or "Start & end trigger", one of "RISE", "FALL" or "BOTH" is shown.
Start trigger Level	Display level of start trigger If logging pattern is "Start trigger" or "Start & end trigger", it is shown. If the trigger is "EXT", it is not shown.
Measurement time	Display time to record data
Sampling	Display sampling period and sampling frequency
Measurement Status	Display end status in case that "Data logging function" is used. <ul style="list-style-type: none"> <li>● If logging pattern is "Measurement time", "Ended with time".</li> <li>● If logging pattern is "Start trigger", "Ended with time".</li> <li>● If logging pattern is "End trigger", "Ended with trigger".</li> <li>● If logging pattern is "Start &amp; end trigger", "Ended with trigger".</li> <li>● When logging was aborted, "Interrupt".</li> </ul>
End trigger CH	Display a channel of end trigger If logging pattern is "End trigger" or "Start & end trigger", one of "CH1", "CH2" or "EXT" is shown.
End trigger Edge	Display edge of end trigger If logging pattern is "End trigger" or "Start & end trigger", one of "RISE", "FALL" or "BOTH" is shown.
End trigger Level	Display level of end trigger If logging pattern is "End trigger" or "Start & end trigger", it is shown. If the trigger is "EXT", it is not shown.

## Basic operation

## Data play and scroll operation

## Data play

- 1 Select "Speed" and click "Play" button .

**About Speed**

- If trigger search is being used (trigger retrieval is ticked), data play speed cannot be selected.

- 2 During data play, if "Pause" button  is clicked, data play is paused. If "Stop" button  is clicked, data play stops and display position returns to the top of the data.

## Basic operation

### Scroll operation for all data by tracking bar

Move the position of tracking bar to left and right to scroll all data.

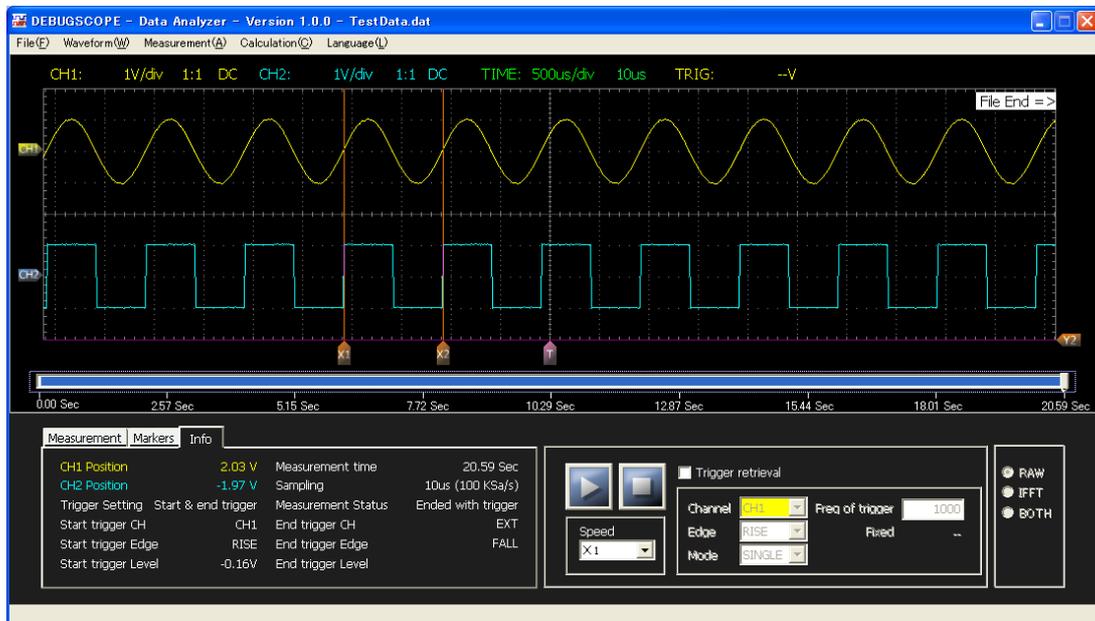


Tracking bar is not available during trigger retrieval.



If a data file is played to the end, "File End =>" is shown upper right in the screen.

When "File End" is shown, data play is completed.



Click "Stop" button  to back to the top of the data.

\* "File" and Trigger control panel in menu cannot be selected during data play.

Basic operation

# Selection of displayed waveform

The waveform of CH1 and CH2 to be displayed on the screen can be selected.

Operation procedure in the main screen

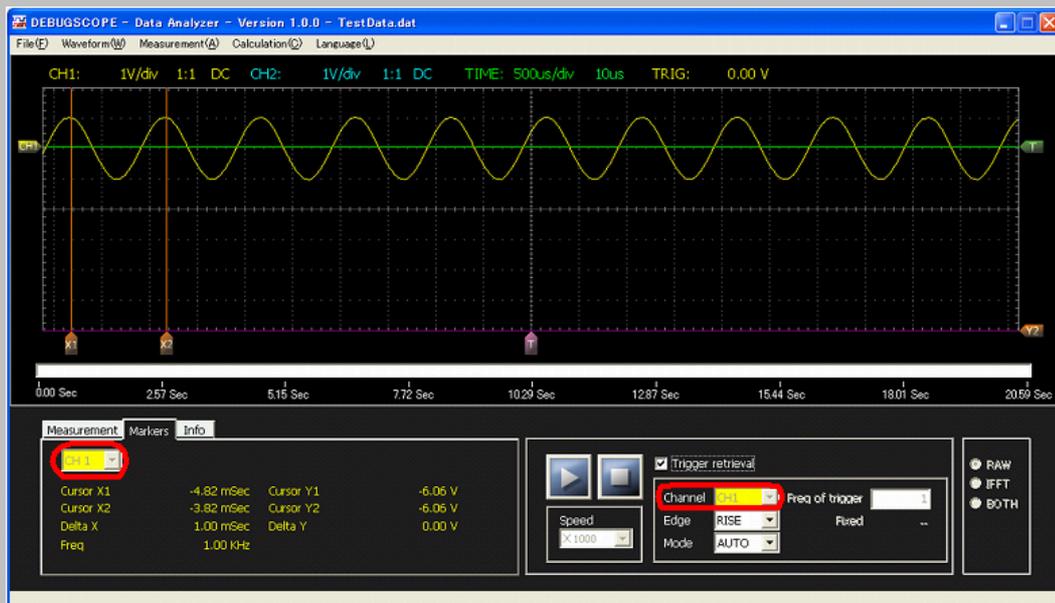
Select "Waveform" -> "CH1", "CH2" or "BOTH" in menu.

Show CH1 only	<ul style="list-style-type: none"> <li>• "Waveform" -&gt; "CH1" in menu</li> <li>• "Shift" + "F1"</li> </ul>
Show CH2 only	<ul style="list-style-type: none"> <li>• "Waveform" -&gt; "CH2" in menu</li> <li>• "Shift" + "F2"</li> </ul>
Show both CH1 and CH2	<ul style="list-style-type: none"> <li>• "Waveform" -&gt; "BOTH" in menu</li> <li>• "Shift" + "F3"</li> </ul>



## Displayed waveform

- In case that only "CH1" is shown, marker and trigger channel is "CH1" only. FFT shows "CH1" only.



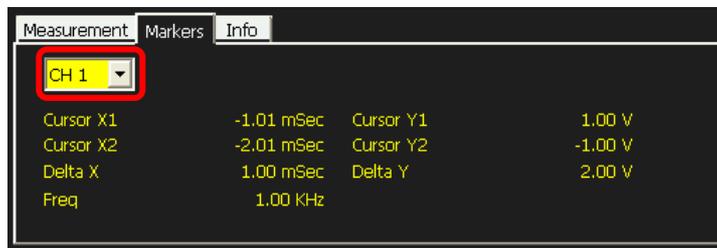
Basic operation

# Use of cursor

Measure voltage and frequency by cursor.

Operation procedure in the main screen

- 1 Switch the tab in the main screen to "Markers".
- 2 Select a channel to be measured.



\* In the setting of the waveform display, the channel set to non-display is not available.

-> Refer to "Selection of displayed waveform" in P12

- 3 Move horizontal cursor Y1 and Y2 , and vertical cursor X1 and X2 to measure.

The following table shows the description of cursor display.

Cursor X1	Show the time of vertical cursor X1.
Cursor X2	Show the time of vertical cursor X2.
DeltaX	Show the absolute value of the difference between X1 and X2.
Frequency	Show the frequency of DeltaX.
Cursor Y1	Show the voltage value of horizontal cursor Y1.
Cursor Y2	Show the voltage value of horizontal cursor Y2.
DeltaY	Show the absolute value of the difference between Y1 and Y2.



### Initial cursor position at the start

- When this software is started for the first time, vertical cursor X1 and X2 are in the left end of the screen. Since X1 and X2 have overlapped, X1 will be displayed if X2 is moved.
- Horizontal cursor Y1 and Y2 are in the lower right of the screen. Since Y1 and Y2 have overlapped, Y1 will be displayed if Y2 is moved.

Basic operation

Operation procedure when FFT or spectrogram is shown

- 1 Show FFT or spectrogram.  
-> Refer to "Use of FFT and spectrogram" in P23



- 2 Move horizontal cursor H1 and H2 , and vertical cursor V1 and V2 to measure.

The following table shows the description of cursor display.

v1	Show the value of vertical cursor V1.
v2	Show the value of vertical cursor V2.
DeltaV	Show the absolute value of the difference between v1 and v2.
h1	Show the value of horizontal cursor H1.
h2	Show the value of horizontal cursor H2.
DeltaH	Show the absolute value of the difference between h1 and h2.

Basic operation

# Use of trigger retrieval

Set trigger channel, edge and mode, and perform trigger retrieval. As for trigger channel, either "CH1" or "CH2" is selected. Edge is selected among "RISE", "FALL" or "BOTH".

As for mode, there are "Auto mode" which play as sequentially triggered, "Single mode" which retrieval is done by one trigger and "Count mode" which set the number of trigger.

## Operation procedure of auto mode

**1** Read a file. **-> Refer to "Read of data file" in P6**

**2** Tick checkbox of "Trigger retrieval" in trigger control panel and set as follows.

- Channel :CH1
- Edge :RISE
- Mode :AUTO
- Trigger level :0V

\* Move up and down the trigger level  displayed in the right of the screen to set trigger level.

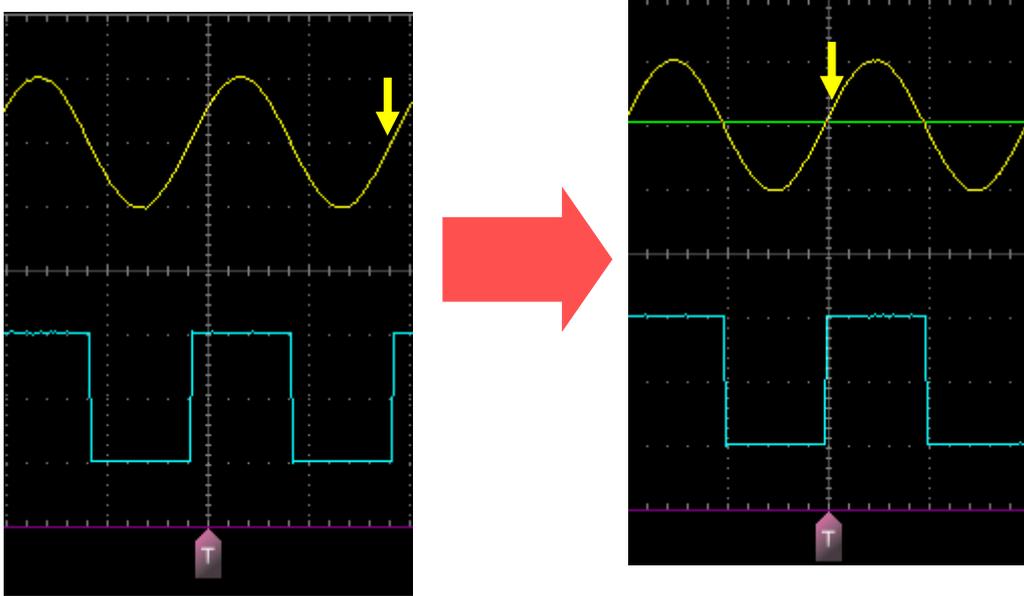
The voltage value of trigger level is shown in the trigger level display (TRIG \*\*V).



**Basic operation**

3

Click "Play" button  and the trigger works. The following pictures shows that risen edge of sine wave (yellow) of CH1 moves to the trigger position.

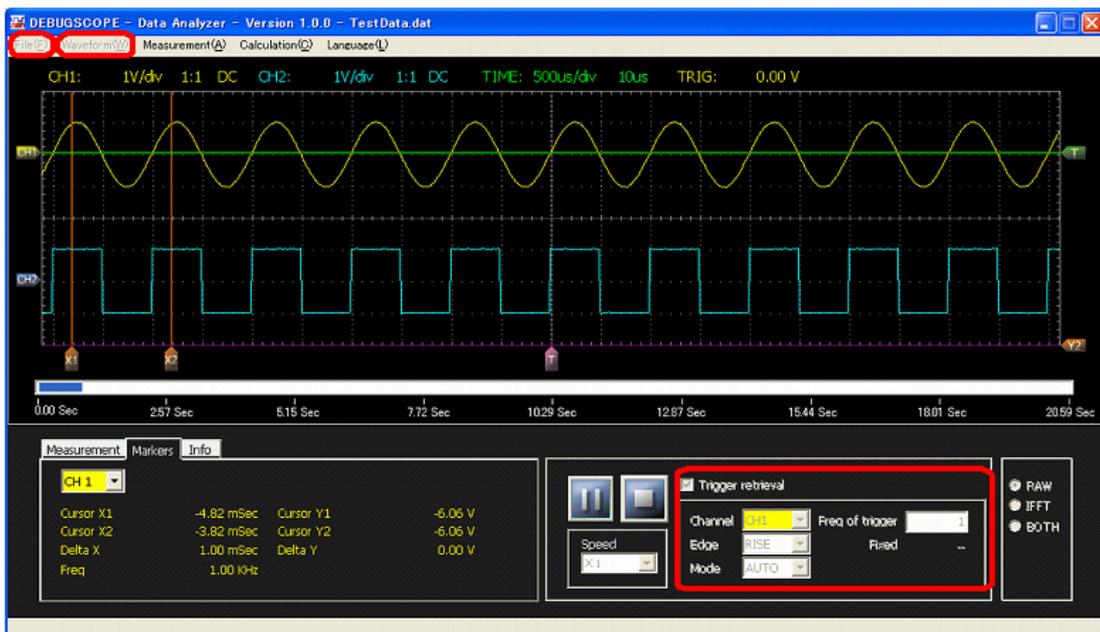


Data is played as sequentially triggered until the end of the file.

When the trigger works, the screen is updated. If the trigger does not work, the screen is not updated.

If "Pause" button  is clicked, trigger retrieval stops temporarily.

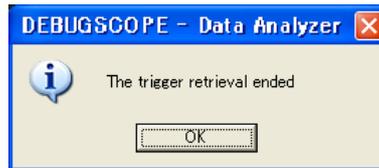
\* "File" and "Waveform" in menu and "Trigger retrieval", "Trigger channel", "Trigger edge" and "Trigger mode" in Trigger control panel cannot be selected during trigger retrieval.



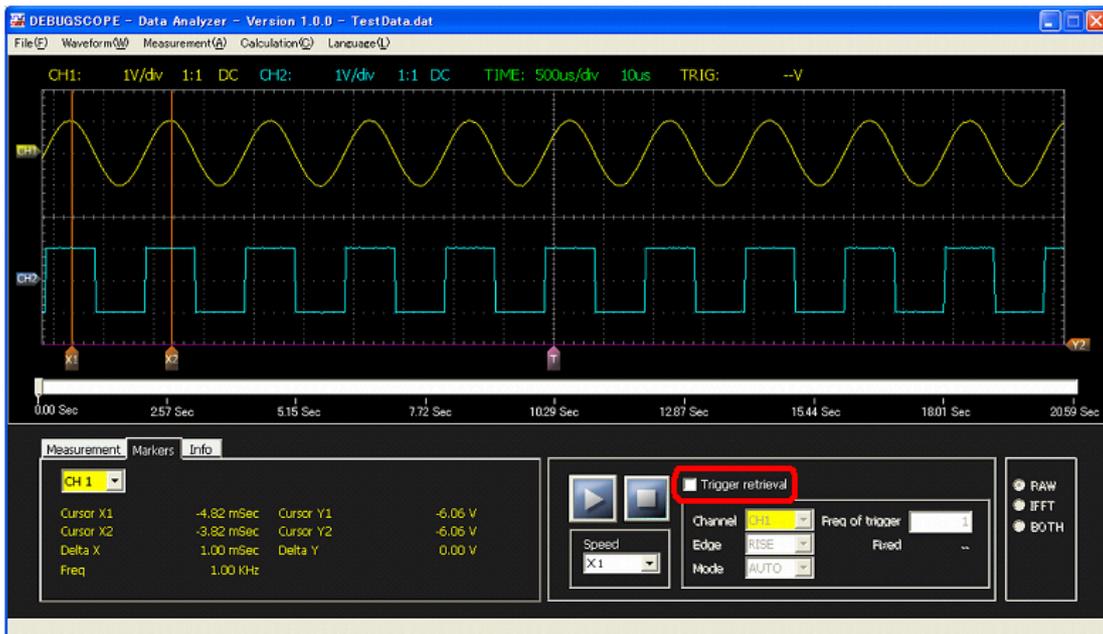
**Basic operation**

4 If "Play" button  is clicked again, trigger retrieval is restarted from the position where trigger retrieval stopped temporarily.

5 When trigger retrieval is performed until the end of the file, the following message is shown and trigger retrieval is completed.  
Click "OK".



6 Click "Stop" button  to return to the first screen of data and to remove the check mark from the box for "Trigger retrieval".



Basic operation

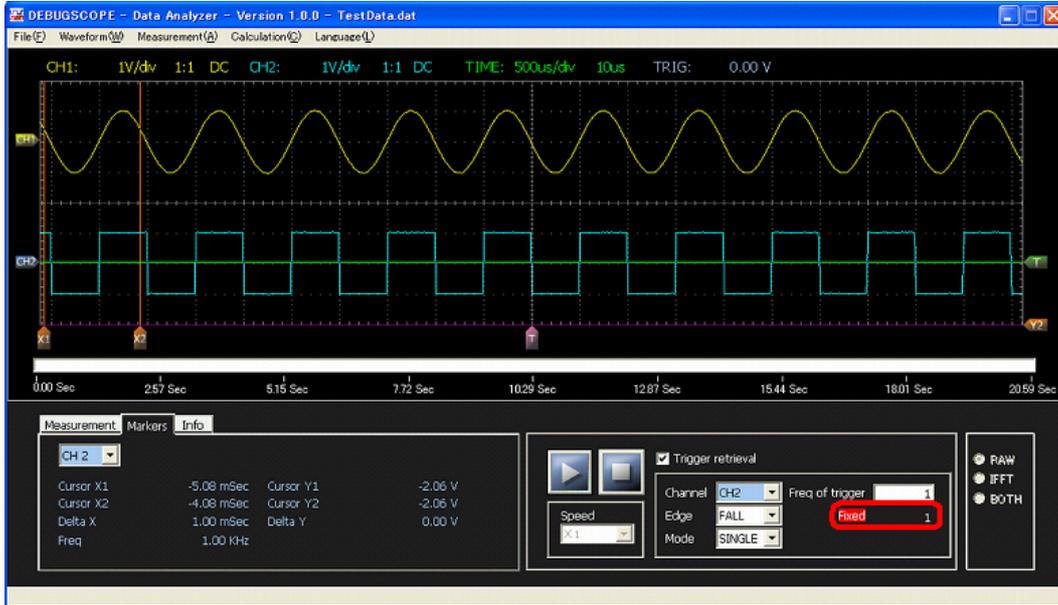
Usage of single mode

- 1 Read a file.-> Refer to "Read of data file" in P6
- 2 Tick checkbox of "Trigger retrieval" in trigger control panel and set as follows.
  - Channel :CH2
  - Edge :FALL
  - Mode :Single
  - Freq of trigger :1
  - Trigger level :0V



Basic operation

- Click "Play" button  When the trigger works, the count of "Fixed" shows "1" from "--", "Fixed" is highlighted in red, and trigger retrieval is completed.



- Click "Stop" button  to return to the first screen of data and to remove the check mark from the box for "Trigger retrieval". The count of "Fixed" shows "--" and "Fixed" is de-highlighted.

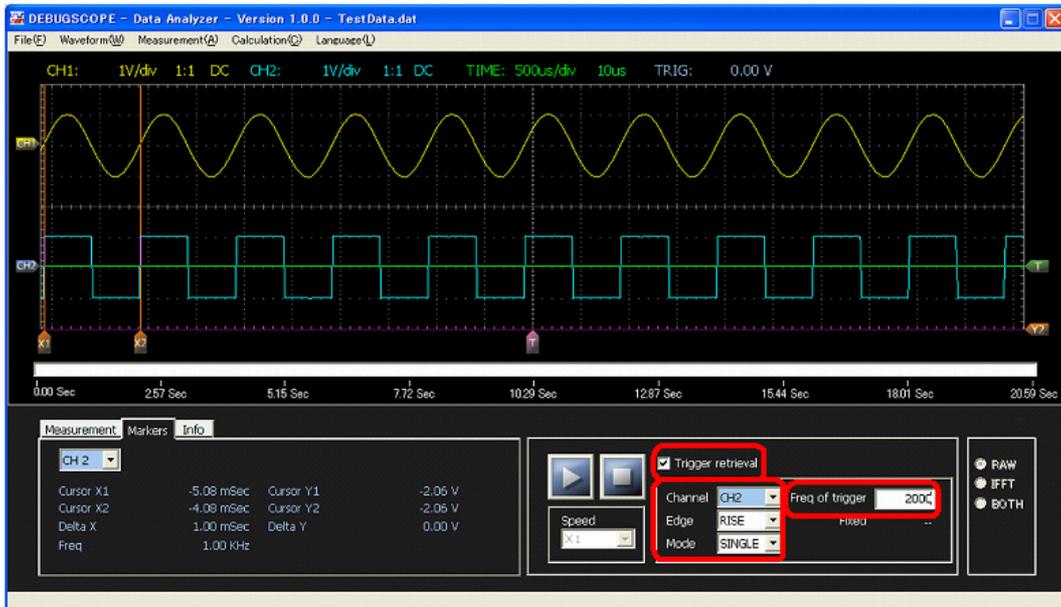


**Basic operation**

**Operation procedure of count mode**

The following operation stops data play when the number of trigger is counted 2000 times from the top of data.

- 1 Read a file. -> Refer to "Read of data file" in P6  
 Tick "Trigger retrieval" in trigger control panel and set as follows.
  - Channel :CH2
  - Edge :RISE
  - Mode : Single
  - Freq of trigger :2000
  - Trigger level :0V



- 2 Click "Play" button  and the trigger works, and "Fixed" which shows the number of trigger is counted up.

If "Pause" button  is clicked, "Freq of trigger" can be changed.

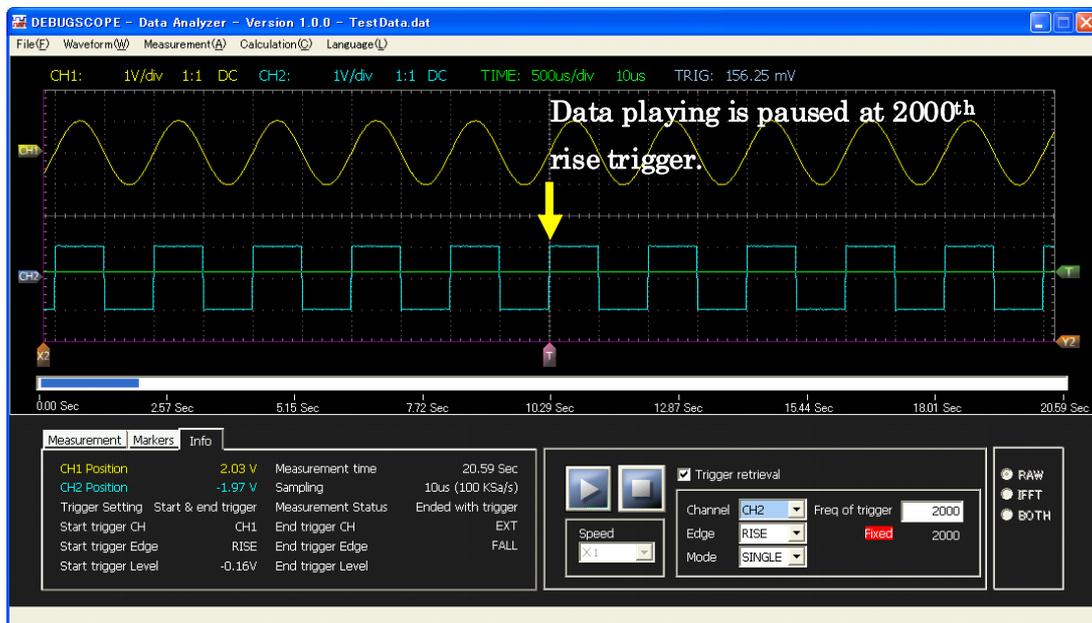
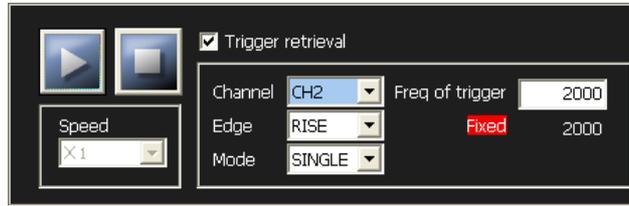
**\* When "Freq of trigger" is changed, the count of "Fixed" is reset.**

 **Freq of trigger**

- "Freq of trigger" accepts up to 9999999 counts.
- Enter the value with one-byte number. (Two-byte characters cannot be entered.)

Basic operation

- 3 When the count of "Fixed" reaches the number in "Freq of trigger", "Fixed" lights up and data play stops.



**Resetting of "Fixed" count**

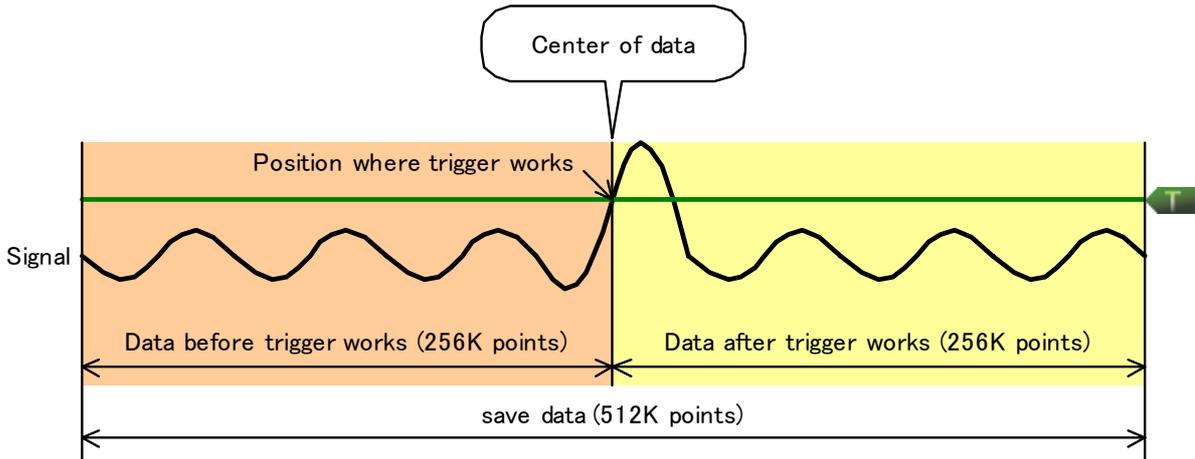
- The following process resets "Fixed" count. ("Fixed" shows "—").
  - Click "Stop" button
  - Untick "Trigger retrieval"
  - Change trigger channel (Display is not reset, but if "Play" button is clicked, the count starts from 0.)
  - Change trigger mode from "Single" to "Auto"
  - After "Freq of trigger" is changed, click "Play" button. (Display is not reset, but if "Play" button is clicked, the count starts from 0.)

Basic operation

# Pre-trigger data

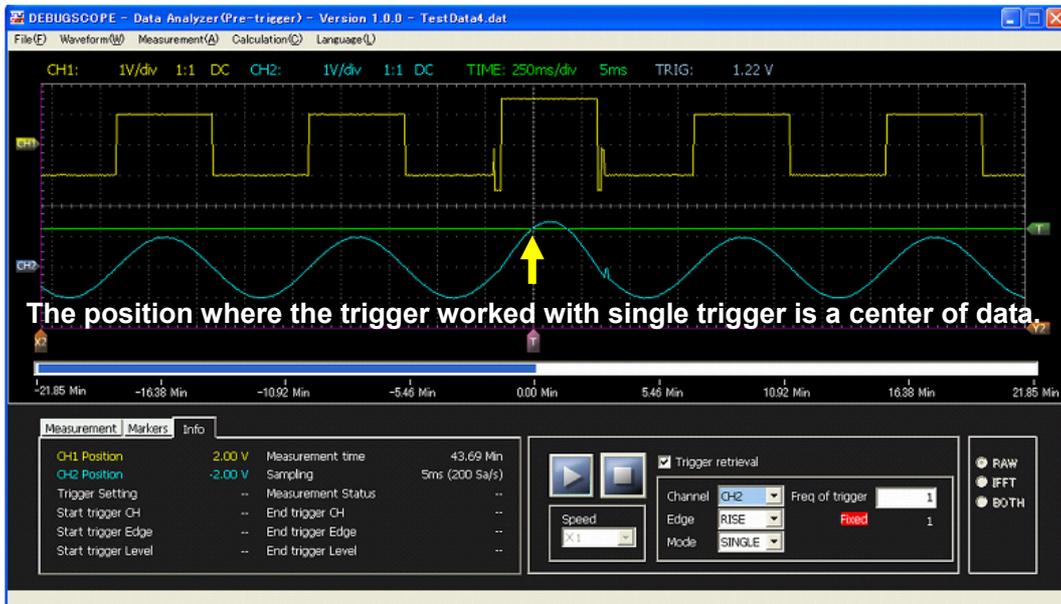
## Composition of pre-trigger data

Pre-trigger data is 512K points data which consists of 256K points before and after the position in which the trigger worked.



## How to display center of data

By retrieving the trigger with single trigger using the same trigger setting as time that used the pre-trigger function, the center of data is displayed.



Calculation function

# Calculation function

## Use of FFT and spectrogram

Measured signal waveform can be calculated by FFT, and shown in spectral display.

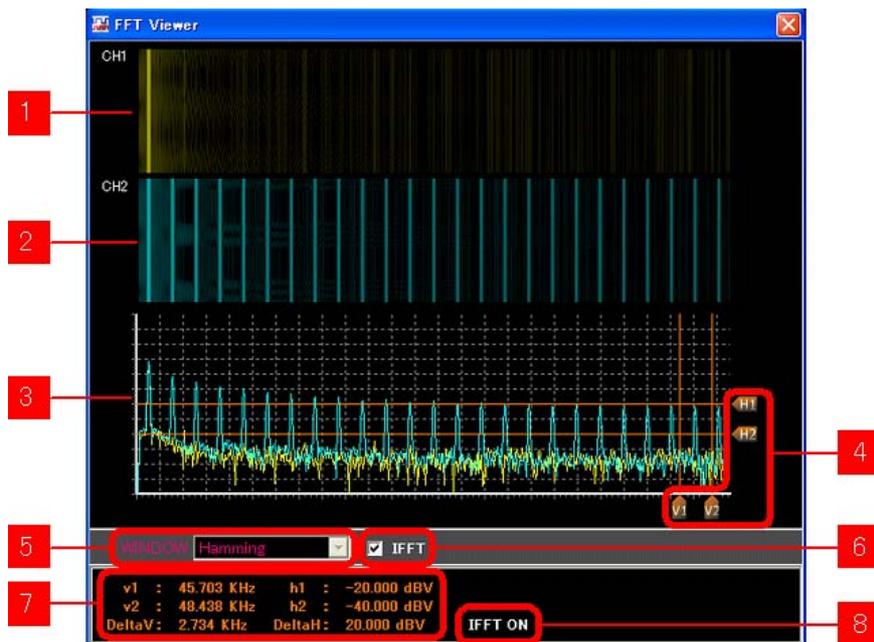
- Number of data :512 points
- Window function :None•Hanning•Hamming•Blackman•Blackman-Harris

Temporal variation and characteristics of frequency can be seen by spectrogram. Horizontal axis shows frequency, vertical axis shows time, and brightness shows spectrum intensity.

If spectrum intensity is strong, brightness gets higher logarithmically.

### Operation procedure

Click "Calculation" -> "FFT" in menu and "FFT Viewer" is shown.



- |   |  |   |   |
|---|--|---|---|
| 1 | ●CH1 spectrogram<br>Show CH1 spectrogram | 5 | ●Window function<br>Set window function                     |
| 2 | ●CH2 spectrogram<br>Show CH2 spectrogram | 6 | ●IFFT<br>Switch ON/OFF of IFFT                              |
| 3 | ●FFT<br>Show FFT of CH1 and CH2          | 7 | ●Cursor display<br>Show frequency and the value of spectrum |
| 4 | ●CURSOR<br>Measure data with this cursor | 8 | ●IFFT display<br>Display ON/OFF of IFFT                     |

## Calculation function

### Setting of window function

Switch FFT window function by "WINDOW" list box in FFT display.

Type of window function : None • Hanning • Hamming • Blackman • Blackman-Harris

### Measurement by cursor

Frequency and spectrum value can be measured by cursor. -> Refer to "Use of cursor" in P13

Graph cannot be zoomed.



### Automatic measurement when FFT is displayed

- When FFT is displayed, "FPEAK" (peak frequency) and "FFTMAX" (peak level) of automatic measurement function are shown.

Measurement	Markers	Info	
MAX	0.97V	MAX	1.00V
MIN	-1.09V	MIN	-1.06V
P-P	2.06V	P-P	2.06V
MEAN	-0.01V	MEAN	0.02V
AVG	0.00V	AVG	0.00V
FPEAK	976.56Hz	FPEAK	976.56Hz
FFTMAX	5.301dB	FFTMAX	7.247dB

Calculation function

# Use of IFFT (inverse FFT)

IFFT (inverse transform of FFT) function can be used if tick the checkbox in FFT display.

Filter with various frequency characteristics are available by use of IFFT, and those filters can set cutoff frequency by cursor operation.

FFT display screen and the main screen are used in IFFT.

## Example of bandpass filter creation

The following is an example of excerpt basic frequency (1KHz) from square wave with 1KHz.

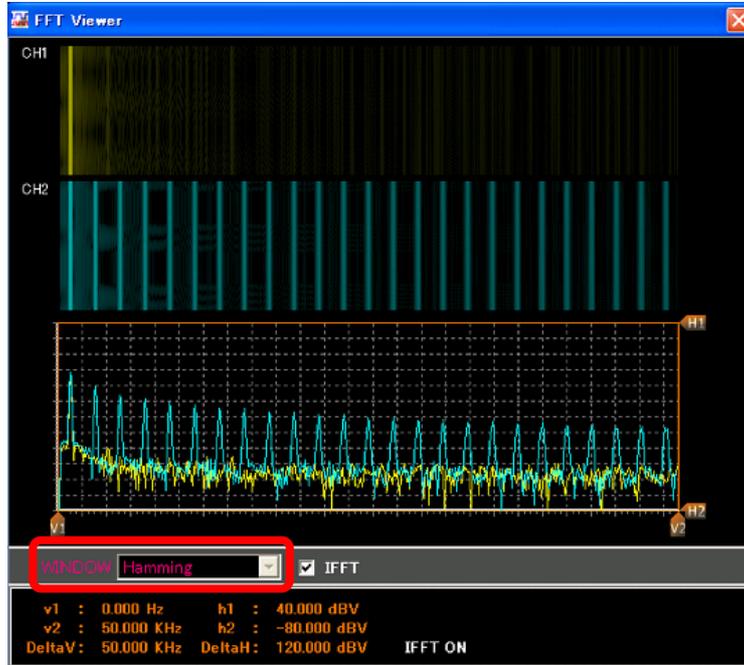
- 1 Reproduce square wave with 1KHz.  
The following shows square wave with 1KHz of CH2.



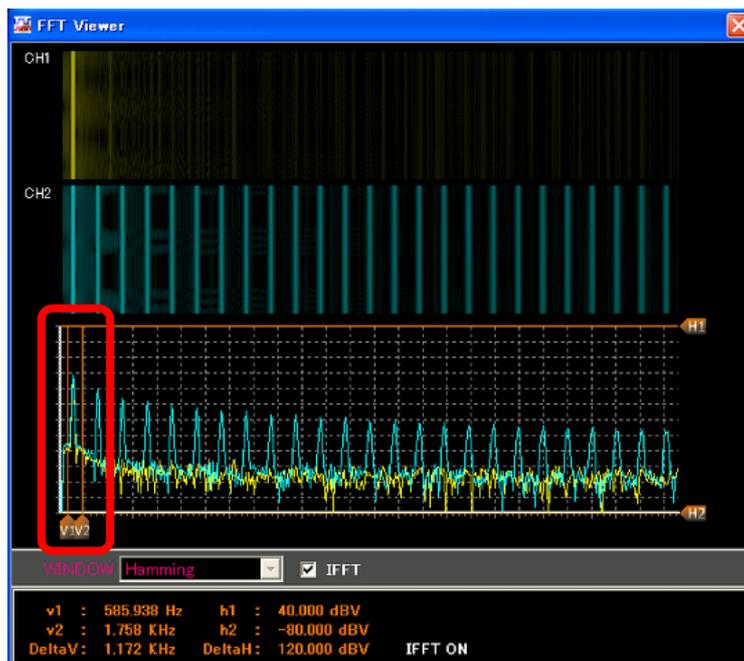
- 2 Click "Calculation" -> "FFT" in menu to show FFT Viewer.

Calculation function

- 3 Tick "IFFT" checkbox.  
\* Window function is automatically set to "Hamming".



- 4 Sandwich a part of spectrum in square wave by vertical cursors V1 and V2 as shown below.
  - Cursor V1 :587.084Hz
  - Cursor V2 :1.761KHz



## Calculation function

5

The result of inverse conversion is shown in the main screen.

Change radio button of "RAW", "IFFT" and "BOTH" in the lower right of the main screen to "IFFT" or "BOTH".

Setting and waveform are as follows.

RAW	Only measured waveform is shown.
IFFT	Only waveform where IFFT is performed is shown.
BOTH	Both measure waveform and waveform of IFFT are shown.

In case that radio button is set to "IFFT", only waveform where IFFT is performed is shown.



The following table shows Color of line and Definition of waveform.

Yellow	Waveform of CH1
Blue	Waveform of CH2
White	Waveform after IFFT of CH1
Purple	Waveform after IFFT of CH2

Calculation function

# Use of X-Y display

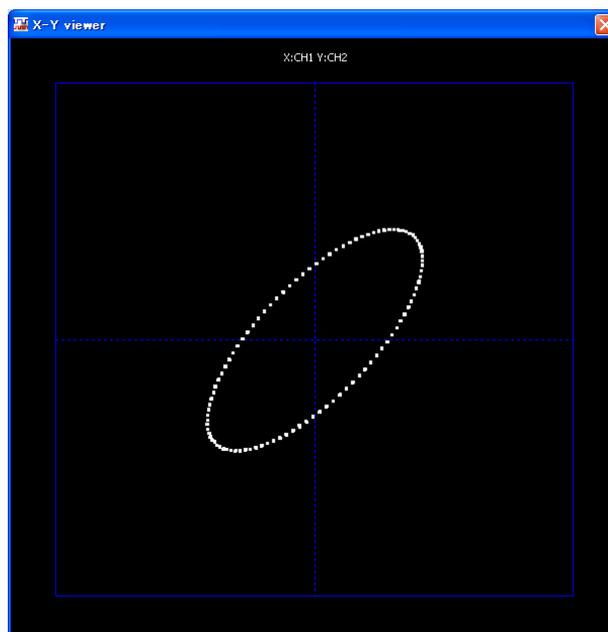
## Operation procedure

Click "Calculation" -> "X-Y" in menu to show X-Y Viewer.

CH1 shows horizon (X-axis) and CH2 shows vertical (Y-axis).

The following figures show input signal waveform display and X-Y display.

- CH1: Frequency 1kHz, sine wave, phase 0°
- CH2: Frequency 1kHz, sine wave, phase 45°



Calculation function

# Use of automatic measurement function

MAX (maximum value), MIN (minimum value), P-P (peak to peak), MEAN (average), AVG (average), FPEAK and FFTMAX of waveform data which is shown in the screen can be automatically measured per channel.

## Operation procedure

- 1 Click "Measurement" -> "BOTH" in menu.
  - If only CH1 use automatic measurement, click "Measurement" -> "CH1" in menu.
  - If only CH2 use automatic measurement, click "Measurement" -> "CH2" in menu.
  - If automatic measurement is not used, click "Measurement" -> "None" in menu.
  
- 2 Change the tab to "Measurement".



**\* "FPEAK" and "FFTMAX" of automatic calculation can be shown only when FFT is used.**

MAX	Show maximum value of voltage of displayed waveform
MIN	Show minimum value of voltage of displayed waveform
P-P	Show amplitude (peak-to-peak voltage) of displayed waveform
MEAN	Show average value of displayed waveform
AVG	Show average value which is calculated from total value of 128 times of MEAN
FPEAK	Show maximum spectral frequency of FFT
FFTMAX	Show maximum value of FFT

## Utility function

# Utility function

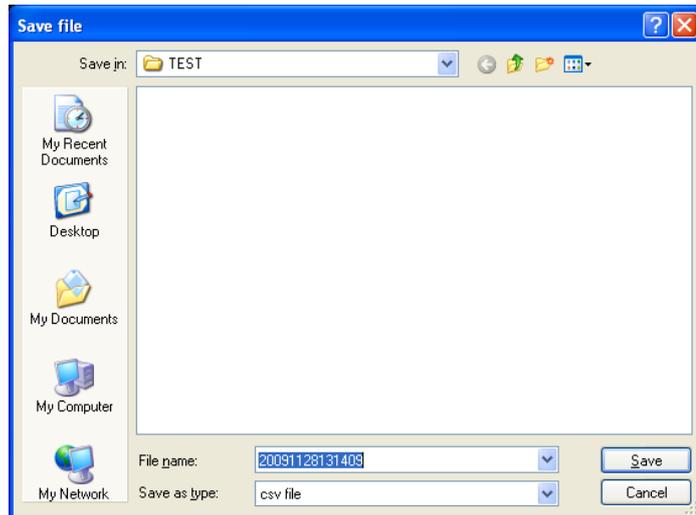
## Output of CSV (comma-separated) file

Screen data (1,024 data) and FFT data which are being shown is CSV output.

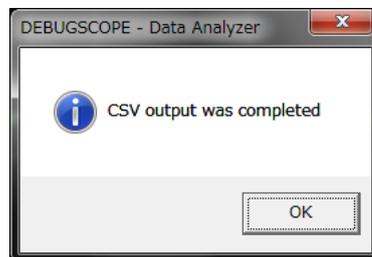
### Operation procedure

1 Select "File" -> "CSV output" in menu.

2 Name CSV file and save it.



3 Click "OK".



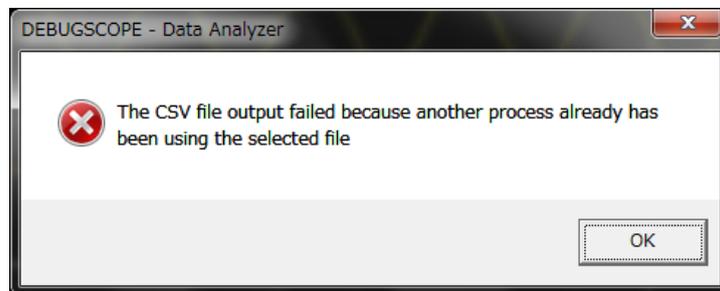
## Utility function



### CSV file output function

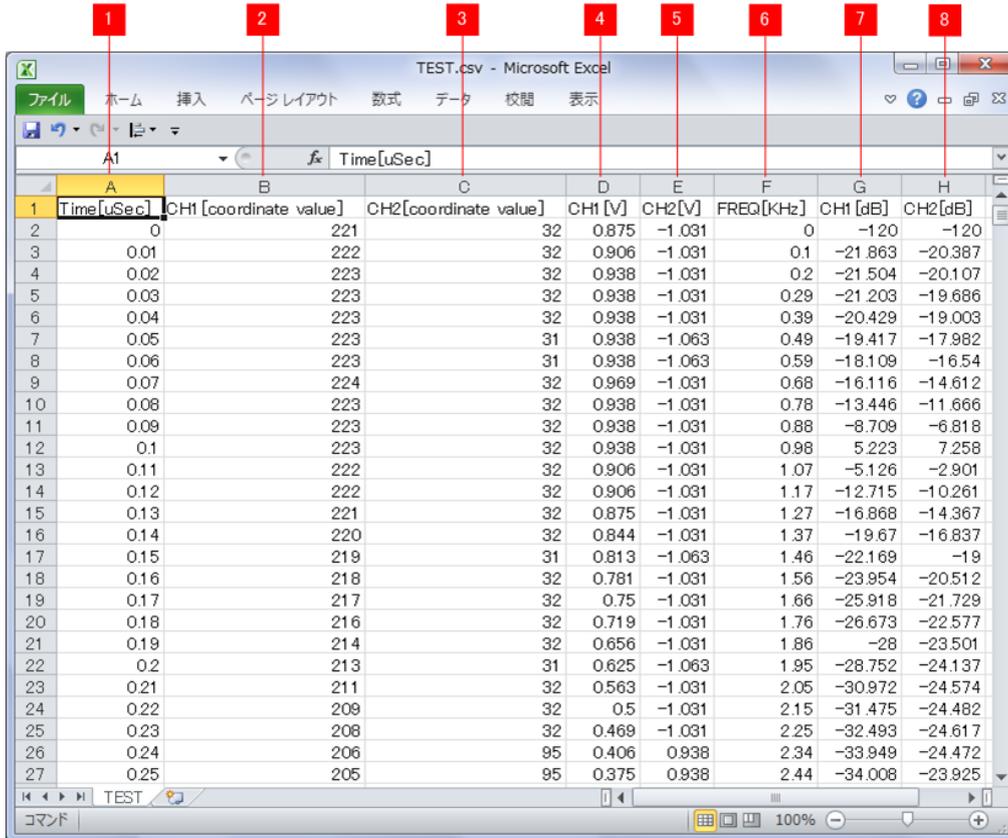
- When "FFT Viewer" is shown, FFT data (512 points) is also CSV output.
- CSV file output function cannot be used when the data is replayed.

- When a CSV file which has been opened by other software is trying to be overwritten and saved, the following alarm is shown. Change the file name.



Utility function

The following shows when CSV file is read by Excel.



1	Time[***]	Sampling time of data currently displayed on the screen. Unit is shown at ***. Unit is varied in accordance with sampling setting.
2	CH1[coordinate value]	Coordinate value of CH1 Bottom in graph area is "0", top in graph area is "255"
3	CH2[coordinate value]	Coordinate value of CH2 Bottom in graph area is "0", top in graph area is "255"
4	CH1[V]	Voltage value of CH1
5	CH2[V]	Voltage value of CH2
6	FREQ[***]	Frequency of FFT Unit is shown at ***. Unit is varied in accordance with sampling setting.
7	CH1[dB]	Spectrum value (decibel) of CH1
8	CH2[dB]	Spectrum value (decibel) of CH2

Utility function

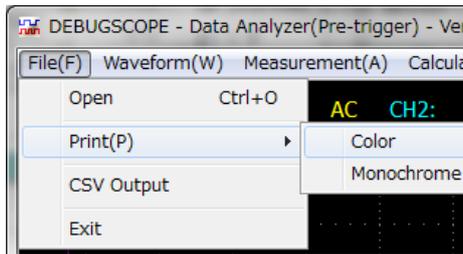
# Use of print function

This function can be used only when data play is stopped.

## Operation procedure

1 Stop data play by clicking "PAUSE" button  or "STOP" button .

2 Click "File" -> "Print" in menu. Color or monochrome can be selected.



3 Preview screen is shown.  
There is a field for comment in the bottom part of preview screen and comment can be entered. Select "FFT" or "X-Y" of "Calculation" in menu, and if "FFT viewer" or "X-Y viewer" screen is shown, the screen which is being shown is shown in page 2 or after of preview screen.

(Use "Previous page"  "Next page"  button to change pages.)

4 Click "PRINT" button .

5 Click "CLOSE" button  to return to the main screen.

**\* Please carry out neither operation of the mouse nor the keyboard after choosing "color" or "monochrome" until the preview screen is displayed.**

**The image of the preview screen may not be normally displayed.**

**\* This product only supports that size of paper for printing is A4 and portrait orientation.**

**Please note that it does not support landscape orientation , and size other than A4.**

**In case that size other than A4 is set, setting should be changed to A4 size.**

**Setting of orientation for printing should be changed to "Portrait".**

## Utility function



### Print function

- In accordance with processing speed of PC in use, it may take 10 sec. or so to show the above preview screen.
- Negative monochrome screen is printed by clicking "File" -> "Print" -> "Monochrome" in menu.
- Set a printer which is usually used by clicking "Control panel" -> "Printers and Faxes".  
If a printer is changed when the software is starting up, the change is not reflected.  
If a printer which is normally used is changed, reboot the software after the printer is changed.
- If a printer which is usually used is not set, print function is not available.
- If resolution of PC in use is 1280×768 or lower, the following message is shown and print is not available. Increase resolution.



## Utility function

# Change of language

Language which is used in the software can be changed.

## Operation procedure

- 1 Select "Language" in menu.
- 2 The language which is currently used is ticked.



Tick the language which is going to be used.

The following message is shown. Click "OK".



- 3 Restart the software.

## Specifications

# Specifications

## Hardware requirements

Computer	PC/AT compatible machine which has the CPU of Pentium III, 600MHz and above.
Memory	Windows 2000 : 256MB Windows XP : 512MB Windows Vista : 1024MB Windows 7 : 2048MB
Disk device	CD-ROM drive
Display	Display adapter with 1152×864 or 1280×768 pixels above and color 24bits or above
Peripheral device	Mouse, keyboard
OS	Microsoft Windows 2000 SP4, XP(32bit), Vista(32bit), 7(32bit)

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