

**DL850/DL850V**  
**ScopeCorder**

**U S E R ' S M A N U A L**

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Thank you for purchasing the DL850 ScopeCorder or DL850V ScopeCorder Vehicle Edition (hereinafter, "DL850/DL850V" will refer to both of these products).

This User's Manual explains how to use the DL850/DL850V. To ensure correct use, please read this manual thoroughly before beginning operation.

Keep this manual in a safe place for quick reference in the event a question arises. The following manuals, including this one, are provided as manuals for the DL850/DL850V. Please read all manuals.

Manual Title	Manual No.	Description
DL850/DL850V ScopeCorder Features Guide	IM DL850-01EN	The supplied CD contains the PDF file of this manual. This manual explains all the DL850/DL850V features other than the communication interface features.
DL850/DL850V ScopeCorder User's Manual	IM DL850-02EN	This manual. The supplied CD contains the PDF file of this manual. The manual explains how to operate the DL850/DL850V.
DL850/DL850V ScopeCorder Getting Started Guide	IM DL850-03EN	This guide explains the handling precautions and basic operations of the DL850/DL850V.
DL850/DL850V ScopeCorder Communication Interface User's Manual	IM DL850-17EN	The supplied CD contains the PDF file of this manual. This manual explains the DL850/DL850V communication interface features and how to use them.
DL850/DL850V ScopeCorder Real Time Math (/G3 Option) User's Manual	IM DL850-51EN	The supplied CD contains the PDF file of this manual. This manual explains the features of the DL850/DL850V Real Time Math option and how to use it.

## Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functionality. The figures given in this manual may differ from those that actually appear on your screen.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
- Copying or reproducing all or any part of the contents of this manual without the permission of YOKOGAWA is strictly prohibited.
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- 1st Edition: June 2010
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- 4th Edition: March 2011

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# Conventions Used in This Manual

## Notes and Cautions

The notes and cautions in this manual are categorized using the following symbols.



Improper handling or use can lead to injury to the user or damage to the instrument. This symbol appears on the instrument to indicate that the user must refer to the user's manual for special instructions. The same symbol appears in the corresponding place in the user's manual to identify those instructions. In the manual, the symbol is used in conjunction with the word "WARNING" or "CAUTION."

### **WARNING**

Calls attention to actions or conditions that could cause serious or fatal injury to the user, and precautions that can be taken to prevent such occurrences.

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### **CAUTION**

Calls attention to actions or conditions that could cause light injury to the user, or cause damage to the instrument or user's data, and precautions that can be taken to prevent such occurrences.

### **Note**

Calls attention to information that is important for proper operation of the instrument.

## Unit

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k	Denotes 1000. Example: 100 kS/s (sample rate)
K	Denotes 1024. Example: 720 KB (file size)

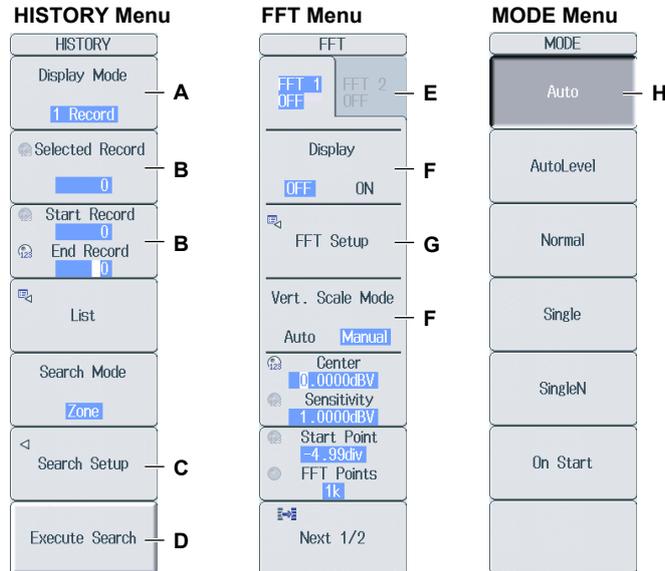
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# Key and Jog Shuttle Operations

## Key Operations

### How to Use Setup Menus That Appear When Keys Are Pressed

The operation after you press a key varies depending on the key that you press.



- A: Press the soft key to display a selection menu.  
Press the soft key that corresponds to the appropriate setting.
- B: Press the soft key to use the jog shuttle to configure this setting. Use the jog shuttle or the arrow keys to set the value or select an item.  
To set a value, press NUM LOCK, and then use the CH1 to CH16 keys.
- C: A related setup menu appears when you press the soft key.
- D: Press the soft key to execute the specified feature.
- E: Selects which item to configure when configuring a feature that consists of two items that operate with different settings, such as the FFT1 and FFT2 features.
- F: The selected setting switches each time you press the soft key.
- G: Displays a dialog box or a keyboard.  
Use the jog shuttle, SET key, and arrow keys to configure the settings in the dialog box or operate the keyboard.
- H: Pressing a key sets the item to the setting that corresponds to that key.

### How to Display the Setup Menus That Are Written in Purple below the Keys

In the explanations in this manual, "SHIFT+key name (written in purple)" is used to indicate the following operation.

1. Press **SHIFT**. The SHIFT key illuminates to indicate that the keys are shifted.  
Now you can select the setup menus written in purple below the keys.
2. Press the key that you want to display the setup menu of.

### ESC Key Operation

If you press the ESC key when a setup menu or available settings are displayed, the screen returns to the menu level above the current one. If you press the ESC key when the highest level menu is displayed, the setup menu disappears.

### RESET Key Operation

If you press RESET when you are using the jog shuttle to set a value or select an item, the setting is reset to its default value (depending on the operating state of the DL850/DL850V, the setting may not be reset).

### SET Key Operations

The operation varies depending on what you are setting.

- For a soft key menu that has two values that you use the jog shuttle to adjust  
Press SET to switch the value that the jog shuttle adjusts.
- For a menu that has the jog shuttle + SET mark (⊖+⊕) displayed on it.  
Press SET to confirm the selected item.

### Arrow Key Operations

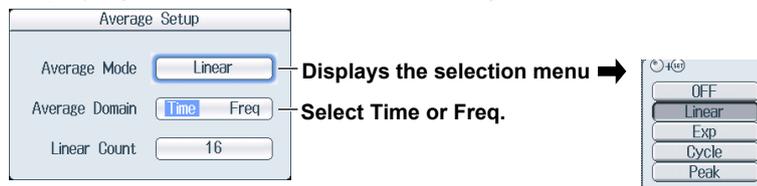
The operation varies depending on what you are setting.

- When setting a value  
Up and down arrow keys: Increases and decreases the value  
Left and right arrow keys: Changes which digit to set
- When selecting the item to set  
You can use the up and down arrow keys.

## How to Enter Values in Setup Dialog Boxes

1. Use the keys to display the appropriate setup dialog box.
2. Use the **jog shuttle** or the **arrow keys** to move the cursor to the setting that you want to set.
3. Press **SET**. The operation varies as indicated below depending on what you are setting.
  - A selection menu appears.
  - A check box is selected or cleared.
  - An item is selected.
  - A table of settings is selected.

#### Displaying a Selection Menu and Selecting an Item

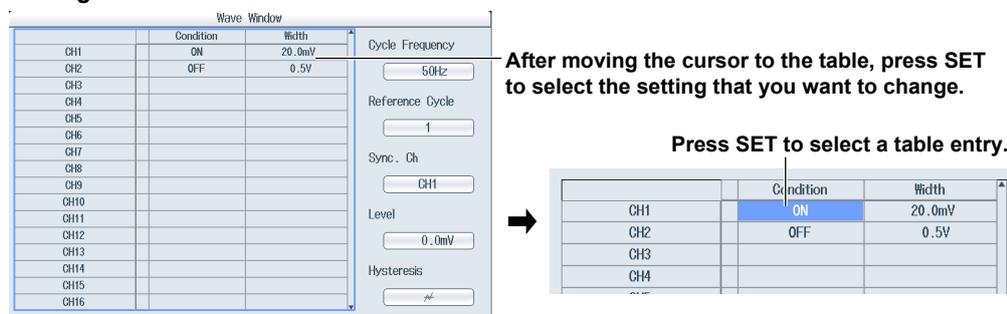


Displays the selection menu →

Select Time or Freq.

After selecting an item with the jog shuttle, press SET to confirm it.

#### Setting Items in a Table



After moving the cursor to the table, press SET to select the setting that you want to change.

Press SET to select a table entry.

#### How to Clear Setup Dialog Boxes

Press **ESC** to clear the setup dialog box from the screen.

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# Entering Values and Strings

## Entering Values

### Using Dedicated Knobs

You can use the following dedicated knobs to enter values directly.

- Vertical POSITION knob
- SCALE knob
- TIME/DIV knob
- ZOOM magnification knob (MAG)
- Zoom POSITION knob (for scrolling zoom waveforms)

### Using the Jog Shuttle

Select the appropriate item using the soft keys, and change the value using the jog shuttle and the SET key or using the arrow keys and the SET key. This manual sometimes describes this operation simply as “using the jog shuttle.”

### Using the Keypad

Press **NUM LOCK** to illuminate the NUM LOCK key, and use the **CH1** to **CH16** keys to enter a value. After you enter the value, press **ENTER** to confirm it.



Use the keypad to enter the value.

### Note

Some items that you can set using the jog shuttle can be reset to their default values when you press the RESET key.

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## Entering Character Strings

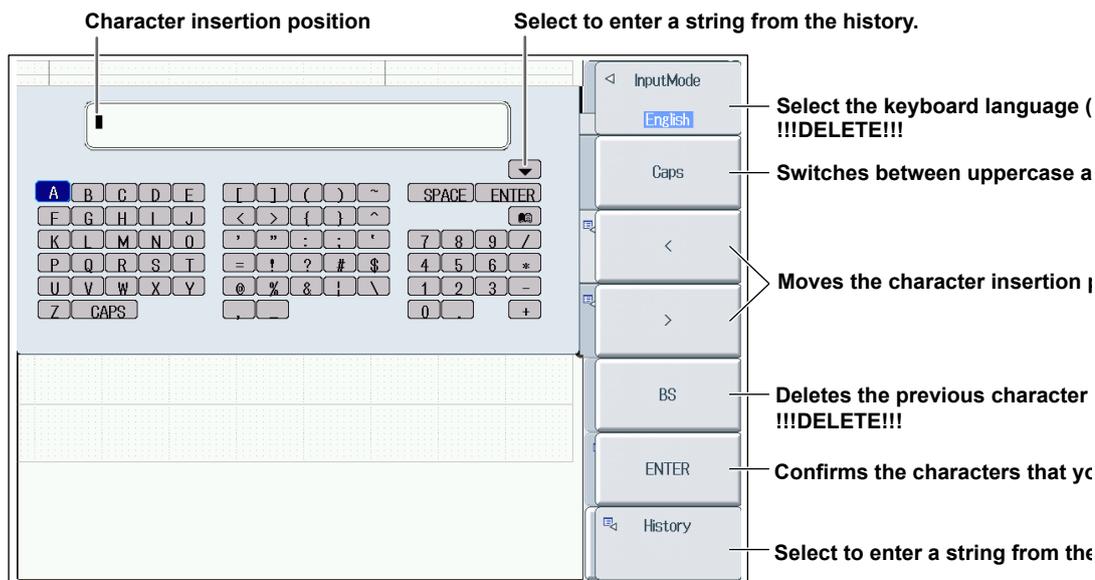
Use the keyboard that appears on the screen to enter file names and comments. Use the jog shuttle and the SET key or use the arrow keys and the SET key to operate the keyboard and enter a character string.

### How to Operate the Keyboard

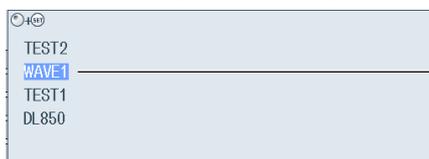
1. Press the **InputMode** soft key and then the **English** soft key.
2. After bringing up the keyboard, use the jog shuttle to move the cursor to the character that you want to enter. You can also move the cursor using the up, down, left, and right arrow keys.
3. Press SET to enter the character.
  - If a character string has already been entered, use the arrow soft keys (< and >) to move the cursor to the position you want to insert characters into.
  - To switch between uppercase and lowercase letters, press the **Caps** soft key.
  - To delete the previous character, press the **BS** soft key.
4. Repeat steps 1 and 3 to enter all of the characters in the string.
 

Select  on the keyboard or press the **History** soft key to display a list of character strings that you have entered previously.

Use the jog shuttle to select a character string, and press **SET** to enter the selected character string.
5. Press the **ENTER** soft key, or move the cursor to ENTER on the keyboard, and press **SET** to confirm the character string and clear the keyboard.



#### List of previously entered strings



After selecting an item using the jog shuttle or the arrow keys,

### Note

- @ cannot be entered consecutively.
- File names are not case-sensitive. Comments are case-sensitive. The following file names cannot be used due to MS-DOS limitations:  
AUX, CON, PRN, NUL, CLOCK, COM1 to COM9, and LPT1 to LPT9

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## 1.1 Configuring Voltage Measurements

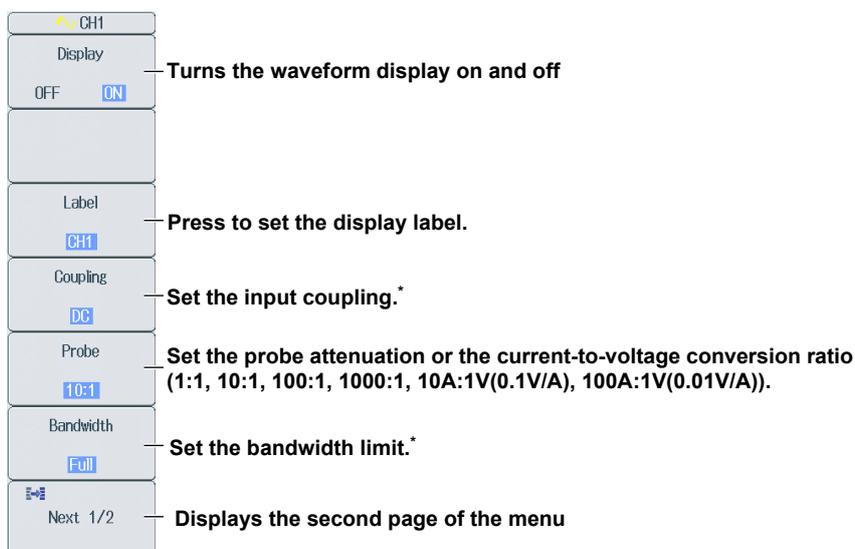
This section explains the following settings (which are related to the vertical axis for voltage measurements):

- Waveform display on and off
- Display labels
- Input coupling
- Probe attenuation
- Bandwidth limit
- The zoom method
- The zoom percentage
- The upper and lower display limits for zooming waveforms
- Offset
- Trace settings (input channel assignment)
- Inverted waveform display on and off
- Linear scaling
- Vertical scale
- Vertical position

► [“Voltage Measurement” in the Features Guide](#)

### CH Menu

Press a key from **CH1** to **CH16** to display the following menu.



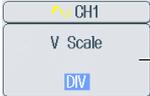
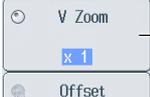
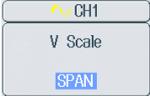
\* The available settings vary depending on the module.

### Note

Channel keys (from CH1 to CH16) whose waveforms are displayed are illuminated. You can press channel keys that are not illuminated to turn the waveform display on. You can press channel keys that are illuminated to turn the waveform display off.

## 1.1 Configuring Voltage Measurements

Press the **Next** soft key to display the second page of the menu.

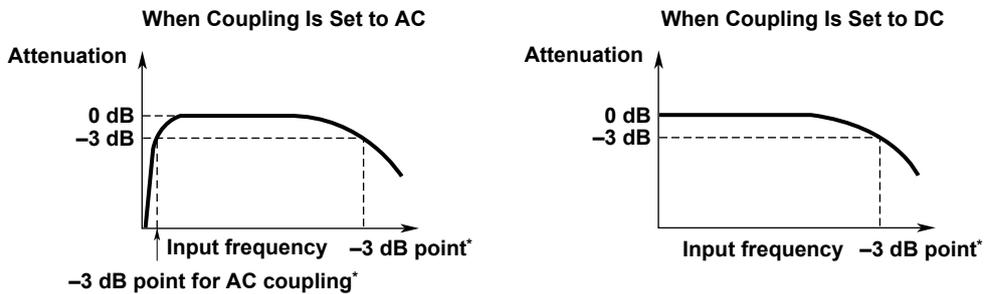
 <p><b>V Scale</b> DIV</p>	<p>Set the zoom method (DIV, SPAN).</p>	 <p><b>V Zoom</b> x 1</p>	<p>Set the zoom percentage (using the jog shuttle).</p>	 <p><b>Offset</b> 0.00V</p>	<p>Set the offset (using the jog shuttle).</p>	 <p><b>Trace Setup</b></p>	<p>Press to set the traces.</p>	 <p><b>Invert</b> OFF ON</p>	<p>Turns the inverted waveform display on and off</p>	 <p><b>Linear Scale</b> OFF</p>	<p>Press to configure the linear scaling.</p>	 <p>Next 2/2</p>	<p>Displays the first page of the menu</p>
<b>When the Zoom Method Is Set to SPAN</b>													
 <p><b>V Scale</b> SPAN</p>	<p>Set the upper and lower display limits for zooming waveforms (using the jog shuttle).</p>	 <p><b>Upper</b> 250.00V <b>Lower</b> -250.00V</p>											
<b>Next 2/2</b>													

## Setting the Input Coupling (Coupling)

### Input Coupling Settings and Frequency Response

The frequency responses for the AC and DC input coupling methods are shown below.

Please note that when set to AC, the DL850/DL850V does not acquire low frequency signals or low frequency components, as seen in the following figure.



\* This value differs depending on the input module. For details, see "Module Specifications" in the Startup Guide.



### CAUTION

- When the input coupling is set to AC, if the frequency of the input signal is 1 Hz or less, the signal will not be attenuated down to 1/10 of the original signal even when you use a probe whose attenuation is 10:1 and whose input resistance is 10 MΩ. Therefore, make sure that the voltage components less than or equal to 1 Hz do not exceed the maximum input voltages of the modules.
- Do not apply voltages that exceed the input modules' maximum input voltages or maximum allowable common voltages. Doing so may damage the input section.

## Setting the Probe (Probe)

1:1, 10:1, 100:1, 1000:1:

Displays the voltage probe attenuation

10A:1V(0.1V/A), 100A:1V(0.01V/A):

Displays the current probe's output voltage rate

### Note

The DL850/DL850V can only display input signal voltage values and scale values correctly if you set the correct probe type. For example, if you use a 10:1 voltage probe but set the probe type to 1:1, the automatically measured amplitude of the waveform will be 1/10 the real value.

## Setting the Traces (Trace Setup)

Press the **Trace Setup** soft key to display the following screen.

Set the allocation method (Auto, User).

#	CH	Color	#	CH	Color	#	CH	Color
1	CH14_1	Red	23	CH14_23	Blue	45	CH14_45	Green
2	CH14_2	Green	24	CH14_24	Purple	46	CH14_46	Red
3	CH14_3	Magenta	25	CH14_25	Blue	47	CH14_47	Grey
4	CH14_4	Cyan	26	CH14_26	Blue	48	CH14_48	Grey
5	CH14_5	Red	27	CH14_27	Yellow	49	CH14_49	Yellow
6	CH14_6	Orange	28	CH14_28	Blue	50	CH14_50	Green
7	CH14_7	Light Blue	29	CH14_29	Green	51	CH14_51	Magenta
8	CH14_8	Purple	30	CH14_30	Red	52	CH14_52	Cyan
9	CH14_9	Blue	31	CH14_31	Green	53	CH14_53	Red
10	CH14_10	Pink	32	CH14_32	Grey	54	CH14_54	Orange
11	CH14_11	Yellow	33	CH14_33	Yellow	55	CH14_55	Blue
12	CH14_12	Dark Blue	34	CH14_34	Green	56	CH14_56	Purple
13	CH14_13	Teal	35	CH14_35	Magenta	57	CH14_57	Blue
14	CH14_14	Red	36	CH14_36	Cyan	58	CH14_58	Pink
15	CH14_15	Green	37	CH14_37	Red	59	CH14_59	Yellow
16	CH14_16	Grey	38	CH14_38	Orange	60	CH14_60	Dark Blue
17	CH14_17	Yellow	39	CH14_39	Blue	61	CH5	Red
18	CH14_18	Green	40	CH14_40	Purple	62	CH6	Yellow
19	CH14_19	Magenta	41	CH14_41	Blue	63	Math1	Orange
20	CH14_20	Cyan	42	CH14_42	Pink	64	Math2	Green
21	CH14_21	Red	43	CH14_43	Yellow	-	-	-
22	CH14_22	Orange	44	CH14_44	Blue	-	-	-

Set the display colors.      Set the display zone.<sup>1</sup>

Set the waveforms that you want to allocate.

Set the display group.<sup>2</sup>

Clears all the settings of the specified group.<sup>2</sup>

Automatically reassigns just the waveforms whose displays are turned on.<sup>2</sup>

- 1 This can only be set when Allocation Mode is set to User.
- 2 Including sub channels, when there are 64 channels or more, they can be allocated to groups 1 to 4 and displayed.

## 1.1 Configuring Voltage Measurements

### Configuring the Linear Scaling (Linear Scale)

Press the **Linear Scale** soft key to display the following screen.

#### When Scaling Mode Is Set to AX+B

Linear Scale

Scaling

Scaling Mode: OFF AX+B P1-P2 Shunt

A: 25.0000 **Scaling coefficient**

B: -25.0000 **Offset**

Unit String:

Display Type

Mode: Exponent Floating

Decimal Number: Auto

Sub Unit: Auto

#### When Scaling Mode Is Set to P1-P2

Linear Scale

Scaling

Scaling Mode: OFF AX+B P1-P2 Shunt

P1[X]: 1.0000 **Retrieves the current measured value**

P1[Y]: 0.0000

P2[X]: 5.0000 **Retrieves the current measured value**

P2[Y]: 100.0000

Unit String:

Display Type

Mode: Exponent Floating

Decimal Number: Auto

Sub Unit: Auto

These are the display type settings when using a voltage module to perform voltage measurements or when using a strain module to perform strain measurements

#### When Scaling Mode Is Set to Shunt (Selectable only when using the Strain Module 701271(STRAIN\_DSUB))

Linear Scale

Scaling

Scaling Mode: OFF AX+B P1-P2 Shunt

P1[X]: 1.0000

P1[Y]: 0.0000

P2[X]: 5.0000

P2[Y]: 100.0000

Shunt Cal: Exec **Executes shunt calibration**

Unit String:

Display Type

Mode: Exponent Floating

Decimal Number: Auto

Sub Unit: Auto

### Setting the Vertical Scale (SCALE knob)

Press one of the **CH1** to **CH16** keys to select the channel that you want to set the vertical scale for.

Turn the **SCALE** knob to set the vertical scale.

If you turn the SCALE knob when waveform acquisition is stopped, two values are shown on the vertical scale screen. The upper value is the vertical scale for the displayed waveforms. The lower value is the vertical scale that you have set. This value will be applied the next time that waveform acquisition is started.

Upper value: Vertical scale for the displayed waveform  
Lower value: Vertical scale that you have set



While the vertical scale is being set, its value is displayed here.

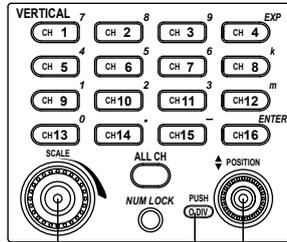
\* When the displayed waveform's vertical scale and the vertical scale that you have set are the same, only the lower value is displayed.

## Setting the Waveform Vertical Position (Vertical POSITION knob)

Press one of the **CH1** to **CH16** keys to select the channel that you want to set the vertical position for.

Turn the vertical **POSITION** knob to set the vertical position.

You can set the vertical position to 0 V by pressing the knob.



SCALE knob

Vertical POSITION knob

This indicates that you can press the vertical POSITION knob to set the vertical position to 0 div.

## 1.2 Configuring Voltage Measurements (For 16-CH Voltage Input Modules)

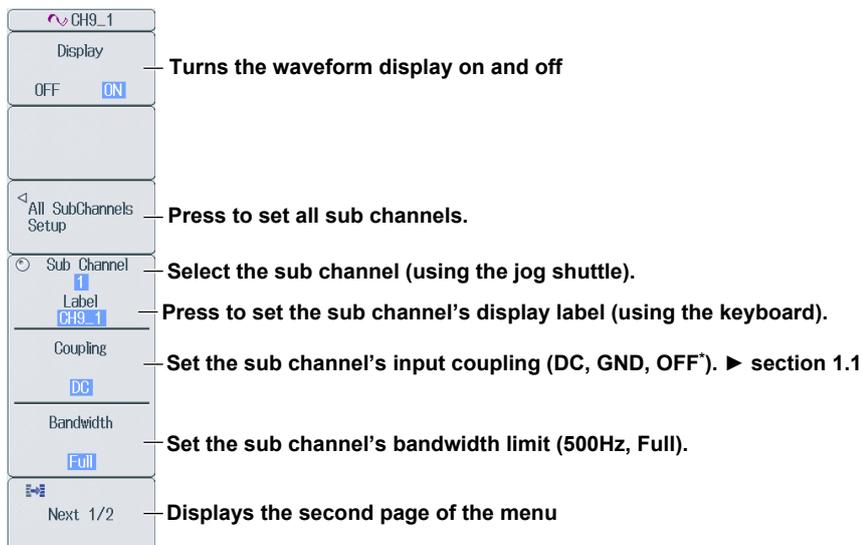
This section explains the following settings for the 16-CH Voltage Input Module:

- Waveform display on and off
- Settings for all sub channels
- Sub channel's display label
- Input coupling
- Bandwidth limit
- The zoom method
- The zoom percentage
- The upper and lower display limits for zooming waveforms
- Offset
- Trace settings (input channel assignment)
- Inverted waveform display on and off
- Linear scaling
- Vertical scale
- Vertical position

► [“Voltage Measurement \(For the 16-CH Voltage Input Module\)”](#)  
in the Features Guide

### CH Menu

Press a key from **CH1** to **CH16** to display the following menu.



\* To turn the sub-channel input off, set Coupling to OFF.

### Note

Channel keys (from CH1 to CH16) whose waveforms are displayed are illuminated. You can press channel keys that are not illuminated to turn the waveform display on. You can press channel keys that are illuminated to turn the waveform display off.

## 1.2 Configuring Voltage Measurements (For 16-CH Voltage Input Modules)

Press the **Next** soft key to display the second page of the menu.



**Set the zoom method (DIV, SPAN).**

**Set the zoom percentage (using the jog shuttle).**

**Set the offset (using the jog shuttle).**

**Press to set the traces. ▶ section 1.1**

**Turns the inverted waveform display on and off**

**Press to configure the linear scaling. ▶ section 1.1**

**Displays the first page of the menu**

**When the Zoom Method Is Set to SPAN**



**Set the upper and lower display limits for zooming waveforms (using the jog shuttle).**

### Configuring All Sub Channels (All SubChannels Setup)

Press the **All SubChannels Setup** soft key to display the following screen.

- Sub Channel Setup**

Use the **jog shuttle** to select the setting that you want to change, and then press **SET** to display a menu of the items that can be selected for the setting.

All Sub Channels Setup									
	Label	Coupling	V Scale	Band Width	DIV/Scale	Offset	Position	V Zoom	
All		DC	2V	Full	DIV	0mV	0.00div	x 1	
1	CH5_1	DC	2V	Full	DIV	0mV	0.00div	x 1	
2	CH5_2	DC	2V	Full	DIV	0mV	0.00div	x 1	
3	CH5_3	DC	2V	Full	DIV	0mV	0.00div	x 1	
4	CH5_4	DC	2V	Full	DIV	0mV	0.00div	x 1	
5	CH5_5	DC	2V	Full	DIV	0mV	0.00div	x 1	
6	CH5_6	DC	2V	Full	DIV	0mV	0.00div	x 1	
7	CH5_7	DC	2V	Full	DIV	0mV	0.00div	x 1	
8	CH5_8	DC	2V	Full	DIV	0mV	0.00div	x 1	
9	CH5_9	DC	2V	Full	DIV	0mV	0.00div	x 1	
10	CH5_10	DC	2V	Full	DIV	0mV	0.00div	x 1	
11	CH5_11	DC	2V	Full	DIV	0mV	0.00div	x 1	
12	CH5_12	DC	2V	Full	DIV	0mV	0.00div	x 1	
13	CH5_13	DC	2V	Full	DIV	0mV	0.00div	x 1	
14	CH5_14	DC	2V	Full	DIV	0mV	0.00div	x 1	
15	CH5_15	DC	2V	Full	DIV	0mV	0.00div	x 1	
16	CH5_16	DC	2V	Full	DIV	0mV	0.00div	x 1	

**To set all the sub channels to the same setting, change the settings in this row.**

**Use the jog shuttle to select the item that you want to set.**

- Linear Scaling Setup**

Press the **Linear Scale** soft key to display the following screen.

Use the **jog shuttle** to select the setting that you want to change, and then press **SET** to display a menu of the items that can be selected for the setting.

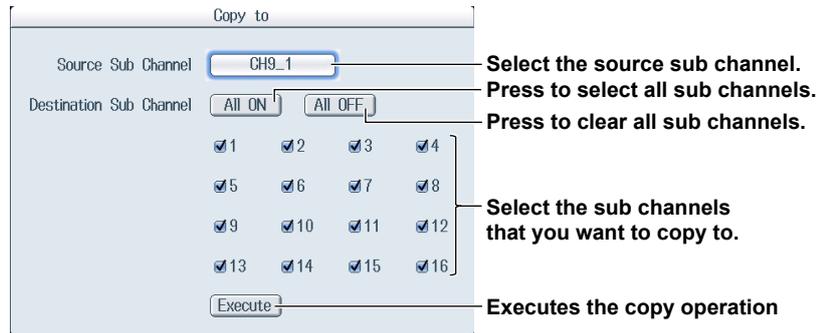
All Sub Channels Setup (Linear Scale)													
	Linear Scale	AX+BSA P1-P2	P1:X	P1:P2	P1:Y	P1-P2	P2:X	P1-P2	P2:Y	Unit	Disp Type	Decim Num	Sub Unit
All	OFF												
1	OFF												
2	OFF												
3	OFF												
4	OFF												
5	OFF												
6	OFF												
7	OFF												
8	OFF												
9	OFF												
10	OFF												
11	OFF												
12	OFF												
13	OFF												
14	OFF												
15	OFF												
16	OFF												

**Use the jog shuttle to select the item that you want to set.**

## 1.2 Configuring Voltage Measurements (For 16-CH Voltage Input Modules)

- **Copying Settings**

Press the **Copy** soft key to display the following screen.



## Turning Sub Channel Displays On and Off and Setting the Display Labels (Sub Channel)

- **Displaying Sub Channels**

Using the jog shuttle, you can set whether a sub channel is displayed. This setting is linked to the display label setting.

- **Display Labels**

Press the **Sub Channel** soft key to display the keyboard, and then use the keyboard to enter the label name.

## Setting the Vertical Scale (SCALE)

► section 1.1

## Setting the Waveform Vertical Position (POSITION)

► section 1.1

## 1.3 Configuring Temperature Measurements

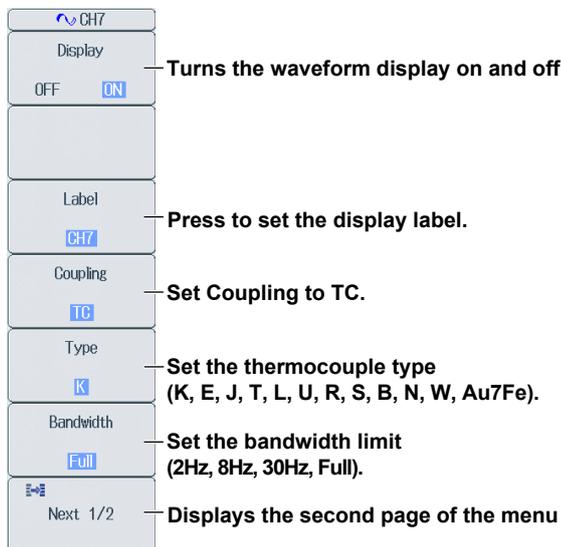
This section explains the following settings for temperature measurements:

- Waveform display on and off
- Display labels
- Input coupling
- Thermocouple type
- Bandwidth limit
- Display range
- Temperature unit
- Trace settings (input channel assignment)
- RJC and burnout on and off

► [“Temperature Measurement” in the Features Guide](#)

### CH Menu

Press a key from **CH1** to **CH16** to display the following menu.

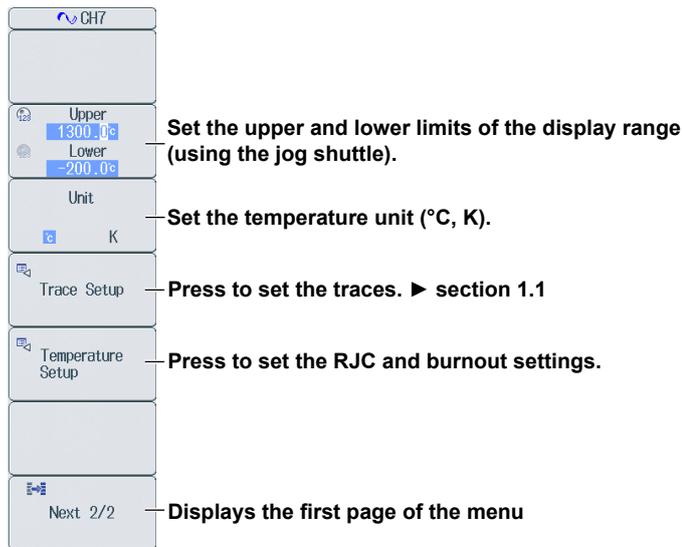


### Note

Channel keys (from CH1 to CH16) whose waveforms are displayed are illuminated. You can press channel keys that are not illuminated to turn the waveform display on. You can press channel keys that are illuminated to turn the waveform display off.

### 1.3 Configuring Temperature Measurements

Press the **Next** soft key to display the second page of the menu.



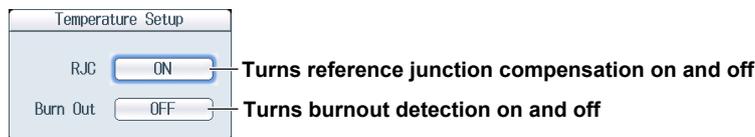
### Setting the Input Coupling (Coupling)

To measure temperature, set the input coupling to TC.

To measure voltage, set the input coupling to an appropriate voltage measurement setting. ► section 1.1

### Turning the RJC and Burnout On and Off (Temperature Setup)

Press the **Temperature Setup** soft key to display the following screen.



## 1.4 Configuring Strain Measurements

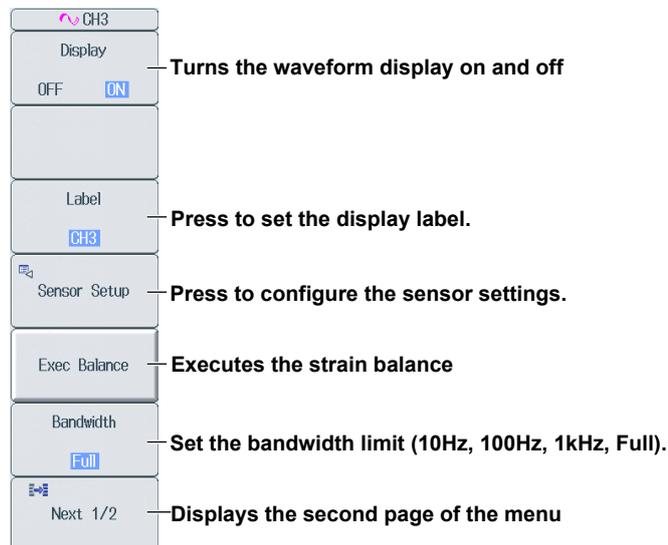
This section explains the following settings for strain measurements:

- Waveform display on and off
- Display labels
- Sensor settings
- Strain balance execution
- Bandwidth limit
- Display range
- Range unit
- Trace settings
- Inverted waveform display
- Linear scaling
- Measurement range

► [“Strain Measurement” in the Features Guide](#)

### CH Menu

Press a key from **CH1** to **CH16** to display the following menu.

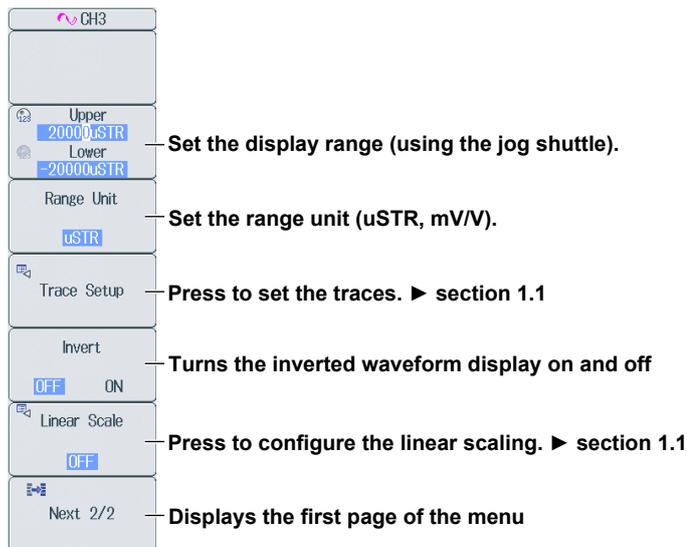


### Note

Channel keys (from CH1 to CH16) whose waveforms are displayed are illuminated. You can press channel keys that are not illuminated to turn the waveform display on. You can press channel keys that are illuminated to turn the waveform display off.

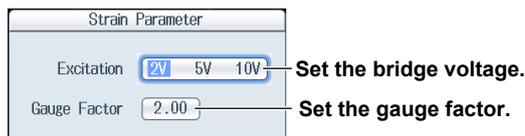
## 1.4 Configuring Strain Measurements

Press the **Next** soft key to display the second page of the menu.



### Configuring the Sensor (Sensor Setup)

Press the **Sensor Setup** soft key to display the following screen.



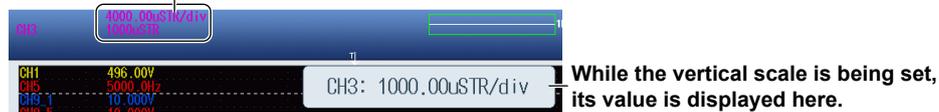
### Setting the Range Unit (Range Unit)

- $\mu$ STR: A unit that represents the amount of strain ( $\times 10^{-6}$  strain)
  - mV/V: Strain-gauge-converter output unit
- The mV/V range is calculated from the following equation.
- $$\text{mV/V} = 0.5 \times (\mu\text{STR}/1000)$$

### Setting the Vertical Scale (SCALE knob)

Press one of the **CH1** to **CH16** keys to select the channel that you want to set the vertical scale for. Turn the **SCALE** knob to set the vertical scale.

**Upper value:** Vertical scale for the displayed waveform  
**Lower value:** Vertical scale that you have set



## 1.5 Configuring Acceleration Measurements

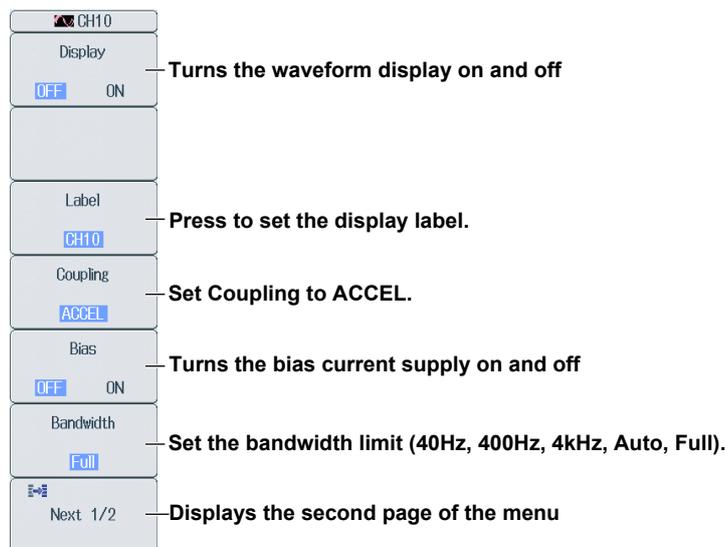
This section explains the following settings for acceleration measurements:

- Waveform display on and off
- Display labels
- Input coupling
- Bias current supply
- Bias current supply to the acceleration sensor on and off
- Bandwidth limit
- The zoom method
- The zoom percentage
- The upper and lower display limits for zooming waveforms
- Gain
- Trace settings (input channel assignment)
- Acceleration sensor sensitivity
- Acceleration unit
- Vertical position

► [“Acceleration Measurement” in the Features Guide](#)

### CH Menu

Press a key from **CH1** to **CH16** to display the following menu.



### Note

Channel keys (from CH1 to CH16) whose waveforms are displayed are illuminated. You can press channel keys that are not illuminated to turn the waveform display on. You can press channel keys that are illuminated to turn the waveform display off.

## 1.5 Configuring Acceleration Measurements

Press the **Next** soft key to display the second page of the menu.

	<p><b>Set the zoom method (DIV, SPAN).</b></p> <p><b>Set the zoom percentage (using the jog shuttle).</b></p> <p><b>Set the gain.</b></p> <p><b>Press to set the traces. ► section 1.1</b></p> <p><b>Set the acceleration sensor's sensitivity.</b></p> <p><b>Set the acceleration unit.</b></p> <p><b>Displays the first page of the menu</b></p>	<p><b>When the Zoom Method Is Set to SPAN</b></p> 	<p><b>Set the upper and lower display limits for zooming waveforms (using the jog shuttle).</b></p>
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### Setting the Input Coupling (Coupling)

To measure acceleration, set the input coupling to ACCEL.

To measure voltage, set the input coupling to an appropriate voltage measurement setting. ► section 1.1

### Setting the Waveform Vertical Position (POSITION)

► section 1.1

## 1.6 Configuring Frequency, Revolution, Period, Duty Cycle, Power Supply Frequency, Pulse Width, Pulse Integration, and Velocity Measurements

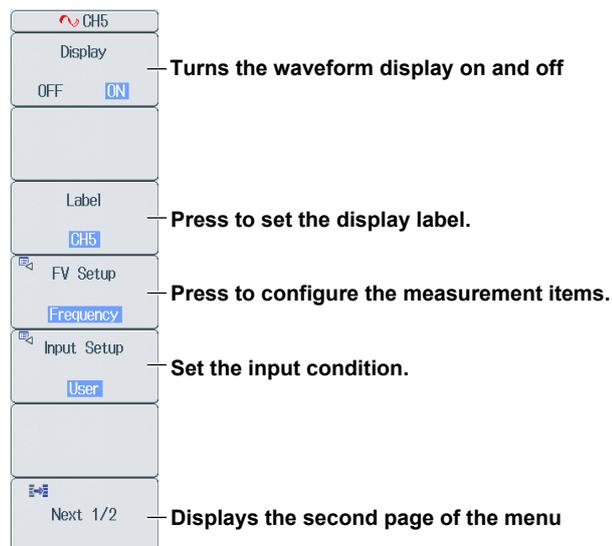
This section explains the following settings for frequency, revolution, period, duty cycle, power supply frequency, pulse width, pulse integration, and velocity measurements:

- Waveform display on and off
- Display labels
- Measurement items
- Input conditions
- The zoom method
- The zoom percentage
- The upper and lower display limits for zooming waveforms
- Offset
- Trace settings (input channel assignment)
- Linear scaling
- Vertical scale
- Vertical position

► [“Frequency Measurement” in the Features Guide](#)

### CH Menu

Press a key from CH1 to CH16 to display the following menu.



### Note

Channel keys (from CH1 to CH16) whose waveforms are displayed are illuminated. You can press channel keys that are not illuminated to turn the waveform display on. You can press channel keys that are illuminated to turn the waveform display off.

## 1.6 Configuring Frequency Measurements

Press the **Next** soft key to display the second page of the menu.

	<p><b>Set the zoom method (DIV, SPAN).</b></p> <p><b>Set the zoom percentage (using the jog shuttle).</b></p> <p><b>Set the offset (using the jog shuttle).</b></p> <p><b>Press to set the traces. ► section 1.1</b></p> <p><b>Press to configure the linear scaling. ► section 1.1</b></p> <p><b>Displays the first page of the menu</b></p>	<p><b>When the Zoom Method Is Set to SPAN</b></p> 	<p><b>Set the upper and lower display limits for zooming waveforms (using the jog shuttle).</b></p>
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## Configuring Measurement Items (FV Setup)

Press the **FV Setup** soft key to display the following screen.

- **When Performing Frequency or Period Measurements**



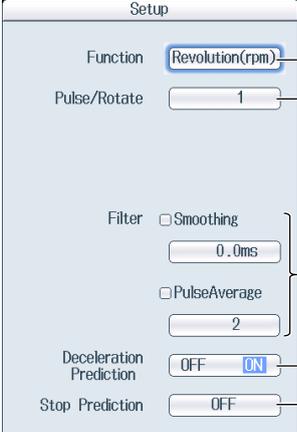
**Set Function to Frequency or Period.**

**Set the filter (Smoothing, PulseAverage).**

**Turns the deceleration prediction on and off**

**Set the stop prediction (OFF, 1.5, 2, 3, 4, 5, 6, 7, 8, 9, 10).**

- **When Performing Revolution Measurements**



**Set Function to Revolution (rpm) or Revolution (rps).**

**Set the pulse and rotate values.**

**Set the filter (Smoothing, PulseAverage).**

**Turns the deceleration prediction on and off**

**Set the stop prediction (OFF, 1.5, 2, 3, 4, 5, 6, 7, 8, 9, 10).**

• When Performing Duty Cycle or Pulse Width Measurements

Setup

Function  Set Function to Duty or Pulse Width.

Measure Pulse  Set the pulse to measure (Positive, Negative).

Filter  Smoothing } Set the filter (Smoothing).

• When Performing Power Supply Frequency Measurements

Setup

Function  Set Function to Power Freq.

Center Frequency  Set the center frequency (50Hz, 60Hz, 400Hz).

Filter  Smoothing } Set the filter (Smoothing, PulseAverage).

PulseAverage

• When Performing Pulse Integration Measurements

Setup

Function  Set Function to Pulse Integ.

Unit/Pulse  Set the unit or pulse value.

Unit  Set the unit.

Filter  Smoothing } Set the filter (Smoothing, PulseAverage).

PulseAverage

Over Limit Reset  ON Turns over-limit reset on and off

Reset  Executes the manual reset of the pulse count

## 1.6 Configuring Frequency Measurements

- **When Performing Velocity Measurements**

**Setup**

- Function: **Velocity** — Set Function to Velocity.
- Distance/Pulse: 1.0000 — Set the distance or pulse value (using the jog shuttle).
- Time Unit: Second — Set the time unit (Hour, Minute, Second).
- Unit: m/s — Set the unit.
- Filter:
  - Smoothing — Set the filter (Smoothing, PulseAverage).
  - 0.0ms
  - PulseAverage
  - 2
- Deceleration Prediction: OFF **ON** — Turns the deceleration prediction on and off
- Stop Prediction: OFF — Set the stop prediction (OFF, 1.5, 2, 3, 4, 5, 6, 7, 8, 9, 10).

### Setting Input Conditions (Input Setup)

Press the **Input Setup** soft key to display the following screen.

**Input Setup**

- Preset: **User** — Set the preset.
- V Range: ±10V — Set the voltage range.
- Coupling: DC — Set the input coupling.
- Probe: 1:1 — Set the probe type.
- Bandwidth: Full — Set the bandwidth limit.
- Threshold: 0.0V — Set the threshold level (using the jog shuttle).
- Hysteresis: **AV** ~~AV~~ ~~AV~~ — Set the hysteresis (~~AV~~, ~~AV~~, ~~AV~~).
- Slope: **f** ~~u~~ — Set the slope (f, u).
- Chatter Elimination: 0ms — Set the chatter elimination (using the jog shuttle).

**When Preset Is Set to Pull-up 5V**

**Input Setup**

- Preset: **Pull-up 5V**
- V Range: ±10V
- Coupling: DC
- Probe: 1:1
- Bandwidth: Full
- Threshold: 2.50V
- Hysteresis: **AV** ~~AV~~ ~~AV~~
- Slope: **f** ~~u~~
- Chatter Elimination: 0ms
- Pull Up: **OFF** **ON** — Turns pull-up on and off

### Setting the Preset

You can set the preset to one of the following 10 options: Logic 5V, Logic 3V, Logic 12V, Logic 24V, Pull-up 5V, ZeroCross, AC100V, AC200V, EM Pickup, or User (user-defined).

The settable input items differ depending on the preset that you set. You can only turn pull-up on and off when the preset is set to Pull-up 5V.

### Setting the Vertical Scale (SCALE)

► section 1.1

### Setting the Waveform Vertical Position (POSITION)

► section 1.1

## 1.7 Configuring Logic Signal Measurements

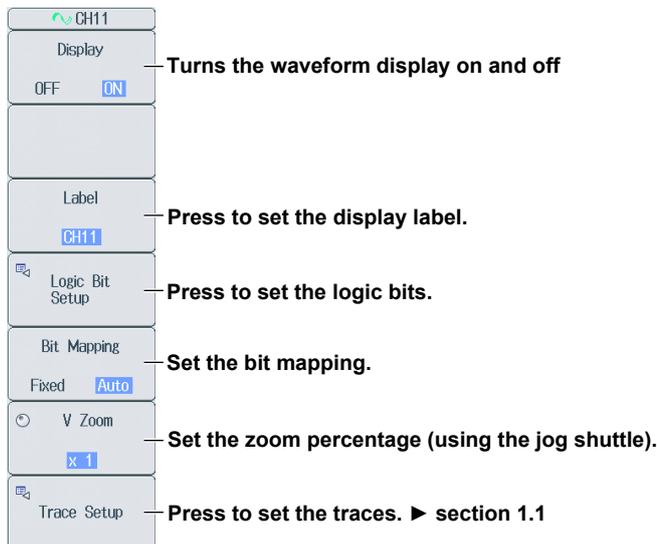
This section explains the following settings for logic measurements:

- Waveform display on and off
- Display labels
- Logic bits
- Bit mapping
- The zoom percentage
- Trace settings (input channel assignment)
- Vertical scale
- Vertical position

► [“Logic Measurement” in the Features Guide](#)

### CH Menu

Press a key from CH1 to CH16 to display the following menu.



### Note

Channel keys (from CH1 to CH16) whose waveforms are displayed are illuminated. You can press channel keys that are not illuminated to turn the waveform display on. You can press channel keys that are illuminated to turn the waveform display off.

### Setting Logic Bits (Logic Bit Setup)

Press the **Logic Bit Setup** soft key to display the following screen.

The screenshot shows the 'Logic' configuration screen. It features a table with three columns: 'Display', 'Bit Name', and 'Chatter Elimination'. There are eight rows, one for each bit from Bit1 to Bit8. Each row has a checkbox in the 'Display' column, a text field for the 'Bit Name', and a button for 'Chatter Elimination'. Below the table are two buttons: 'All Bits On' and 'All Bits Off'. Annotations with arrows point to these elements: 'Use the check boxes to turn the display on or off for each bit and press the buttons to set the label for each bit.' points to the checkboxes and name fields; 'Set the chatter elimination.' points to the 'Chatter Elimination' buttons; and 'Turns the display on or off for all bits' points to the 'All Bits On' and 'All Bits Off' buttons.

	Display	Bit Name	Chatter Elimination
Bit1	<input checked="" type="checkbox"/>	Bit1	OFF
Bit2	<input checked="" type="checkbox"/>	Bit2	OFF
Bit3	<input checked="" type="checkbox"/>	Bit3	OFF
Bit4	<input checked="" type="checkbox"/>	Bit4	OFF
Bit5	<input checked="" type="checkbox"/>	Bit5	OFF
Bit6	<input checked="" type="checkbox"/>	Bit6	OFF
Bit7	<input checked="" type="checkbox"/>	Bit7	OFF
Bit8	<input checked="" type="checkbox"/>	Bit8	OFF

### Setting the Vertical Scale (SCALE knob)

► section 1.1

### Setting the Waveform Vertical Position (Vertical POSITION knob)

► section 1.1

## 1.8 Configuring CAN Bus Monitor Settings (Applies to the DL850V)

This section explains the following settings for the CAN bus monitor:

- Waveform display on and off
- Data frame reading settings  
Port settings, loading of definition files, and CAN data extraction conditions
- Sub channel's display label
- Individual sub channel scale
- Display range
- One shot output
- Trace settings (input channel assignment)
- All sub channel scales

► [“CAN Bus Signal Monitoring” in the Features Guide](#)

### CH Menu

Press a key from CH13 to CH16 to display the following menu.

The screenshot shows the CH15\_1 menu with the following options and descriptions:

- Display**: OFF ON — Turns the waveform display on and off
- Port Configuration** — Press to configure data frame reading settings.
- Sub Channel**: 1 — Select the sub channel (using the jog shuttle).
- Label**: CH15\_1 — Press to set the sub channel's display label (using the keyboard).
- Scale** — Set the sub channel scale (Auto, Default).
- Upper**: 1.0000 — Set the sub channel display range (using the jog shuttle).
- Lower**: 0.0000
- Next 1/2** — Displays the second page of the menu

Press the **Next** soft key to display the second page of the menu.

The screenshot shows the CH14\_1 menu with the following options and descriptions:

- One shot out Setup** — Press to configure one shot output settings.
- Output** — Executes one shot output
- All SubChannel Scale** — Press to set the scale for all sub channels (All SubChannel Auto, All SubChannel Default).
- Next 2/2** — Displays the first page of the menu

## 1.8 Configuring CAN Bus Monitor Settings (Applies to the DL850V)

### Configuring Data Frame Reading Settings (Port Configuration)

Press the **Port Configuration** soft key to display the following screen.

**Set sub channels to ON or OFF.**  
Set the input of each sub channel to ON or OFF.

**Set CAN data extraction conditions.**  
Use the jog shuttle to select the setting that you want to change, and then press SET to display a menu of the items that can be selected for the setting. Configure the settings for each sub channel.

All SubChannels Setup												
	Input	Label	Msg Fmt	ID(Hex)	Byte Count	Start Bit	Bit Cnt	Byte Order	Value Type	Factor	Offset	Unit
All	OFF											
1	OFF	CH14_1	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
2	OFF	CH14_2	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
3	OFF	CH14_3	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
4	OFF	CH14_4	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
5	OFF	CH14_5	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
6	OFF	CH14_6	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
7	OFF	CH14_7	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
8	OFF	CH14_8	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
9	OFF	CH14_9	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
10	OFF	CH14_10	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
11	OFF	CH14_11	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
12	OFF	CH14_12	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
13	OFF	CH14_13	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
14	OFF	CH14_14	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
15	OFF	CH14_15	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
16	OFF	CH14_16	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
17	OFF	CH14_17	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
18	OFF	CH14_18	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
19	OFF	CH14_19	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
20	OFF	CH14_20	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
21	OFF	CH14_21	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
22	OFF	CH14_22	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
23	OFF	CH14_23	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	
24	OFF	CH14_24	STD	000	Auto	0	8	Big	Unsign	1.0000	0.0000	

**Configuration**

- Port Setup — Press to configure port settings.
- Symbol File Load — Loads a definition (.sbl) file
- Trace Setup — Press to set the traces. ▶ section 1.1
- Select Display Gr. — Set the display group\* (1, 2, 3, 4)
- PageUp — Moves up a page.
- PageDown — Moves down a page.

\* Only when there are 64 or more channels including sub channels

### Port Settings (Port Setup)

Press the **Port Setup** soft key to display the following screen.

**Port Setup**

- Bit Rate: 500kbps — Set the bit rate (10k, 20k, 33.3k, 50k, 62.5k, 83.3k, 100k\*, 125k, 250k, 500k, 800k, 1Mbps).
- Sample Point: 85% — Set the sample point (71%, 78%, 85%).
- Sync Jump Width: 2 — Set the sync jump width (1–4).
- Bit Sample Num: 1 — Set the number of sample (1, 3).
- Listen Only: OFF ON — Turns listen only on and off
- Terminator: OFF ON — Turns the terminator on and off

\* 100kbps covers firmware versions 1.30 or later.

### One Shot Output Settings (One shot out)

Press the **One shot out** soft key to display the following screen.

**One shot out Setup**

- Message Format: STD XTD — Set the message format (STD, XTD).
- ID (Hex): 000 — Set the message ID.
- Frame: Remote Data — Set the frame (Remote, Data).
- DLC: 0 — Set the size, in bytes, of the data area (0–15)\*.
- Data (Hex): 00 00 00 00 — Set the data.

\* Can only be set when Frame is set to Data.



## 1.9 Displaying the Menu for Configuring All Channels

### Configuring the Linear Scaling (Linear Scale)

Press the **Linear Scale** soft key to display the following screen.

Use the jog shuttle to select the item that you want to set.

Channels Setup (Linear Scale)													
	Linear Scale	AX+BSA P1-P2	P1:X	AX+BSA P1-P2	P1:Y	P1-P2	P2:X	P1-P2	P2:Y	Unit	Disp Type	Decim Num	Sub Unit
1	AX+B	25.0000		25.0000									
2	P1-P2	1.0000		0.0000		5.0000		100.0000			Exp		
3	OFF										Exp		
4	OFF												
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													

### Copying the Vertical Axis Settings to the Specified Channels (Copy to)

Press the **Copy** soft key to display the following screen.

Copy to

Source:

Destination:

CH1    CH2    CH3    CH4  
 CH5    CH6    CH7    CH8  
 CH9    CH10    CH11    CH12  
 CH13    CH14    CH15    CH16

Select the copy source channel.

Selects all channels

Clears all channels

Select the channels that you want to copy to.

Executes the copy operation

### Configuring the Strain Balance (Strain Balance)

Press the **Strain Balance** soft key to display the following screen.

Strain Balance

CH1    CH2    CH3    CH4  
 CH5    CH6    CH7    CH8  
 CH9    CH10    CH11    CH12  
 CH13    CH14    CH15    CH16

Balance:

Select the channels that you want to perform strain balancing on.

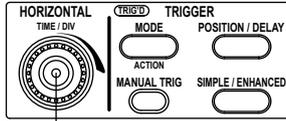
Executes strain balancing

## 1.10 Configuring the Horizontal Axis (Time axis)

Set the time per grid (1 div) displayed on the screen.

Turn the **TIME/DIV** knob to set the value.

► [“Horizontal Axis \(Time axis\)” in the Features Guide](#)



TIME/DIV knob

### Display of the TIME/DIV Screen

If you turn the TIME/DIV knob when waveform acquisition is stopped, two values are shown on the TIME/DIV screen. The upper value is the current TIME/DIV value for the displayed waveforms. The lower value is the changed TIME/DIV value. The changed TIME/DIV value will be applied the next time that waveform acquisition is started.



Upper value: The acquisition mode

Lower value: The current TIME/DIV value for the displayed waveform

↓ Turn the TIME/DIV knob.



Upper value: The current TIME/DIV value for the displayed waveform

Lower value: The TIME/DIV value that will be applied the next time that waveform acquisition is started

## 2.1 Setting the Trigger Mode

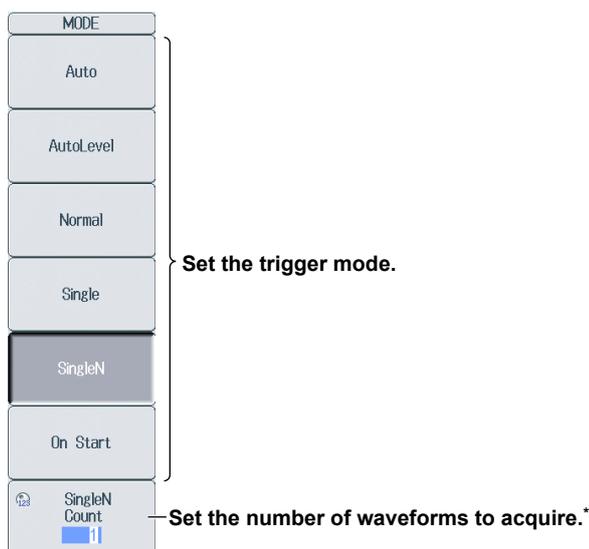
This section explains the following setting (which is used when updating the displayed waveform):

- Trigger mode

► [“Trigger Mode \(Trigger Mode\)” in the Features Guide](#)

### MODE Menu

Press **MODE** to display the following menu.



\* Displayed when the trigger mode is set to SingleN.

### Setting the Trigger Mode (Mode)

**Auto:** If the trigger conditions are met within 50 ms, the DL850/DL850V updates the displayed waveforms on each trigger occurrence. If not, the DL850/DL850V automatically updates the displayed waveforms. If the time axis is set to a value that would cause the display to switch to roll mode, the roll mode display will be enabled.

**Auto Level:** If a trigger occurs before a timeout (which is approximately 1 second), the DL850/DL850V updates the waveform in the same way that it does in Auto mode. If a trigger does not occur before a timeout, the DL850/DL850V automatically changes the trigger level to the center value of the trigger source amplitude, triggers on that value, and updates the displayed waveform.

**Normal:** The DL850/DL850V only updates the waveform display when the trigger conditions are met.

**Single:** When the trigger conditions are met, the DL850/DL850V updates the displayed waveform once and stops signal acquisition. If the time axis is set to a range that causes the display to switch to roll mode, the roll mode display will be enabled. When the DL850/DL850V triggers, it begins recording data. When data has been acquired up to the amount specified by the set record length, the waveform display stops.

**N Single:** The DL850/DL850V acquires signals each time the trigger conditions are met until a specified number of signals have been acquired, and then displays all of the acquired signals. If no triggers occur, the display is not updated.

**On Start:** Regardless of the trigger settings, when you press the START key, the DL850/DL850V updates the displayed waveforms once and stops signal acquisition. If the time axis is set to a value that would cause the display to switch to roll mode, the roll mode display will be enabled. When data has been acquired up to the amount specified by the set record length, the waveform display stops.

## 2.2 Setting the Trigger Position and Trigger Delay

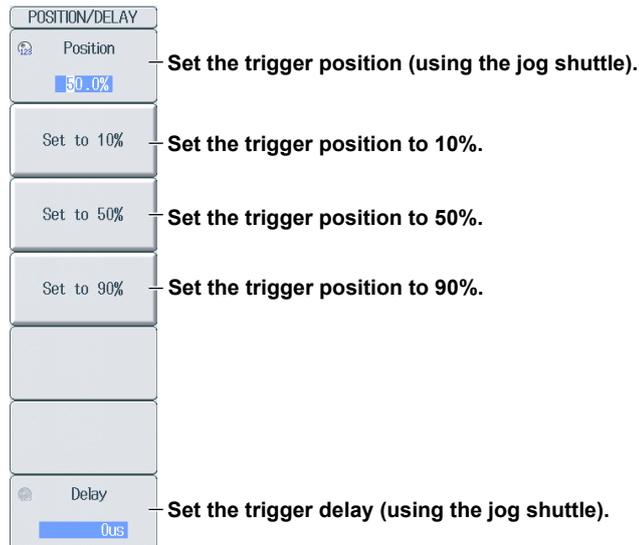
This section explains the following settings (which are used when updating the displayed waveform):

- Trigger position
- Trigger delay

► [“Trigger Position \(Position\)”](#) and [“Trigger Delay \(Delay\)”](#) in the [Features Guide](#).

### POSITION/DELAY Menu

Press **POSITION/DELAY** to display the following menu.



## 2.3 Setting the Trigger Hold-Off

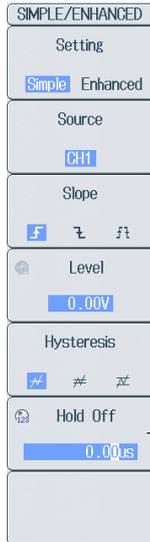
This section explains the following setting (which is used when updating the displayed waveform):

- Hold-off time

► [“Trigger Hold-Off \(Hold Off\)” in the Features Guide](#)

### SIMPLE/ENHANCED Menu

Press **SIMPLE/ENHANCED** to display the following menu.



Set the trigger hold-off (using the jog shuttle).

### Setting the Hold-off Time (Hold off)

The trigger hold-off feature temporarily stops the detection of the next trigger once a trigger has occurred.

## 2.4 Triggering on an Edge Trigger (Simple)

This section explains the following settings (which are used when triggering on the edges of an analog-signal trigger source):

- Trigger source
- Trigger level
- Trigger slope
- Trigger hysteresis

► “Simple Trigger (Simple),” “Trigger Source (Source),” “Trigger Slope (Slope),” “Trigger Level (Level),” and “Trigger Hysteresis (Hysteresis)” in the Features Guide.

### SIMPLE CH Menu

Press **SIMPLE/ENHANCED** and then the **Setting** soft key to select Simple to display the following menu.

SIMPLE/ENHANCED	
Setting Simple Enhanced	Set Setting to Simple.
Source CH1	Set the trigger source (CH1–CH16, 16chVOLT, CAN).
Slope f f̄ f̄f̄	Set the trigger slope (f, f̄, f̄f̄).
Level 0.00V	Set the trigger level (using the jog shuttle).
Hysteresis ≠ ≠≠ ≡	Set the trigger hysteresis (≠, ≠≠, ≡).
Hold Off 0.00μs	Set the trigger hold-off. ► section 2.3

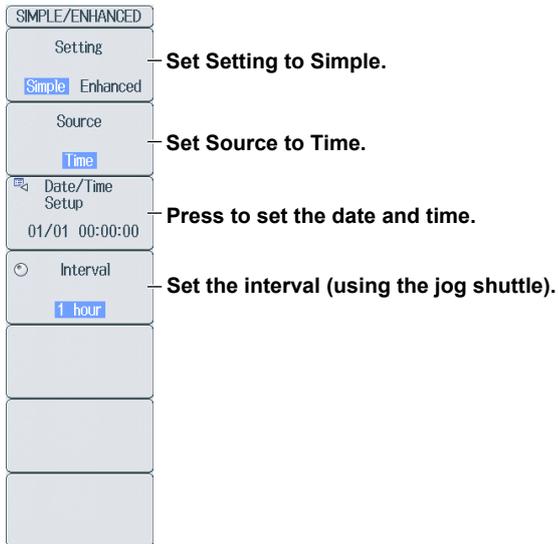
## 2.5 Triggering on a Timer Trigger (Simple)

This section explains the settings that are used when triggering on a date and time.

► “Time (Time)” and “Trigger Source (Source)” in the Features Guide.

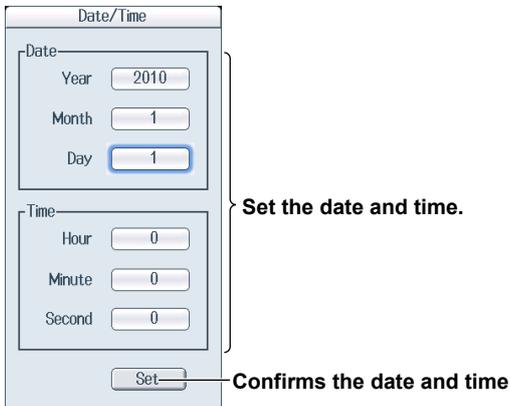
### SIMPLE Time Menu

Press **SIMPLE/ENHANCED** and then the **Setting** soft key to select Simple to display the following menu.



### Setting the Date and Time (Date/Time Setting)

Press the **Date/Time Setting** soft key to display the following screen.



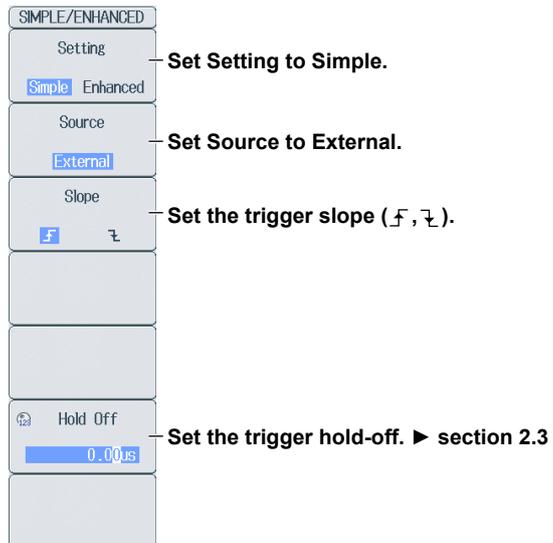
## 2.6 Triggering on an External Trigger (Simple)

This section explains the settings that are used when triggering on an external signal.

► “External Signal (External),” “Trigger Source (Source),” and “Trigger Slope (Slope)” in the Features Guide.

### SIMPLE External Menu

Press **SIMPLE/ENHANCED** and then the **Setting** soft key to select Simple to display the following menu.



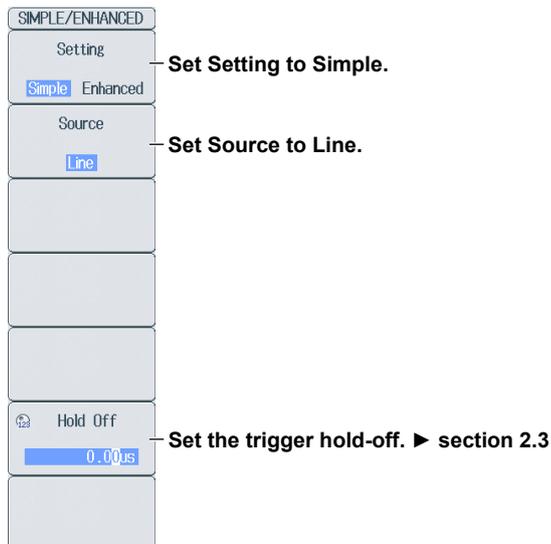
## 2.7 Triggering on a Power Line Signal (Simple)

This section explains the settings that are used when triggering on a power line signal.

► [“Power Line Signal \(Line\)”](#) and [“Trigger Source \(Source\)”](#) in the [Features Guide](#).

### SIMPLE Line Menu

Press **SIMPLE/ENHANCED** and then the **Setting** soft key to select Simple to display the following menu.



## 2.8 Triggering on a Logic Trigger (Simple)

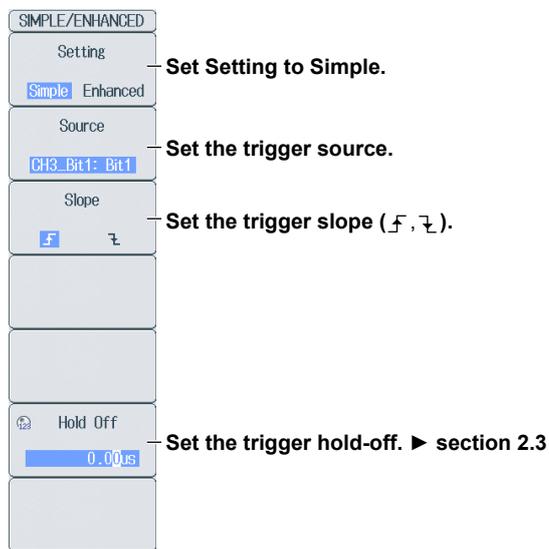
This section explains the following settings (which are used when triggering on the edges of a logic-signal trigger source):

- Trigger source
  - Source bit
- Trigger slope

► “Simple Trigger (Simple),” “Trigger Source (Source),” and “Trigger Slope (Slope)” in the Features Guide.

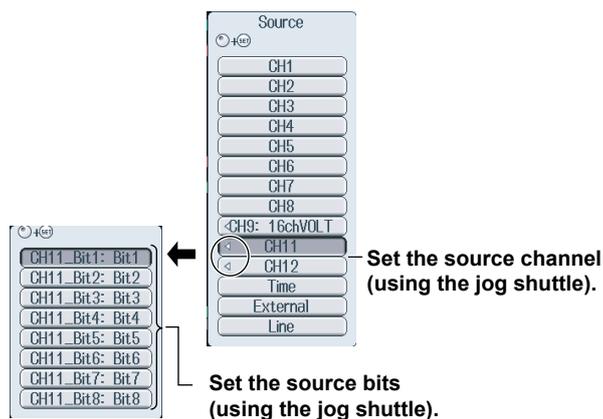
### SIMPLE CH Menu

Press **SIMPLE/ENHANCED** and then the **Setting** soft key to select Simple to display the following menu.



### Setting the Trigger Source (Source)

Press the **Source** soft key to display the following menu.



## 2.9 Triggering on an A -> B(N) Trigger (Enhanced)

This section explains the following settings (which are used when triggering on an A -> B(N) trigger):

- Trigger source
- State condition
- State condition achievement condition
- Number of times state condition B must be met
- Trigger condition

► “A -> B(N) Trigger (Enhanced)” in the Features Guide

### ENHANCED A -> B(N) Trigger Menu

Press **SIMPLE/ENHANCED** and then the **Setting** soft key to select Enhanced to display the following menu.

The screenshot shows a menu with the following options and annotations:

- SIMPLE/ENHANCED** (Header)
- Setting**: Set Setting to Enhanced. (Options: Simple, **Enhanced**)
- Type**: Set Type to A -> B(N). (Option: **A -> B(N)**)
- Set Pattern**: Press to set the state and trigger conditions.
- Hold Off**: Set the trigger hold-off. ► section 2.3 (Value: 0.00µs)

### Setting the State and Trigger Conditions (Set Pattern)

Press the **Set Pattern** soft key to display the following menu.

The screenshot shows the Set Pattern menu with the following annotations:

- Set the state condition (H, L, or X (do not use as a trigger source)).**
- Set the trigger level.**
- Set the hysteresis (~~∇~~, ~~∇~~, ~~∇~~).**

	A State	B State	Level	Hys
CH1	X	H	0.00V	∇
CH2	X	X	0.0V	∇
CH3				
CH3-Bit1:Bit1	X	X		
CH3-Bit2:Bit2	X	X		
CH3-Bit3:Bit3	X	X		
CH3-Bit4:Bit4	X	X		
CH3-Bit5:Bit5	X	X		
CH3-Bit6:Bit6	X	X		
CH3-Bit7:Bit7	X	X		
CH3-Bit8:Bit8	X	X		
CH4				
CH5				
CH6				
CH7				
CH8				

Annotations for the right side of the menu:

- A Condition**: Enter Exit
- B Condition**: Enter Exit (Set the state condition achievement conditions (Enter, Exit).)
- Count**: 1 (Set the number of times state condition B must be met.)
- Logic Signal Note**: If you are applying a logic signal, open the menu to set each bit.

**Logic Diagram:** Shows A State (H/L/X) and B State (H/L/X) inputs to a PND (Pattern and Noise Detector) block, which outputs a Trigger signal. The B State input is also connected to a B Condition menu.

## 2.10 Triggering on an A Delay B Trigger (Enhanced)

This section explains the following settings (which are used when triggering on an A Delay B trigger):

- Trigger source
- State condition
- State condition achievement condition
- Delay time
- Trigger condition

► “A Delay B Trigger (Enhanced)” in the Features Guide

### ENHANCED A Delay B Trigger Menu

Press **SIMPLE/ENHANCED** and then the **Setting** soft key to select Enhanced to display the following menu.

The screenshot shows a menu with the following items and annotations:

- SIMPLE/ENHANCED** (top button)
- Setting**: Simple **Enhanced** (highlighted). Annotation: **Set Setting to Enhanced.**
- Type**: **A Delay B** (highlighted). Annotation: **Set Type to A Delay B.**
- Set Pattern**: (with a small icon). Annotation: **Press to set the state and trigger conditions.**
- Hold Off**: **0.00us** (highlighted). Annotation: **Set the trigger hold-off. ► section 2.3**

### Setting the State and Trigger Conditions (Set Pattern)

Press the **Set Pattern** soft key to display the following menu.

The screenshot shows the Set Pattern menu with the following annotations:

- A Delay B** (header): **Set the state condition (H, L, or X (do not use as a trigger source)).**
- Level**: **Set the trigger level.**
- hys**: **Set the hysteresis ( $\surd$ ,  $\nexists$ ,  $\nabla$ ).**
- A Condition**: **Set the state condition achievement conditions (Enter, Exit).**
- B Condition**: (part of the same annotation as A Condition)
- Delay**: **Set the delay time.**
- CH1-CH8**: **If you are applying a logic signal, open the menu to set each bit.**

The menu table is as follows:

	A State	B State	Level	hys
CH1	X	H	0.00V	$\nexists$
CH2	X	X	0.0V	$\nexists$
CH3				
CH3-Bit1:Bit1	X	X		
CH3-Bit2:Bit2	X	X		
CH3-Bit3:Bit3	X	X		
CH3-Bit4:Bit4	X	X		
CH3-Bit5:Bit5	X	X		
CH3-Bit6:Bit6	X	X		
CH3-Bit7:Bit7	X	X		
CH3-Bit8:Bit8	X	X		
CH4				
CH5				
CH6				
CH7				
CH8				

At the bottom, a logic diagram shows the relationship between A and B conditions, states, and delay to produce a Trigger signal.

## 2.11 Triggering on an Edge On A Trigger (Enhanced)

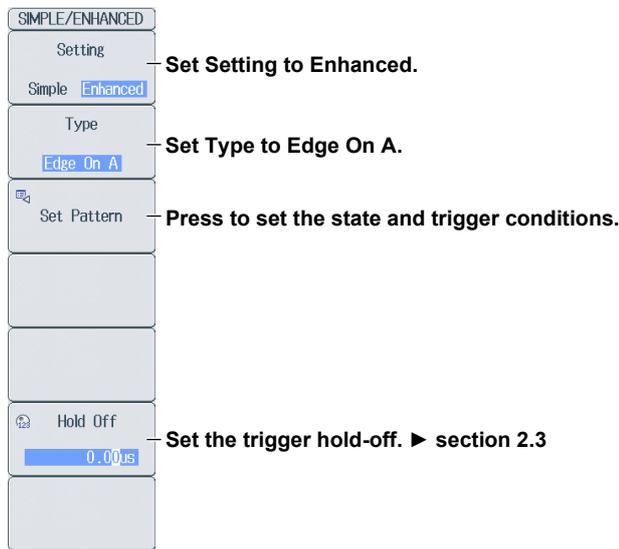
This section explains the following settings (which are used when triggering on an Edge On A trigger):

- Trigger source
- State condition
- State condition achievement condition
- Edge detection condition
- Trigger condition

► “Edge On A Trigger (Enhanced)” in the Features Guide

### ENHANCED Edge On A Trigger Menu

Press **SIMPLE/ENHANCED** and then the **Setting** soft key to select Enhanced to display the following menu.



### Setting the State and Trigger Conditions (Set Pattern)

Press the **Set Pattern** soft key to display the following menu.

Set the state condition (H, L, or X (do not use as a trigger source)).  
 Set the edge detection condition (┘, └, —).  
 Set the trigger level.

	A State	Edge	Level	Hys	Condition
CH1	X	┘	0.00V	≠	True
CH2	X	—	0.0V	≠	
CH3					
CH3-Bit1:Bit1	X	—			
CH3-Bit2:Bit2	X	—			
CH3-Bit3:Bit3	X	—			
CH3-Bit4:Bit4	X	—			
CH3-Bit5:Bit5	X	—			
CH3-Bit6:Bit6	X	—			
CH3-Bit7:Bit7	X	—			
CH3-Bit8:Bit8	X	—			
CH4					
CH5					
CH6					
CH7					
CH8					

Set the hysteresis (~~≠~~, ~~≠~~, ~~≠~~).  
 Set the state condition achievement conditions (True, False).  
 If you are applying a logic signal, open the menu to set each bit.

The logic diagram shows the following flow:

- A State**: CH1 (H/L/X), ..., CH16 (H/L/X)
- Edge OR**: CH1 (┘/└/—), ..., CH16 (┘/└/—)
- Trigger**: OR gate output

## 2.12 Triggering on an OR or AND Trigger (Enhanced)

This section explains the following settings (which are used when triggering on an OR or AND trigger):

- Trigger source
- Edge detection condition (OR trigger)
- Achievement condition (AND trigger)
- Trigger condition

► “OR Triggers (Enhanced)” and “AND Triggers (Enhanced)” in the Features Guide

### ENHANCED OR Trigger Menu

Press **SIMPLE/ENHANCED** and then the **Setting** soft key to select Enhanced to display the following menu.

**Setting** — Set Setting to Enhanced.

**Type** — Set Type to OR.

**Set Pattern** — Press to set the state and trigger conditions.

**Hold Off** — Set the trigger hold-off. ► section 2.3

### Setting the State and Trigger Conditions (Set Pattern)

Press the **Set Pattern** soft key to display the following menu.

Set the edge detection condition (F,  $\bar{F}$ , IN, OUT, —).

Set the trigger level.

Set the level width (when the edge detection condition is set to IN or OUT).

Set the hysteresis ( $\bar{\Delta}$ ,  $\Delta$ ,  $\Delta\bar{\Delta}$ ).

If you are applying a logic signal, open the menu to set each bit.

Channel	Edge	Level	Width	Hys
CH1	F	0.00V	0.10V	$\bar{\Delta}$
CH2	IN	0.0V	5.0V	$\bar{\Delta}$
CH3	$\bar{F}$			
CH3-Bit1-Bit1				
CH3-Bit2-Bit2				
CH3-Bit3-Bit3				
CH3-Bit4-Bit4				
CH3-Bit5-Bit5				
CH3-Bit6-Bit6				
CH3-Bit7-Bit7				
CH3-Bit8-Bit8				
CH4				
CH5				
CH6				
CH7				
CH8				
CH9				

## ENHANCED AND Trigger Menu

Press **SIMPLE/ENHANCED** and then the **Setting** soft key to select Enhanced to display the following menu.

The screenshot shows a vertical menu with the following items and annotations:

- SIMPLE/ENHANCED** (top button)
- Setting** (text label) with an arrow pointing to the **Enhanced** option in the **Simple** field. Annotation: **Set Setting to Enhanced.**
- Type** (text label) with an arrow pointing to the **AND** option in the **Type** field. Annotation: **Set Type to AND.**
- Set Pattern** (text label) with an arrow pointing to the **Set Pattern** button. Annotation: **Press to set the state and trigger conditions.**
- Hold Off** (text label) with an arrow pointing to the **0.00us** value in the **Hold Off** field. Annotation: **Set the trigger hold-off. ▶ section 2.3**

## Setting the State and Trigger Conditions (Set Pattern)

Press the **Set Pattern** soft key to display the following menu.

**Set the achievement condition (H, L, IN, OUT, —).**

**Set the trigger level.**

	Condition	Level	Width	Hys
CH1	H	0.00V	0.10V	≠
CH2	-	0.0V	5.0V	≠
CH3	-			
CH3-Bit1:Bit1	-			
CH3-Bit2:Bit2	-			
CH3-Bit3:Bit3	-			
CH3-Bit4:Bit4	-			
CH3-Bit5:Bit5	-			
CH3-Bit6:Bit6	-			
CH3-Bit7:Bit7	-			
CH3-Bit8:Bit8	-			
CH4				
CH5				
CH6				
CH7				
CH8				

Annotations for the table:

- Arrow pointing to the **AND** mode selector: **Set the achievement condition (H, L, IN, OUT, —).**
- Arrow pointing to the **Level** column: **Set the trigger level.**
- Arrow pointing to the **Width** column: **Set the level width (when the achievement condition is set to IN or OUT).**
- Arrow pointing to the **Hys** column: **Set the hysteresis (≠, ≠, ≠).**
- Arrows pointing to the bit selection rows (CH3-Bit1:Bit1 to CH3-Bit8:Bit8): **If you are applying a logic signal, open the menu to set each bit.**

## 2.13 Triggering on a Period Trigger (Enhanced)

This section explains the following settings (which are used when triggering on a period trigger):

- Trigger source
- State condition
- Reference mode
- Reference time
- Trigger condition

► “Period Trigger (Enhanced)” in the Features Guide

### ENHANCED Period Trigger Menu

Press **SIMPLE/ENHANCED** and then the **Setting** soft key to select Enhanced to display the following menu.

The screenshot shows a vertical menu with the following items and annotations:

- SIMPLE/ENHANCED**: A button at the top.
- Setting**: A menu item with sub-options **Simple** and **Enhanced**. An arrow points to **Enhanced** with the text "Set Setting to Enhanced."
- Type**: A menu item with sub-option **Period**. An arrow points to **Period** with the text "Set Type to Period."
- Set Pattern**: A menu item with a small icon. An arrow points to it with the text "Press to set the state and trigger conditions."
- Hold Off**: A menu item with a sub-option **0.00us**. An arrow points to it with the text "Set the trigger hold-off. ► section 2.3"

### Setting the State and Trigger Conditions (Set Pattern)

Press the **Set Pattern** soft key to display the following menu.

Set the state condition (H, L, or X (do not use as a trigger source)).  
Set the trigger level.

Channel	B State	Level	Hys	Mode
CH5	X	0.0Hz	≠	T1 < T < T2
CH6	X	0.0Hz	≠	
CH7	X	0.0c	≠	T1
CH8	H	0.00V	≠	
CH9				T2
CH9_1	X	0.00V	≠	
CH9_2	X	0.00V	≠	
CH9_3	X	0.00V	≠	
CH9_4	X	0.00V	≠	
CH9_5	X	0.00V	≠	
CH9_6	X	0.00V	≠	
CH9_7	X	0.00V	≠	
CH9_8	X	0.00V	≠	
CH9_9	X	0.00V	≠	
CH9_10	X	0.00V	≠	
CH9_11	X	0.00V	≠	

Annotations for the table:

- Arrows point to the **B State** column with the text "Set the state condition (H, L, or X (do not use as a trigger source))."
- Arrows point to the **Level** column with the text "Set the trigger level."
- An arrow points to the **Hys** column with the text "Set the hysteresis (~~≠~~, ~~≠~~, ~~≠~~)." (Note: the original image shows symbols like  $\neq$ ,  $\neq$ ,  $\neq$ ).
- An arrow points to the **Mode** column with the text "Set the reference mode."
- Arrows point to the **T1** and **T2** fields with the text "Set the reference time.\*"
- An arrow points to the table with the text "If you are applying a logic signal, open the menu to set each bit."

\* Set T1 and T2 when the reference mode is T1 < T < T2 or T < T1, T2 < T.  
Set Time when the reference mode is T < Time or T > Time.

### Setting the Reference Mode (Mode)

Set what kind of relationship must be established between period T and the specified reference times (Time or T1 and T2) for the DL850/DL850V to trigger.

---

T < Time	Period T must be shorter than the reference time (Time).
T > Time	Period T must be longer than the reference time (Time).
T1 < T < T2	Period T must be longer than reference time T1 and shorter than reference time T2.
T < T1, T2 < T	Period T must be shorter than reference time T1 or longer than reference time T2.

---

## 2.14 Triggering on a Pulse Width Trigger (Enhanced)

This section explains the following settings (which are used when triggering on a pulse width trigger):

- Trigger source
- State condition
- Reference mode
- Reference time
- Trigger condition

► “Pulse Width Trigger (Enhanced)” in the Features Guide

### ENHANCED Pulse Width Trigger Menu

Press **SIMPLE/ENHANCED** and then the **Setting** soft key to select Enhanced to display the following menu.

The screenshot shows a vertical menu with the following items and annotations:

- SIMPLE/ENHANCED** (top button)
- Setting**: Simple, **Enhanced** (selected). Annotation: **Set Setting to Enhanced.**
- Type**: **Pulse Width** (selected). Annotation: **Set Type to Pulse Width.**
- Set Pattern**: Annotation: **Press to set the state and trigger conditions.**
- Hold Off**: 0.00us (selected). Annotation: **Set the trigger hold-off. ► section 2.3**

### Setting the State and Trigger Conditions (Set Pattern)

Press the **Set Pattern** soft key to display the following menu.

Set the state condition (H, L, or X (do not use as a trigger source)).  
Set the trigger level.

Channel	B State	Level	Hys
CH5	X	0.0Hz	≠
CH6	X	0.0Hz	≠
CH7	X	0.0c	≠
CH8	H	0.00V	≠
CH9			
CH9_1	X	0.00V	≠
CH9_2	X	0.00V	≠
CH9_3	X	0.00V	≠
CH9_4	X	0.00V	≠
CH9_5	X	0.00V	≠
CH9_6	X	0.00V	≠
CH9_7	X	0.00V	≠
CH9_8	X	0.00V	≠
CH9_9	X	0.00V	≠
CH9_10	X	0.00V	≠
CH9_11	X	0.00V	≠

Mode: B Between

T1: 0.01us

T2: 0.02us

Annotations:

- Set the hysteresis ( $\neq$ ,  $\neq$ ,  $\neq$ ).
- Set the reference mode.
- Set the reference time.\*
- If you are applying a logic signal, open the menu to set each bit.

\* Set T1 and T2 when the reference mode is B Between.  
Set Time when the reference mode is B < Time, B > Time, or B TimeOut.

### Setting the Reference Mode (Mode)

Set what kind of relationship must be established between the state condition B achievement time and the specified reference times (Time or T1 and T2) for the DL850/DL850V to trigger.

---

B < Time	The DL850/DL850V triggers when the achievement time is shorter than the reference time (Time), and the state condition changes from being met to not being met.
B > Time	The DL850/DL850V triggers when the achievement time is longer than the reference time (Time), and the state condition changes from being met to not being met.
B TimeOut	The DL850/DL850V triggers when the achievement time is longer than the reference time (Time).
B Between	The DL850/DL850V triggers when the achievement time is longer than reference time T1 and shorter than reference time T2, and the state condition changes from being met to not being met.

---

## 2.15 Triggering on a Wave Window Trigger (Enhanced)

This section explains the following settings (which are used when triggering on a wave window trigger):

- Target channel  
Tolerance width, cycle frequency, and reference cycle
- Synchronization channel
- Trigger condition

► “Wave Window Trigger” in the Features Guide

### ENHANCED Wave Window Trigger Menu

Press **SIMPLE/ENHANCED** and then the **Setting** soft key to select Enhanced to display the following menu.

The screenshot shows a vertical menu with the following items and annotations:

- SIMPLE/ENHANCED** (top button)
- Setting** (text) with **Simple** and **Enhanced** (selected) options. Annotation: **Set Setting to Enhanced.**
- Type** (text) with **Wave Window** (selected) option. Annotation: **Set Type to Wave Window.**
- Set Pattern** (text) with a small icon. Annotation: **Press to set the trigger conditions**
- Hold Off** (text) with a **0.00µs** value. Annotation: **Set the trigger hold-off. ► section 2.3**

### Setting the Trigger Conditions (Set Pattern)

Press the **Set Pattern** soft key to display the following menu.

The screenshot shows the **Set Pattern** menu with the following settings and annotations:

- Wave Window** (header)
- Condition** table:
 

Channel	Condition	Width
CH1	OFF	0.5V
CH2	OFF	0.5V
CH3	OFF	1µSTR
CH4	OFF	1µSTR
CH5		
CH6		
CH7		500µSTR
CH8	OFF	0.05V
CH9		
CH9_1		
CH9_2		
CH9_3		
CH9_4		
CH9_5		
CH9_6		
CH9_7		
- Cycle Frequency**: 50Hz. Annotation: **Set the cycle frequency.**
- Reference Cycle**: 1. Annotation: **Set the reference cycle.**
- Sync. Ch**: CH1. Annotation: **Set the synchronization channel (Auto, CH1-CH16).**
- Level**: 0.0V
- Hysteresis**: ≠
- Annotation: **Set the level for detecting the start and end points, and set the detection hysteresis.\***

At the bottom, a logic diagram shows an OR gate with inputs for CH1, ..., CH16, each with an ON/OFF switch, leading to a **Trigger** output.

\* When the synchronization channel is not set to Auto.

---

## 2.16 Triggering the DL850/DL850V Manually (Manual Trigger)

▶ [“Trigger Type \(Type\)” in the Features Guide](#)

Press **MANUAL TRIG**.

# 3.1 Setting Conditions for Waveform Acquisition

This section explains the following settings (which are used when acquiring waveforms):

- Record length
- Acquisition mode
- Trigger mode
- Number of times to acquire waveforms
- Time base

► [“Waveform Acquisition” in the Features Guide](#)

## ACQUIRE Menu

Press **ACQUIRE** to display the following menu.

- **When Acquisition Mode Is Set to Normal, Envelope, or BoxAverage**

The screenshot shows the ACQUIRE menu with the following settings and instructions:

- Record Length:** Set to 10k. Instruction: Set the record length (using the jog shuttle).
- Acquisition Mode:** Set to Normal. Instruction: Set Acquisition Mode to Normal, Envelope, or BoxAverage.
- Trigger Mode:** Set to Auto. Instruction: Set the trigger mode.
- Acquisition Count:** Set to Infinite. Instruction: Set the number of times to acquire waveforms (using the jog shuttle).
- HD RecordCondition:** Set to OFF. Instruction: (None)
- Time Base:** Set to Int. Instruction: Set the time base (Int, Ext).

- **When Acquisition Mode Is Set to Average**

The screenshot shows the ACQUIRE menu with the following settings and instructions:

- Record Length:** Set to 10k. Instruction: Set the record length (using the jog shuttle).
- Acquisition Mode:** Set to Average. Instruction: Set Acquisition Mode to Average.
- Trigger Mode:** Set to Auto. Instruction: Set the trigger mode.
- Acquisition Count:** Set to Infinite. Instruction: Set the number of times to acquire waveforms (using the jog shuttle).
- Weight:** Set to 4. Instruction: Set the attenuation constant (using the jog shuttle).
- Time Base:** Set to Int. Instruction: Set the time base (Int, Ext).

### 3.1 Setting Conditions for Waveform Acquisition

---

#### Setting the Acquisition Mode (Mode)

- Normal: Displays waveforms without processing the sampled data. You can set the number of waveforms to acquire with the jog shuttle.
- Envelope: Displays waveforms in envelope mode. You can set the number of waveforms to acquire with the jog shuttle.
- BoxAverage: Displays box-averaged waveforms. You can set the number of waveforms to acquire with the jog shuttle.
- Average: Displays averaged waveforms. You can set the attenuation constant and the number of times to average with the jog shuttle.

#### Setting the Trigger Mode (Trigger Mode)

The trigger mode determines the conditions for updating the displayed waveforms. You can also set the trigger mode by pressing the MODE key. ► section 2.1

You can set the trigger mode to one of the settings below.

Auto, Auto Level, Normal, Single, SingleN, or On Start

---

## 3.2 Starting and Stopping Waveform Acquisition

### Waveform Acquisition (START/STOP)

Press **START/STOP** to start or stop waveform acquisition.

The key illuminates while the DL850/DL850V is acquiring waveforms.

▶ [“Waveform Acquisition \(START/STOP\)” in the Features Guide.](#)

## 3.3 Using the Dual Capture Feature

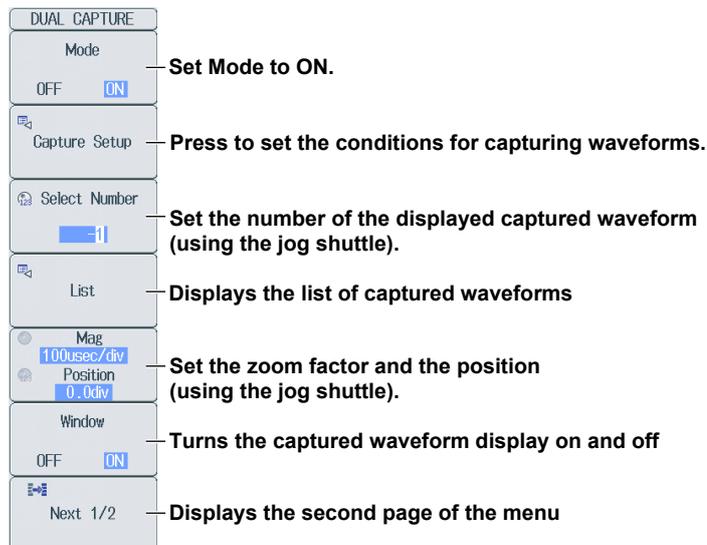
This section explains the following waveform settings (which are used when using the dual capture feature):

- Dual capture feature on and off
- Captured waveform settings
  - Record length and trigger mode to use to capture waveforms, horizontal axis, and the action to perform after the waveform is acquired
- Specifying and displaying acquired waveforms
- Specifying and displaying waveforms from the list of acquired waveforms
- Zoom factor
- Captured waveform display area on and off
- Percentage of the screen that the main waveform takes up
- Display area layout
- Format of the captured waveform display
- Event waveform display on and off
- Channels that are displayed in the captured waveform display area

► [“Dual Capture Feature On and Off” in the Features Guide.](#)

### DUAL CAPTURE Menu

Press **SHIFT+ACQUIRE** (DUAL CAPTURE) and then the **Mode** soft key to select ON to display the following menu.



#### Note

You cannot use the dual capture feature when the acquisition mode is set to Average.

Press the **Next** soft key to display the second page of the menu.

**DUAL CAPTURE**

- Main Ratio** — Set the main waveform's display percentage (50%, 20%, 0%).
- Window Layout** — Set the screen layout (Side, Vertical).
- Format** — Set the display format of the capture screen (Main, 1, 2, 3, 4, 6, 8, 12, 16; set using the jog shuttle)
- Event Display** — Turns the event display on and off
- Allocation** — Press to allocate the channels to display on the capture screen.
- Next 2/2** — Displays the first page of the menu

### Setting Waveform Captures (Capture Setup)

Press the **Capture Setup** soft key to display the following screen.

**Capture Setup**

- Time / div** — Set the horizontal axis.
- Capture Length** — Set the capture length.
- Capture Mode** — Maximum number of waveforms that can be captured
- Action** — Set the capture mode (Auto, On Start).
- Action Setup** — Set the action to perform after waveforms are acquired. ► section 12.1

Select the check box to set the action.

\* This differs depending on whether an external memory device or the optional internal HDD is present.

### Displaying a List of Captured Waveforms (List)

Press the **List** soft key to display the following screen.

**List**

- You can use the jog shuttle to scroll the list.
- Captured waveforms are displayed in order of their timestamps, starting with the newest capture.

### 3.3 Using the Dual Capture Feature

## Allocating the Waveforms That You Want to Capture (Allocation)

Press the **Allocation** soft key to display the following screen.

Allocation				
<input checked="" type="checkbox"/> CH1	-	-	-	-
<input checked="" type="checkbox"/> CH2	-	-	-	-
<input checked="" type="checkbox"/> CH3	-	-	-	-
<input checked="" type="checkbox"/> CH4	-	-	-	-
<input checked="" type="checkbox"/> Math1	-	-	-	-
<input checked="" type="checkbox"/> Math2	-	-	-	-
<input checked="" type="checkbox"/> Math3	-	-	-	-
<input checked="" type="checkbox"/> Math4	-	-	-	-
<input checked="" type="checkbox"/> Math5	-	-	-	-
<input checked="" type="checkbox"/> Math6	-	-	-	-
<input checked="" type="checkbox"/> Math7	-	-	-	-
<input checked="" type="checkbox"/> Math8	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Select the channels that you want to display.

## 3.4 Recording Data to the Optional Hard Disk

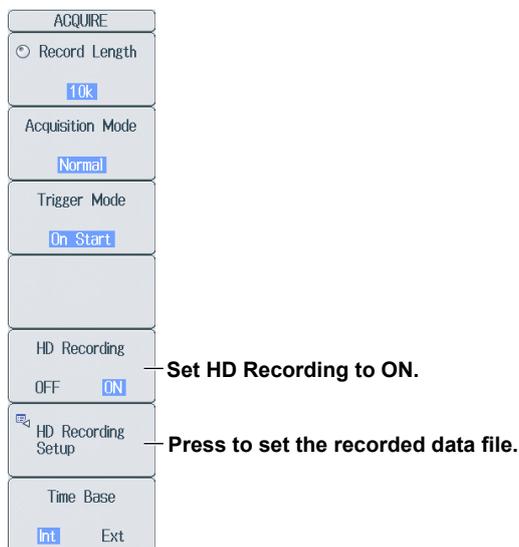
This section explains the following settings (which are used when saving data to the optional hard disk):

- Hard disk recording on and off
- Save destination and file name for recorded data
- File division

► “Waveform Acquisition” and “Hard Disk Recording (HD Record Condition)” in the Features Guide

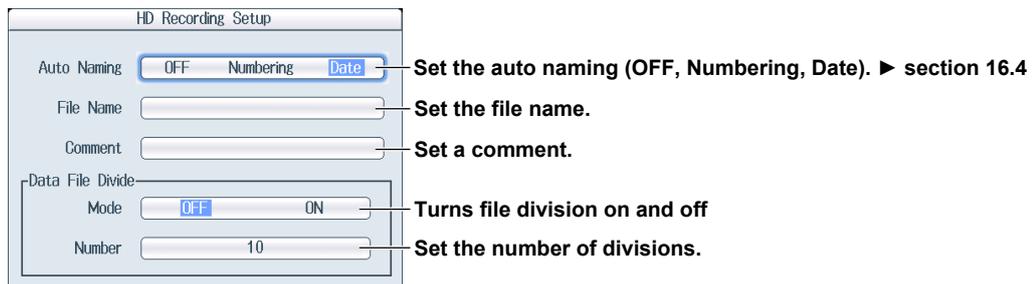
### ACQUIRE Menu

Press **ACQUIRE** and then the **HD Recording** soft key to select ON to display the following menu. (The front-panel HDD RECORDING LED illuminates, and the DL850/DL850V can then record data to the hard disk.)



### Setting the Recorded Data File (HD Recording Setup)

Press the **HD Recording Setup** soft key to display the following menu.



### Recording to the Hard Disk (START/STOP)

Press **START/STOP** to start waveform acquisition and hard disk recording. Press **START/STOP** again to stop waveform acquisition hard disk recording. Even if the set recording time has not been exceeded, the recording will stop.

### 3.4 Recording Data to the Optional Hard Disk

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#### **CAUTION**

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- If the power supply is interrupted during hard disk recording, the hard disk may be damaged. If this occurs, make a backup of any important data that is stored on the hard disk, and then format it.
  - During hard disk recording, do not apply vibration to the DL850/DL850V or the hard disk. Doing so may damage the hard disk or may cause errors in hard disk recording.
  - During hard disk recording, the  icon blinks in the center of the screen. While this icon is blinking, do not disconnect the USB storage device that is connected to the USB port for connecting peripheral devices. Doing so may cause the DL850/DL850V to malfunction or may corrupt the data that is being recorded to the hard disk.
- 

#### **Note**

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For information about how to save data, see chapter 16.

---

# 4.1 Setting Display Conditions

This section explains the following settings (which are used when viewing the display):

- Display format
- Extra window
- Graticule
- Scale value display on and off
- Waveform arrangement and color
- Labels on and off
- Display interpolation

▶ “Display” in the Features Guide

## DISPLAY Menu

Press **DISPLAY** to display the following menu.

**DISPLAY**

- Format — Set the display format (1 (no divisions), 2, 3, 4, 6, 8, 12, 16).
- Extra Window — Set the extra window (OFF, 1, 2, 3, 4, 5, 6, 7, 8, Auto).
- Graticule — Set the graticule (dotted line, crosshairs, frame).
- Scale Value — Turns the scale value display on and off
- Select Display Gr. — Set the display group\* (1, 2, 3, 4)
- Trace Setup — Press to arrange waveforms and set their colors.
- Next 1/2 — Displays the second page of the menu

\* Only when there are 64 or more channels including sub channels

Press the **Next** soft key to display the second page of the menu.

**DISPLAY**

- Trace Label — Turns trace labels on and off
- Dot Connect — Set the display interpolation (OFF, Sine, Line, Pulse).
- Accumulate
- Manual Event
- Ch.Information
- Next 2/2 — Displays the first page of the menu

## 4.1 Setting Display Conditions

### Arranging Waveforms and Setting Their Colors (Trace Setup)

Press the **Trace Setup** soft key to display the following screen.

Set the allocation method (Auto, User).

Set the display colors.      Set the display zone.<sup>1</sup>

Set the waveforms that you want to allocate.

Set the display group.<sup>2</sup>

Clears all the settings of the specified group.<sup>2</sup>

Automatically reassigns just the waveforms whose displays are turned on.<sup>2</sup>

- 1 This can only be set when Allocation Mode is set to User.
- 2 Including sub channels, when there are 64 channels or more, they can be allocated to groups 1 to 4 and displayed.

## 4.2 Displaying Accumulated Waveforms

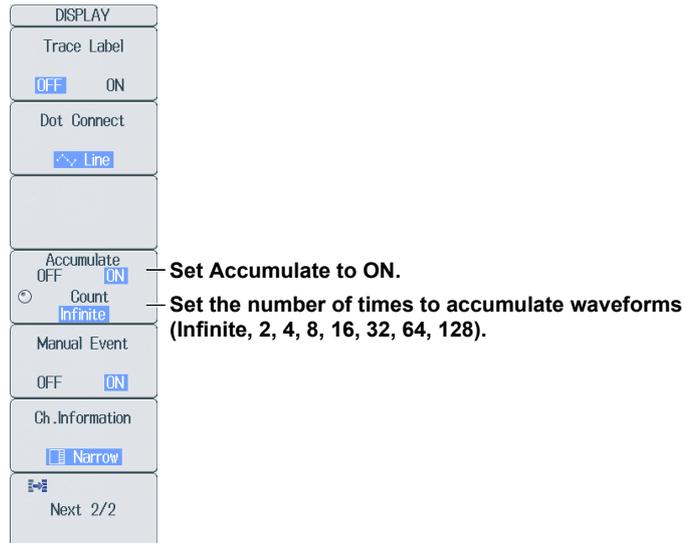
This section explains the following settings (which are used when using the accumulate feature):

- Accumulated display on and off
- Number of times to accumulate waveforms

► [“Accumulate \(Accumulate\)” in the Features Guide](#)

### DISPLAY Menu

Press **DISPLAY** and then the **Next** soft key to display the second page of the menu.



## 4.3 Displaying Manual Events

This section explains the following setting (which is used when displaying manual events):

- Manual event display on and off

► [“Manual Event” in the Features Guide](#)

### DISPLAY Menu

Press **DISPLAY** and then the **Next** soft key to display the second page of the menu.

DISPLAY
Trace Label OFF ON
Dot Connect Line
Accumulate OFF ON
Manual Event OFF ON
Ch. Information Narrow
Next 2/2

Turns the manual event display on and off

## 4.4 Displaying the Channel Information and the Numeric Monitor

This section explains the following settings (which are used when displaying the channel information and the numeric monitor):

- Size of the channel-information and numeric-monitor display areas
- Displaying the channel information
- Displaying the numeric monitor
- Expanding the waveform display area

▶ [“Size of the Channel Information and Numeric Monitor Windows \(Ch. Information\)” in the Features Guide](#)

### DISPLAY Menu

Press **DISPLAY** and then the **Next** soft key to display the second page of the menu.

The screenshot shows a vertical menu titled "DISPLAY". The options and their current settings are:

- Trace Label: OFF (highlighted) ON
- Dot Connect: Line (highlighted)
- Accumulate: OFF (highlighted) ON
- Manual Event: OFF ON (ON is highlighted)
- Ch. Information: Narrow (highlighted)
- Next 2/2 (with a right arrow icon)

— Set the channel-information and numeric-monitor display area (Full, Narrow, Wide).

### Size of the Channel-Information Display Area

Full: The whole screen is used to display the channel information.

Narrow: The channel information display area is the same width as the setup menu.

Wide: The right half of the screen is used to display the channel information.

### Displaying the Channel Information

While the setup menu is displayed, press **ESC** twice. The setup menu on the right side of the screen disappears, and the main information for the channels that are being displayed appears.

### Displaying the Numeric Monitor

While the channel information is displayed, press **ESC**. The channel information disappears, and the numeric monitor for the channels that are being displayed appears.

### Expanding the Waveform Display Area

While the numeric monitor is displayed, press **ESC**. The numeric monitor disappears, and the waveform display area expands horizontally.

Press **ESC** again to display the channel information.

---

## 4.5 Taking Snapshots and Clearing Traces

Press **SNAPSHOT** to retain the currently displayed waveform on the screen as a snapshot displayed in white. Snapshot waveforms remain on the screen until you execute a clear trace operation.

Press **CLEAR TRACE** to clear all the waveforms that are displayed on the screen.

▶ [“Snapshot \(SNAPSHOT\)” and “Clear Trace \(CLEAR TRACE\)”](#)  
in the [Features Guide](#)

---

### **Note**

You can press **SHIFT+SNAPSHOT** to only clear snapshot waveforms.

---

# 5.1 Displaying XY Waveforms

This section explains the following settings (which are used when displaying XY waveforms):

- XY waveform display on and off and source waveforms
- Display range
- Pen markers on and off.
- Trace-clear-on-start on and off
- Main window display
- Screen layout
- Combining displays on and off
- Interpolation
- The number of data points that are used to display waveforms

► [“Displaying XY Waveforms” in the Features Guide](#)

## X-Y Menu

Press **SHIFT+DISPLAY** (X-Y) to display the following menu.

The screenshot shows the first page of the X-Y menu. It includes the following items and annotations:

- Window1 ON / Window2 OFF**: Select whether to set Window1 or Window2.
- Display OFF / ON**: Turns the X-Y window display on and off.
- Setup**: Press to turn the display of XY1 to XY4 (XY5 to XY8) waveforms on and off and set the source waveforms.
- Start Point -5.00div / End Point 5.00div**: Set the start and end points.
- Pen Marker OFF / ON**: Turns pen markers on and off.
- Trace clear on Start OFF / ON**: Turns the trace-clear-on-start on and off.
- Next 1/2**: Displays the second page of the menu.

Press the **Next** soft key to display the second page of the menu.

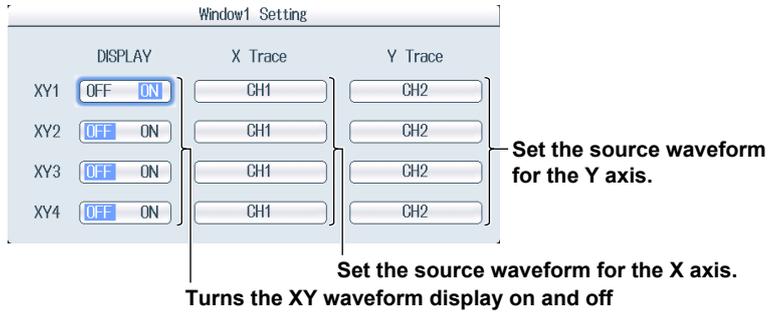
The screenshot shows the second page of the X-Y menu. It includes the following items and annotations:

- Main Ratio 50%**: Set the main screen's display percentage (50%, 20%, 0%).
- Window Layout Side**: Set the screen layout (Side, Vertical).
- Combine Display OFF / ON**: Select whether to combine the displays of Window1 and Window2 (ON) or not (OFF).
- Dot Connect OFF**: Set the display interpolation (OFF, Line).
- Decimation 2k / 100k**: Set the number of data points that are used to display waveforms (2k, 100k).
- Next 2/2**: Displays the first page of the menu.

## 5.1 Displaying XY Waveforms

### Turning the Display of XY1 to XY4 (XY5 to XY8) Waveforms On and Off and Setting the Source Waveforms (Setup)

Press the **Setup** soft key to display the following menu.



# 6.1 Zooming in on or out of Waveforms

This section explains the following settings (which are used when zooming in on or out of waveforms):

- Zoom box
- Zooming on and off
- Zoom position
- Main window display
- Screen layout
- Display format
- Auto scrolling
- Zoom source waveform
- Zoom factor

► “Zooming in on Waveforms” in the Features Guide

## ZOOM Menu

Press **ZOOM** to display the following menu. If you press **ZOOM** while no zoom window is displayed on the screen, zoom box 1 is automatically turned on.

**ZOOM**

- Zoom1 ON / Zoom2 OFF** — Select whether to set Zoom1 or Zoom2.
- Display OFF / ON** — Turns the zoom window display on and off
- Zoom1 Position 0.00div** — Set the zoom position.
- Format Zoom1 Main** — Set the display format (Main, 1, 2, 3, 4, 6, 8, 12, 16).
- Move Zoom1 to Front** — Moves the zoom position to the latest position
- Next 1/2** — Displays the second page of the menu

**Zoom1 Position 0.00div**  
**Zoom2 Position 0.00div**  
If both zoom box 1 and zoom box 2 are being displayed.

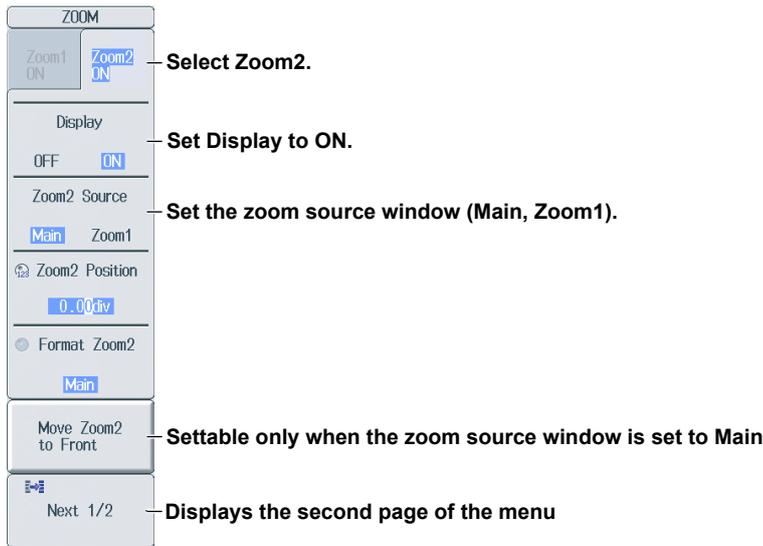
Press the **Next** soft key to display the second page of the menu.

**ZOOM**

- Main Ratio 50%** — Set the main screen’s display percentage (50%, 20%, 0%).
- Window Layout Side** — Set the screen layout (Side, Vertical).
- Auto Scroll** — Press to configure automatic scrolling.
- Allocation** — Press to allocate the zoom source waveforms.
- Next 2/2** — Displays the first page of the menu

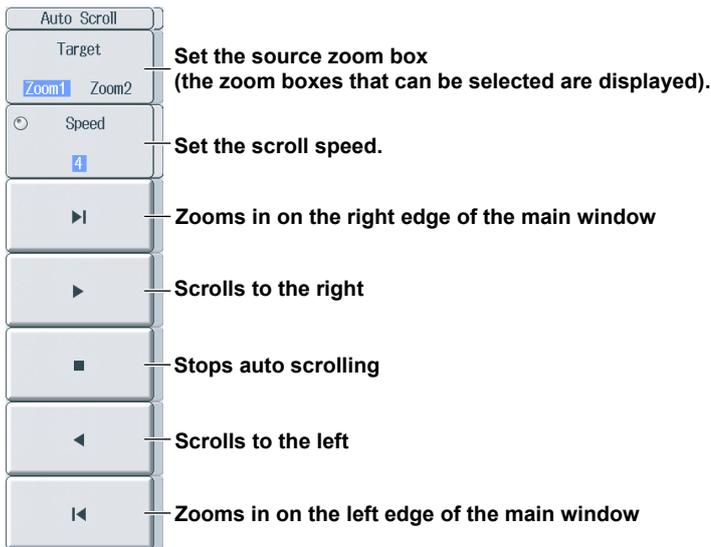
## 6.1 Zooming in on or out of Waveforms

- The First Page of the Menu When Zoom2 Is Set to ON



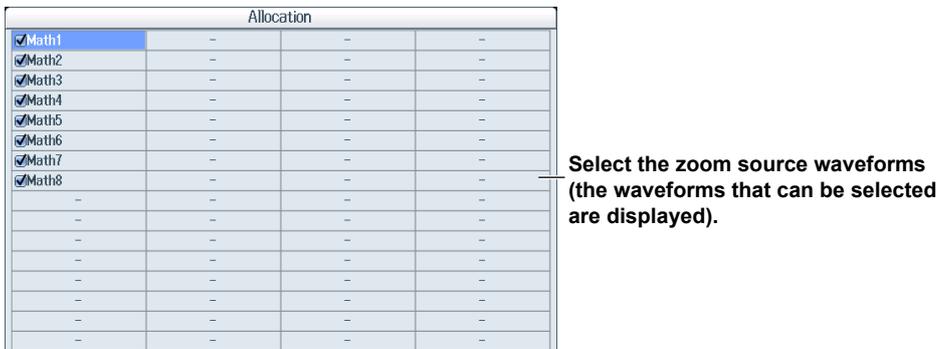
## Configuring Automatic Scrolling (Auto Scroll)

Press the **Auto Scroll** soft key to display the following menu.



## Allocating Zoom Source Waveforms (Allocation)

Press the **Allocation** soft key to display the following screen.

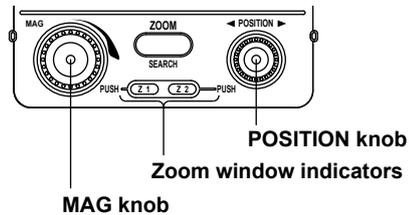


### Zoom Factor (MAG knob)

Use the **MAG** knob to set the zoom factor.

The **MAG** knob controls the waveforms in the window whose corresponding indicator, Z1 or Z2, is illuminated.

The **MAG** knob has a push switch. Push the knob to illuminate the Z1 indicator, Z2 indicator, or both indicators. When both the Z1 and Z2 indicators are illuminated, you can set both windows to the same zoom ratio at the same time.



### Setting the Zoom Position (Zoom POSITION knob)

Use the zoom **POSITION** knob to set the zoom position.

The zoom **POSITION** knob controls the waveforms in the window whose corresponding indicator, Z1 or Z2, is illuminated more brightly.

The zoom **POSITION** knob has a push switch. Push the knob to illuminate the Z1 indicator, Z2 indicator, or both indicators. When both the Z1 and Z2 indicators are illuminated, you can set both windows to the same zoom position at the same time.

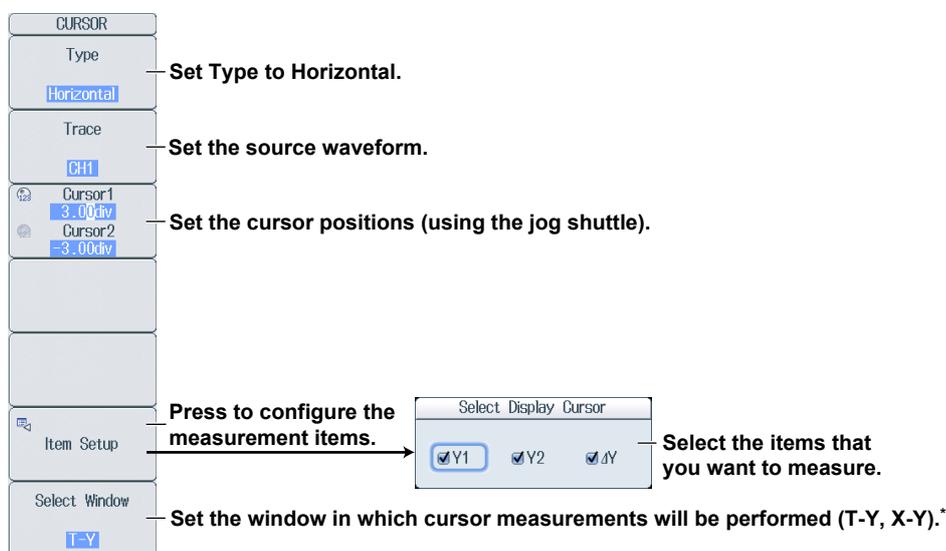
# 7.1 Measuring with Horizontal Cursors

This section explains the following settings (which are used when measuring with horizontal cursors):

- Cursor type
- Source waveform
- Cursor position
- Measurement items
- Measurement source window
  - ▶ “Horizontal Cursors (Horizontal; T-Y),” “Horizontal Cursors (Horizontal; X-Y),” and “Turning the X-Y Window Display On and Off (Display)” in the Features Guide.

## CURSOR Horizontal Menu

Press **CURSOR**, the **Type** soft key, and then the **Horizontal** soft key to display the following menu.



\* This can only be selected when the X-Y window display is turned on.

## Setting the Source Waveform (Trace)

The waveforms that you can select differ depending on the cursor-measurement source window.

- T-Y: CH1 to CH16, 16chVOLT, CAN, Math1 to Math8
- X-Y: XY1 to XY8

## 7.2 Measuring with Vertical Cursors

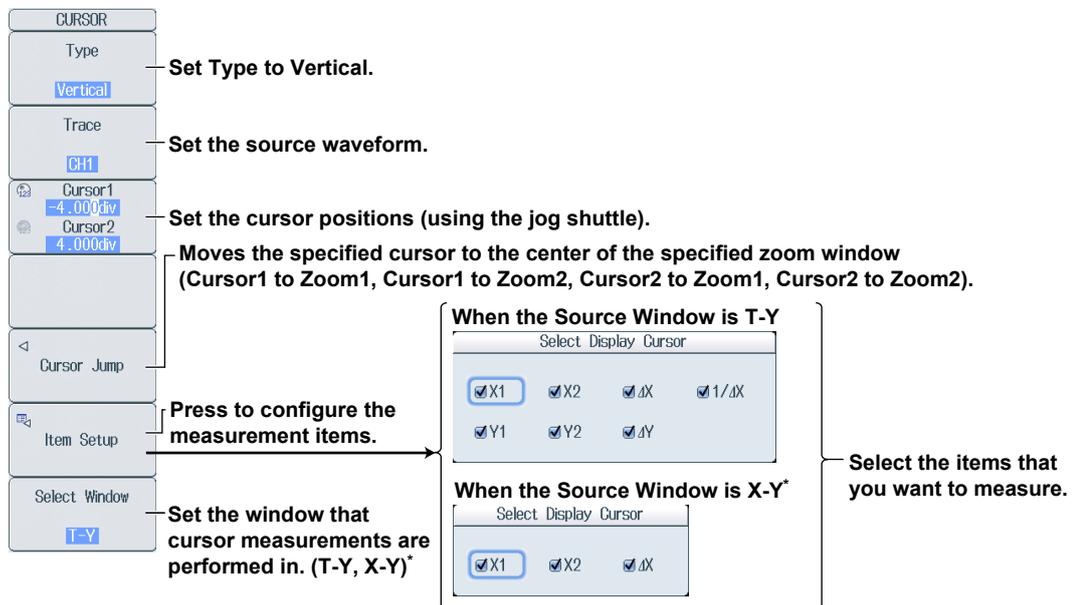
This section explains the following settings (which are used when measuring with vertical cursors):

- Cursor type
- Source waveform
- Cursor position
- Measurement items
- Measurement source window

► “Vertical Cursors (Vertical; T-Y),” “Vertical Cursors (Vertical; X-Y),” and “Turning the X-Y Window Display On and Off (Display)” in the Features Guide.

### CURSOR Vertical Menu

Press **CURSOR**, the **Type** soft key, and then the **Vertical** soft key to display the following menu.



\* This can only be selected when the X-Y window display is turned on.

### Setting the Source Waveform (Trace)

The waveforms that you can select differ depending on the cursor-measurement source window.

- T-Y: All, CH1 to CH16, 16chVOLT, CAN, Math1 to Math8
- X-Y: XY1 to XY8

## 7.3 Measuring with Marker Cursors (Marker)

This section explains the following settings (which are used when measuring with marker cursors):

- Cursor type
- Source waveform
- Cursor position
- Marker display format
- Measurement items
- Measurement source window

▶ “Marker Cursors (Marker; T-Y),” “Marker Cursors (Marker; X-Y),” “Marker Cursors (Marker; FFT),” “Turning the X-Y Window Display On and Off (Display),” and “Turning FFT On and Off (Display)” in the Features Guide.

### CURSOR Marker Menu

Press **CURSOR**, the **Type** soft key, and then the **Marker** soft key to display the following menu.

The image shows the CURSOR Marker Menu and its sub-menus. The main menu has the following options:

- CURSOR**
- Type**: Marker (Set Type to Marker.)
- Marker #**: Marker1 X (Select the marker cursor that you want to use (Marker1 X, Marker2 +, Marker3 Y, Marker4  $\wedge$ )).
- Trace**: CH1 (Set the source waveform.)
- Position**: -3.000div (Set the cursor position (using the jog shuttle)).
- Cursor Jump**: (Moves the specified cursor to the center of the specified zoom window (To Zoom1, To Zoom2)).
- Item & Marker Form**: (Press to configure the measurement items.)
- Select Window**: T-Y (Set the measurement source window. (T-Y, X-Y, FFT)\*)

The **Item & Marker Form** sub-menu is shown in two states:

- When the Source Window is T-Y or FFT\***:
  - Marker Form: Mark Line (Set the marker display format (Mark, Line).)
  - Display Item:
 

<input checked="" type="checkbox"/> X1	<input checked="" type="checkbox"/> X2	<input checked="" type="checkbox"/> X3	<input checked="" type="checkbox"/> X4
<input checked="" type="checkbox"/> $\Delta$ (X2-X1)	<input checked="" type="checkbox"/> $\Delta$ (X3-X1)	<input checked="" type="checkbox"/> $\Delta$ (X4-X1)	
<input type="checkbox"/> $\Delta$ (X3-X2)	<input type="checkbox"/> $\Delta$ (X4-X2)	<input type="checkbox"/> $\Delta$ (X4-X3)	
<input checked="" type="checkbox"/> Y1	<input checked="" type="checkbox"/> Y2	<input checked="" type="checkbox"/> Y3	<input checked="" type="checkbox"/> Y4
<input checked="" type="checkbox"/> $\Delta$ (Y2-Y1)	<input checked="" type="checkbox"/> $\Delta$ (Y3-Y1)	<input checked="" type="checkbox"/> $\Delta$ (Y4-Y1)	
<input type="checkbox"/> $\Delta$ (Y3-Y2)	<input type="checkbox"/> $\Delta$ (Y4-Y2)	<input type="checkbox"/> $\Delta$ (Y4-Y3)	
- When the Source Window is X-Y\***:
  - Marker Form: Mark Line (Set the marker display format (Mark, Line).)
  - Display Item:
 

<input checked="" type="checkbox"/> X1	<input checked="" type="checkbox"/> X2	<input checked="" type="checkbox"/> X3	<input checked="" type="checkbox"/> X4
<input checked="" type="checkbox"/> Y1	<input checked="" type="checkbox"/> Y2	<input checked="" type="checkbox"/> Y3	<input checked="" type="checkbox"/> Y4
<input checked="" type="checkbox"/> T1	<input checked="" type="checkbox"/> T2	<input checked="" type="checkbox"/> T3	<input checked="" type="checkbox"/> T4
<input checked="" type="checkbox"/> $\Delta$ (T2-T1)	<input checked="" type="checkbox"/> $\Delta$ (T3-T1)	<input checked="" type="checkbox"/> $\Delta$ (T4-T1)	

Select the items that you want to measure.

\* This can only be selected when the X-Y window display or FFT window display is turned on.

### Setting the Source Waveform (Trace)

The waveforms that you can select differ depending on the cursor-measurement source window.

- T-Y: OFF, CH1 to CH16, 16chVOLT, CAN, Math1 to Math8
- X-Y: OFF, XY1 to XY8
- FFT: OFF, FFT1, FFT2

## 7.4 Measuring with Angle Cursors (Degree)

This section explains the following settings (which are used when measuring with angle cursors):

- Cursor type
- Source waveform
- Cursor position
- Reference angle
- Reference cursor
- Measurement items

► “Angle Cursors (Degree)” in the Features Guide

### CURSOR Degree Menu

Press **CURSOR**, the **Type** soft key, and then the **Degree** soft key to display the following menu.

The image shows two screenshots from a device's menu system. The first screenshot is the 'CURSOR' menu, and the second is the 'Select Display Cursor' dialog.

**CURSOR Menu:**

- Type:** Degree (Set Type to Degree.)
- Trace:** CH1 (Set the source waveform (All, CH1-CH16, 16chVOLT, CAN, Math1-Math8).)
- Cursor1:** -4.000div (Set the cursor positions (using the jog shuttle).)
- Cursor2:** 4.000div (Set the cursor positions (using the jog shuttle).)
- Ref1:** -2.000div (Set the reference angle (using the jog shuttle).)
- Ref2:** 2.000div (Set the reference angle (using the jog shuttle).)
- Cursor Jump:** (Moves the specified cursor to the center of the specified zoom window (Cursor1 to Zoom1, Cursor1 to Zoom2, Cursor2 to Zoom1, Cursor2 to Zoom2).)
- Item & RefValue:** (Press to configure the measurement items.)
- Select Window:** T-Y

**Select Display Cursor Dialog:**

- RefValue:** 360 (Set the reference cursors (using the jog shuttle).)
- Display Item:** X1, X2, ΔX, Y1, Y2, ΔY (Select the items that you want to measure.)

## 7.5 Measuring with Horizontal and Vertical Cursors (H & V)

This section explains the following settings (which are used when measuring with horizontal and vertical cursors):

- Cursor type
- Source waveform
- Vertical cursor position
- Horizontal cursor position
- Measurement items
- Measurement source window

► [“Horizontal and Vertical Cursors \(H & V; T-Y\),”](#) [“Horizontal and Vertical Cursors \(H & V; X-Y\),”](#) and [“Turning the X-Y Window Display On and Off \(Display\)”](#) in the Features Guide.

### CURSOR H & V Menu

Press **CURSOR**, the **Type** soft key, and then the **H & V** soft key to display the following menu.

The screenshot shows the CURSOR H & V menu with the following options and annotations:

- Type**: Set Type to H & V. (The menu shows 'H & V' selected.)
- Trace**: Set the source waveform. (The menu shows 'CH1' selected.)
- V-Cursor1**: -4.000div
- V-Cursor2**: 4.000div
- H-Cursor1**: 3.00div
- H-Cursor2**: -3.00div
- Cursor Jump**: Moves the specified vertical cursor to the center of the specified zoom window (Cursor1 to Zoom1, Cursor1 to Zoom2, Cursor2 to Zoom1, Cursor2 to Zoom2).
- Item Setup**: Press to configure the measurement items. This option leads to two sub-menus:
  - When the Source Window is T-Y**: Select Display Cursor. Options:  X1,  X2,  ΔX,  1/ΔX,  Y1,  Y2,  ΔY.
  - When the Source Window is X-Y\***: Select Display Cursor. Options:  X1,  X2,  ΔX,  Y1,  Y2,  ΔY.
- Select Window**: Set the measurement source window.\* (The menu shows 'T-Y' selected.)

A bracket on the right side of the sub-menus indicates: **Select the items that you want to measure.**

\* Selectable on when the X-Y window display is turned ON

### Setting the Source Waveform (Trace)

The waveforms that you can select differ depending on the cursor-measurement source window.

- T-Y: CH1 to CH16, 16chVOLT, CAN, Math1 to Math8
- X-Y: XY1 to XY8

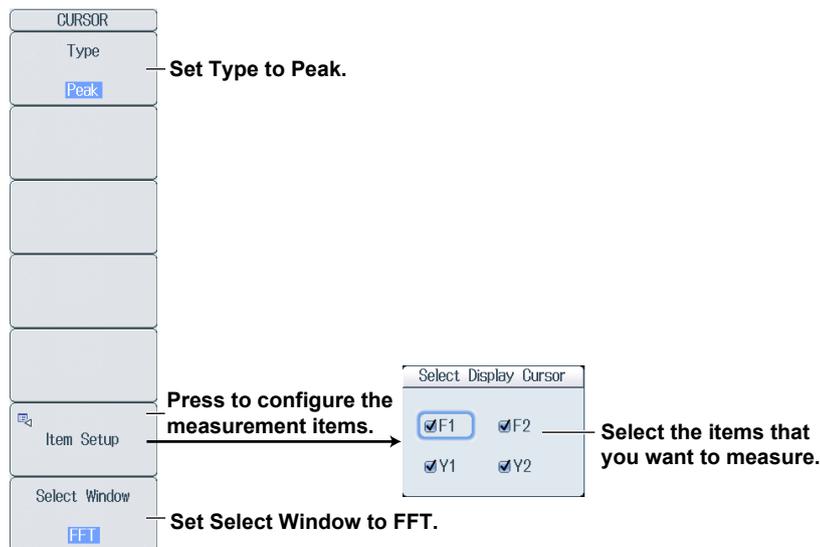
## 7.6 Measuring with Peak Cursors (Peak)

This section explains the following settings (which are used when measuring with peak cursors). You can use peak cursors when the FFT window is displayed.

- Cursor type
- Measurement items
- Measurement source window
  - ▶ [“Peak Cursors \(Peak\)”](#) and [“Turning FFT On and Off \(Display\)”](#) in the Features Guide.

### CURSOR Peak Menu

Press **CURSOR**, the **Type** soft key, and then the **Peak** soft key to display the following menu.



#### Note

On models that are not equipped with the user-defined computation option, measurement items F2 or Y2 are not displayed.

# 8.1 Automatically Measuring Waveform Parameters

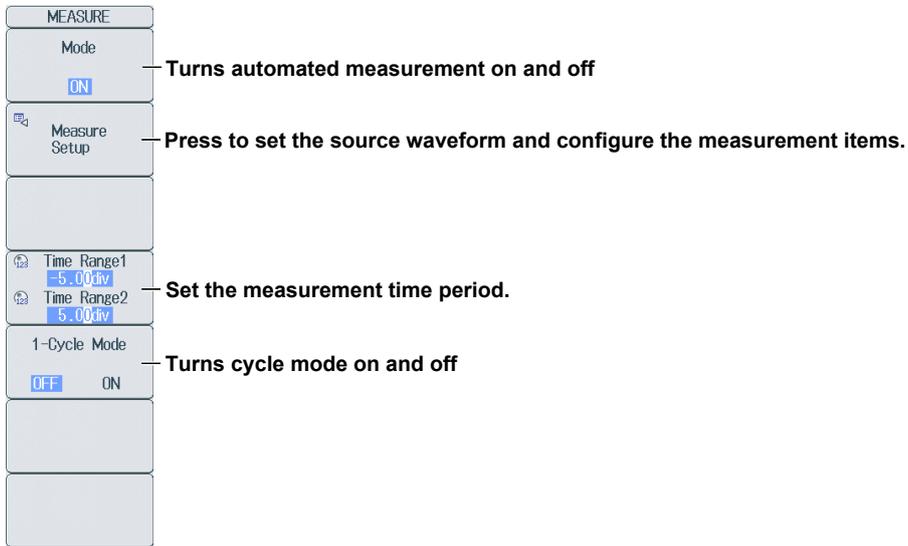
This section explains the following settings (which are used when automatically measuring waveform parameters):

- Automated measurement on and off
- Source waveform and measurement items
- Delay settings
- Period measurement on and off
- Time-measurement reference level
- Measurement source window and measurement time period

▶ [“Automated Measurement of Waveform Parameters” in the Features Guide](#)

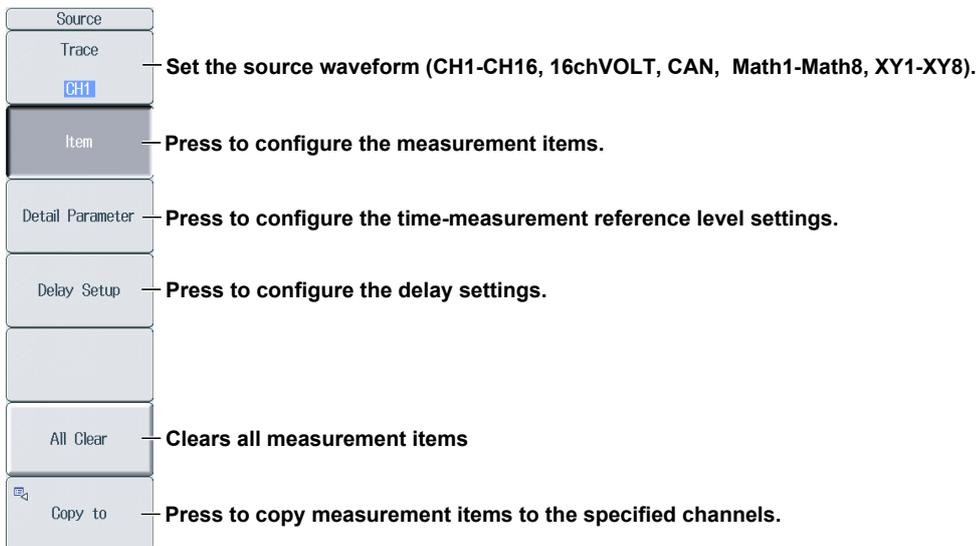
## MEASURE Menu

Press **MEASURE**, the **Mode** soft key, and then the **ON** soft key to display the following menu.



## Setting the Source Waveform and Configuring the Measurement Items (Measure Setup)

Press **MEASURE** and then the **Measure Setup** soft key to display the following menu.

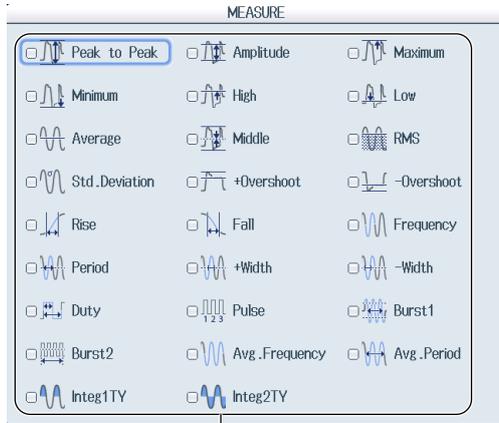


## 8.1 Automatically Measuring Waveform Parameters

### Configuring the Measurement Items (Item)

Press the **Item** soft key to display the following screen.

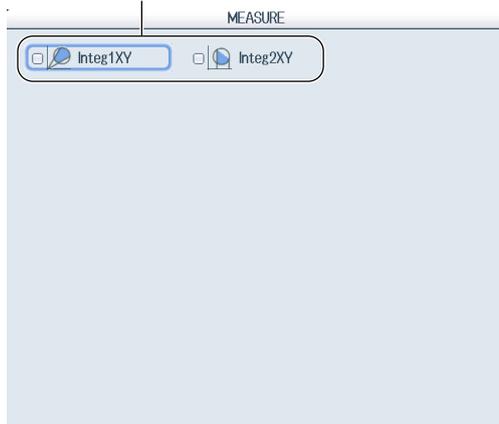
**When the Source Waveform is CH1 to CH16, 16chVOLT, CAN, Math1 to Math8**



Select the items that you want to measure.

**When the Source Waveform is XY1 to XY8**

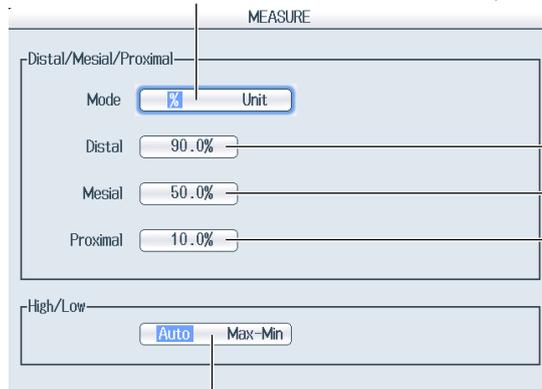
Select the items that you want to measure.



### Configuring the Time-Measurement Reference Level Settings (Detail Parameter)

Press the **Detail Parameter** soft key to display the following screen.

Set the unit for the reference level (% , Unit).



Set the distal value (using the jog shuttle).

Set the mesial value (using the jog shuttle).

Set the proximal value (using the jog shuttle).

Set the mode for determining high and low levels (Auto, Max-Min).



### Setting the Measurement Time Period (Time Range1 and Time Range2)

Set the measurement time period within the window specified by **Time Range1** and **Time Range2**.

**Note**

---

Measurements can be performed from the measurement start point (Time Range1) up to the point 10 Mwords after the measurement start point.

---

### Setting the Cycle Mode (1-Cycle Mode)

- OFF: 1-cycle mode is disabled.
- ON: 1-cycle mode is enabled.

**Note**

---

If the interval between Time Range1 and Time Range2 is less than one period, "\*\*\*\*\*" is displayed for the measured value.

---

## 8.2 Performing Normal Statistic Processing

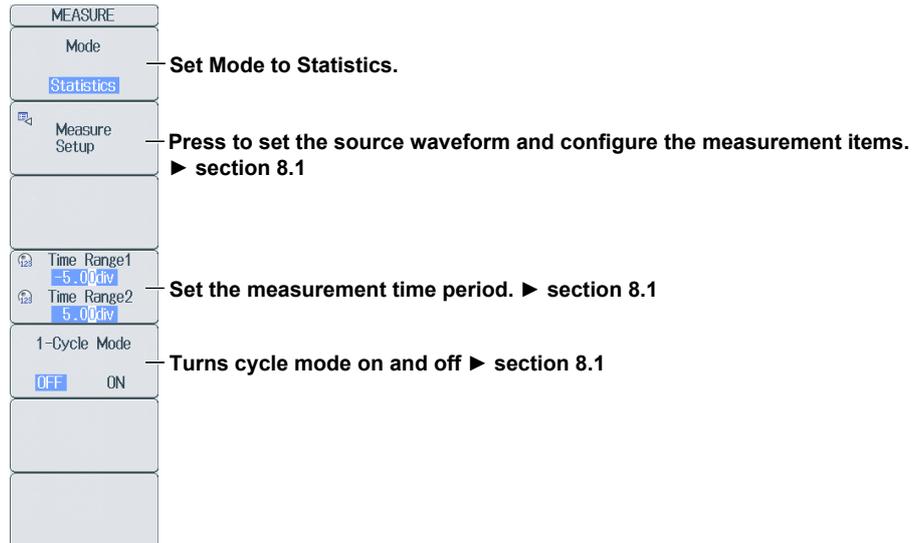
This section explains the following setting (which is used when performing normal statistic processing on the displayed waveforms):

- Turning statistical processing on

► “Normal Statistical Processing (Statistics)” in the Features Guide

### MEASURE Menu

Press **MEASURE**, the **Mode** soft key, and then the **Statistics** soft key to display the following menu.



## 8.3 Performing Cycle Statistic Processing

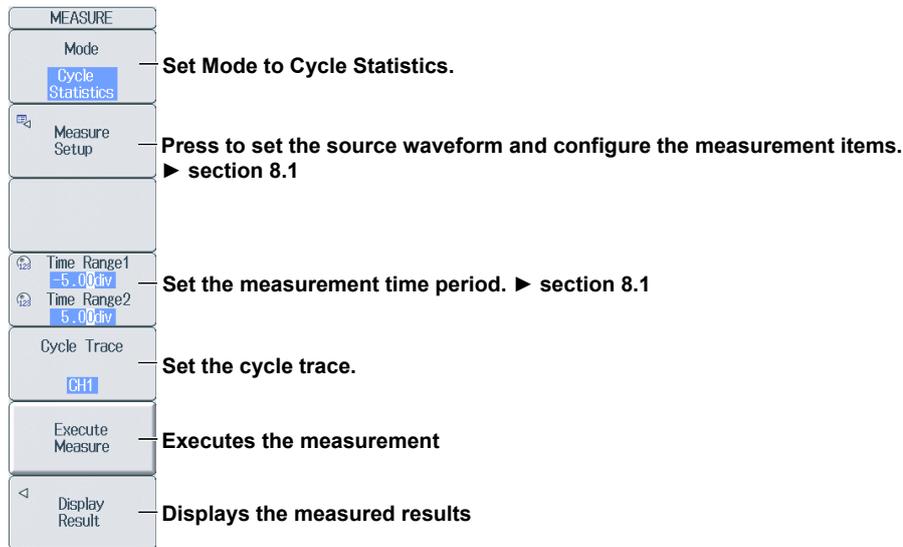
This section explains the following settings (which are used when performing cycle statistic processing on the displayed waveforms):

- Turning cycle statistics on
- Source waveforms that are used to determine the period
- Displaying results

► [“Cyclic Statistical Processing \(Cycle Statistics\)” in the Features Guide](#)

### MEASURE Menu

Press **MEASURE**, the **Mode** soft key, and then the **Cycle Statistics** soft key to display the following menu.



### Setting the Cycle Trace (Cycle Trace)

CH1-CH16, 16chVOLT, CAN, Math1-Math8:

The DL850/DL850V automatically measures the waveform parameters of all the source waveforms and performs statistical processing on the measured values once per period of the specified channel.

**OWN:** The DL850/DL850V determines the period of each source waveform. It then automatically measures the waveform parameters and performs statistical processing once per period. However, if signals that have different periods are applied to multiple channels, the number of iterations of automated measurement and statistical processing for each signal is equal to the number of periods in the slowest signal.

## Displaying the Measured Results (Display Result)

Press **MEASURE** and then the **Display Result** soft key to display the following screen.

- ↑: Displayed by the maximum value of each measurement item.
- ↓: Displayed by the minimum value of each measurement item.

Utility

< Sort

Forward

Statistics Max

Statistics Min

Select the sort method (Forward, Reverse).

The maximum value

The minimum value

Cycle Statistics				
	Mxl (CH2)	Rms (CH2)	SDv (CH2)	+Ovr(CH2)
6	498.958mV ↑	718.676mV	494.054mV ↓	0.12%
7	498.125mV	718.745mV	494.197mV	0.02%
8	498.333mV	718.784mV	494.359mV	0.08%
9	498.750mV	718.811mV	494.282mV	0.10%
10	498.958mV	718.826mV	494.242mV	0.10%
11	498.125mV	718.606mV ↓	494.173mV	0.00%
12	498.333mV	718.688mV	494.271mV	0.02%
13	498.333mV	718.770mV	494.348mV	0.00%
14	498.125mV	718.687mV	494.354mV	0.02%
15	498.750mV	718.730mV	494.154mV	0.08%
16	498.750mV	718.743mV	494.225mV	0.00%
17	498.333mV	718.961mV ↑	494.542mV ↑	0.04%
18	498.542mV	718.852mV	494.374mV	0.04%
19	498.542mV	718.825mV	494.293mV	0.04%
20	498.333mV	718.619mV	494.192mV	0.00%
21	498.333mV	718.757mV	494.267mV	0.02%
22	498.750mV	718.675mV	494.179mV	0.14% ↑
23	498.750mV	718.772mV	494.267mV	0.00%
24	498.750mV	718.621mV	494.059mV	0.00%
25	497.917mV	718.688mV	494.230mV	0.00%
26	498.750mV	718.770mV	494.244mV	0.00%
27	498.542mV	718.634mV	494.150mV	0.00%
28	498.125mV	718.676mV	494.190mV	0.00%
29	498.542mV	718.771mV	494.307mV	0.04%
30	498.542mV	718.757mV	494.360mV	0.08%
31	498.750mV	718.743mV	494.340mV	0.00%
32	498.542mV	718.674mV	494.251mV	0.06%
33	498.958mV	718.811mV	494.240mV	0.00%

When this scroll bar is displayed, you can use the left and right arrow keys to scroll the display.

## 8.4 Performing Statistic Processing on History Waveforms

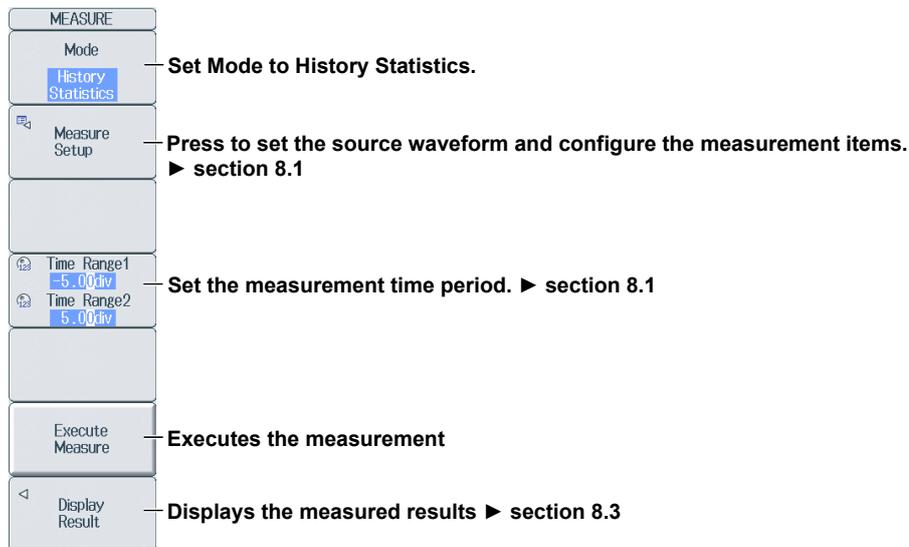
This section explains the following settings (which are used when performing statistic processing on the waveforms that are stored in the history memory):

- Turning history waveform statistics on
- Displaying results

► [“Statistical Processing of History Waveforms \(History Statistics\)”](#)  
in the [Features Guide](#)

### MEASURE Menu

Press **MEASURE**, the **Mode** soft key, and then the **History Statistics** soft key to display the following menu.



# 9.1 Performing Addition, Subtraction, Multiplication, and Division

This section explains the following settings (which are used when performing addition, subtraction, multiplication, and division):

- Operators (+, -, \*, /)
- Computation source waveform
- Label
- Unit
- Scaling

► “Basic Arithmetic (S1+S2, S1-S2, S1\*S2, and S1/S2)” in the Features Guide

## MATH Menu

Press **MATH**, the **Mode** soft key, and then the **ON** soft key to display the following menu.

**MATH**

Mode  
OFF **ON** — Turns computations on and off

Select Math Trace  
1 — Select the computed trace (using the jog shuttle).

Math Setup — Press to configure the computation.

Scaling Mode  
Auto **Manual** — Set the scaling mode (Auto, Manual).

Upper 1.0000  
Lower -1.0000 — Set the display range of the computed waveform (set using the jog shuttle when Scaling Mode is set to Manual).

FFT Setup

Start Point -5.00div  
End Point 5.00div — Set the start and end points (using the jog shuttle).

**On Models with the User-Defined Computation Option**

**MATH**

Mode  
OFF **ON**

Math Setup

Select Math Trace  
1

Scaling Mode  
Auto **Manual**

Upper 1.0000E+03  
Lower -1.0000E+03

Start Point -5.000div  
End Point 5.000div

Next 1/2

## Configuring Computations (Math Setup)

Press the **Math Setup** soft key and then a soft key from **Math1** to **Math8** to display the following screen.

**Math1**

Operation S1 + S2 — Select the operation (S1+S2, S1-S2, S1\*S2, S1/S2).

Source1 CH1  
Source2 CH2 — Select the computation source waveform (CH1-CH16, 16chVOLT, CAN, Math1-Math7).

Unit — Press to set the unit.

Label Math1 — Press to set the label.

Display OFF **ON** — Turns the waveform display on and off

## Setting the Scaling (Scaling Mode)

**Auto:** The upper and lower limits are set automatically.

**Manual:** You can set the upper and lower limits. The selectable range is -9.9999E+30 to 9.9999E+30.

### Note

If you set Scaling Mode to Auto, you cannot set Upper and Lower.

## 9.2 Performing Binary Computations

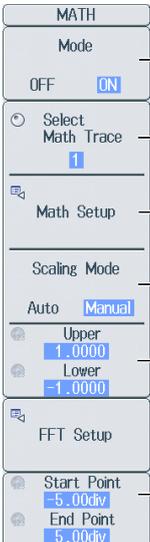
This section explains the following settings (which are used when performing binary computations):

- Function (Bin(S1))
- Computation source waveform
- Threshold level
- Label
- Unit
- Scaling

► “Binary Conversion (Bin (S1))” in the Features Guide

### MATH Menu

Press **MATH**, the **Mode** soft key, and then the **ON** soft key to display the following menu.



**MATH**

Mode  
OFF **ON** — Turns computations on and off

Select Math Trace  
1 — Select the computed trace (using the jog shuttle).

Math Setup — Press to configure the computation.

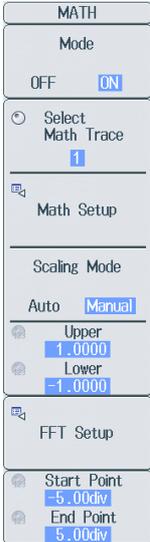
Scaling Mode  
Auto **Manual** — Set the scaling mode. ► section 9.1

Upper 1.0000  
Lower -1.0000 — Set the display range of the computed waveform. ► section 9.1

FFT Setup

Start Point -5.00div  
End Point 5.00div — Set the start and end points (using the jog shuttle).

**On Models with the User-Defined Computation Option**



**MATH**

Mode  
OFF **ON**

Select Math Trace  
1

Math Setup

Scaling Mode  
Auto **Manual**

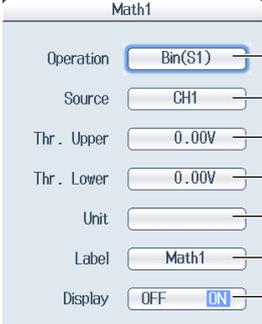
Upper 1.0000  
Lower -1.0000

FFT Setup

Start Point -5.00div  
End Point 5.00div

### Configuring Computations (Math Setup)

Press the **Math Setup** soft key and then a soft key from **Math1** to **Math8** to display the following screen.



**Math1**

Operation **Bin(S1)** — Set Function to Bin(S1).

Source **CH1** — Select the computation source waveform (CH1-CH16, 16chVOLT, CAN, Math1-Math7).

Thr. Upper 0.00V — Set the upper threshold limit (using the jog shuttle).

Thr. Lower 0.00V — Set the lower threshold limit (using the jog shuttle).

Unit — Press to set the unit.

Label **Math1** — Press to set the label.

Display **OFF ON** — Turns the waveform display on and off

## 9.3 Shifting the Phase

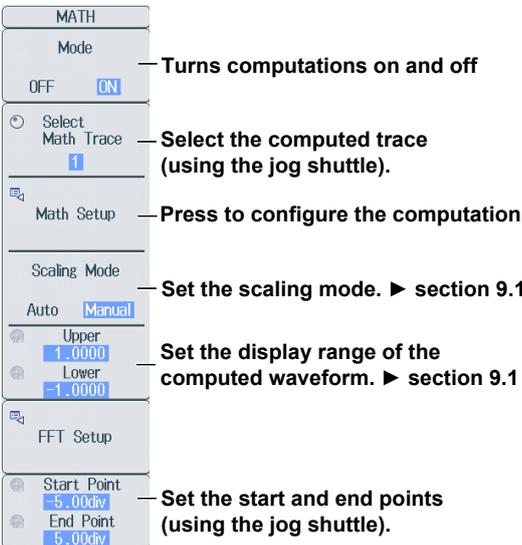
This section explains the following settings (which are used when shifting the phase):

- Function (Shift(S1))
- Computation source waveform
- Shift range
- Label
- Unit
- Scaling

► “Phase Shift (Shift (S1))” in the Features Guide

### MATH Menu

Press **MATH**, the **Mode** soft key, and then the **ON** soft key to display the following menu.



**MATH**

Mode  
OFF **ON** — Turns computations on and off

Select Math Trace  
1 — Select the computed trace (using the jog shuttle).

Math Setup — Press to configure the computation.

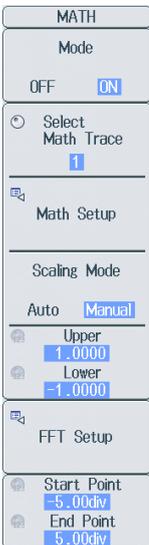
Scaling Mode  
Auto **Manual** — Set the scaling mode. ► section 9.1

Upper 1.0000  
Lower -1.0000 — Set the display range of the computed waveform. ► section 9.1

FFT Setup

Start Point -5.00div  
End Point 5.00div — Set the start and end points (using the jog shuttle).

**On Models with the User-Defined Computation Option**



**MATH**

Mode  
OFF **ON**

Select Math Trace  
1

Math Setup

Scaling Mode  
Auto **Manual**

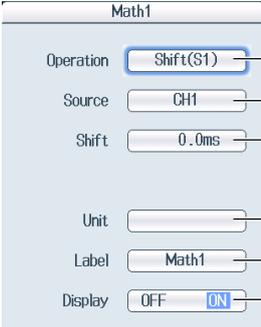
Upper 1.0000  
Lower -1.0000

FFT Setup

Start Point -5.00div  
End Point 5.00div

### Configuring Computations (Math Setup)

Press the **Math Setup** soft key and then a soft key from **Math1** to **Math8** to display the following screen.



**Math1**

Operation **Shift(S1)** — Set Function to Shift(S1).

Source **CH1** — Select the computation source waveform (CH1-CH16, 16chVOLT, CAN, Math1-Math7).

Shift **0.0ms** — Set the range that you want to shift by (using the jog shuttle).

Unit — Press to set the unit.

Label **Math1** — Press to set the label.

Display **OFF** **ON** — Turns the waveform display on and off

## 9.4 Displaying the Power Spectrum

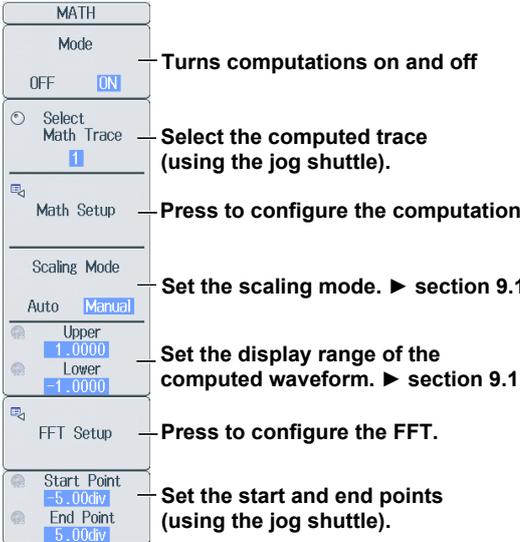
This section explains the following settings (which are used when displaying the power spectrum during FFT computations):

- The number of FFT points
- Window function

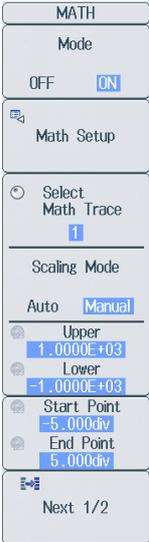
► “Power Spectrum (PS (S1))” in the Features Guide

### MATH Menu

Press **MATH**, the **Mode** soft key, and then the **ON** soft key to display the following menu.



**On Models with the User-Defined Computation Option**



### Configuring FFT Computations (FFT Setup)

Press the **FFT Setup** soft key to display the following screen.

**Set the number of FFT points (1k, 2k, 5k, 10k, 20k, 50k, 100k).**



**Set the window function (Rect, Hanning, Flat Top, Hamming).**

## 9.5 Performing User-Defined Computations (Optional)

This section explains the following settings (which are used when performing user-defined computations):

- Operation or Function (User Define)
- Expressions
- Computation conditions
- Label and unit
- Auto scaling
- Scaling
- Averaging, FFT, filters, and constants

► “User-Defined Computation (Optional)” in the Features Guide

### MATH Menu

Press **MATH**, the **Mode** soft key, and then the **ON** soft key to display the following menu.

The screenshot shows the MATH menu with the following items and annotations:

- MATH** (Title)
- Mode**: OFF | ON — Turns computations on and off
- Math Setup** — Press to configure the computation.
- Select Math Trace**: 1 — Select the computed trace (using the jog shuttle).
- Scaling Mode**: Auto | Manual — Set the scaling mode. ► section 9.1
- Upper**: 1.0000E+03 — Set the display range of the computed waveform. ► section 9.1
- Lower**: -1.0000E+03
- Start Point**: -5.000div — Set the start and end points (using the jog shuttle).
- End Point**: 5.000div
- Next 1/2** — Displays the second page of the menu

Press the **Next** soft key to display the second page of the menu.

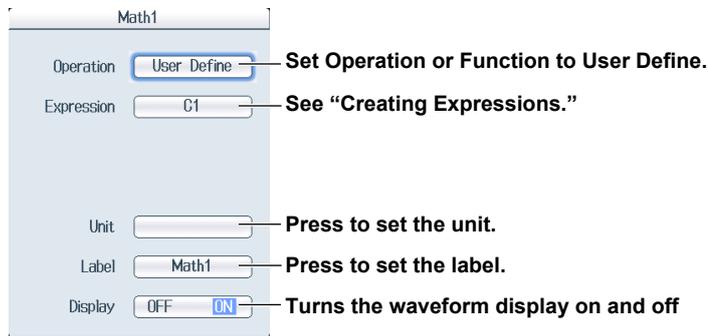
The screenshot shows the second page of the MATH menu with the following items and annotations:

- MATH** (Title)
- Average Setup** — Press to configure averaging.
- FFT Setup** — Press to configure the FFT.
- Filter Setup** — Press to configure filters.
- Constant Setup** — Press to define constants.
- Next 2/2** — Displays the first page of the menu

## 9.5 Performing User-Defined Computations (Optional)

### Configuring Computations (Math Setup)

Press the **Math Setup** soft key and then a soft key from **Math1** to **Math8** to display the following screen.

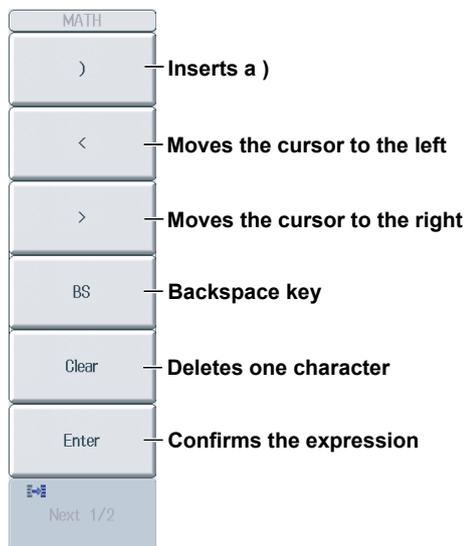


### Creating Expressions (Expression)

Press the **Expression** soft key to display the following screen.

**Adds automated measurements of waveform parameters to expressions**

Define an expression by combining computation source waveforms, operators and Function.



## Configuring Averaging (Average Setup)

Press the **Average Setup** soft key to display the following screen.

### Linear Averaging (Linear)

Average Setup

Average Mode

Average Domain  Time  Freq

Linear Count

Set Average Mode to Linear.

Select the domain to average over (Time, Freq).

Set the number of times to average (the number of waveforms to acquire).

- **Average Domain**

Time: The DL850/DL850V performs averaging on time-domain waveforms.

Freq: The DL850/DL850V performs averaging on frequency-domain waveforms.

### Exponential Averaging (Exp)

Average Setup

Average Mode

Average Domain  Time  Freq

Average Weight

Set Average Mode to Exp.

Select the domain to average over (Time, Freq).

Set the attenuation constant.

- **Average Domain**

The settings are the same as in linear averaging.

### Cycle Averaging (Cycle)

Average Setup

Average Mode

Cycle Count

Set Average Mode to Cycle.

Set the number of data points in one period.

### Peak Computation (Peak)

Average Setup

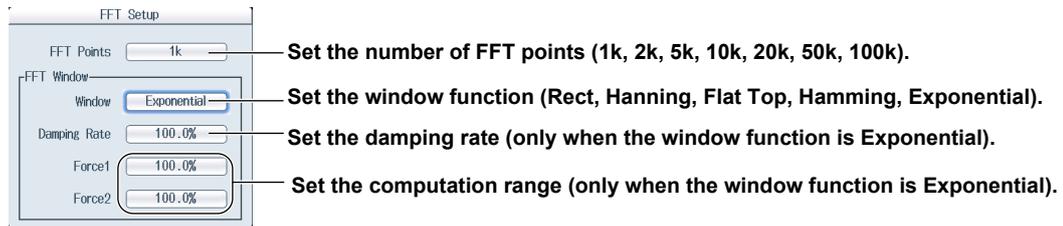
Average Mode

Set Average Mode to Peak.

## 9.5 Performing User-Defined Computations (Optional)

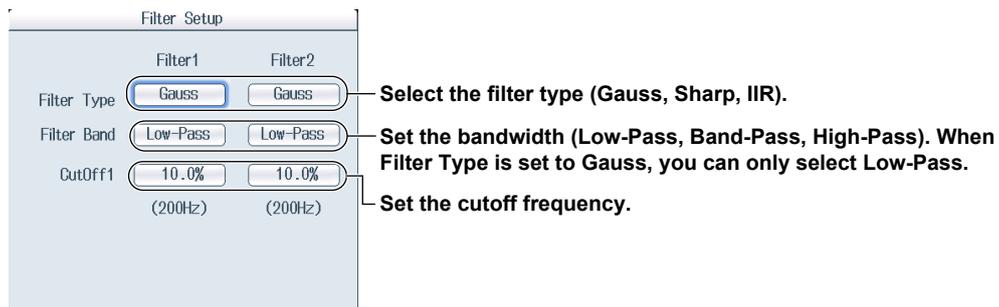
### Configuring FFT Computations (FFT Setup)

Press the **FFT Setup** soft key to display the following screen.



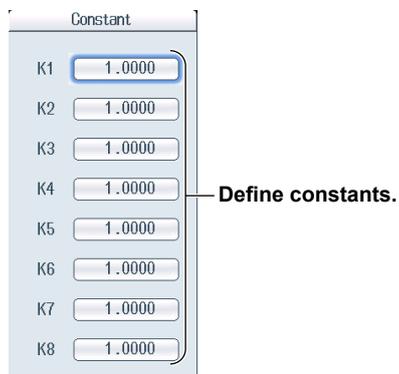
### Configuring Filters (Filter Setup)

Press the **Filter Setup** soft key to display the following screen.



### Defining Constants (Constant Setup)

Press the **Constant Setup** soft key to display the following screen.



# 10.1 Displaying FFT Waveforms

This section explains the following settings (which are used when displaying power-spectrum waveforms in the FFT window):

- FFT waveform display on and off
- Vertical and horizontal scale values

On models with the user-defined computation option, you can display up to two FFT waveforms, and you can analyze the following spectrums in addition to the power spectrum (PS).

- LS (linear spectrum)
- CS (cross spectrum of two waveforms)
- RS (RMS power spectrum)
- TF (transfer function of two waveforms)
- PSD (power spectrum density)
- CH (coherence function of two waveforms)

► “FFT” in the Features Guide

## FFT Menu

Press **SHIFT+MATH (FFT)** to display the following menu.



**FFT(PS)**

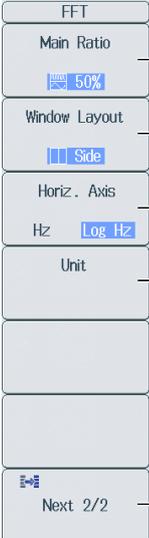
- Display** OFF ON — Turns the FFT waveform display on and off
- Source** CH1 — Select the analysis source waveform. (CH1-CH16, 16chVOLT, CAN, Math1-Math6)
- Start Point** -5.00div — Set the analysis start point (using the jog shuttle).
- FFT Points** 1k — Set the number of FFT points (1k, 2k, 5k, 10k, 20k, 50k, 100k).
- Window** Hanning — Set the FFT window (Rect, Hanning, Flat Top, Hamming).
- Vert. Scale Mode** Auto Manual — Set the vertical scale mode (Auto, Manual).
- Center** 0.0000dBV — Set the vertical-axis center point and the sensitivity (using the jog shuttle).
- Sensitivity** 1.0000dBV — (These can only be set when Vert. Scale Mode is set to Manual.)
- Next 1/2 — Displays the second page of the menu

**On Models with the User-Defined Computation Option**



- FFT 1** ON **FFT 2** OFF — Select whether to set FFT1 or FFT2.
- Display** OFF ON
- FFT Setup** — Press to configure the FFT.
- Vert. Scale Mode** Auto Manual
- Center** 0.0000dBV
- Sensitivity** 1.0000dBV
- Start Point** -1.998div
- FFT Points** 1k
- Next 1/2

Press the **Next** soft key to display the second page of the menu.



**FFT**

- Main Ratio** 50% — Set the main screen's display percentage (50%, 20%, 0%).
- Window Layout** Side — Set the FFT window layout (Side, Vertical).
- Horiz. Axis** Hz Log Hz — Set the horizontal scale (Hz, Log Hz).
- Unit** — Set the unit.
- Next 2/2 — Displays the first page of the menu

## Configuring FFT Conditions (FFT Setup)

Press the **FFT Setup** soft key to display the following screen.

The screenshot shows the 'FFT Setting' screen with the following configuration options and callouts:

- FFT 1**
  - Type: CS (Callout: Set the spectrum type (LS, RS, PS, PSD, CS, TF, CH).)
  - Sub Type: LOGMAG (Callout: Set the spectrum sub type (REAL, IMAG, MAG, LOGMAG, PHASE).)
  - Source1: CH1
  - Source2: CH1 (Callout: Select the analysis source waveform (CH1-CH16, 16chVOLT, CAN, Math1-Math6). You can set Trace 2 when the spectrum type is CS, TF, or CH.)
- FFT Window**
  - Window: Exponential
  - Damping Rate: 100.0%
  - Force1: 100.0%
  - Force2: 100.0%
  - (Callout: Configure the window function. ▶ section 9.5, "Configuring FFT Computations (FFT Setup)")
- Average**
  - Average Mode: Linear
  - Average Domain: Time (selected), Freq
  - Linear Count: 16
  - (Callout: Configure the averaging. ▶ section 9.5, "Configuring Averaging (Average Setup)")

# 11.1 Performing GO/NO-GO Determination with Waveform Zones

This section explains the following settings (which are used when performing GO/NO-GO determination with waveform zones):

- Selecting the mode
- Creating and editing waveform zones
- Reference conditions
- Action execution

▶ [“Waveform Zone \(Wave Zone\)” in the Features Guide](#)

## GO/NO-GO Menu

Press **SHIFT+MEASURE** (GO/NO-GO) to display the following menu.

The screenshot shows a vertical menu with the following items and annotations:

- GO/NO-GO** (Title)
- Mode**: Set Mode to Wave Zone. (Sub-menu: Wave Zone)
- Edit Zone**: Press to edit the waveform zone. (Sub-menu: Zone1)
- Judgement Setup**: Press to configure the determination conditions.
- Action Setup**: Press to configure the actions.
- Time Range1**: Set the determination start point (using the jog shuttle). (Value: -5.000div)
- Time Range2**: Set the determination end point (using the jog shuttle). (Value: 5.000div)

## Editing Zones (Edit Zone)

1. Press the **Edit Zone** soft key to use the jog shuttle to adjust this setting.
2. Use the **jog shuttle** to set the number of the zone that you want to edit (Zone1 to Zone6).
3. Press the **Edit Zone** soft key to display the following menu.

The screenshot shows the **Edit Zone** menu with the following items and annotations:

- Edit**: Set the editing range (Whole, Part). (Sub-menu: Whole, Part)
- Upper**: Set the range of the zone (using the jog shuttle). (Value: 0.00div)
- Lower**: (Value: 0.00div)
- Left**: (Value: 0.00div)
- Right**: (Value: 0.00div)
- Store as**: Set the waveform zone that you want to save to (Zone1-Zone6, Cancel). (Value: Zone1)
- Execute Store**: Saves the waveform zone
- New**: Select the base waveform (CH1-CH16, Math1-Math8, Cancel).
- Quit**: Finishes editing

**When Edit Is Set to Part** (Sub-menu):

- Time Range1**: (Value: 0.00div)
- Time Range2**: (Value: 0.00div)

## Configuring Determination Conditions (Judgement Setup)

Press the **Judgement Setup** soft key to display the following screen.

Set the reference standard (X, IN, OUT).

Select the source waveform (CH1-CH16, Math1-Math8).

Set the zone number (Zone1-Zone6).

#	Mode	Truce	Zone No.
1	X	CH1	Zone1
2	X	CH1	Zone1
3	X	CH1	Zone1
4	X	CH1	Zone1
5	X	CH1	Zone1
6	X	CH1	Zone1
7	X	CH1	Zone1
8	X	CH1	Zone1
9	X	CH1	Zone1
10	X	CH1	Zone1
11	X	CH1	Zone1
12	X	CH1	Zone1
13	X	CH1	Zone1
14	X	CH1	Zone1
15	X	CH1	Zone1
16	X	CH1	Zone1

Logic:  AND  OR

ActCondition:  Always  Fail  Success

Sequence:  Single  Continue

ACQ Count:

Remote:  OFF  ON

Set the determination logic (AND, OR).

Set the action condition (Always, Fail, Success).

Set the sequence (Single, Continue).

Set the number of times to acquire waveforms (using the jog shuttle).

Turns the external synchronization function of GO/NO-GO determination on and off

### Action Condition (Act Condition)

Always: The set actions are always executed.

Fail: The set actions are executed when the GO conditions are not met.

Success: The set actions are executed when the GO conditions are met.

### Sequence (Sequence)

Single: The set actions are executed once.

Continue: The set actions are executed repeatedly. The set actions are executed until the number of acquisitions specified by ACQ Count is reached. If ACQ Count is set to Infinite, the set actions are executed until waveform acquisition is stopped.

## Configuring Actions (Action Setup)

Press the **Action Setup** soft key to display the following screen.

**Select to sound an alarm.**  Beep

**Select to print a screen capture.**  Print Image

**Select to save waveform data.**  Save Data

▶ **section 16.4**

**Set the file name.**

▶ **section 16.4**

**Select to save a screen capture.**  Save Image

▶ **section 16.4**

**Set the file name.**

**Select to send e-mail.**  Send Mail

File Path USB-0

Auto Naming

File Name

Data Type

File Path USB-0

Auto Naming

File Name

Mail Count

**Displays the file list**  
▶ **section 16.10**

**Set the number of e-mail messages to send (using the jog shuttle).**

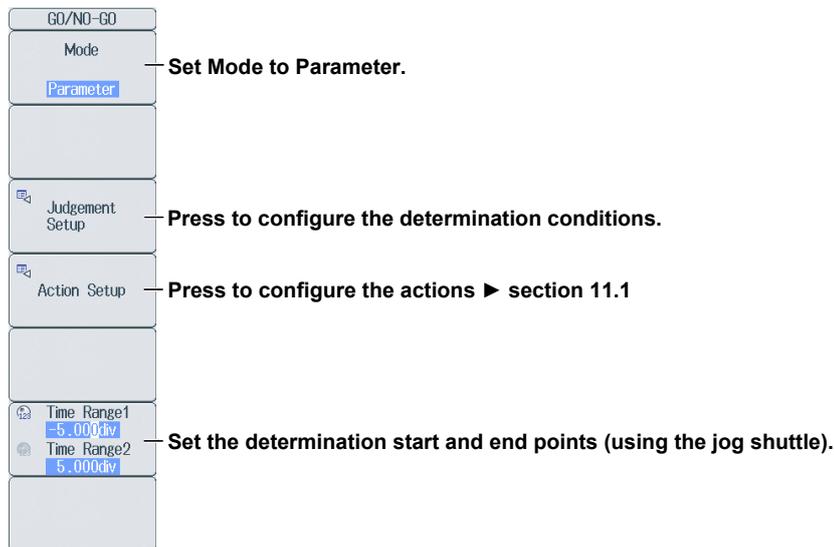
## 11.2 Performing GO/NO-GO Determination with Waveform Parameters

This section explains the following settings (which are used when performing GO/NO-GO determination with waveform parameters):

- Selecting the mode
- Determination conditions
- Action execution
  - ▶ “Waveform Parameters (Parameter)” and “Automated Measurement of Waveform Parameters” in the Features Guide

### GO/NO-GO Menu

Press **SHIFT+MEASURE** (GO/NO-GO) to display the following menu.



### Configuring Determination Conditions (Judgement Setup)

Press the **Judgement Setup** soft key to display the following screen.

**Set the reference standard (X, IN, OUT).**

**Select the source waveform (CH1-CH16, Math1-Math8).**

**Set the waveform parameters.**

The screenshot shows the Judgement Setup screen with the following annotations:

- Upper and Lower Limits**: Set the upper and lower limits of the parameters (using the jog shuttle).
- Logic**: Set the determination logic (AND, OR).
- ActCondition**: Set the action condition (Always, Fail, Success).
- Sequence**: Set the sequence (Single, Continue).
- ACQ Count**: Set the number of times to acquire waveforms (using the jog shuttle).
- Remote**: Turns the external synchronization function of GO/NO-GO determination on and off.

#	Mode	Trace	Item	Upper	Lower
1	X	GH1	Peak to Peak	0.0000	0.0000
2	X	GH1	Peak to Peak	0.0000	0.0000
3	X	GH1	Peak to Peak	0.0000	0.0000
4	X	GH1	Peak to Peak	0.0000	0.0000
5	X	GH1	Peak to Peak	0.0000	0.0000
6	X	GH1	Peak to Peak	0.0000	0.0000
7	X	GH1	Peak to Peak	0.0000	0.0000
8	X	GH1	Peak to Peak	0.0000	0.0000
9	X	GH1	Peak to Peak	0.0000	0.0000
10	X	GH1	Peak to Peak	0.0000	0.0000
11	X	GH1	Peak to Peak	0.0000	0.0000
12	X	GH1	Peak to Peak	0.0000	0.0000
13	X	GH1	Peak to Peak	0.0000	0.0000
14	X	GH1	Peak to Peak	0.0000	0.0000
15	X	GH1	Peak to Peak	0.0000	0.0000
16	X	GH1	Peak to Peak	0.0000	0.0000

### Setting Waveform Parameters (Item)

You can use all 29 automatically measured waveform parameters as reference conditions. You can perform GO/NO-GO determination on up to 16 parameters at the same time. ► section 8.1

# 12.1 Setting the Action

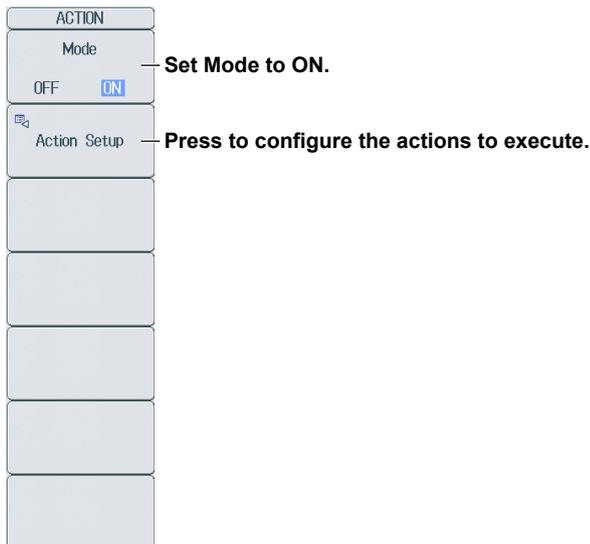
This section explains the following settings (which are used when executing the action function):

- Action mode  
The actions to execute

► “Action” in the Features Guide

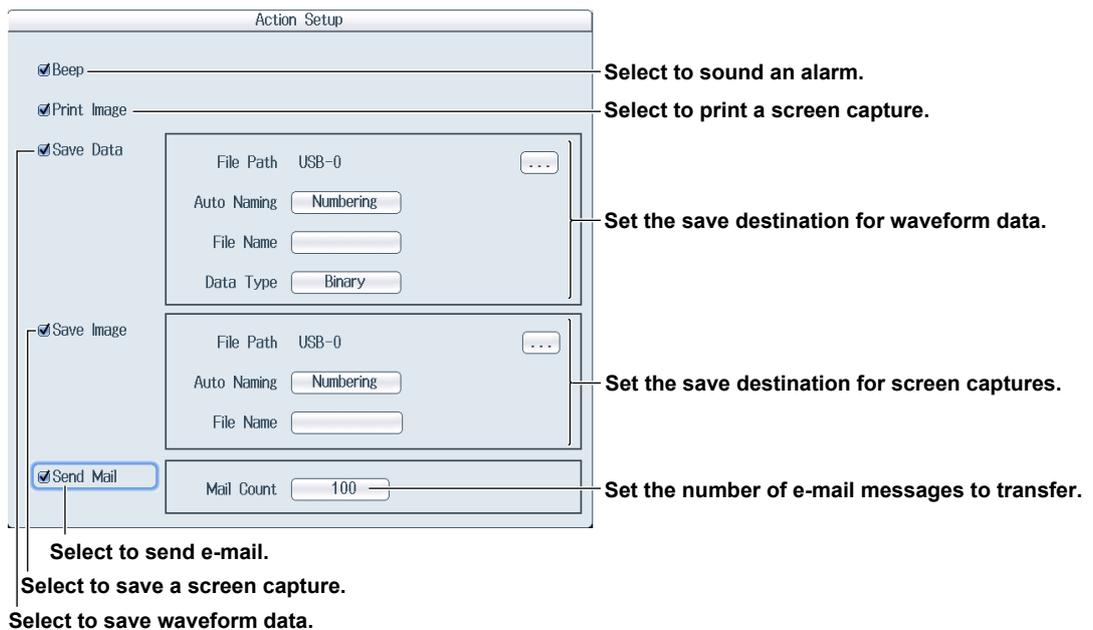
## ACTION Menu

Press **SHIFT+MODE (ACTION)** to display the following menu.



## Configuring Actions to Execute (Action Setup)

Press the **Action Setup** soft key to display the following screen.



### Executing Actions

After you set the action mode, the actions to execute, and the number of times to execute the actions, press **START/STOP**. The actions will be executed each time that the DL850/DL850V triggers. An icon () appears in the upper left of the screen when actions are being executed. To stop executing actions, press **START/STOP**.

#### **Note**

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When one of the actions to execute is e-mail transmission, the DL850/DL850V sends the number of messages specified by either the number of times to execute the actions or Mail Count, whichever is lower.

---

## 13.1 Searching for Edges

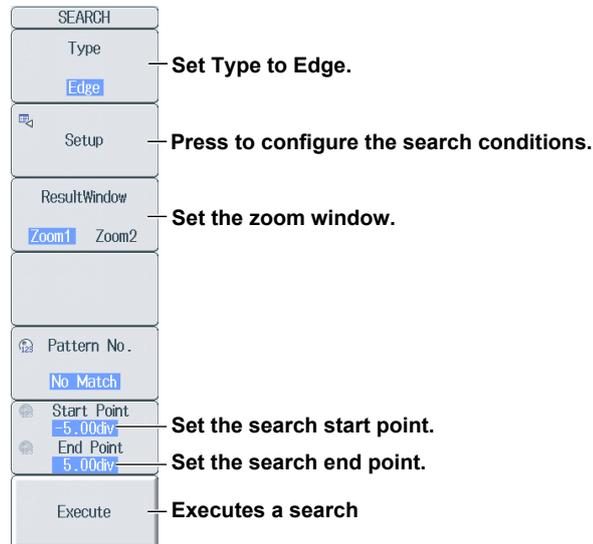
This section explains the following settings (which are used when searching for edges):

- Search type
  - Search conditions
    - The source waveform, level for determining the state of the source waveform, edge polarity, hysteresis, and the number of times to detect the conditions
- Detected waveform display
  - Zoom window
- Pattern number
- Search range
  - Search start and end points
- Executing searches

► [“Edge Search \(Edge\)” in the Features Guide](#)

### SEARCH Edge Menu

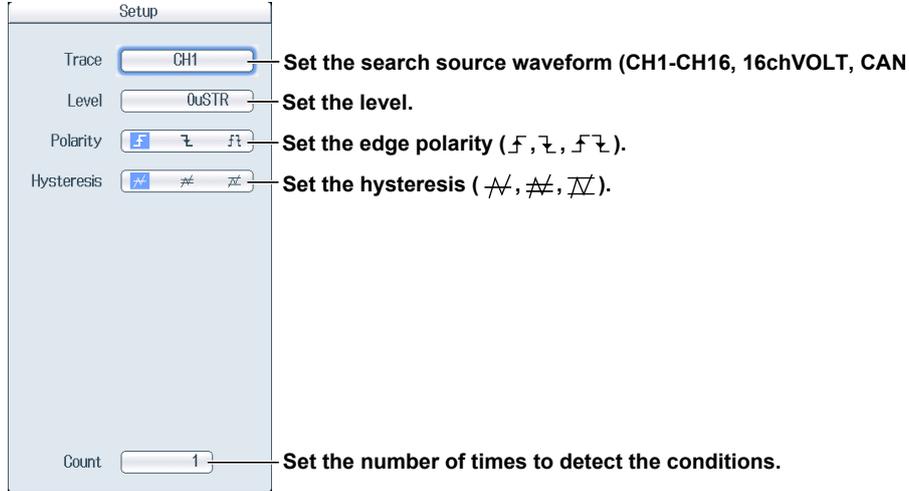
Press **SHIFT+ZOOM** (SEARCH), the **Type** soft key, and then the **Edge** soft key to display the following menu.



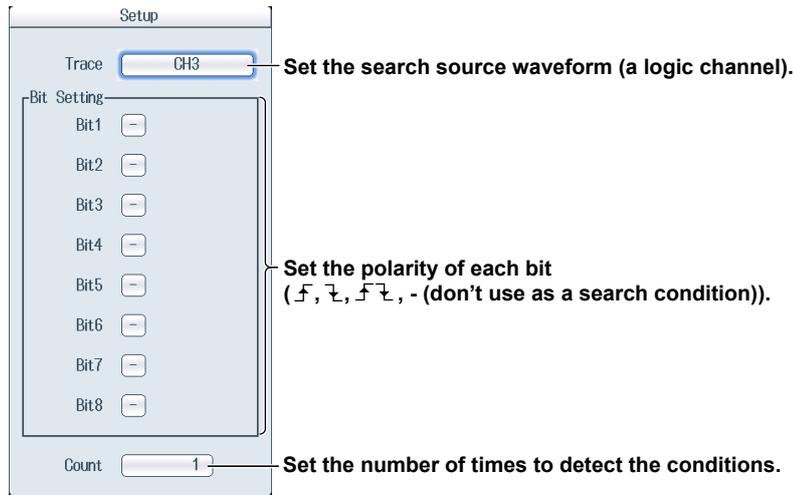
### Configuring Search Conditions (Setup)

Press the **Setup** soft key to display one of the menus shown below. The menu that is displayed varies depending on the search source waveform that you have set.

#### If the Search Source Waveform Is CH1-CH16, 16chVOLT, or CAN



#### If the Search Source Waveform Is a Logic Channel (When a logic input module is installed)

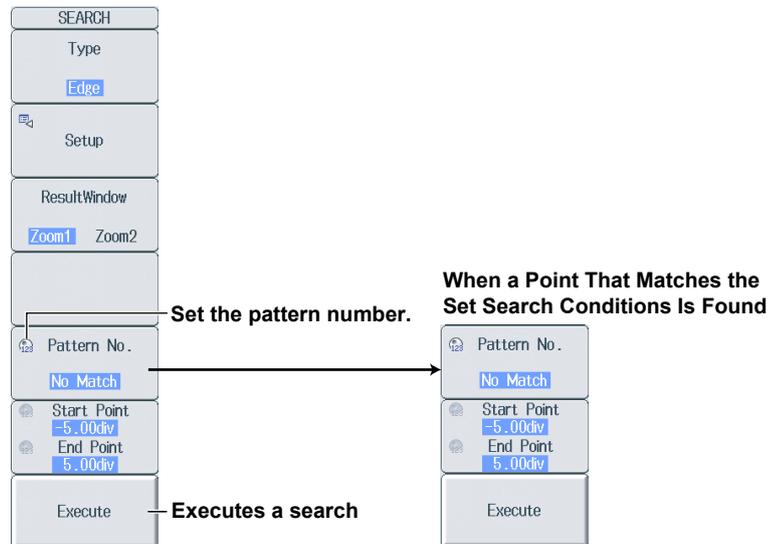


### Setting the Zoom Window (ResultWindow)

Set which zoom window, Z1 or Z2, to display the searched waveform in. You can set zoom windows Z1 and Z2 when they are displayed. If both Z1 and Z2 are not displayed, Z1 will be displayed when you press SHIFT+ZOOM (SEARCH) to display the SEARCH menu.

## Executing a Search (Execute)

Press the **Execute** soft key to execute the search.



- Executing Searches

After setting the search conditions, press the **Search** soft key to execute the search. If the DL850/ DL850V finds points that match the search conditions (detected points), it shows numbers (0, 1, 2, etc.) from the left of the waveform display in the order that the points were detected.

- Setting the Pattern Number

After setting the pattern number, you can display the detected point centered on its corresponding waveform in the zoom window.

## 13.2 Searching for Events

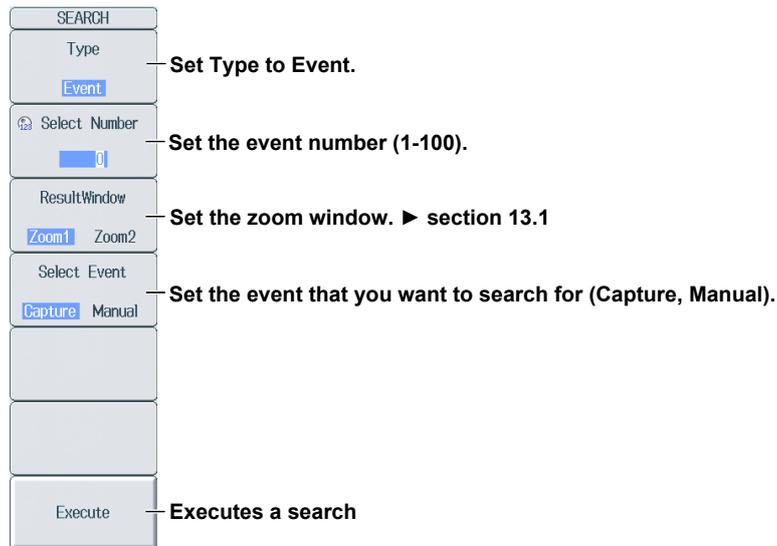
This section explains the following settings (which are used when searching for events):

- Search type
- Search source
- Event number

► “Event Search (Event)” in the Features Guide

### SEARCH Event Menu

Press **SHIFT+ZOOM** (SEARCH), the **Type** soft key, and then the **Event** soft key to display the following menu.



### Executing a Search (Execute)

Press the **Execute** soft key to execute a search. The specified event number is displayed centered on its corresponding waveform in the zoom window.

## 13.3 Searching for Logic Patterns

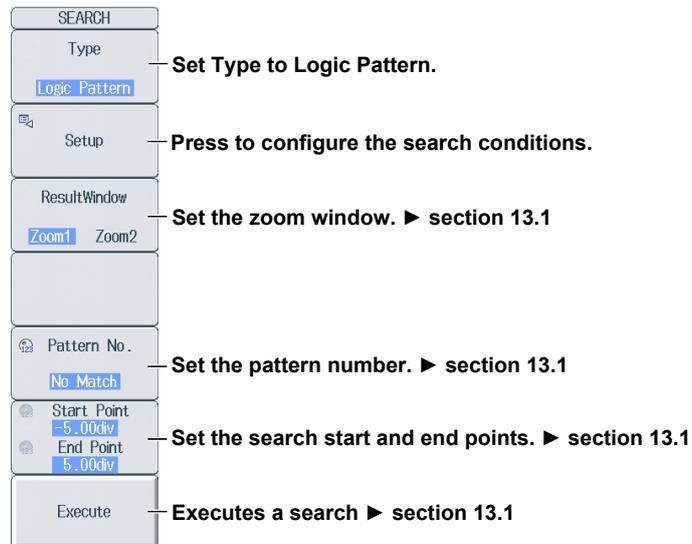
This section explains the following settings (which are used when searching for logic patterns):

- Search type
- Search conditions
  - Source waveform, source bits, and the number of times to detect the conditions

▶ “Logic Pattern Search (Logic Pattern)” in the Features Guide

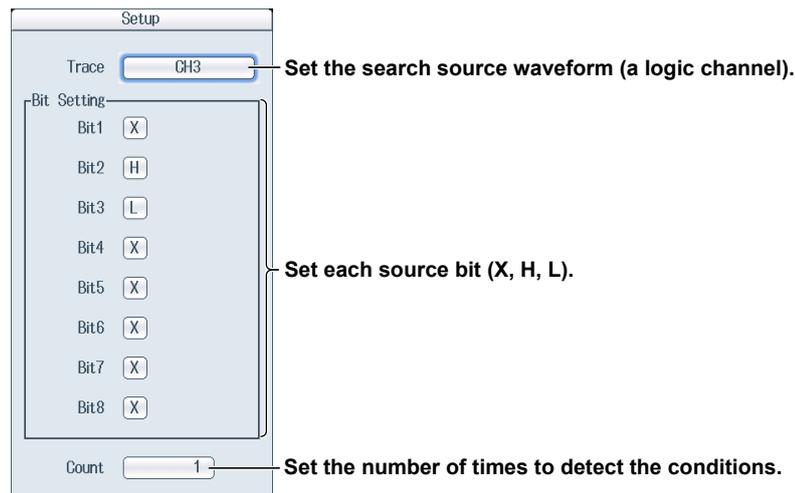
### SEARCH Logic Pattern Menu

Press **SHIFT+ZOOM** (SEARCH), the **Type** soft key, and then the **Logic Pattern** soft key to display the following menu.



### Configuring Search Conditions (Setup)

Press the **Setup** soft key to display the following screen.



## 13.4 Searching for Specific Times

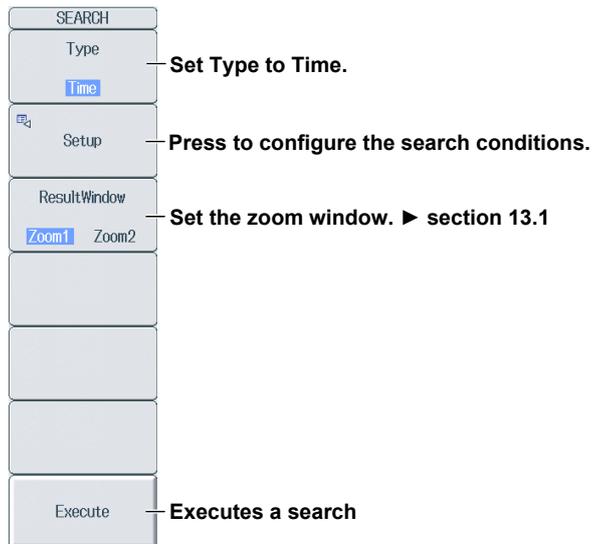
This section explains the following settings (which are used when searching for specific times):

- Search type
- Search source
- Time

► [“Time Search \(Time\)” in the Features Guide](#)

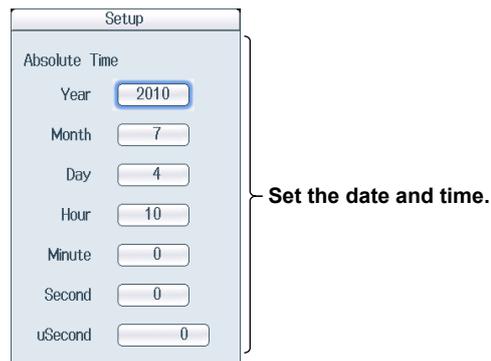
### SEARCH Time Menu

Press **SHIFT+ZOOM** (SEARCH), the **Type** soft key, and then the **Time** soft key to display the following menu.



### Configuring Search Conditions (Setup)

Press the **Setup** soft key to display the following screen.



### Executing a Search (Execute)

Press the **Execute** soft key to execute a search. The specified date and time is displayed centered on its corresponding waveform in the zoom window.

## 14.1 Displaying History Waveforms

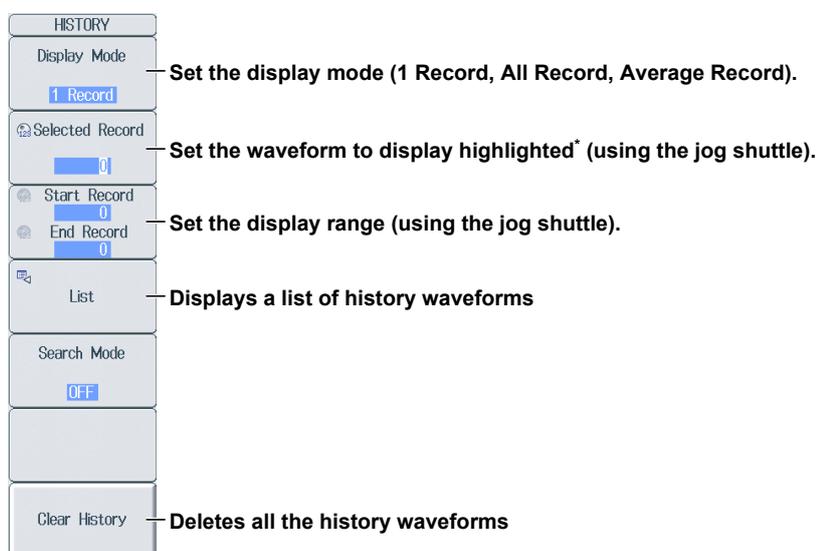
This section explains the following settings (which are used when displaying history waveforms, waveforms that were previously saved to acquisition memory):

- Display mode
- Highlighting of the selected record number
- Display range (start and end record numbers)
- Displaying the list of waveform timestamps
- Deleting all history waveforms

► “Displaying and Searching History Waveforms” in the Features Guide

### HISTORY Menu

Press **HISTORY** to display the following menu.



\* This setting only appears when Display Mode is set to 1 Record or All Record.

### Setting the Display Mode (Display Mode)

**1 Record:** Only displays the waveform corresponding to the selected record number.<sup>1</sup>

**All Record:** Overlays all selected waveforms.<sup>2</sup> All waveforms except the waveform corresponding to the selected record number<sup>1</sup> are displayed in an intermediate color.

**Average Record:** Computes the linear average of all the selected waveforms<sup>2</sup> and displays the result.

1 Specify the highlighted waveform with Select Record.

2 Specify with Start Record and End Record.

### Note

- After you execute a search on the history waveforms, the only waveforms that are displayed are those that met the search conditions. To display all the history waveforms in acquisition memory again, turn the history waveform search feature off.
- Average Record feature requires a certain amount of acquisition memory. If this is not available, you will not be able to display the Average Record.

### Displaying a List of History Waveforms (List)

Press the **List** soft key to display the following screen.

Record number	Time when the waveform was acquired in acquisition memory
	List
#-0000	15:46:18.980110
#-0001	15:45:31.924126
#-0002	15:45:05.155323
#-0003	15:44:34.610994

— List of history waveforms (you can use the jog shuttle to scroll through the list of data)

#### Note

---

##### Notes about Setting the History Feature

- When the acquisition mode is set to Average, you cannot use the history feature.
- If you stop waveform acquisition, the DL850/DL850V only displays waveforms that have been acquired completely.

##### Notes about Recalling Data Using the History Feature

- You can start waveform acquisition when the History menu is displayed. However, you cannot change the history feature settings while waveform acquisition is in progress.
  - The settings are restricted so that the following relationship is retained: Last record (End)  $\leq$  Select No  $\leq$  first record (Start).
  - When you load waveform data from the specified storage medium, history waveforms up to that point are cleared. The loaded waveform data is placed in record number zero. If you load a file containing multiple waveforms, the latest waveform is placed in zero, and earlier waveforms are placed in order to record numbers -1, -2, and so on.
  - Computation and automated measurement of waveform parameters are performed on the waveform of the record number specified by Select No. You can analyze old data as long as you do not overwrite the acquisition memory contents by restarting waveform acquisition. If Display Mode is set to Average Record, analysis is performed on the averaged waveform.
  - History waveforms are cleared when you turn the power off.
-

## 14.2 Searching History Waveforms

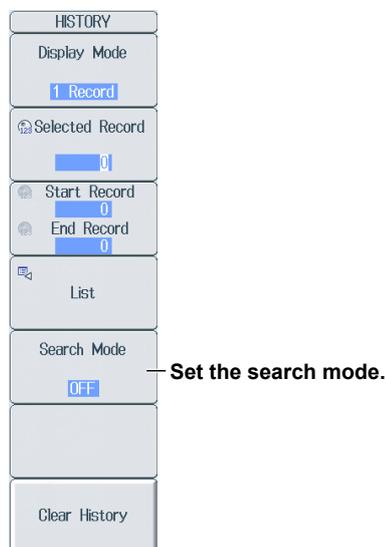
This section explains the following settings (which are used when searching history waveforms):

- Search mode
  - Zone and parameters
- Search conditions
  - Search zone and parameter registration, search condition, source waveform, selectable range of the search window (upper and lower limits and left and right edges), search logic, and measurement range of the parameters
- Executing searches

► [“Searching History Waveforms \(Search\)” in the Features Guide](#)

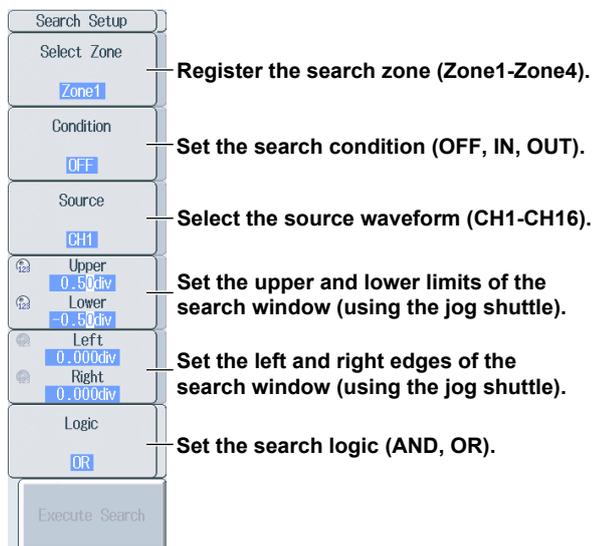
### HISTORY Menu

Press **HISTORY** to display the following menu.



### Searching by Zone (Search Setup)

Press the **Search Mode** soft key, the **Zone** soft key, and then the **Search Setup** soft key to display the following menu.



### Searching by Automatically Measured Parameter (Search Setup)

Press the **Search Mode** soft key, the **Parameter** soft key, and then the **Search Setup** soft key to display the following menu.

The screenshot shows the 'Search Setup' menu with the following options and annotations:

- Select Param**: Param1 — Register the search parameter (Param1-Param4).
- Condition**: OFF — Set the search condition (OFF, IN, OUT).
- Source**: — Press to set the source waveform (Trace) and the parameter (Item).
- Upper**: 0.0000 — Set the upper and lower limits of the search condition (using the jog shuttle).
- Lower**: 0.0000
- Logic**: AND — Set the search logic (AND, OR).
- Time Range1**: -5.000div — Use the jog shuttle to set the measurement time period of the parameter (left edge – Time Range1; right edge – Time Range2).
- Time Range2**: 5.000div
- Execute Search**: —

### Setting the Waveform to Search and the Parameter (Source)

Press the **Source** soft key to display the following menu.

The screenshot shows the 'Source' menu with the following options and annotations:

- Trace**: CH1 — Select the source channel (CH1-CH16).
- Item**: Peak to Peak — Set the waveform parameter type. ▶ section 8.1

### Searching History Waveforms (Execute Search)

After you finish setting all the search conditions, press **ESC** to display the following menu.

The screenshot shows the 'HISTORY' menu with the following options and annotations:

- Display Mode**: 1 Record
- Selected Record**: 0
- Start Record**: 0
- End Record**: 0
- List**: —
- Search Mode**: Zone
- Search Setup**: —
- Execute Search**: — Execute the history waveform search.

## 15.1 Loading Roll Paper into the Built-In Printer (Optional)

This section explains how to load roll paper into the optional built-in printer.

### Printer Roll Paper

Only use roll paper specifically made for use with the DL850/DL850V series. The DL850/DL850V comes with one set of roll paper included. Use this when you first load roll paper into the built-in printer. When you need a new supply of roll paper, please contact your nearest YOKOGAWA dealer.

Part Number:	B9988AE
Specifications:	Heat sensitive paper, 10 m
Minimum Quantity:	10 rolls

### Handling Roll Paper

The roll paper is made of heat sensitive paper that changes color thermochemically. Please read the following information carefully.

#### Storage Precautions

The heat-sensitive paper changes color gradually at temperatures of approximately 70°C or higher. The paper can be affected by heat, humidity, light, and chemicals, whether something has been recorded on it. As such, please follow the guidelines listed below.

- Store the paper in a cool, dry, and dark place.
- Use the paper as quickly as possible after you break its protective seal.
- If you attach a plastic film that contains plasticizing material, such as vinyl chloride film or cellophane tape, to the paper for a long time, the recorded sections will fade due to the effect of the plasticizing material. Use a holder made of polypropylene to store the roll paper.
- When pasting the record paper to another material, do not use paste that contains organic solvents such as alcohol or ether. Doing so will change the paper's color.
- We recommend that you make copies of the recordings if you intend to store them for a long period of time. Because of the nature of heat-sensitive paper, the recorded sections may fade.

#### Handling Precautions

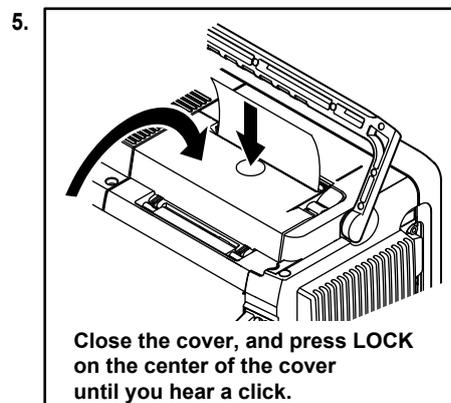
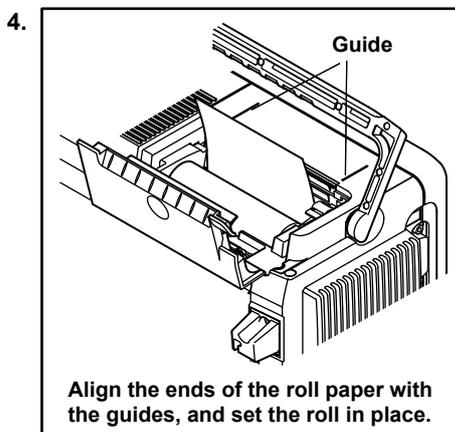
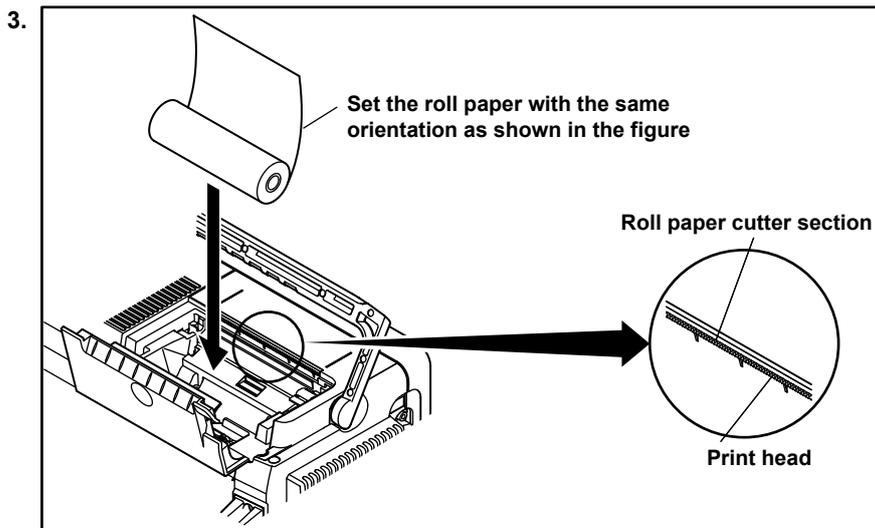
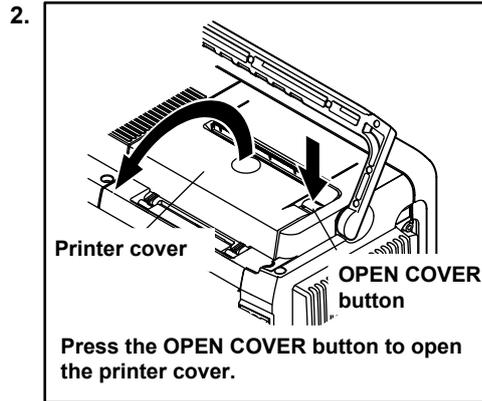
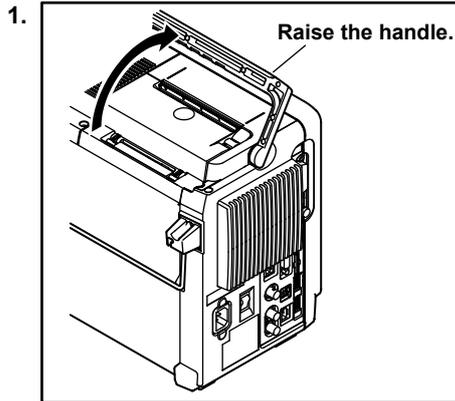
- Only use genuine, YOKOGAWA-supplied roll paper.
- If you touch the roll paper with sweaty hands, there is a chance that you will leave fingerprints on the paper, or blur the recorded sections.
- If you rub something hard against the surface of the roll paper, the paper may change color due to frictional heat.
- If the roll paper comes into contact with products such as chemicals or oil, the paper may change color or the recorded sections may disappear.

## Attaching the Roll Paper



### CAUTION

- Do not touch the print head. If you do, you may burn yourself.
- Do not touch the roll paper cutter section at the front end of the printer cover. Doing so may cause injury.



## 15.2 Printing Using the Built-in Printer (Optional)

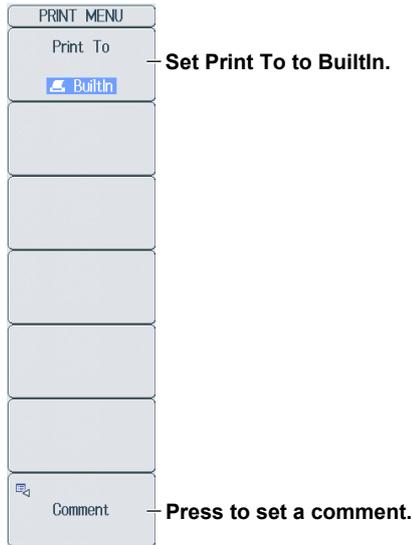
This section explains the following settings (which are used when printing the image that is displayed on the DL850/DL850V using the optional built-in printer):

- Print destination
- Comment

▶ [“Printing on the Built-in Printer \(BuiltIn\)” in the Features Guide](#)

### PRINT MENU Menu

Press **PRINT MENU**, the **Print To** soft key, and then the **BuiltIn** soft key to display the following menu.



### Printing

Press **PRINT** to print the image that is displayed on the screen using the built-in printer.

## 15.3 Printing on a Network Printer

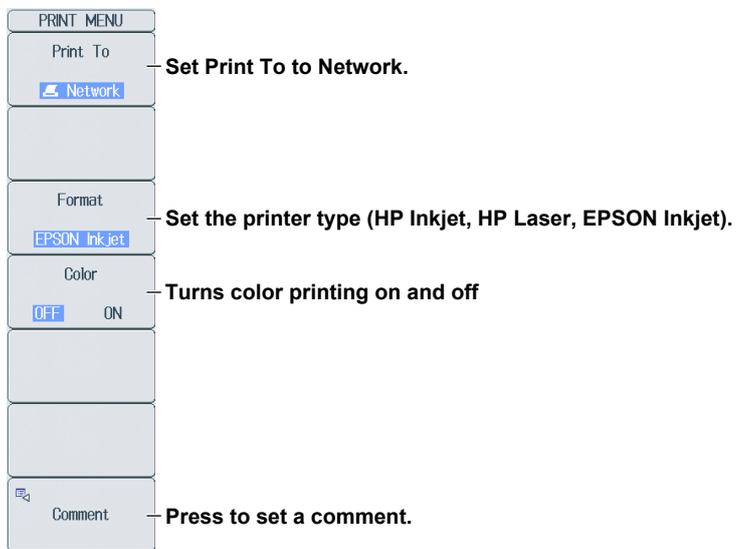
This section explains the following settings (which are used when printing the image that is displayed on the DL850/DL850V using a network printer):

- Print destination
- Printer type
- Color printing
- Comment

► [“Printing on a Network Printer \(Network\)” in the Features Guide](#)

### PRINT MENU Menu

Press **PRINT MENU**, the **Print To** soft key, and then the **Network** soft key to display the following menu.



### Note

You must configure the network printer in advance by following the instructions in section 17.8.

### Printing

Press **PRINT** to print the image that is displayed on the screen using a network printer.

## 15.4 Saving Screen Captures to Files

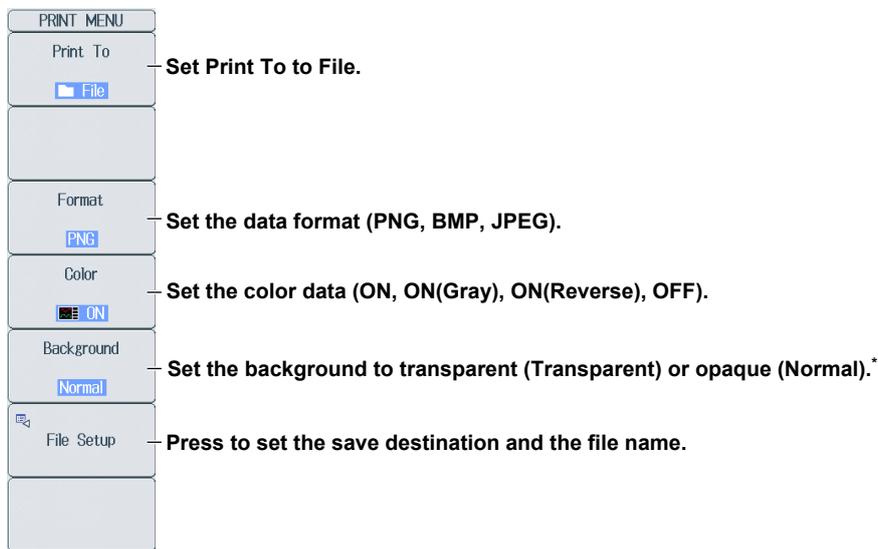
This section explains the following settings (which are used when saving screen captures to files). You can use the PRINT MENU menu or the SAVE MENU menu to set how files are saved.

- Save destination
- Data format
- Color data
- Background transparency (transparent or opaque)
- Save destination and the file name

► “Saving Screen Captures to Files (File)” in the Features Guide

### PRINT MENU Menu

Press **PRINT MENU**, the **Print To** soft key, and then the **File** soft key to display the following menu.

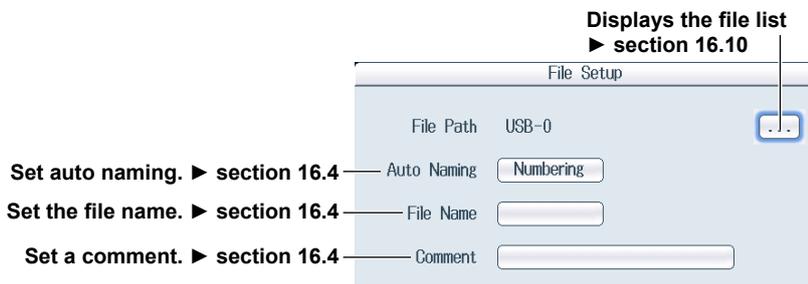


\* This appears when the data format is set to PNG.

When the data format is JPEG, a setup menu for turning the frame on and off appears.

### Setting the Save Destination and the File Name (File Setup)

Press the **File Setup** soft key to display the following screen.

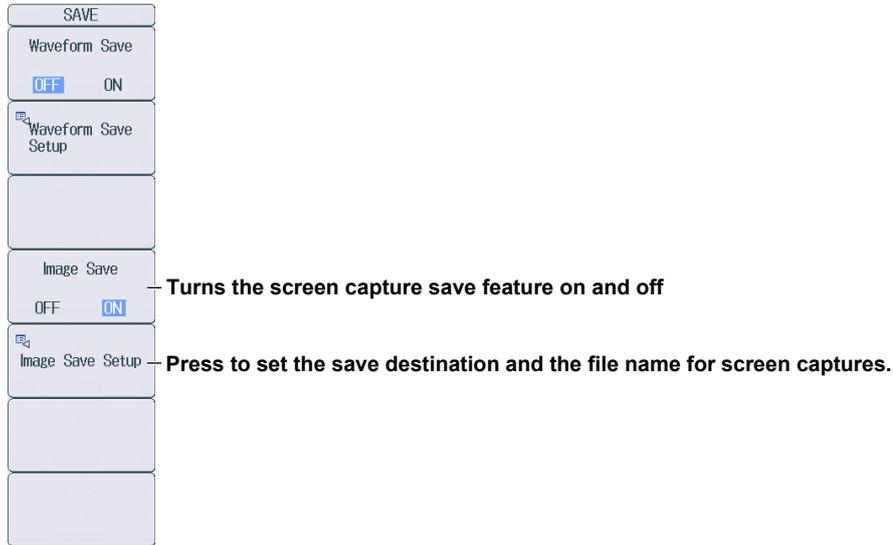


### Saving

Press **PRINT** to save the screen capture file to the specified folder.

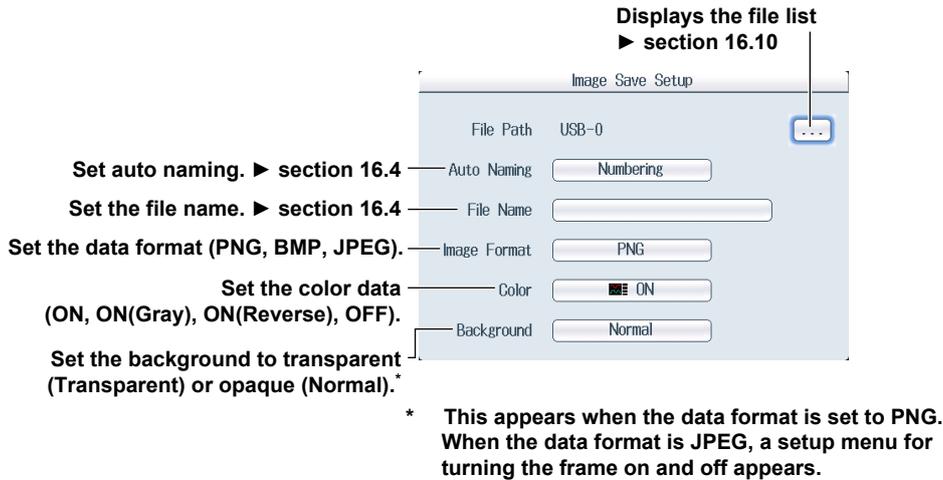
### SAVE MENU Menu

Press **SHIFT+SAVE** (MENU) to display the following menu.



### Setting the Save Destination and the File Name of the Screen Capture (Image Save Setup)

Press the **Image Save Setup** soft key to display the following screen.



### Saving

Press **SAVE** to save the screen capture file to the specified folder. If Data Save on the SAVE menu is set to ON, the waveform data is also saved.

## 16.1 Connecting Storage Media

This section explains how to connect the following storage media (which are used when saving and loading data) to the DL850/DL850V:

- SD memory cards
- USB storage devices
- External hard disks (optional)

### SD Memory Cards



#### CAUTION

- Do not orient the SD memory card in the wrong direction, and force it into the DL850/DL850V. Doing so may damage the SD memory card and the DL850/DL850V.
- Inserting and removing the SD memory card quickly (within the span of a second) may damage the DL850/DL850V.
- Removing the SD memory card from the DL850/DL850V while the card is being accessed may corrupt the data on the SD memory card.
- An icon (📁) centered at the top of the screen indicates when the SD memory card is being accessed.

#### SD Memory Cards That Can Be Used

You can use memory cards that conform to the SD or SDHC standard with the DL850/DL850V. For details, contact your nearest YOKOGAWA dealer.

#### Note

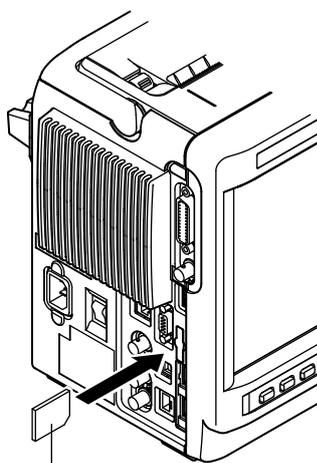
When using an SD memory card with a PC, make sure that the PC is compatible with the SD memory card. Also, depending on the type of PC, some of the cards that you have checked by contacting Yokogawa may not function properly. Make sure that the card that you intend to use is compatible with your PC.

#### How to Insert an SD Memory Card

Orient the SD memory card so that its front is facing you, and then insert the card in the SD memory card slot.

The SD memory card slot is on the left side panel of the DL850/DL850V.

If you are using an SD memory card that has a write-protection feature and you want to save data to or format the card, disable the write-protection feature before you insert the SD memory card into the DL850/DL850V.



SD memory card

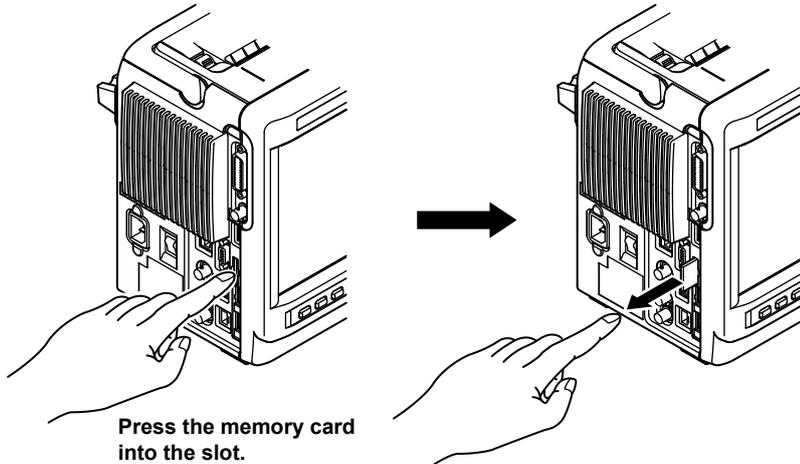
## 16.1 Connecting Storage Media

---

### How to Remove the SD Memory Card

Press the end of the SD memory card into the slot, and then release the card to eject it from the DL850/DL850V.

Remove the SD memory card.



### General SD Memory Card Handling Precautions

Follow the general handling precautions that are included with your SD memory card.

## USB Storage Media

### CAUTION

- Do not remove the USB storage medium or turn off the power when the medium is being accessed. If you do so, the data on the USB storage medium may be corrupted.
- An icon (🖨️) centered at the top of the screen indicates when the USB storage medium is being accessed.

### USB Storage Media That Can Be Used

You can use USB storage media that are compatible with USB Mass Storage Class version 1.1.

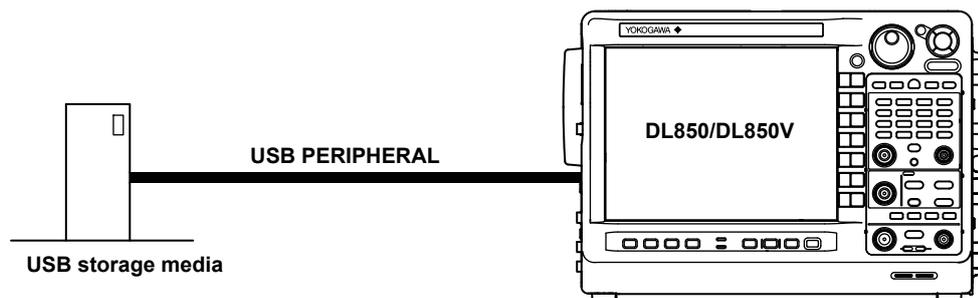
### Note

- Only connect USB keyboards, USB mouse devices, and USB storage media to the USB PERIPHERAL ports.
- The DL850/DL850V can handle up to four storage media. If the connected medium is partitioned, the DL850/DL850V treats each partition as a separate storage medium.
- Connect USB storage devices directly, not through a USB hub.
- Do not connect and disconnect the two USB devices repetitively. Allow at least 10 seconds between removal and connection.

### How to Connect USB Storage Media

When connecting a USB storage medium to a DL850/DL850V USB port, connect the USB cable directly as shown in the figure below. You can connect or disconnect a USB cable at any time whether the DL850/DL850V is on or off (hot-plugging is supported). Connect the type A connector of the USB cable to the DL850/DL850V, and connect the type B connector to the USB storage medium. If you connect a USB storage medium when the power switch is on, the medium becomes available for use after the DL850/DL850V detects it.

The DL850/DL850V has two USB ports: USB0 and USB1. The port numbers are not fixed. The port at which the first USB storage medium is detected becomes USB0. The port at which the second USB storage medium is detected becomes USB1.



### General USB Storage Media Handling Precautions

Follow the general handling precautions that are included with your USB storage media.

## External Hard Disks (Optional)



---

### CAUTION

---

- Do not orient the cable's connector in the wrong direction, and force it into the DL850/DL850V. Doing so may damage the external hard disk and the DL850/DL850V.
  - Do not remove the cable or turn off the power when the external hard disk (the hard disk that is connected to the EXT HDD connector) is being accessed. If you do so, the data on the external hard disk may be corrupted.
  - An icon (  ) centered at the top of the screen indicates when the external hard disk is being accessed.
  - Connect the external hard disk to the DL850/DL850V when the DL850/DL850V is off.
- 

#### eSATA Cable

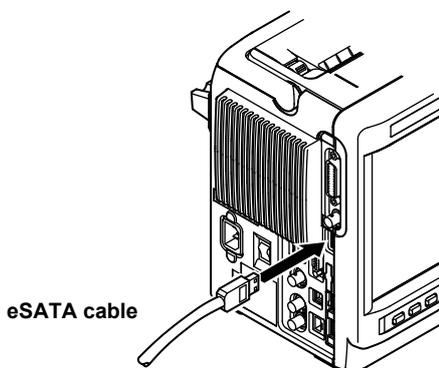
Use a commercially available eSATA (External Serial ATA) cable whose length is 2 m or less.

#### Connection Procedure

1. Connect the eSATA cable to the EXT HDD connector on the left side panel.
2. Turn the external hard disk on.
3. Turn the DL850/DL850V on.

#### Note

- Wait approximately 10 seconds after you turn the external hard disk on before you turn the DL850/DL850V on.
  - For details on formatting the external hard disk, see section 16.3.
- 



#### External Hard Disks That You Can Connect to the DL850/DL850V

The eSATA peripheral devices that you can connect to the DL850/DL850V are hard disks only. For details on the hard disks that you can connect to the DL850/DL850V, contact your nearest YOKOGAWA dealer.

#### General External Hard Disk Handling Precautions

Follow the general handling precautions that are included with your external hard disk.

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## 16.2 Internal Hard Disk (Optional)

This section explains about handling the internal hard disk.



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### **CAUTION**

Do not store more than 512 files in the root directory of the internal hard disk. Doing so will slow the file access operations to all files. In addition, we cannot guarantee the operation of the hard disk recording feature when the DL850/DL850V is in this state.

---

## 16.3 Formatting Storage Media

This section explains how to format storage media.

- Storage management
- Formatting storage media

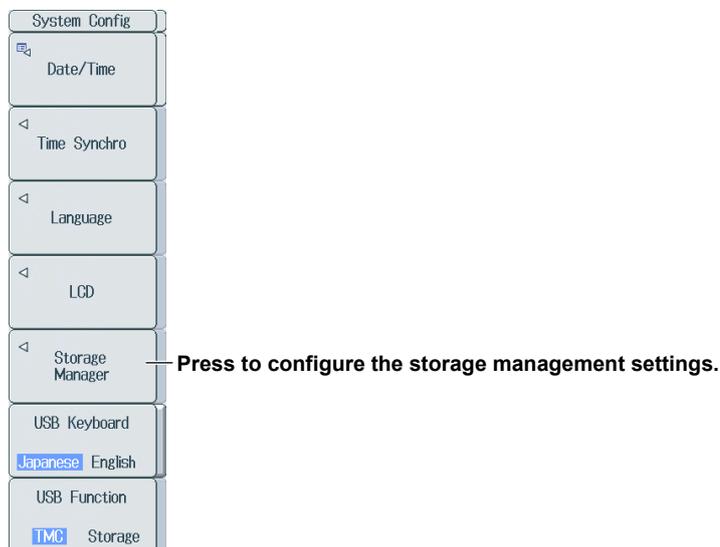
► “Other Features” in the Features Guide

### CAUTION

- When you format a storage medium, all the data that is stored on the medium is deleted.
- If a formatted storage medium cannot be detected by the DL850/DL850V, use the DL850/DL850V to format the storage medium again.

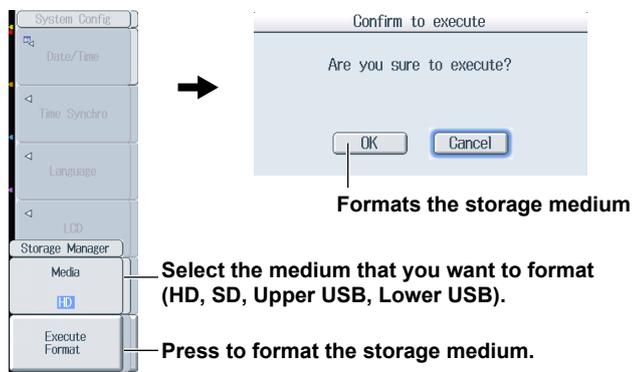
### UTILITY System Config Menu

Press **UTILITY** and then the **System Config** soft key to display the following menu.



### Configuring Storage Management (Storage Manager)

Press the **Storage Manager** soft key to display the following menu.



### Storage Medium That Will Be Formatted (Media)

- HD: External or internal hard disk
  - On models with the /HD0 option, this is the external hard disk.
  - On models with the /HD1 option, this is the internal hard disk.
- SD: SD memory card
- Upper USB: USB storage medium connected to the upper PERIPHERAL connector
- Lower USB: USB storage medium connected to the lower PERIPHERAL connector

## 16.4 Saving Waveform Data

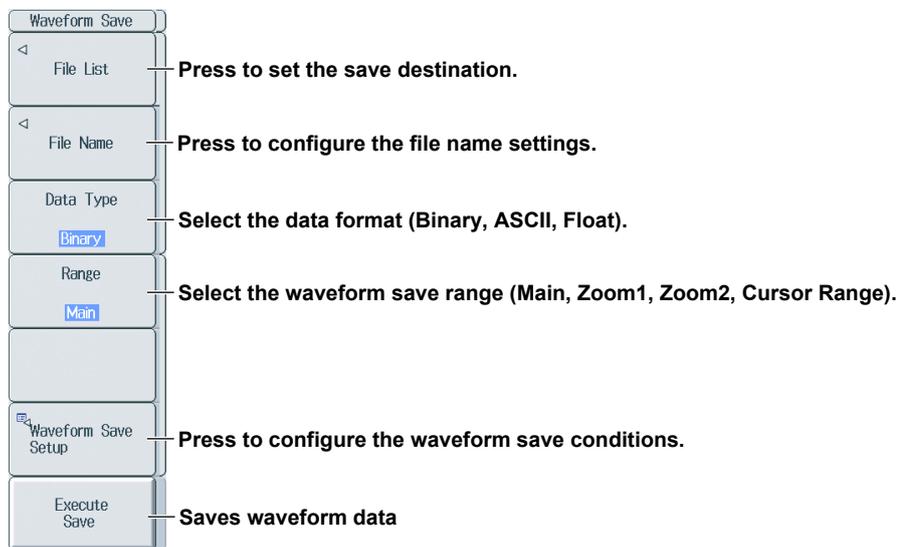
This section explains the following settings (which are used when saving waveform data). You can use the FILE Waveform (Save) menu or the SAVE MENU menu to set how files are saved.

- Save destination
- File name
- Data format
- Save range
- Waveform to save
- Saving waveform data

► “Saving Waveform Data (Waveform)” in the Features Guide

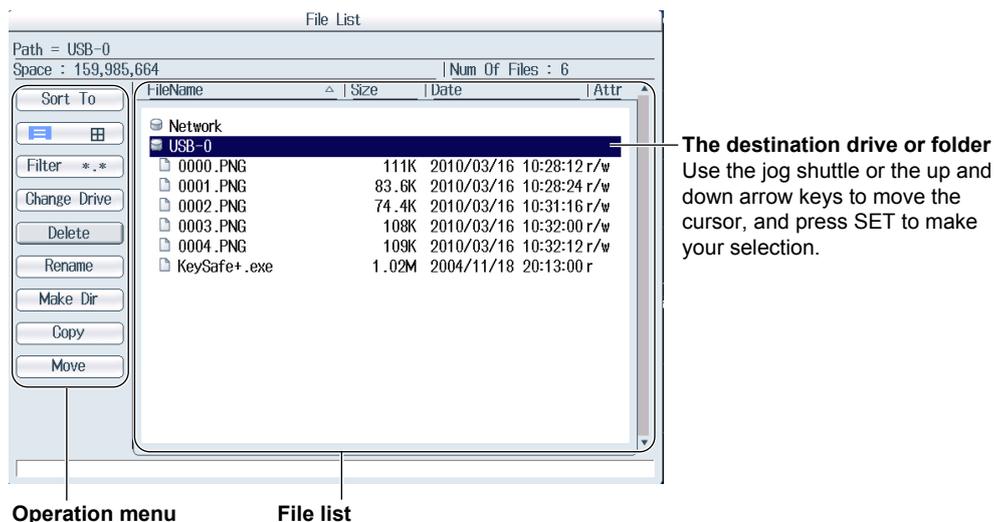
### FILE Waveform (Save) Menu

Press **FILE** and then the **Waveform (Save)** soft key to display the following menu.



### Setting the Save Destination (File List)

Press the **File List** soft key to display the following screen.



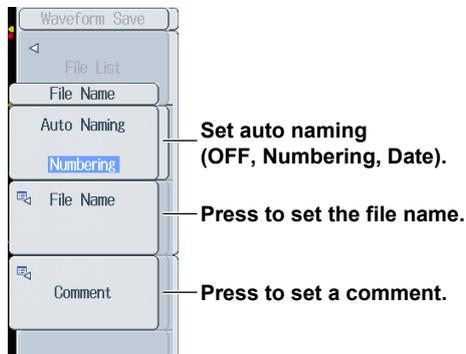
For more information on file operations, see section 16.10.

**Note**

You can also set the save destination drive by using the Change Drive item on the operations menu.

**Configuring File Name Settings (File Name)**

Press the **File Name** soft key to display the following menu.

**Setting Auto Naming (Auto Naming)**

**OFF:** Disables the auto naming feature. The name that you specify using the File Name setting is used. If there is a file with the same name in the save destination folder, you cannot save the data.

**Numbering:** The DL850/DL850V automatically adds a four-digit number from 0000 to 9999 after the common name specified using the File Name setting (up to four characters) and saves files.

**Date:** The file name is the date and time (down to ms) when the file is saved. The file name specified using the File Name setting is not used.

20100630\_121530\_100\_000 (2010/06/30 12:15:30.100)

Year    Month    Day    Hour    Minute    Second    ms

Sequence number when a single file exceeds 2 GB (000 to 999).

A sequence number is appended to the date and time when the size of a single file exceeds 2 GB. The number is incremented by one each time a file is added. The number is not appended if the file does not exceed 2 GB.

**Setting a Comment (Comment)**

You can add a comment that consists of up to 120 characters when you save a file. You do not have to enter a comment. All characters, including spaces, can be used in comments.

**Selecting the Data Type (Data Type)**

**Binary:**

- The sampled data stored in the acquisition memory is saved to a file in binary format.
- The extension is .WDF.

**ASCII:**

- The sampled data stored in the acquisition memory is converted using the specified range and saved to a file in ASCII format.
- You cannot load the data using the DL850/DL850V.
- The extension is .CSV.

**Float:**

- The sampled data stored in the acquisition memory is converted using the specified range and saved to a file in 32-bit IEEE floating format.
- You cannot load the data using the DL850/DL850V.
- The extension is .FLD.

### Selecting the Waveform Save Range (Range)

You can select the waveform save range (area) from one of the choices below. The DL850/DL850V can only load binary data (data that was saved with the Data Type set to Binary as described previously in “Selecting the Data Type”).

Main: This is the normal waveform range. Waveforms are saved up to the displayed record length (the range that is displayed on the screen).

Zoom1: This is the range of zoom waveform Zoom1.

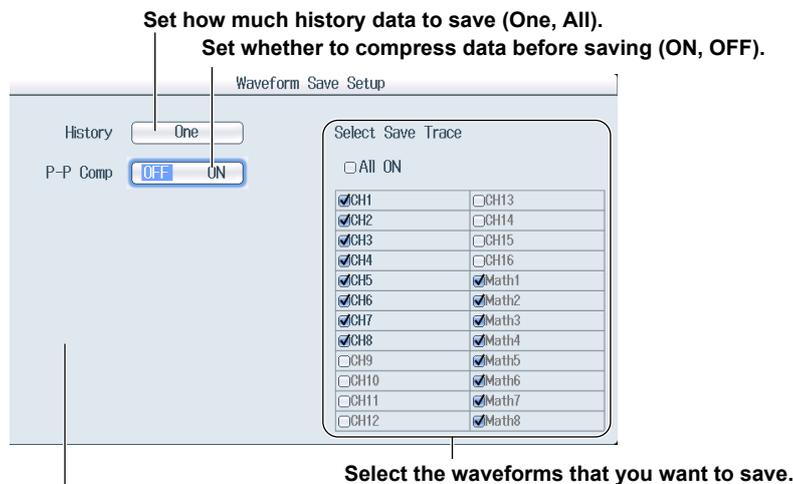
Zoom2: This is the range of zoom waveform Zoom2.

Cursor Range: This is the range that is bounded by Cursor1 and Cursor2.

### Configuring Waveform Save Conditions (Waveform Save Setup)

Press the **Waveform Save Setup** soft key to display the following screen.

• **When the data format is Binary**



When the data format is ASCII, you can set the following items.

- Data removal interval (OFF, Per5, Per10, Per20, Per50, Per100, Per200, Per500, Per1000, Per2000, Per5000)
- Whether to save time information (ON, OFF)
- Extension of the data file (csv, MATLAB)
- Decimal point display (Point, Comma)
- Sub channel data supplement method (Supplement, Space)

#### Saving History Data (History)

One: The one waveform that is selected with Select Record on the HISTORY menu will be saved.

All: All waveforms within the range bounded by Start Record and End Record on the HISTORY menu will be saved. If you search for history waveforms, and then select All, only the detected waveforms will be saved.

#### Note

If the history feature's Display Mode is set to Average Record, select One.

#### Compressing and Saving Data (P-P Comp; when Data Type is set to Binary)

- If you set P-P Comp to ON, and then save data, the DL850/DL850V saves just the maximum and minimum values from the multiple measured data points on the same time axis. This decreases the size of the saved file.
- You cannot perform P-P compression when saving power-spectrum computed data.
- If you set P-P Comp to ON, you cannot use Range to select the save range.

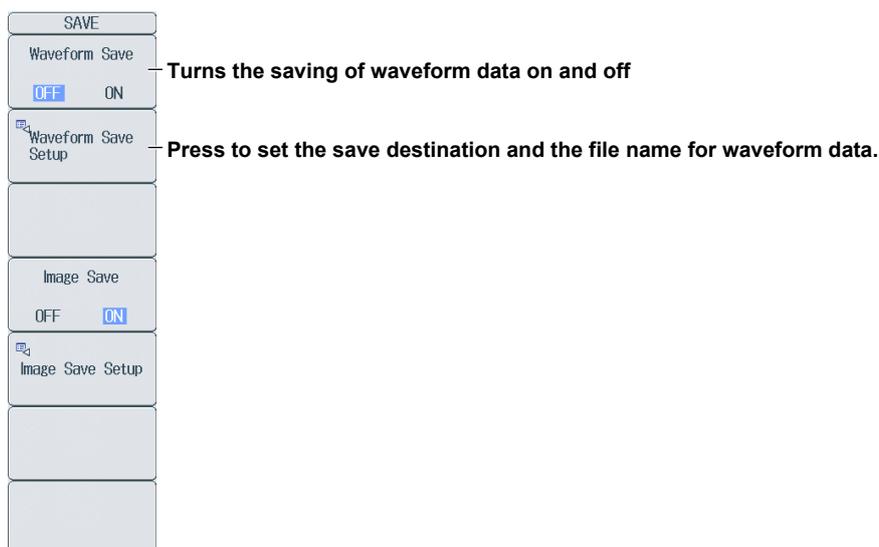
### Selecting the Waveform to Save (Select Save Trace)

- You can select All ON, CH1 to CH16, 16chVOLT, CAN, and the Math waveforms. The waveforms you select that are displayed are saved.
- If you set History to All, the Math waveforms will not be saved. If you want to save the Math data, set History to One.

If you set History to All, all waveforms within the range bounded by Start Record and End Record on the HISTORY menu will be saved. If you want to select which waveform will be saved, do not select All.

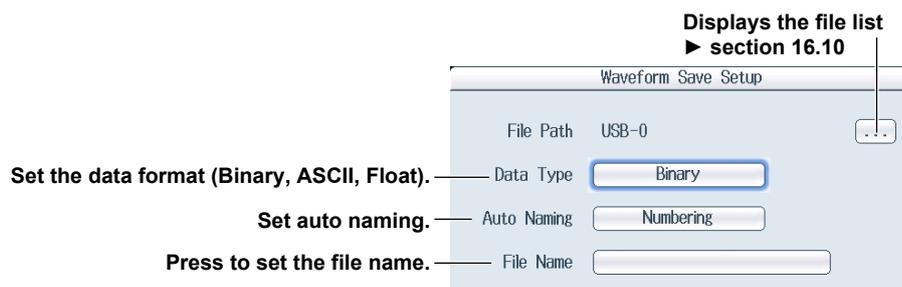
## SAVE Menu

Press **SHIFT+SAVE** (MENU) to display the following menu.



## Setting the Save Destination and the File Name of the Waveform Data (Data Save Setup)

Press the **Data Save Setup** soft key to display the following screen.



## Saving

Press **SAVE** to save the waveform data file to the specified folder. If Image Save Setup on the SAVE menu is set to ON, the screen capture data is also saved.

## Save Destination for Hard Disk Recording and Action Execution

In the specified drive, a folder is automatically created with the date (year, month, and day) as its name, and data is saved to files in that folder whose names are specified by the auto naming feature. If the number of files in the save destination folder exceeds 1000, a new folder is automatically created with the date and an incremented sequence number (000 to 999) as its name, and the data continues to be saved in the new folder.

## 16.5 Saving Setup Data

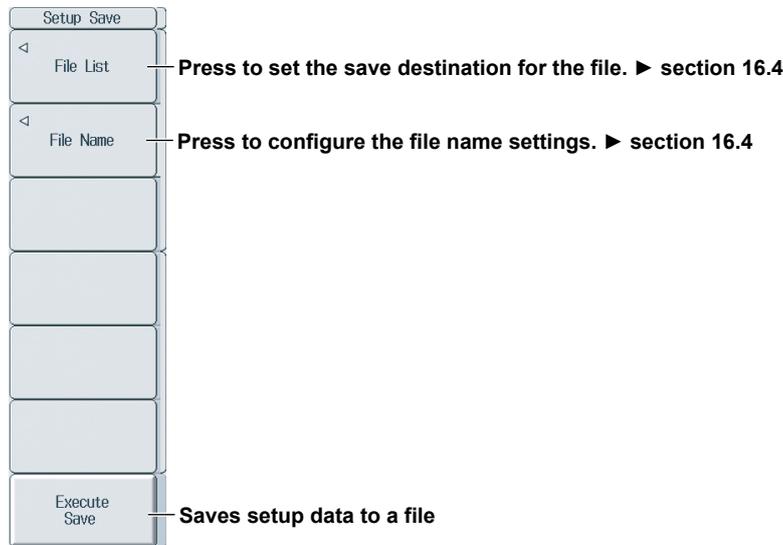
This section explains the following settings (which are used when saving setup data). You can save setup data to a file.

- Save destination
- File name
- Saving setup data

► [“Saving Setup Data \(Setup\)” in the Features Guide](#)

### FILE Setup (Save) Menu

Press **FILE** and then the **Setup (Save)** soft key to display the following menu.



### Saving Setup Data (Execute Save)

- Press the Execute Save soft key to save the setup data (the setup information of each key at the time that the file is saved) to a file. The extension is .SET.
- The date, time, and communication setup parameters are not saved.
- You cannot save setup data during waveform acquisition. Press START/STOP to stop the waveform acquisition.

## 16.6 Saving Other Types of Data

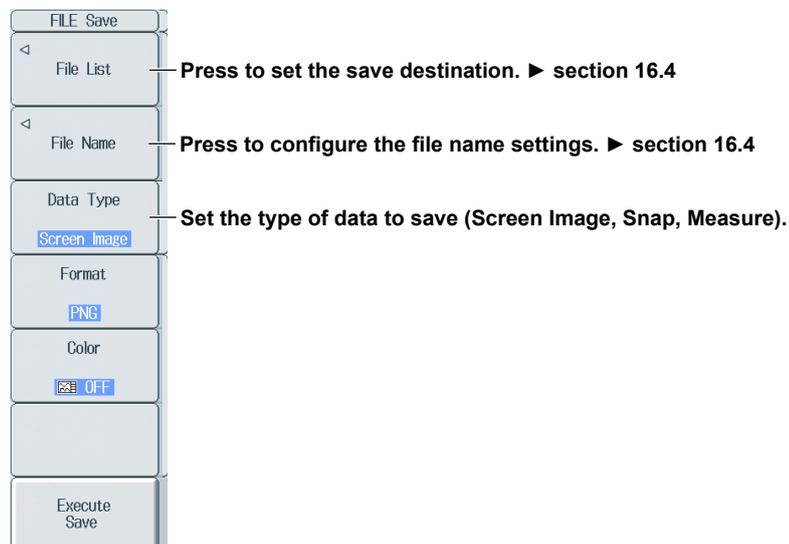
This section explains the following settings (which are used when saving screen captures, snapshot waveform data, and the results of automated measurement of waveform parameters):

- Save destination
- File name
- Data type to save
- Data format (for screen captures)
- Color data (for screen captures)
- Saving data

► “Saving Other Types of Data (Others)” in the Features Guide

### FILE Others (Save) Menu

Press **FILE** and then the **Others (Save)** soft key to display the following menu.



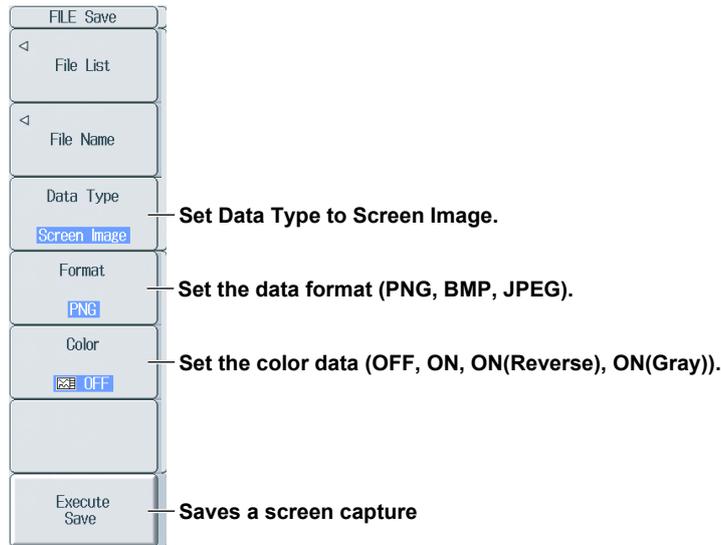
### Setting the Data Type to Save (Data Type)

**Screen Image:** Save the display to a PNG, BMP, or JPEG file.

**Snap:** Save the waveform data captured in a snapshot to a file with .SNP extension.

**Measure:** Save the results of automated measurement of waveform parameters to a file in CSV format.

**When Data Type Is Screen Image**



**Setting the Data Format (Format)**

You can save the following types of files to the specified storage medium. The table below shows the extensions that are automatically assigned to each format and the approximate sizes of files in each format.

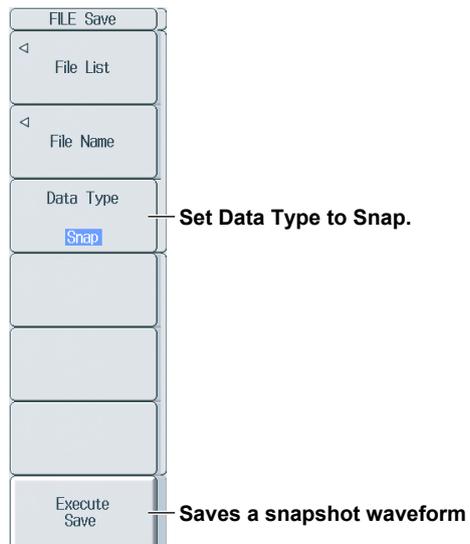
Output Data Format	Extension	File Size <sup>1</sup>
PNG	*.PNG	Approx. 6 KB (approx. 14 KB) <sup>2</sup>
JPEG	*.JPG	Approx. 400 KB (approx. 400 KB) <sup>2</sup>
BMP	*.BMP	Approx. 60 KB (approx. 480 KB) <sup>2</sup>

- 1 When Color is set to OFF.
- 2 The file sizes in parentheses indicate the file size when Color is set to ON.

**Setting the Color (Color; when Format is set to BMP)**

- ON: An image is produced with a 65536-color palette.
- ON(Reverse): The screen background is not produced in color.
- ON(GRAY): An image is produced with a 16-color grayscale palette.
- OFF: A black-and-white image is produced.

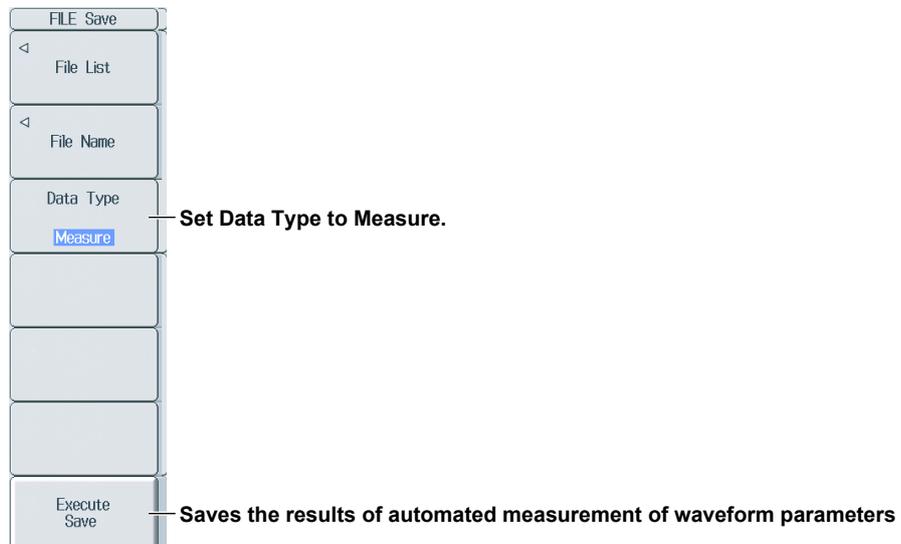
### When Data Type Is Snap



### Note

You cannot use this feature when you are using the FTP server feature, network printer feature, or Web server feature.

### When Data Type Is Measure



### Note

You cannot use this feature when you are using the FTP server feature, network printer feature, or Web server feature.

## 16.7 Loading Waveform Data

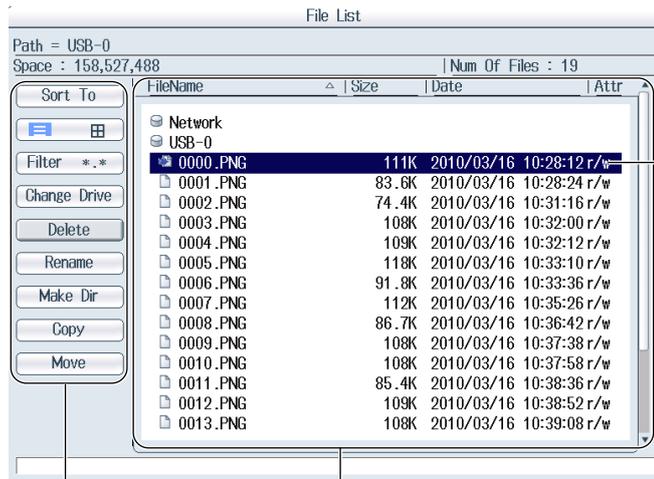
This section explains the following settings (which are used when loading waveform data):

- Displaying file information
- Loading waveform data into reference waveforms
- Loading waveform data into channels

► [“Loading Waveform Data \(Waveform\)” in the Features Guide](#)

### FILE Waveform (Load) Menu

Press **FILE** and then the **Waveform (Load)** soft key to display the following menu.



**The file to load**  
Use the jog shuttle or the up and down arrow keys to move the cursor, and press SET to make your selection.

Operation menu

File list



Displays file information

Loads waveform data

## Selecting Files

Select the file to load from the file list. ► section 16.10

## Loading Waveform Data (Execute Load)

- The selected waveform data file (.WDF extension) is loaded together with the setup file. Loaded data is cleared when you start measurement.
- If the modules that are currently installed in the DL850/DL850V are different from the modules that were installed when the waveform data was saved, you cannot load the waveform data for the modules that are different.

## 16.8 Loading Setup Data

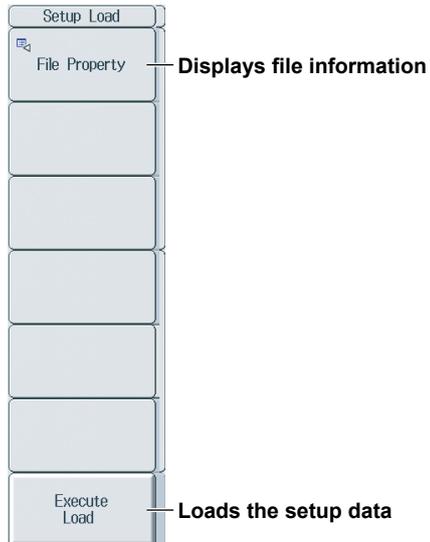
This section explains the following settings (which are used when loading setup data):

- Displaying file information
- Loading setup data

▶ [“Loading Setup Data \(Setup\)” in the Features Guide](#)

### FILE Setup (Load) Menu

Press **FILE** and then the **Setup (Load)** soft key to display the following menu.



### Selecting Files

Select the file to load from the file list. ▶ section 16.10

### Loading Setup Data (Execute Load)

Select the setup data (.SET extension) that you want to load.

If the modules that are currently installed in the DL850/DL850V are different from the modules that were installed when the setup data was saved, you cannot load the setup data.

## 16.9 Loading Other Types of Data

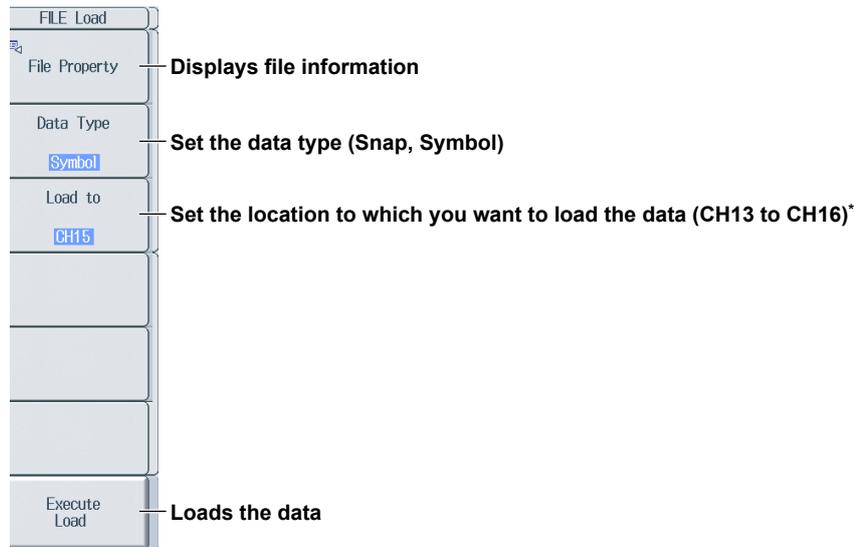
This section explains the following settings (which are used when loading snapshot waveforms):

- Displaying file information
- Type of data to load
- Loading data

► [“Loading Other Types of Data \(Others\)”](#) and [“Loading a CAN Data Definition File \(Symbol File Load\)”](#) in the Features Guide

### FILE Others (Load) Menu

Press **FILE** and then the **Others (Load)** soft key to display the following menu.



\* Only when the type of data to load is set to Symbol

### Setting the Type of Data to Load (Data Type)

Snap: Load snapshot waveform files (.SNP extension) that you have saved.

Symbol: Load CAN data definition files (.SBL extension).

#### Note

You cannot use this feature when you are using the FTP server feature, network printer feature, or Web server feature.

### Clearing the Waveform

To clear the snapshot waveform that you have loaded, press CLEAR TRACE, or initialize the DL850/DL850V.

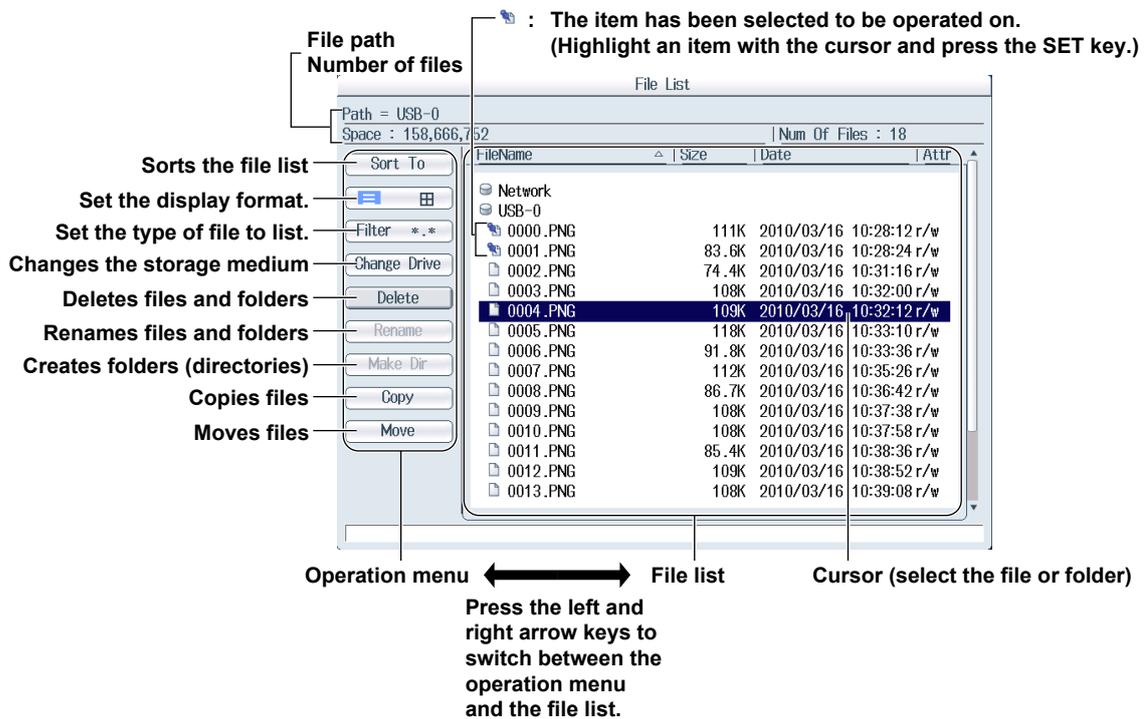
# 16.10 File Operations

This section explains the following settings (which are used when performing various file operations from the file list or the FILE Utility menu):

- Sorting the file list
- Display format
- Selecting the type of file to list
- Changing the storage medium
- Deleting files and folders
- Renaming files and folders
- Creating folders (directories)
- Copying files
- Moving files
- Displaying file information
- File protection on and off
- Selecting files (ALL SET, ALL RESET, SET/RESET)

▶ [“File Operations \(Utility\)” in the Features Guide](#)

## The File List (File List)



### Switching between the Operation Menu and the File List

Press the **left arrow key** to switch to the operation menu. Press the **right arrow key** to switch to the file list.

### Moving the Cursor

Rotate the **jog shuttle**, or press the **up and down arrow keys** in either the operation menu or the file list.

### Confirming Selected Items

To confirm the item selected with the cursor, press **SET**. When the cursor is on a file or folder, the selection is confirmed, and a blue icon (📁) appears.

## Sorting the File List (Sort To)

Select **Sort To** on the operation menu to display the following screen.

Path = USB-0  
Space : 158,388,224 | Num Of Files : 20

FileName	Size	Date	Attr
Network			
USB-0			
0000.PNG	111K	2010/03/16 10:28:12	r/w
0001.PNG	83.6K	2010/03/16 10:28:24	r/w
0002.PNG	74.4K	2010/03/16 10:31:16	r/w
0003.PNG	108K	2010/03/16 10:32:00	r/w
0004.PNG	109K	2010/03/16 10:32:12	r/w
0005.PNG	118K	2010/03/16 10:33:10	r/w
0006.PNG	91.8K	2010/03/16 10:33:36	r/w
0007.PNG	112K	2010/03/16 10:35:26	r/w
0008.PNG	86.7K	2010/03/16 10:36:42	r/w
0009.PNG	108K	2010/03/16 10:37:38	r/w
0010.PNG	108K	2010/03/16 10:37:58	r/w
0011.PNG	85.4K	2010/03/16 10:38:36	r/w
0012.PNG	109K	2010/03/16 10:38:52	r/w
0013.PNG	108K	2010/03/16 10:39:08	r/w

## Switching the Display Format

Select a **display format** on the operation menu to display one of the following screens.

Press **SET** to switch between display formats.

**List Display**

Path = USB-0  
Space : 158,285,824 | Num Of Files : 21

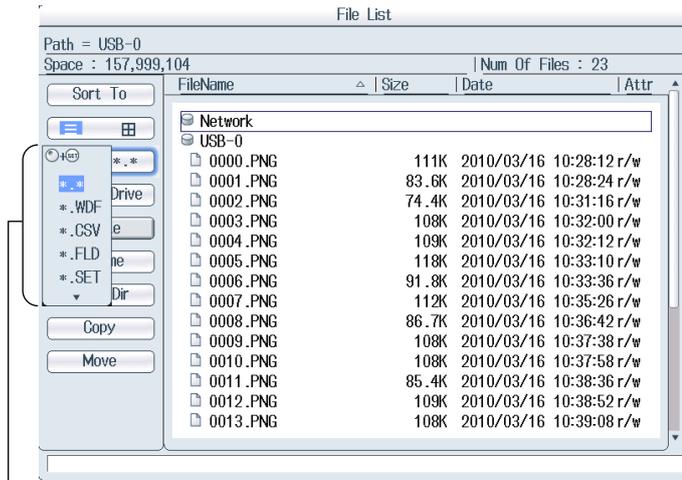
FileName	Size	Date	Attr
Network			
USB-0			
0000.PNG	111K	2010/03/16 10:28:12	r/w
0001.PNG	83.6K	2010/03/16 10:28:24	r/w
0002.PNG	74.4K	2010/03/16 10:31:16	r/w
0003.PNG	108K	2010/03/16 10:32:00	r/w
0004.PNG	109K	2010/03/16 10:32:12	r/w
0005.PNG	118K	2010/03/16 10:33:10	r/w
0006.PNG	91.8K	2010/03/16 10:33:36	r/w
0007.PNG	112K	2010/03/16 10:35:26	r/w
0008.PNG	86.7K	2010/03/16 10:36:42	r/w
0009.PNG	108K	2010/03/16 10:37:38	r/w
0010.PNG	108K	2010/03/16 10:37:58	r/w
0011.PNG	85.4K	2010/03/16 10:38:36	r/w
0012.PNG	109K	2010/03/16 10:38:52	r/w
0013.PNG	108K	2010/03/16 10:39:08	r/w

## Thumbnail Display

Path = USB-0  
Space : 158,146,560 | Num Of Files : 22

## Selecting the Type of File to List (Filter)

Select **Filter** on the operation menu to display the following screen.

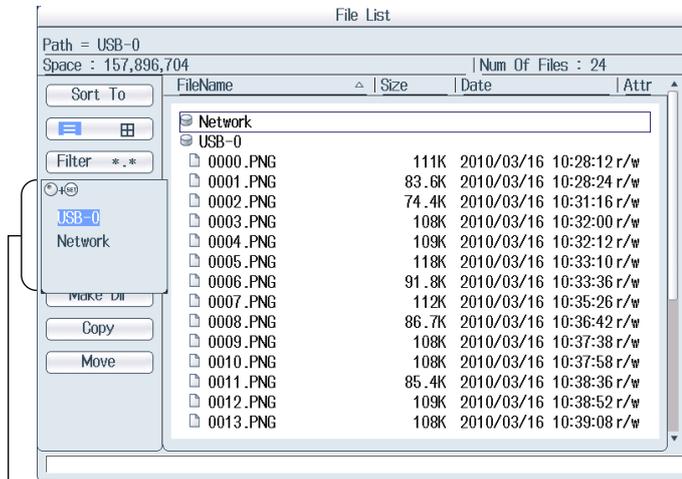


Select the type of file to list.

- \*.\*: All files
- \*..WDF: Waveform file in binary format
- \*.CSV: Waveform file in ASCII format
- \*.FLD: Waveform file in floating-point format
- \*.SET: Setup file
- \*.BMP: Image file in BMP format
- \*.PNG: Image file in PNG format
- \*.JPG: Image file in JPEG format
- \*.SNP: Snapshot waveform file
- \*.SBL: SBL file (CAN data definition file)

## Changing the Storage Medium (Change Drive)

Select **Change Drive** on the operation menu to display the following screen.



Select the storage medium.

- HD: Hard disk
- SD: SD memory card
- USB0: The first USB storage medium that the DL850/DL850V detected
- USB1: The second USB storage medium that the DL850/DL850V detected
- Network: Network drive

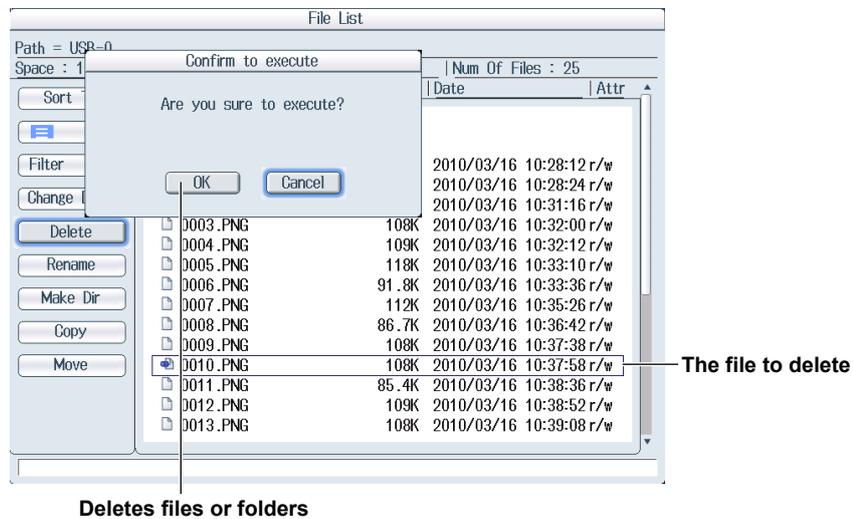
### Note

You can also change the storage medium by highlighting the drive you want to change in the file list and pressing the SET key.

## Deleting Files and Folders (Delete)

Select the file or folder that you want to delete from the file list.

Select **Delete** on the operation menu to display the following screen.



### Note

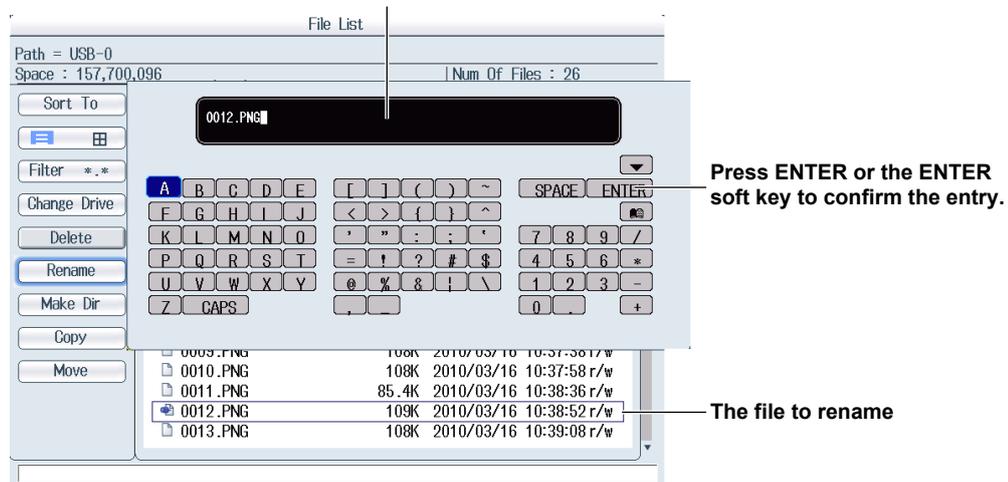
You can delete multiple files at the same time by selecting them with the jog shuttle and the SET key.

## Renaming Files and Folders (Rename)

Select the file or folder that you want to rename from the file list.

Select **Rename** on the operation menu to display the following screen.

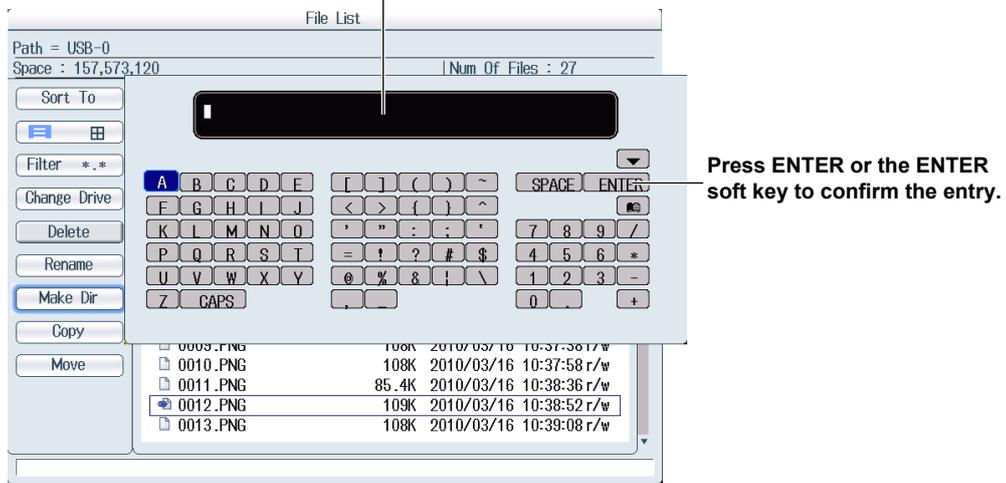
Use the keyboard to enter the new file or folder name.



### Making Folders (Make Dir)

Select the drive or folder that you want to create the new folder in from the file list.  
 Select **Make Dir** on the operation menu to display the following screen.

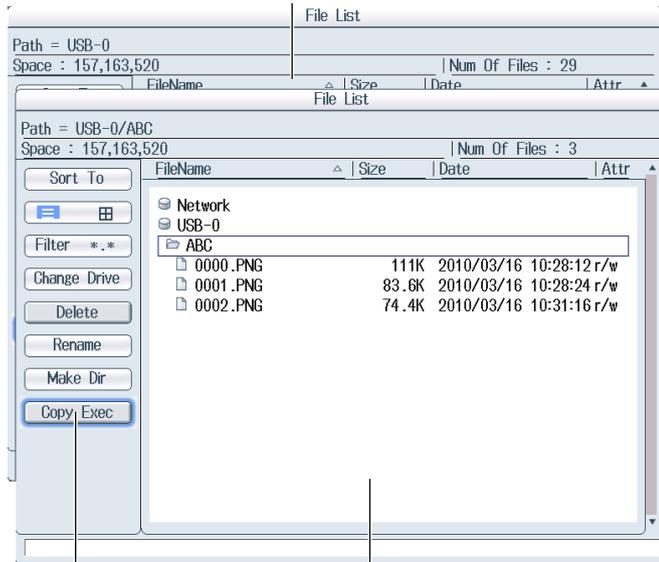
Use the keyboard to enter the new folder name.



### Copying Files (Copy)

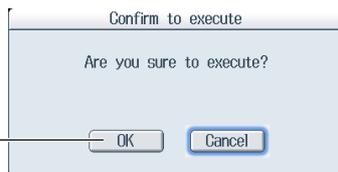
Select the file that you want to copy from the file list.  
 Select **Copy** on the operation menu to display the following screen.

File list you are copying from



Executes the copy operation File list you are copying to

Select the drive and folder on the file list that you are copying to.  
 Select **Copy Exec** on the operation menu to display the following screen.



Executes the copy operation

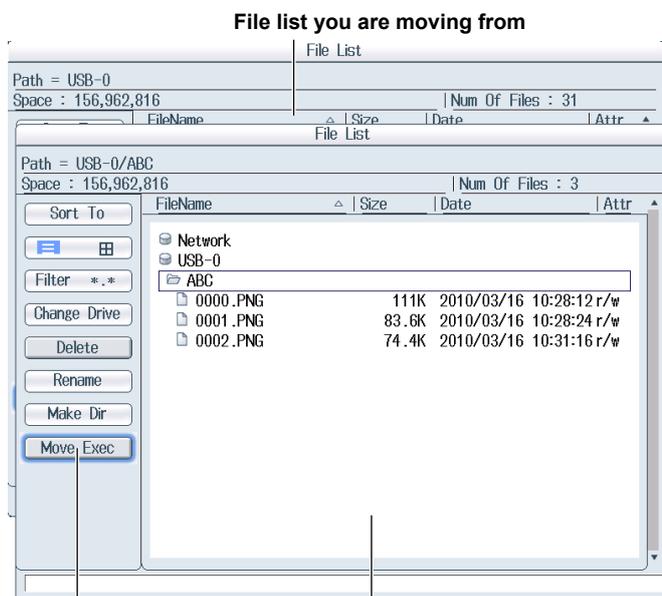
#### Note

- You can copy multiple files at the same time by selecting them with the jog shuttle and the SET key.
- You can perform file operations on the file list that you are copying to as well.

## Moving Files (Move)

Select the file that you want to move from the file list.

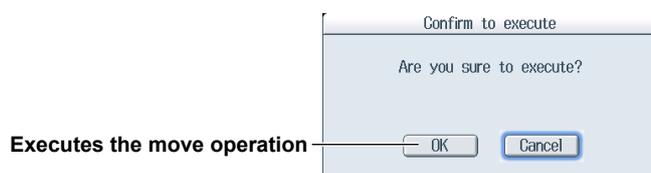
Select **Move** on the operation menu to display the following screen.



Executes the move operation    **File list you are moving to**

Select the drive and folder on the file list that you are moving to.

Select **Move Exec** on the operation menu to display the following screen.

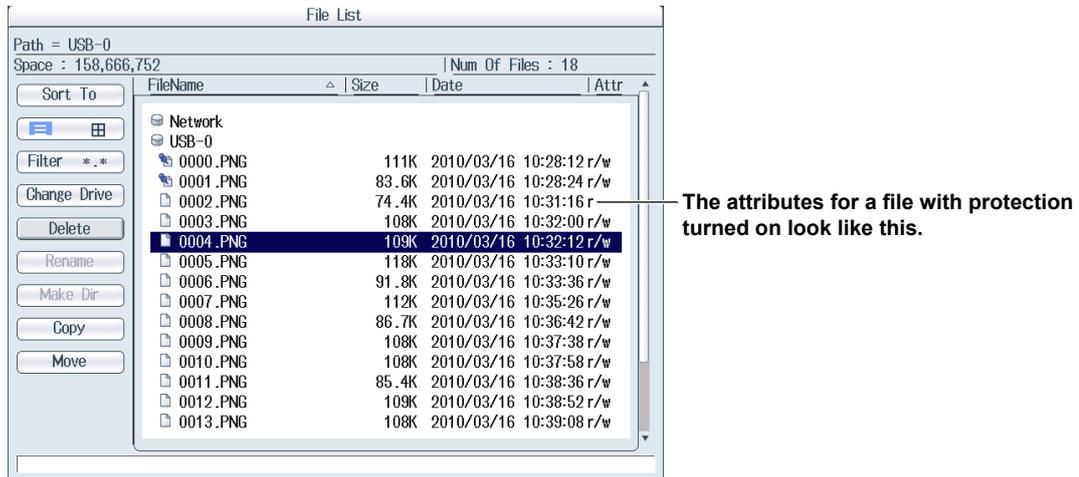
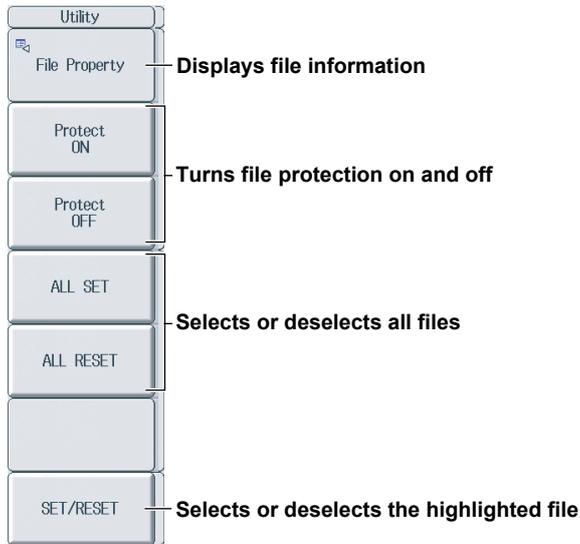


### Note

- You can move multiple files at the same time by selecting them with the jog shuttle and the SET key.
- You can perform file operations on the file list that you are moving files to as well.

## FILE Utility Menu

Press **FILE** and then the **Utility** soft key to display the following menu.



## Turning File Protection On and Off (Protect ON and OFF)

These soft keys turn protection on and off for the selected file. The change is reflected in the file attributes, displayed under the Attr column in the file list.

Protection	File Attribute	Description
ON	r	File protection is on for the selected file. The file can only be read. The file cannot be written to or deleted.
OFF	r/w	File protection is off for the selected file. The file can be read and written to.

## Select All and Clear All (ALL SET and ALL RESET)

**ALL SET:** Select all files displayed. Selected file icons are displayed in blue.

**ALL RESET:** Deselect all files displayed.

## Select/Deselect (SET/RESET)

**SET/RESET:** Selects or deselects the highlighted file. This is the same function as when you press the SET key. Selected file icons are displayed in blue.

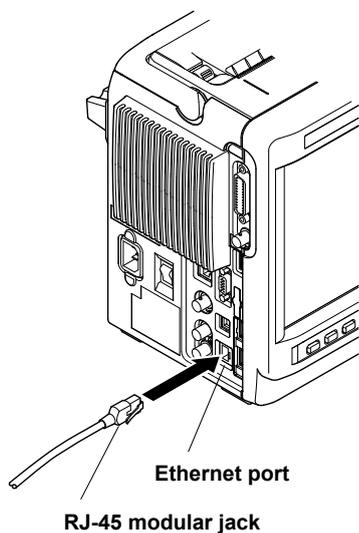
## 17.1 Connecting the DL850/DL850V to a Network

This section explains how to connect the DL850/DL850V to a network.

### Ethernet Interface Specifications

There is a 1000BASE-T port located on the side panel of the DL850/DL850V.

Item	Specifications
Ports	1
Electrical and mechanical specifications	IEEE802.3
Transmission system	Ethernet (1000BASE-T, 100BASE-TX, 10BASE-T)
Communication protocol	TCP/IP
Supported services	Server: FTP, HTTP (Web), and VXI-11 Client: FTP (Net Drive), SMTP (Mail), SNMP, LPR (Net Print), DHCP, and DNS
Connector type	RJ-45



### Items Required to Connect the DL850/DL850V to a Network

#### Cable

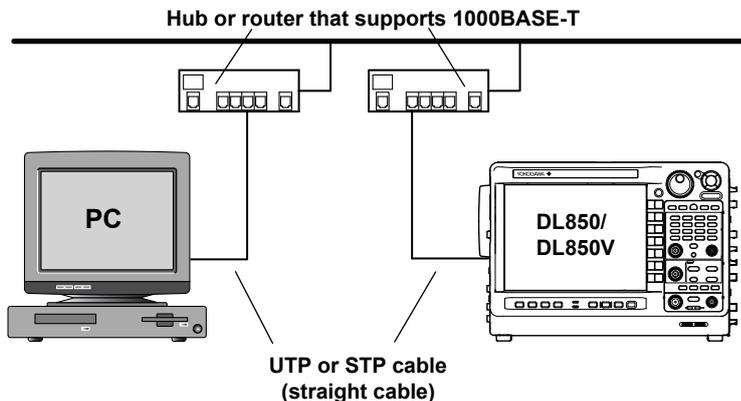
Use one of the following types of network cables that support the data rate of your network.

- A UTP (Unshielded Twisted-Pair) cable
- An STP (Shielded Twisted-Pair) cable

## Connection Procedure

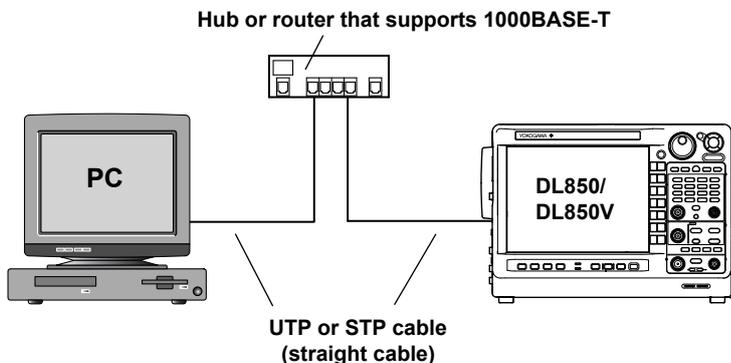
### To Connect to a PC over a Network

1. Turn the DL850/DL850V off.
2. Connect one end of a UTP (or STP) cable to the ETHERNET 1000BASE-T port on the side panel.
3. Connect the other end of the UTP (or STP) cable to a hub or router.
4. Turn the DL850/DL850V on.



### To Connect to a PC through a Hub or Router

1. Turn off the DL850/DL850V and the PC.
2. Connect one end of a UTP (or STP) cable to the ETHERNET 1000BASE-T port on the side panel.
3. Connect the other end of the UTP (or STP) cable to a hub or router.
4. Connect the PC to the hub or router in the same way.
5. Turn the DL850/DL850V on.



### Note

- Use a hub or router that conforms to your network environment (for example, the data rate).
  - When you connect a PC to the DL850/DL850V through a hub or router, the PC must be equipped with an auto switching 1000BASE-T/100BASE-TX/10BASE-T network card.
  - Do not connect the DL850/DL850V to a PC directly. Direct communication without a hub or router is not guaranteed to work.
-

## 17.2 Configuring TCP/IP Settings

This section explains the following TCP/IP settings (which are used when connecting to a network):

- DHCP (IP address, subnet mask, and default gateway)
- DNS (domain name, DNS server IP address, and domain suffix)

▶ [“TCP/IP \(TCP/IP\)” in the Features Guide](#)

### UTILITY Network Menu

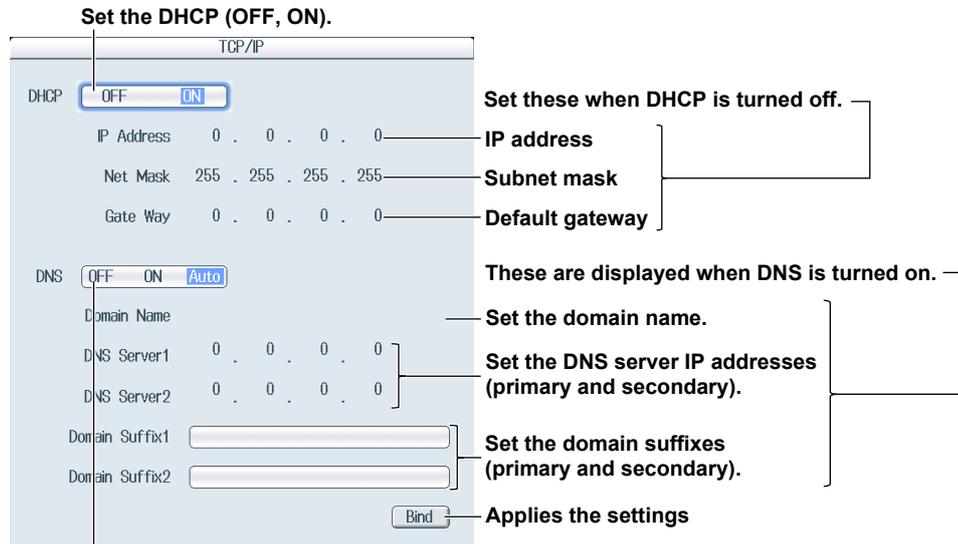
Press **UTILITY** and then the **Network** soft key to display the following menu.



Press to configure the TCP/IP settings.

### Configuring TCP/IP Settings (TCP/IP)

Press the **TCP/IP** soft key to display the following screen.



**Set the DNS (OFF, ON, Auto).**  
Auto is displayed when DHCP is turned on.

### Setting the DNS (DNS)

**OFF:** Disables the DNS.

**ON:** Enables the DNS. Set the domain name, and the DNS server's primary and secondary IP addresses and domain suffixes.

**Auto:** Enables the DNS. After you set the domain suffixes, the domain name and the DNS server IP addresses are set automatically. This option can only be selected when DHCP is turned on.

## 17.3 Accessing the DL850/DL850V from a PC (FTP Server)

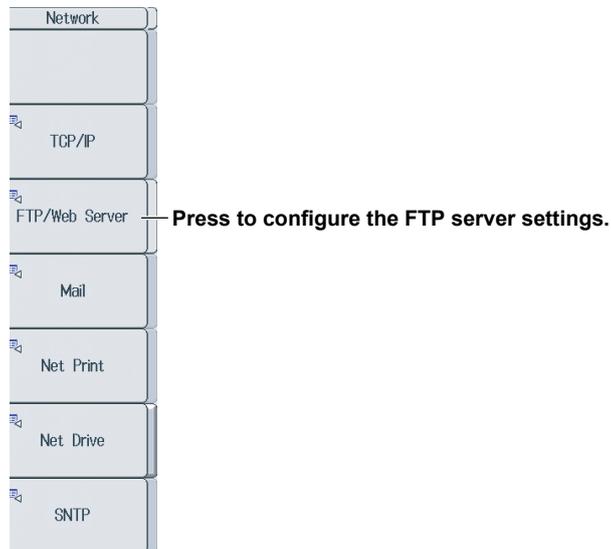
This section explains the following settings (which are used when accessing the DL850/DL850V from a PC on a network):

- User name
- Password
- Timeout
- Starting an FTP client

► “FTP Server (FTP/Web Server)” in the Features Guide

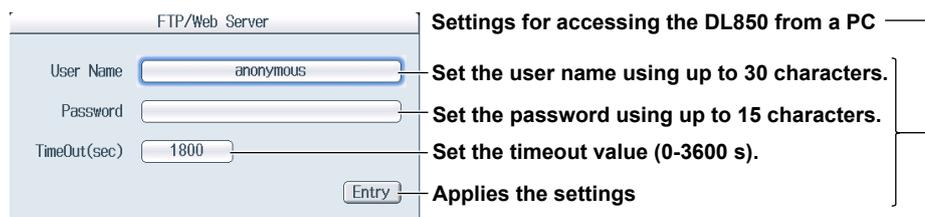
### UTILITY Network Menu

Press **UTILITY** and then the **Network** soft key to display the following menu.



### Configuring FTP Server Settings (FTP/Web Server)

Press the **FTP/Web Server** soft key to display the following screen.



### Starting an FTP Client

Start an FTP client on a PC.

Enter the user name and password that you have set on the DL850/DL850V's FTP/Web Server screen shown above, and connect to the DL850/DL850V.

#### Note

If you set the user name to “anonymous,” you can connect to the DL850/DL850V without entering a password.

## 17.4 Monitoring the DL850/DL850V Display from a PC (Web Server)

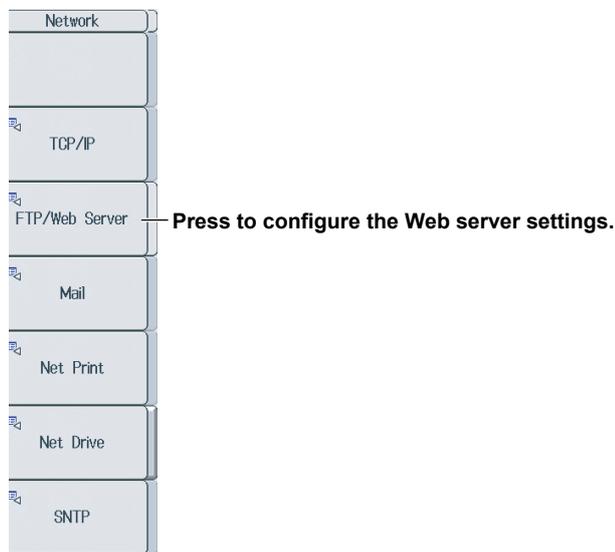
This section explains the following settings (which are used when accessing the DL850/DL850V from a PC on a network to show the DL850/DL850V's display on the PC and to start and stop waveform acquisition from the PC):

- User name
- Password
- Timeout
- Connecting to the DL850/DL850V from a PC

► [“Web Server \(FTP/Web Server\)” in the Features Guide](#)

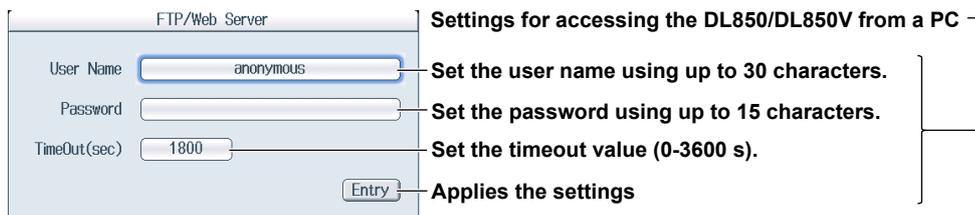
### UTILITY Network Menu

Press **UTILITY** and then the **Network** soft key to display the following menu.



### Configuring Web Server Settings (FTP/Web Server)

Press the **FTP/Web Server** soft key to display the following screen.



## 17.5 Connecting to a Network Drive

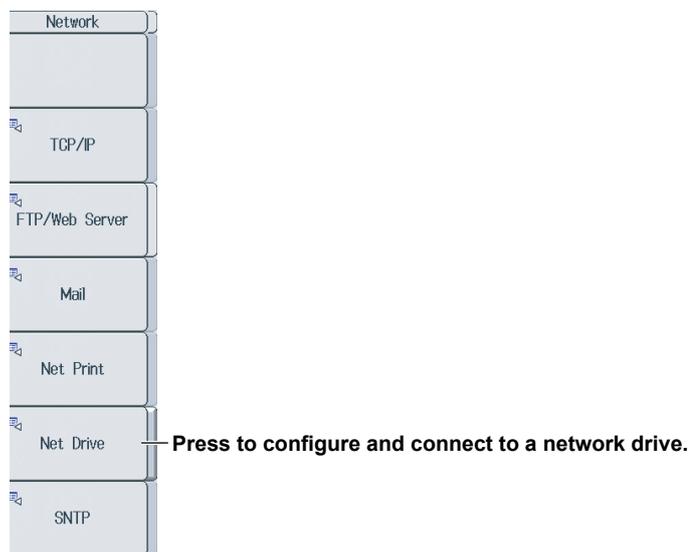
This section explains the following settings (which are used when accessing a network drive (Net Drive) through an Ethernet connection to load or save various DL850/DL850V data):

- FTP server (file server)
- Login name
- Password
- FTP passive mode on and off
- Timeout
- Connecting to and disconnecting from network drives

► “Net Drive (Net Drive)” in the Features Guide

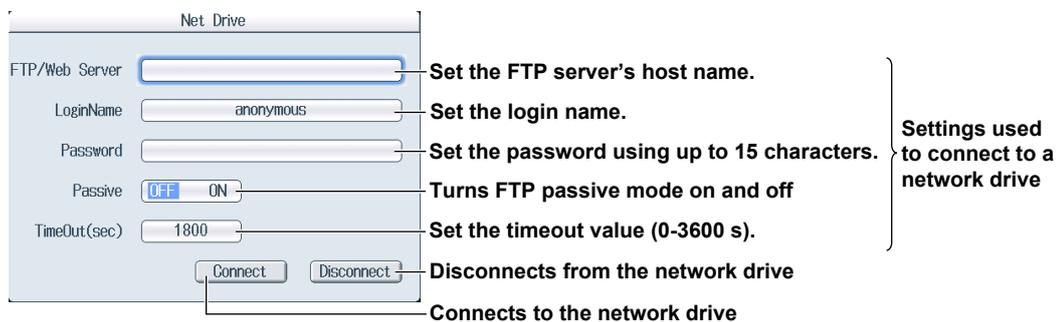
### UTILITY Network Menu

Press **UTILITY** and then the **Network** soft key to display the following menu.



### Configuring Network Drive (Net Drive) Settings and Connecting to It

Press the **Net Drive** soft key to display the following screen.



## 17.6 Configuring E-Mail Transmission (SMTP client function)

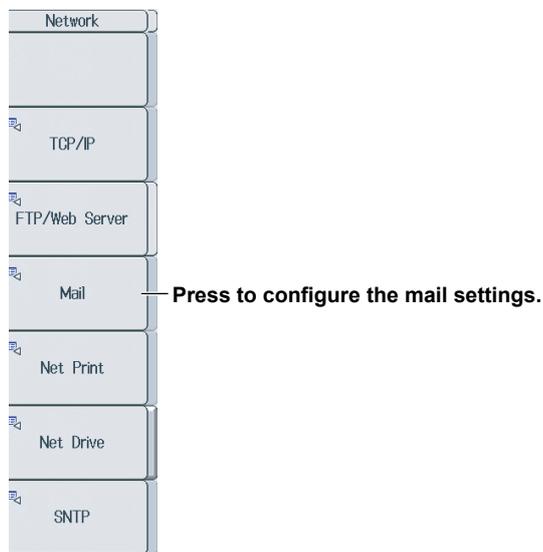
This section explains the following settings (which are used when transmitting mail to a specified mail address on a network):

- Mail server
- Mail address
- Comment
- Attaching image files
- Timeout
- Sending a test mail

► “Mail (Mail)” in the Features Guide

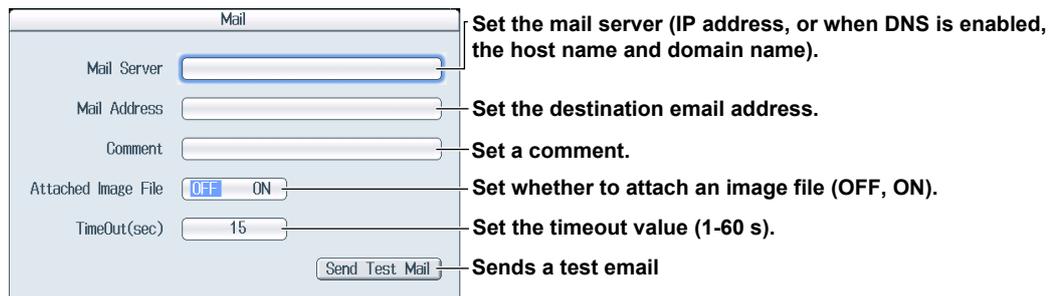
### UTILITY Network Menu

Press **UTILITY** and then the **Network** soft key to display the following menu.



### Configuring Mail Settings (Mail)

Press the **Mail** soft key to display the following screen.



## 17.7 Using SNTP to Set the Date and Time

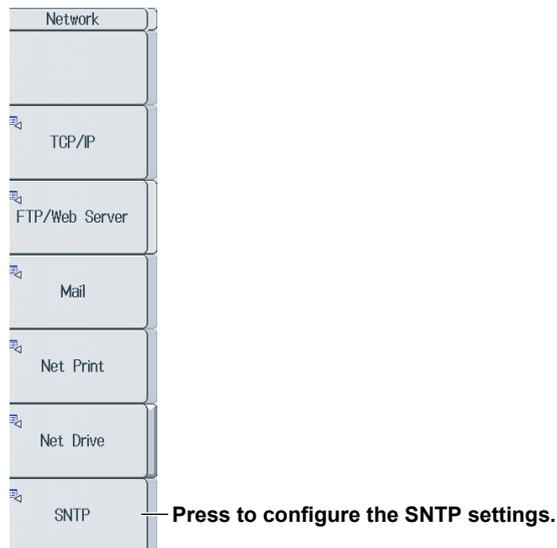
This section explains how to use SNTP to set the date and time of the DL850/DL850V.

- SNTP server
- Timeout
- Executing time adjustment
- Automatic adjustment

► [“SNTP \(SNTP\)” in the Features Guide](#)

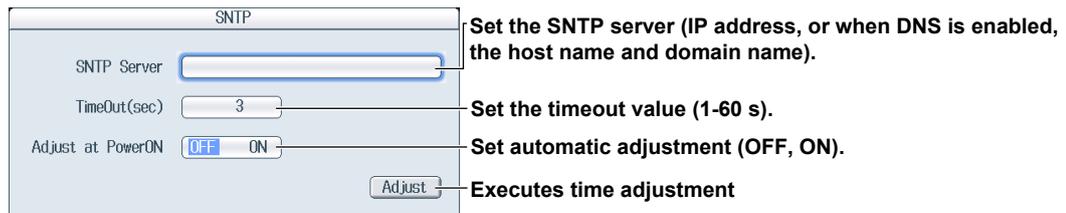
### UTILITY Network Menu

Press **UTILITY** and then the **Network** soft key to display the following menu.



### Configuring SNTP Settings (SNTP)

Press the **SNTP** soft key to display the following screen.



## 17.8 Configuring a Network Printer

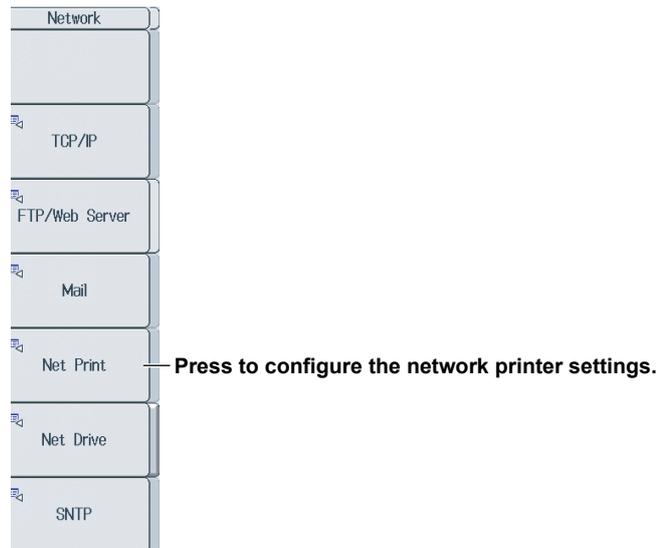
This section explains the following settings (which are used when printing screen captures to a network printer):

- LPR server
- LPR name
- Timeout

► “Network Printer (Net Print)” in the Features Guide

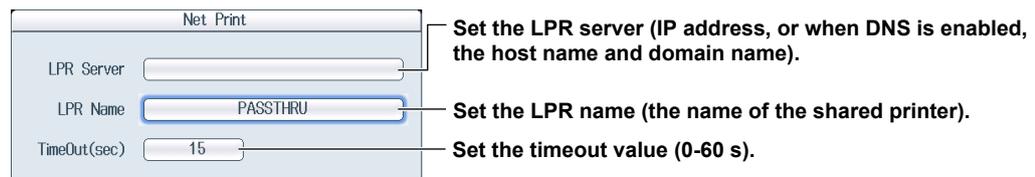
### UTILITY Network Menu

Press **UTILITY** and then the **Network** soft key to display the following menu.



### Configuring Network Printer Settings (Net Print)

Press the **Net Print** soft key to display the following screen.



## 18.1 Performing Auto Setup

This section explains how to perform auto setup, which automatically sets the DL850/DL850V settings to the values that are most suitable for the input signals.

► [“Auto Setup \(Auto Setup\)” in the Features Guide](#)

### SETUP Menu

Press **SETUP** to display the following menu.



## 18.2 Initializing Settings

This section explains how to initialize the DL850/DL850V settings to their factory default values.

▶ [“Initializing Settings \(Initialize\)” in the Features Guide](#)

### SETUP Menu

Press **SETUP** to display the following menu.



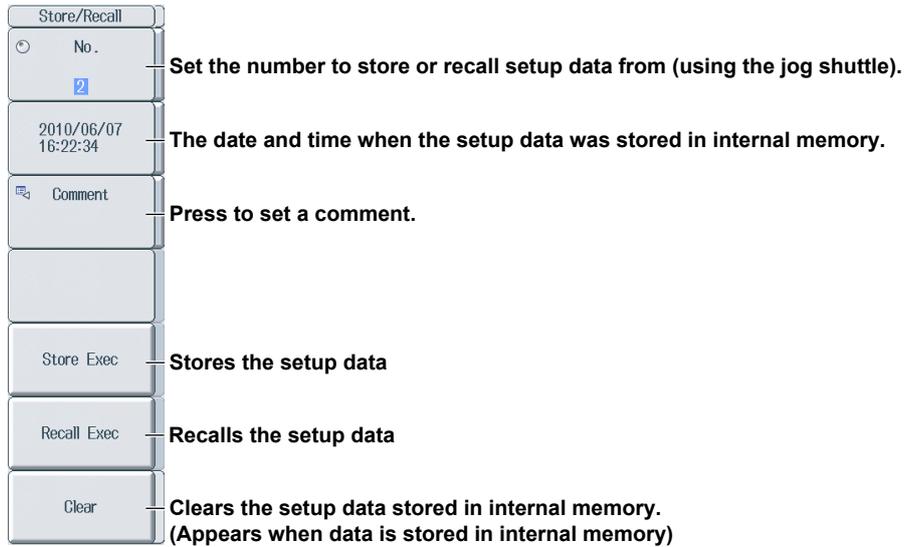
## 18.3 Storing and Recalling Setup Data

This section explains how to save the DL850/DL850V settings to the internal memory and how to load settings from the internal memory.

▶ [“Storing and Recalling Setup Data \(Setup Data Store and Recall\)”](#)  
in the [Features Guide](#)

### SETUP Store/Recall Menu

Press **SETUP** and then the **Setup Data Store/Recall** soft key to display the following menu.



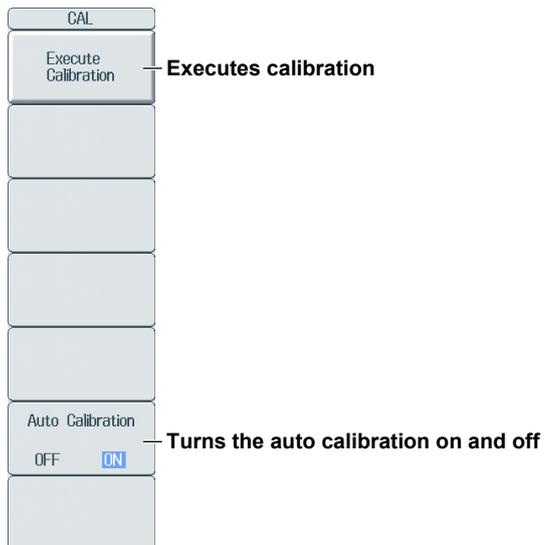
## 18.4 Calibrating the DL850/DL850V

This section explains how to calibrate the DL850/DL850V, which you should do when you want to make accurate measurements.

► [“Calibration \(CAL\)” in the Features Guide](#)

### CAL Menu

Press **SHIFT+SETUP** (CAL) to display the following menu.



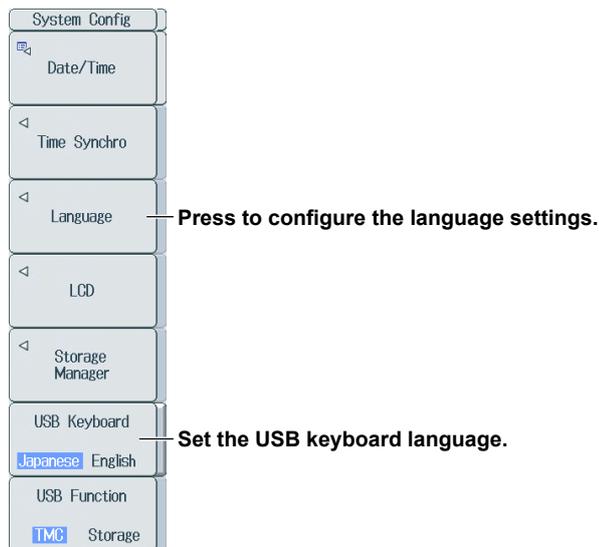
## 18.5 Changing the Message, Menu, and USB Keyboard Languages

This section explains the settings that you can use to change the message, menu, and USB keyboard languages.

► “System Configuration (System Configuration)” in the Features Guide

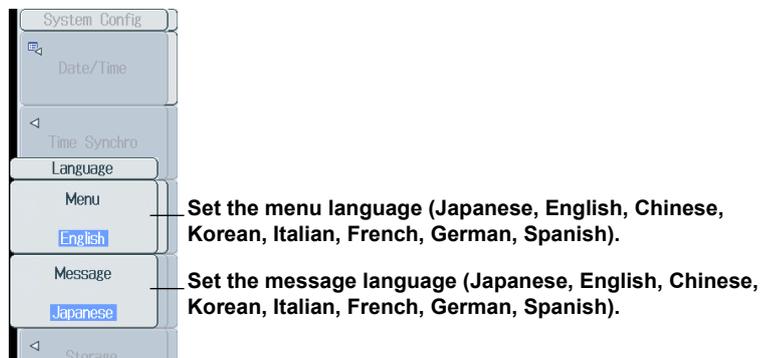
### UTILITY System Config Menu

Press **UTILITY** and then the **System Config** soft key to display the following menu.



### Configuring Language Settings (Language)

Press the **Language** soft key to display the following menu.



#### Note

Some terminology is always displayed in English.

### Setting the USB Keyboard Language (USB Keyboard)

You can use the following keyboards that conform to USB Human Interface Devices (HID) Class Ver. 1.1.

English: 104-key keyboards

Japanese: 109-key keyboards

For details on how DL850/DL850V keys are mapped to the keys on a USB keyboard, see appendix 4 in the getting started guide, IM DL850-03EN.

## 18.6 Setting Time Synchronization (Optional)

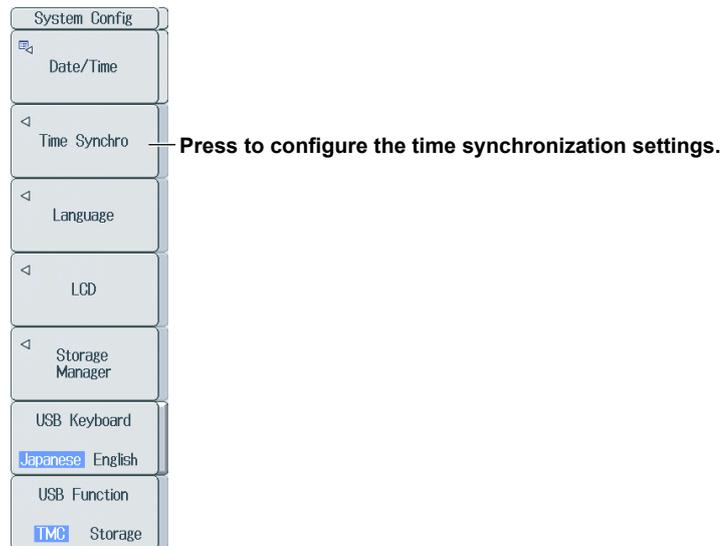
This section explains the following settings (which are used when you synchronize the DL850/DL850V to GPS time):

- IRIG format
- Modulation
- Impedance

► “Time Synchronization Feature (Time Synchro; optional)” in the Features Guide

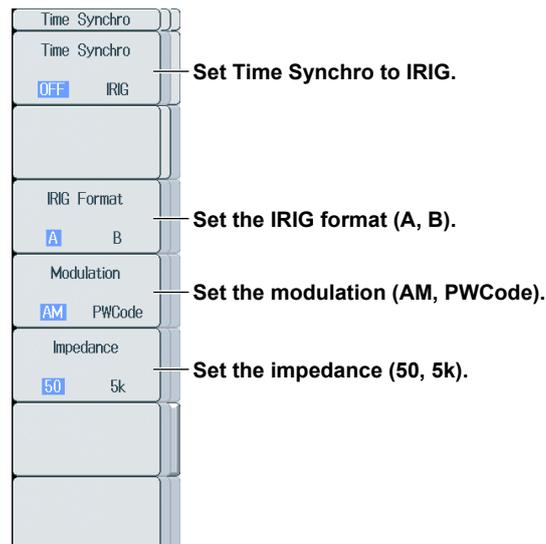
### UTILITY System Config Menu

Press **UTILITY** and then the **System Config** soft key to display the following menu.



### Configuring Time Synchronization (Time Synchro)

Press the **Time Synchro** soft key to display the following menu.



#### Note

To enable the changes that you have made to the time synchronization settings, restart the DL850/DL850V.

## 18.7 Adjusting the Backlight

This section explains the following settings (which are used when adjusting the backlight):

- Turning off the backlight
- Automatically turning off the backlight
- Adjusting the brightness

► “Adjusting the LCD (LCD)” in the Features Guide

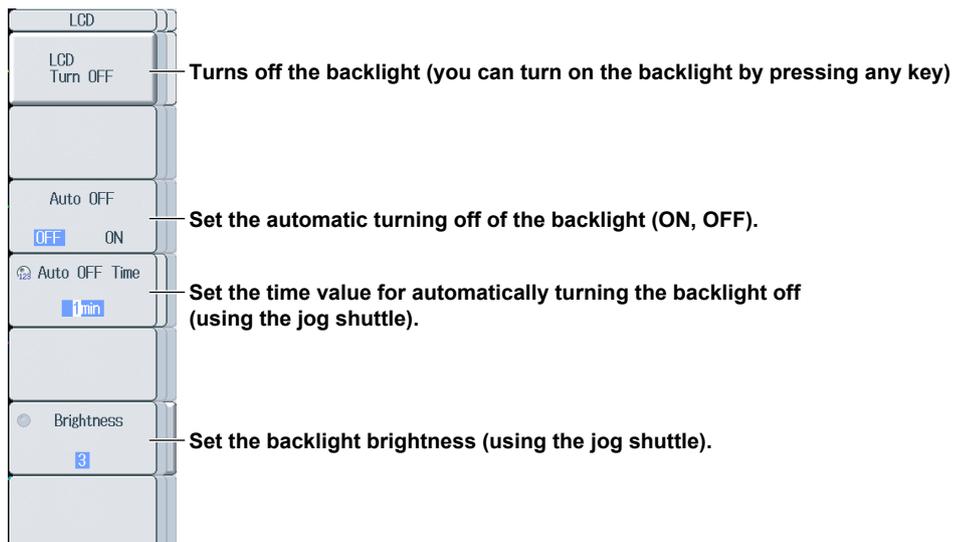
### UTILITY System Config Menu

Press **UTILITY** and then the **System Config** soft key to display the following menu.



### Adjusting the Backlight (LCD)

Press the **LCD** soft key to display the following menu.



## 18.8 Configuring the Environment Settings

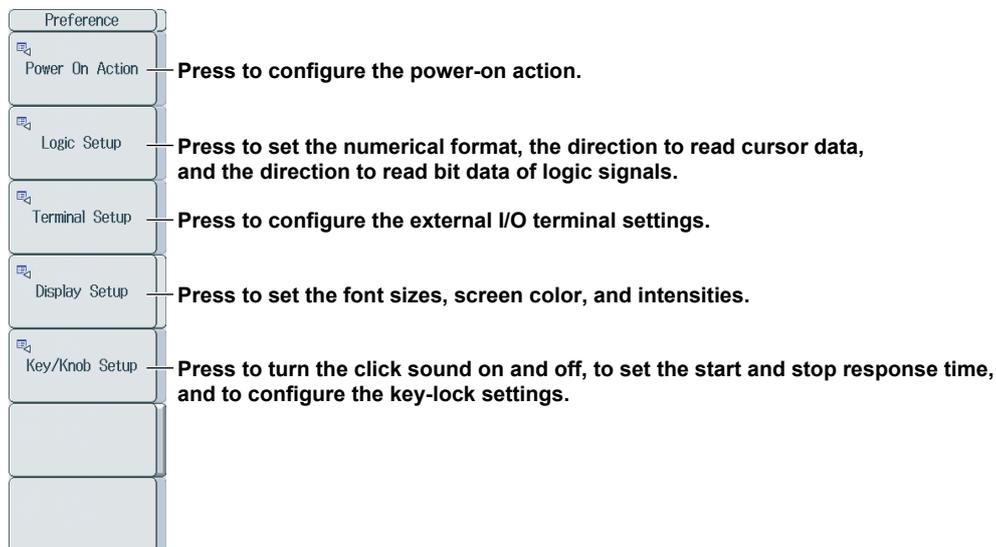
This section explains the following environment settings:

- Action to perform at power on
- Logic settings
- External I/O terminal settings
- Font size, screen color, and intensity settings
- Click sound on and off and key-lock settings

► [“Environment Settings \(Preference\)” in the Features Guide](#)

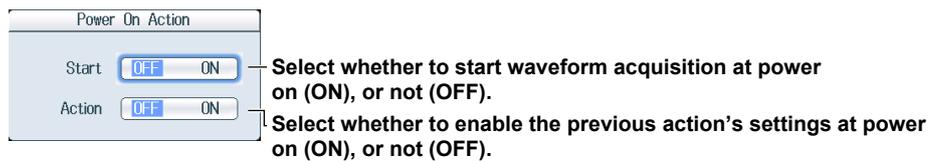
### UTILITY Preference Menu

Press **UTILITY** and then the **Preference** soft key to display the following menu.



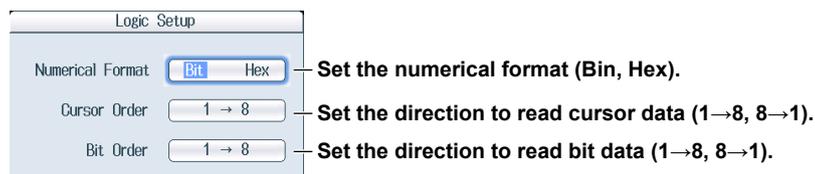
### Configuring Power-on Actions (Power On Action)

Press the **Power On Action** soft key to display the following screen.



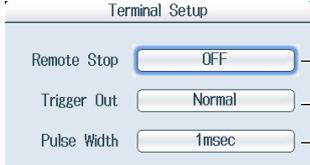
### Configuring the Logic Settings (Logic Setup)

Press the **Logic Setup** soft key to display the following screen.



## Configuring the External I/O Terminal Settings (Terminal Setup)

Press the **Terminal Setup** soft key to display the following screen.



**Terminal Setup**

Remote Stop  OFF  ON

Trigger Out  Normal  Pulse

Pulse Width

**Set the remote stop feature.**  
ON: Enables the STOP signal  
OFF: Disables the STOP signal

**Set the trigger output (Normal, Pulse).**

**Set the pulse width (1msec, 5msec, 100msec, 500msec)**

## Setting the Font Sizes, Screen Color, and Intensities (Display Setup)

Press the **Display Setup** soft key to display the following screen.



**Display Setup**

Menu Font Size  Small  Large

Base Color  Blue  Gray

Scale Font Size  Small  Large

Scale Off Item  All  V Scale

Level Indicator  OFF  ON

**Intensity**

Grid

Cursor

Marker

**Set the menu font size (Small, Large).**

**Set the screen background color (Blue, Gray).**

**Set the scale font size (Small, Large).**

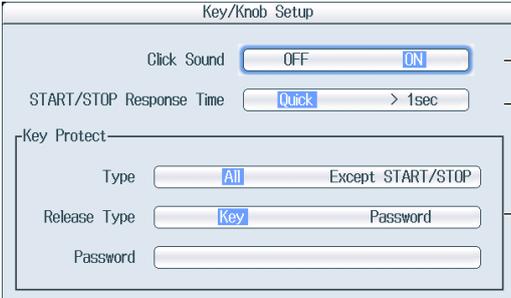
**Set the scale value's display item.**  
Set the item that is displayed if Scale Value is set to OFF on the DISPLAY menu (► section 4.1).  
OFF: No scales are displayed.  
V Scale: The vertical scale is not displayed.

**Turns the level indicator on and off**

**Set the screen intensities.**  
Grid (1-8), Cursor (1-8), Marker (1-8)

## Turning the Click Sound On and Off and Configuring the Key Lock Settings (Key/Knob Setup)

Press the **Key/Knob Setup** soft key to display the following screen.



**Key/Knob Setup**

Click Sound  OFF  ON

START/STOP Response Time  > 1sec

**Key Protect**

Type  All  Except START/STOP

Release Type  Key  Password

Password

**Turns the click sound on and off**

**Set the start/stop response time (Quick, > 1sec).**

**Set the key lock.**  
Set the key-lock type (All, Except START/STOP), the key-lock-release type (Key, Password), and the password (up to 8 characters).

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## 18.9 Using the DL850/DL850V as a USB Storage Device

This section explains the setting that enables you to use the DL850/DL850V as a USB storage device through a USB connection made between the USB port on the DL850/DL850V side panel and a PC.

► [“USB Communication \(USB Function\)” in the Features Guide](#)

### UTILITY System Config Menu

Press **UTILITY** and then the **System Config** soft key to display the following menu.



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#### Note

- When USB Function is set to Storage, only the internal hard disk of the DL850/DL850V can be used as a storage device. You cannot access any other storage media that are connected to the DL850/DL850V.
  - When you access the internal hard disk of the DL850/DL850V from a PC, only perform read operation. Doing otherwise may damage the DL850/DL850V.
  - When USB Function is set to Storage and files are being accessed, do not remove the USB cable or turn off the DL850/DL850V. Doing so may damage the DL850/DL850V.
  - When USB Function is set to Storage, never access the DL850/DL850V internal hard disk from the DL850/DL850V menu.
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## 18.10 Locking the Keys

This section explains how to lock the panel keys, which prevents you from unintentionally changing the current state of the DL850/DL850V.

▶ [“Key Protect \(KEY PROTECT\)” in the Features Guide](#)

### Key Lock (KEY PROTECT)

Press **KEY PROTECT** to lock the panel keys. The KEY PROTECT key illuminates. When the keys are locked, pressing any keys other than **KEY PROTECT** has no effect. Press **KEY PROTECT** again to release the key lock and enable the panel keys. The KEY PROTECT key turns off.

#### **Note**

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When the keys are locked, you cannot use a USB mouse or keyboard to operate the DL850/DL850V either.

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## 19.1 If a Problem Occurs

### Faults and Corrective Actions

- If a message appears on the screen, see the following pages for reference.
- If servicing is necessary, or if the instrument does not operate properly even after you have attempted to deal with the problem according to the instructions in this section, contact your nearest YOKOGAWA dealer.

Description	Probable Cause	Corrective Action	Reference
The instrument does not power on.	Using a power supply outside the ratings.	Use a correct power supply.	3.4*
Nothing is displayed.	The backlight is turned off.	Press any key.	18.7
	The screen is displayed with inappropriate colors.	Turn the power off, and then turn the power on again while pressing <b>RESET</b> .	4.6*
The display is odd.	The system is not operating properly.	Turn off the instrument, and then turn it back on.	3.4*
Channels and MATH waveforms whose displays are turned on do not appear on the screen.	The display group containing the waveforms that you want to display is not selected.	Press <b>DISPLAY</b> and then the Select <b>Display Gr.</b> soft key to select a display group (1 to 4).	4.1, 1.8
Keys do not work.	The instrument is in remote mode.	Press <b>SHIFT+CLEAR TRACE</b> to switch the instrument to local mode.	—
	Other causes.	Perform a key test. If the test fails, servicing is required.	19.3
	The keys are locked.	Press <b>KEY PROTECT</b> .	18.10
Triggering does not work.	The trigger settings are not appropriate.	Set the trigger conditions correctly.	Chapter 2
The measured values are not correct.	Insufficient warm-up.	Warm up the instrument for 30 minutes after turning on the power.	—
	The instrument has not been calibrated.	Calibrate the instrument.	18.4
	The probe's phase has not been corrected.	Perform phase correction properly.	3.7*
	The probe attenuation is not correct.	Set it to an appropriate value.	1.1
	Other causes.	Calibrate the instrument. If the measured values are still not correct, servicing is required.	18.4 19.3
Cannot print to the built-in printer.	The printer head is damaged or worn out.	Servicing is necessary.	—
Cannot save to the specified storage medium.	The storage medium is not formatted.	Format the storage medium.	16.3
	The storage medium is read-only.	Set the storage medium so that it is not read-only.	—
	No more free space on the storage medium.	Delete unneeded files or use another storage medium.	16.10
Unable to configure or control the instrument through the communication interface.	The instrument's address used by the program is different from the specified address.	Match the address used in the program to the instrument's address.	Communication interface user's manual, IM DL850-17EN
	The interface is not used in a way that conforms to the electrical or mechanical specifications.	Use the interface in a way that conforms to the specifications.	

\* *Getting Started Guide*, IM DL850-03EN

## 19.2 Messages and Corrective Actions

### Messages

Messages may appear on the screen during operation. This section describes the error messages and how to respond to them. You can display the messages in the language that you specify through the operations explained in section 18.5. If servicing is necessary to solve the problem indicated by a message, contact your nearest YOKOGAWA dealer.

In addition to the following error messages, there are also communication error messages. These messages are explained in the communication interface user's manual, IM DL850-17EN.

### Information

Code	Message	Chapter or Section
51	Autosetup is running.	—
53	Initializing is in progress.	—
55	Undo is in progress.	18.1
57	Automatic balancing is running...	1.4
58	Automatic balancing is complete.	1.4
59	Calibration is running...	18.4
61	Media format is running.	16.3
62	Media format is complete.	16.3
63	A strain module is installed. Carry out automatic balancing before use.	—
64	File access is aborted.	—
65	Executed the firmware overwriting of the frequency module.	19.4
66	Overwriting firmware of the frequency module...	19.4
67	Key response time is more than 1 second. Push it more than 1 second.	18.8
68	Executed the firmware overwriting of the built-in part. Part :	19.4
69	Overwriting the built-in parts firmware. Part :	19.4
70	Exit from GO/NO-GO mode.	Chapter 11
71	Image printing was aborted.	Chapter 15
72	Completed action-on-trigger.	12.1
73	Aborted the search.	Chapter 13
74	Executed the search, but no record was found that matched the conditions.	Chapter 13
75	Executed the search, but no record was found that matched the pattern.	Chapter 13
77	Aborted the statistical measurement.	8.2
78	Turned on pressing the Utility key. Will be service mode.	—
80	Input module configuration was changed. Relevant settings have been initialized.	Chapter 1
81	This model does not have computation option installed.	—
82	This model does not have the HDD option installed.	—
84	Turned on pressing the RESET key. Will initialize.	—
85	The instrument is set to remote mode by the communication control. Press the SHIFT + CLEAR TRACE key to change to local mode.	—
86	Push 'Zoom Mag' knob or 'Zoom Position' knob when change a target window.	6.1
88	Post processing of Hard disk Record. Wait a while.	—
89	Cannot display XY waveforms under these conditions. -Different sample rate between X & Y. -HD Recording waves	—
90	Executed the Autosetup, but no effective channel was found.	—
91	Some signals were not loaded due to the following problems. Check the symbol file. -The Number of signals is too many. -"Value Type" is not supported. -"Bit Count" is too many.	—

Code	Message	Chapter or Section
93	Following sub channel was set to Off due to limit of memory capacity.	1.8
94	Executing abort process. It takes a few seconds.	13.1
95	Cannot set all sub-channels input to on due to limit of memory capacity.	1.8

## File Errors

Code	Message	Chapter or Section
500	File access failure.	—
501	Invalid file name. The name contains prohibited characters, or file name is duplicated.	16.4
502	Pass name over maximum number of characters. Full pass name should under 255 characters.	16.4
503	Comment over maximum number of characters.	16.4
504	Out of disk space.	—
505	File not found. Check the file.	—
506	Duplicate file or directory name. Change the name.	—
507	The file name is not set. Set the file name.	16.4
508	Save data not found. Check for presence of data and channel.	Chapter 16
509	File system failure.	—
510	Cannot load this file format. Files stored on other models cannot be loaded.	—
511	File is now being accessed. Execute after access is made.	—
512	Cannot be executed while running. Press the START/STOP key to stop acquisition.	—
513	The specified file cannot be loaded on this Firmware version or this model.	—
514	No ch is displayed. Turn ON the display of the appropriate channel.	Chapter 1
516	HDD overrun error. Due to spare sectors, the recording could not be finished within assigned time. The operation is aborted.	—
517	Unknown file format.	Chapter 16
518	Writing prohibited in the media. Unlock write protection of the media.	—
519	Cannot save in this format at the current record length. Specify a range and save a section of the data. * Cannot create a file of size 2 GB or larger.	16.4
520	Media error.	—
521	Directory can not be deleted.	—
522	Cannot load these files on a network drive. The File which larger than 50 Mbyte. The File which is saved by HistoryAll format. Copy the file to the local drive before loading it.	17.3
530	Assigned path does not exist. Check the network setting and configuration.	Chapter 17
531	Assigned file does not exist. Check the network setting and configuration.	Chapter 17
532	Assigned path does not exist. Check the network setting and configuration.	Chapter 17
533	Writing prohibited in this file.	—
534	An error occurred while network access. Confirm network conditions.	Chapter 17
535	Current path is not suitable. Set other path while use action on trigger.	—
536	Destination path is same as source path, or sub folder of source path.	—
537	Confirm a connection with External HDD.	Chapter 17
538	Module configuration is not matched, so it couldn't loaded. Configuration of saved data can see by File property.	—
539	Module configuration is not matched, so it couldn't loaded. Configuration of saved data can see by File property.	—

## 19.2 Messages and Corrective Actions

Code	Message	Chapter or Section
540	Cannot re-save from HD recording data.	—
541	Cannot detect the medium. Check the presence of the medium.	—
542	Cannot start HD recording while disk space shortage.	—
544	Cannot file access, litialize, and autoseup while measure is in progress. Wait measure end, or OFF it.	18.1

## Printer Errors

Code	Message	Chapter or Section
570	Close the printer cover.	15.1
571	Paper empty. Load a roll chart.	15.1
572	The printer head temperature is abnormality. Printing will be aborted. Printing will not be possible until the printer head temperature comes normal.	—
573	Printer over heat. Power off immediately.	—
574	Printer power supply error. Maintenance service is required.	—
575	Printer time out. Maintenance service is required.	—
576	Printer error.	—

## Network Errors

Code	Message	Chapter or Section
600	Unable to connect to the server. Check the network settings and configuration.	Chapter 17
601	Has not connect with ftp server yet. Confirm the network settings and connection.	Chapter 17
602	This ftp function in not supported.	—
603	FTP Error: Client Handle Confirm the network settings and connection.	Chapter 17
604	Cannot send data to a network printer. Confirm the network settings and connection.	Chapter 17
605	Cannot send a mail. Confirm the network settings and connection.	Chapter 17
608	Failed to acquire time from SNTP server. Confirm the network settings and connection.	Chapter 17

## Execution Errors (650 to 799)

Code	Message	Chapter or Section
650	Data is invalid.	—
651	The option is not equiped, so it cannot execute.	—
652	Undo is not possible since data that existed immediately before initialization or auto setup is not available.	—
653	Can not be executed while running. Press START/STOP key to stop acquisition.	—
654	Cannot manipulate files while image printing is in progress. Wait until image printing is complete.	—
656	Calibration failure. Disconnect the input and execute again. If it fails again, servicing is necessary. CH :	—
657	Hard disk recording is valid when the sampling rate is slower than the values shown below. 1CH : 1MS/s, 2~3CH : 500kS/s, 4~8CH : 200kS/s, 9~16CH : 100kS/s	—

## 19.2 Messages and Corrective Actions

Code	Message	Chapter or Section
658	Too many channels for the current T/div setting to hard disk recording. Decrease the number of channels by turning them OFF.	—
659	Capture T/Div should be faster than Main T/Div	—
660	Can not operate while data out. Wait until output is completed.	—
661	Balancing failed. CH :	—
663	Cannot start.	—
664	Go-Nogo is available while Trigger Mode is - 'Single' or 'Normal' - 'Auto' or 'AutoLevel' (Faster than 50ms/div)	2.1, chapter 11
666	Failed to measure statistics. Waveform data may be missing. If Cycle Statistics is specified, the instrument may be configured in a way that fails to detect the cycle.	8.3
667	Executing file access. Abort or wait until it is complete.	—
668	Image is being printed or saved. Wait until the execution of the command is complete.	—
669	Cannot be executed when the action trigger setting is ON.	12.1
670	Cannot be executed when the dual capture setting is ON.	3.3
671	Cannot be executed when a hard disk recording is ON.	3.4
672	Cannot be executed when the time base setting is to be an External clock.	3.1
673	Because there are too many channels, it can't start in the length of the present record.	Chapter 1
674	Average practice can't be done because the record length of the history exceeds the record length that it can be carried out.	Chapter 14
675	Average practice can't be done because the record length of the history exceeds the record length that it can be carried out.	Chapter 14
676	Set the trigger mode and capture mode to On Start for hard disk recording.	2.1, 3.3
677	Cannot do while selftest is executing.	19.3
678	Dual capture is not possible if the main sample rate is faster than 100 ks/S or T/div is faster than 100 msec/div. Meet either of the conditions below. * Shorten the record length (slower sample rate). * Decrease T/Div.	1.10, 3.1
679	Cannot start at the current record length. Shorten the record length or meet the following condition. * Set the trigger mode to Auto, decrease T/Div to less than 100 msec/div to enable roll mode. * Set the trigger mode to Single or On Start.	1.10, 2.1
680	Averaging mode is not possible when the trigger mode is Single, SingleN, or On Start. Change the trigger mode.	2.1
681	Dual capture is not possible when set to average. Change the acquisition mode.	3.1
684	Cannot start when the time base set to external clock while Acq. Mode set to envelope or box average.	3.1
685	Cannot start when roll mode display while accumulate mode set to ON. Turn Off accumulate.	4.2
686	Cannot be executed when the acquisition mode is set to average. Change the mode.	3.1
688	Hard disk recording to the internal hard disk is valid when the record length is longer than 1M.	3.1, 3.4
689	Cannot be executed on hard disk recorded waveforms.	—
690	Cannot be executed on waveforms in dual capture mode.	—
691	File recorded in hard disk is currently being analyzed. Files being analyzed cannot be deleted, or renamed.	—
692	The file which failed in the hard disk record can't be read.	—
693	Cannot be executed when GO/NO-GO Mode is Zone.	—
694	The measuring range is up to 100 MPoints from measure start (TimeRange1).	8.3
695	Set acquisition mode to Normal when using a wave window trigger.	3.1
696	The wave window trigger cannot be used if the sampling rate is faster than 500 kS/s or slower than 10 kS/s. When a record length is shorter than 25k, set a T/div slower than 10ms/div.	1.10
697	Range over. Change to an appropriate range then retry shunt calibration.	1.4
698	Statistical processing cannot be performed on HD recording waveforms.	8.2

## 19.2 Messages and Corrective Actions

Code	Message	Chapter or Section
699	Firmware was not overwritten in the following slots, since the version of the firmware in the module and that of the replacement firmware were the same. (Check the versions on the overview screen. ) SLOT:	19.5
700	Cannot be carried out during recording. Press the START/STOP key to stop the waveform acquisition first.	3.4
702	All search conditions are off. At least one condition should on.	13.1
703	Display setting of search source is off. Set it to on.	13.1
704	Cannot execute Time search while T/div is faster than 100msec/div.	1.8, 13.4
705	Cannot start Action on trigger while Trigger mode is SingleN.	2.1, 12.1
706	Cannot be executed when Go-Nogo Mode is On. Set the Go-Nogo Mode to OFF	Chapter 11
707	Cannot execute search while searched No. reached Maximum(1000).	—
708	Cannot execute or set while AutoScroll processing. Stop AutoScroll.	6.1
709	Cannot search while span is too long. Set to less than 2G points.	—
710	Cannot do these operations on HD Recording waveforms. - Search - WAVEform:SEND?	—
712	Cannot start while No GO/NO-GO condition.	Chapter 11
713	Cannot make wave zone from less than 2,000 points data, from more than 10,000,000 points data, or from less than 10division data.	—
714	Cannot start Action on trigger while PrintImage target is "File". Change target to "printer".	Chapter 15
715	Cannot start while USB Function setting is Storage. Cannot change USB Function setting while HD Recording.	18.9
716	Set the Math and FFT Window to Off to Start GO-Nogo.	Chapter 9, 10
717	Cannot abort this process.	—
718	Cannot start while time of one file is less than 10sec.	3.4
719	Cannot execute Time search when the time base setting is to be an External clock.	13.4

## Setup Errors (800 to 899)

Code	Message	Chapter or Section
800	Illegal date-time. Set the correct date and time.	—
801	Illegal file name. The file name contains characters which are not allowed or the file name is not a valid MS-DOS file name. Enter another file name.	16.4
802	Cannot set while recording.	3.4
803	Cannot change this parameter while running. Press the START/STOP key to stop acquisition.	—
804	Cannot change settings during GO/NO-GO. Stop the GO/NO-GO.	Chapter 11
805	Can not change display points with this T/div setting.	—
806	Cannot be changed when trigger A is not X. Set the state of the channel corresponding to condition A to 'X'.	2.9 to 2.15
807	Cannot set while TimeSynchro setting not Off.	18.6
808	Cannot change when Channel Display is OFF or Math settings are invalid. Set the channel display ON or make appropriate Math settings.	Chapter 1, chapter 9
809	Cannot change when External Clock is active.	3.1
810	Cannot change while running.	—
811	Illegal math expression. Input a correct computing equation.	9.5
812	Cannot set this model	—
813	Cannot set anything other than Low Pass for a Gaussian filter. Change the Filter Type to another filter besides Gaussian.	9.4
814	Cannot change settings while hard disk recording. Stop recording.	—
815	Cannot change settings during Action On Trigger. Stop the Action On Trigger.	12.1
816	Cannot set the channels which do not have modules installed.	Chapter 1, section 19.5
817	Cannot Set or Execute.	—
818	If the trigger mode is set to Single, Single(N), or OnStart, the acquisition mode cannot be set to Average.	3.1
819	If the acquisition mode is Average, the trigger mode cannot be set to Single, Single (N), or OnStart.	2.1
820	The acquisition mode cannot be set in the current record length.	—
822	Cannot be configured or executed during the search operation.	Chapter 13
823	Cannot be configured or executed during the history search operation.	14.2
824	The record cannot be selected.	Chapter 14
825	History record does not exist.	Chapter 14
826	Cannot be configured or executed while computation is in progress. Aborted when history display mode is set to One.	14.1
827	Cannot be configured or executed while updating the history all display. Aborted when history display mode is set to One.	14.1
829	Zones cannot be edited in the following cases: * When the main window is not displayed. * When the relevant waveform is not displayed.	11.1
830	The zone waveform does not exist.	11.1
831	The zone is being edited. To perform other operations, select Quit to exit zone editing.	11.1
832	Zones determination is not possible in the following cases: * When the main window is not displayed. * When the relevant waveform is not displayed. * When the zone waveform does not exist.	Chapter 1, sections 5.1, 6.1, 10.1
833	Processing statistics. To perform other operations, abort the statistical processing.	8.2
834	The channel which couldn't be set up was specified.	—
835	Cannot be set when the acquisition mode is set to average.	3.1
836	Cannot be changed when VScale is SPAN.	1.1
837	Cannot be set during hard disk recording.	—
839	It can't be set up during the dual capture practice or set to on.	3.3

## 19.2 Messages and Corrective Actions

Code	Message	Chapter or Section
840	Cannot be set to a range of 20 sec/div to 3 day/div during roll display.	1.10
841	Cannot be set because there are too many display channels at the current record length. Shorten the record length.	3.1
842	Zooming is not available when the number of displayed points of the FFT waveform is less than 50 in the Zoom window.	Chapter 6, 9.4
844	Cannot change this setting during hard disk recording.	3.4
845	Cannot change the History parameter when accumulate is ON. Turn OFF accumulate first.	4.2
846	P-P compression cannot be used to save when a record length is 1K.	—
847	Cannot set On this module.	—
848	Settings can not be entered for channels on which no strain module is mounted.	—
852	Cannot set Math to OFF while FFT Window ON.	10.1
853	Cannot select this trace because it already selected.	—
854	Because a record length is too long, it can't be set up by the present number of indicationchannels.	Chapter 1, 3.1
855	Because a history number to be one, it can't be set to the record length.	—
856	Cannot Display setting to On. This CH didn't acquisition to memory.	Chapter 5*
857	Cannot set while DualCapture mode on.	3.3
858	Cannot set while Action on trigger on.	12.1
867	Cannot be specified when the print style is Numeric.	—
868	Cannot be specified because characters in the JIS level-2 kanji set are included. Create the file on the local drive, and then copy it to the network drive.	—
869	Cannot set while Go-Nogo mode. Turn Off Go-Nogo mode first.	Chapter 11
870	All sub-channel inputs are off. At least one inputs should on.	1.2
871	No effective channel for Math Setup.	—
872	No effective channel for History Search Setup.	—
873	The capture window cannot be changed while the dual capture is in progress, and while the measuring is in progress.	—
874	Cannot set Save Range except 'Main' while PP-Comp save mode.	—
875	Cannot change or START when accumulate is ON. Turn OFF accumulate first.	4.2
876	Cannot frame setting to ON, except Image format on JPEG.	15.4
877	Cannot set to display points under 100.	—
878	Cannot set Trigger mode while dual capture mode On.	—
879	Cannot set GoNogo mode while Math or FFT Window is On.	Chapter 9, 10
880	Cannot set Action mode to On, while hard disk recording and dual capture mode On.	—
881	Cannot set for CH which ValueType is Float while running.	—
882	Cannot set while Single-N running.	1.8
883	Cannot set Input to ON with limit of memory capacity.	1.8

\* Features Guide, IM DL850-01EN

## System Errors (900 to 999)

Code	Message	Chapter or Section
900	No module installed. Install the module.	—
901	Failed to backup setup data. Will initialize. Backup battery may be low.	—
902	The firmware is not suitable for this system. Install the proper firmware.	—
903	The USB device's power consumption exceeded the capacity of the USB hub.	—
904	Lower the sample rate or reduce the number of measuring channels.	Chapter 1
905	Lower the sample rate or reduce the number of measuring channels.	Chapter 1
906	Fan stopped. Maintenance service is required.	—

## 19.2 Messages and Corrective Actions

Code	Message	Chapter or Section
907	Internal temperature is too high. Maintenance service is required. It will shutdown automatically.	—
908	Check the measured current and the number of probes that you are using.	3.6*
909	Internal HD is full.	16.10
910	Key protect is enabled. To release the protection, press the PROTECT key or enter the password.	18.10
911	Fan for Input modules stopped. Cannot start. Maintenance service is required.	—
912	Fan for CPU stopped. Maintenance service is required. It will shutdown automatically.	—
* <i>Getting Started Guide</i> , IM DL850-03EN		
913	LCD BackLight Failure. Maintenance service is required.	—
914	Cannot start while this module configuration. 720210 should use in CH1 - CH8. 720240 should use in CH13 - CH16.	—
915	It installed the module which cannot support by this machine. CH :	—
916	It installed 701250/701255 which cannot use by this machine. Maintenance service is required. CH :	—
917	Hardware configuration error occurred. Restart this machine. If it occurred again, maintenance service is required.	—
918	IRIG is unlocked.	—
919	Key operate not available while system error occurred	—
920	Firmware overwriting error occurred.	—

### Note

If servicing is required, first see if initializing the instrument fixes the problem.

## 19.3 Carrying Out Self-Tests

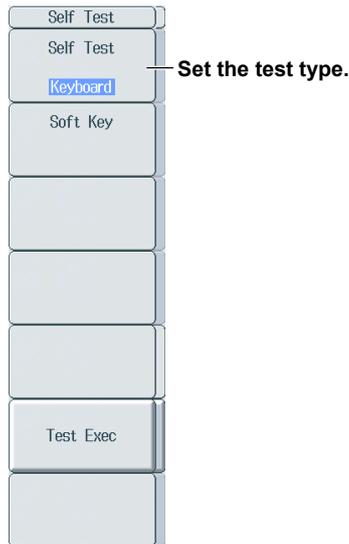
This section explains the following settings (which are used when testing whether the DL850/DL850V's keyboard, memory, SD card interface, internal hard disk, and printer are functioning properly):

- Test type
- Executing tests

► [“Self-Test \(Self Test\)” in the Features Guide](#)

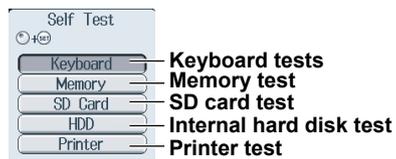
### UTILITY Self Test Menu

Press **UTILITY** and then the **Self Test** soft key to display the following menu.



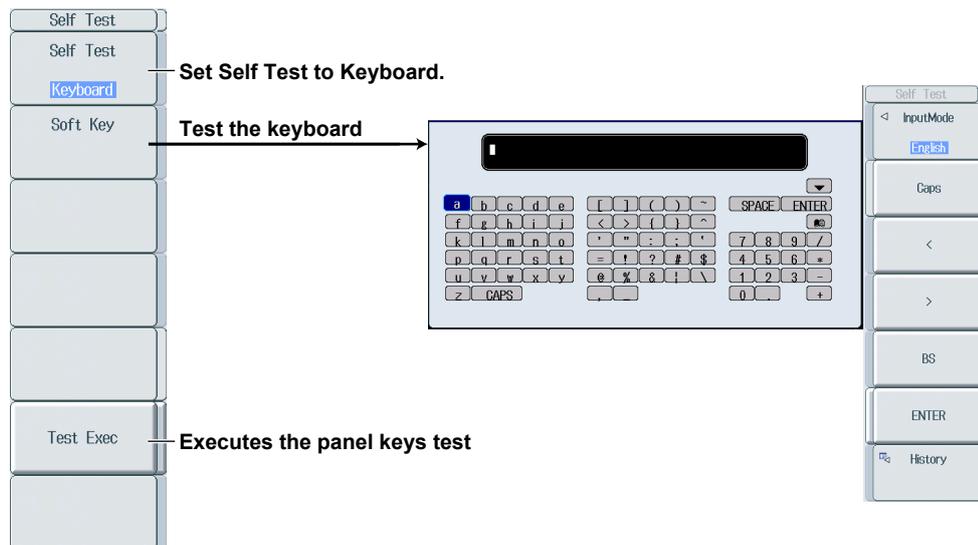
### Setting the Self-Test Type (Self Test)

Press the **Self Test** soft key to display the following menu.

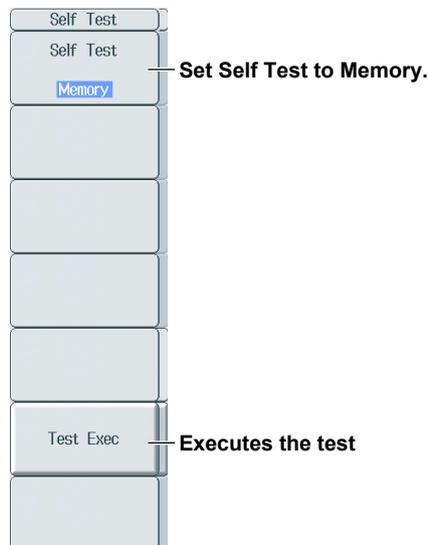


- Keyboard:** Tests to determine whether the front panel keys are operating correctly and whether the keyboard that is displayed on the screen accepts input properly. The front panel keys are operating properly if the names of the keys that you press are highlighted. The keyboard is operating properly if you can enter the specified characters.
- Memory:** A test to determine whether the internal CPU board RAM and ROM are operating properly. If “Pass” appears, they are operating properly. If an error occurs, “Error” appears.
- SD Card:** A test to determine whether the SD card interface is operating properly. If an error occurs, “Error” appears.
- HDD:** A test to determine whether the internal hard disk is operating properly. If an error occurs, “Error” appears.
- Printer:** A test to determine whether the optional built-in printer is operating properly. If the print density is correct, the built-in printer is operating properly. If an error occurs, the built-in printer does not print properly.

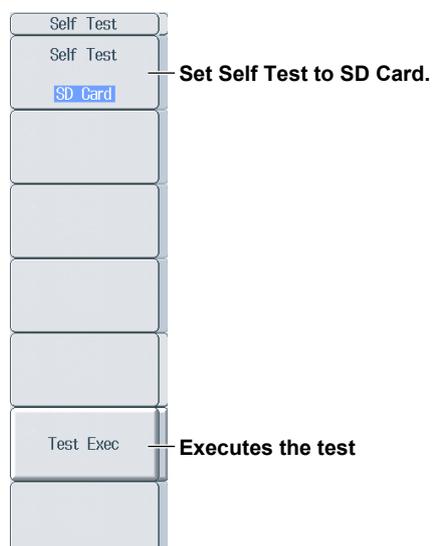
### Executing the Keyboard Tests



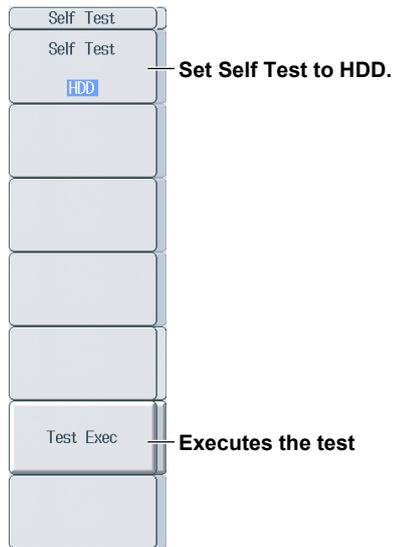
### Executing the Memory Test



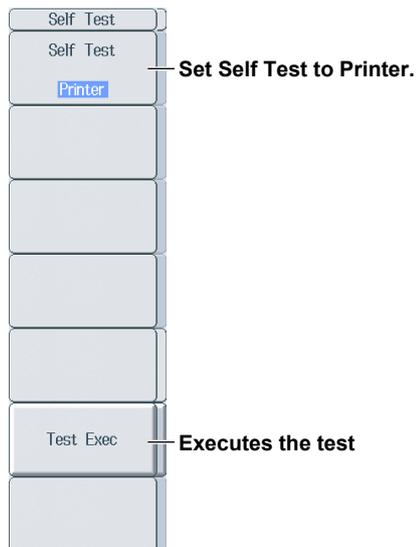
### Executing the SD Card Test



### Executing the Internal Hard Disk Test



### Executing the Printer Test



### If an Error Occurs during a Self-Test

If an error occurs even after you carry out the following procedure, contact your nearest YOKOGAWA dealer.

- Execute the self-test again several times.
- Check whether the media being tested is properly inserted.
- Check that the paper is set properly in the built-in printer and that paper is not jammed.

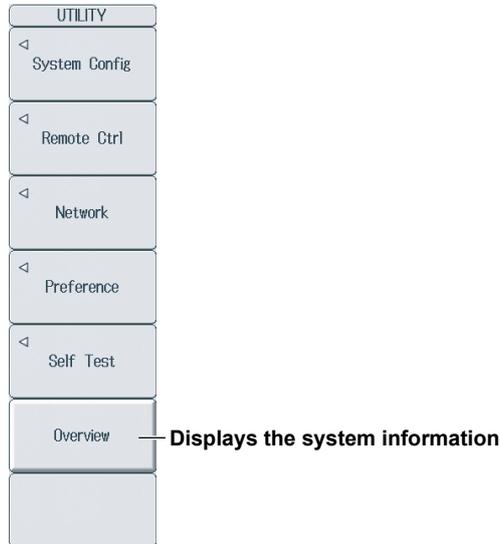
## 19.4 Viewing System Information (Overview)

This section explains how to view the DL850/DL850V system information.

▶ [“Overview \(Overview\)” in the Features Guide](#)

### UTILITY Overview Menu

Press **UTILITY** and then the **Overview** soft key to display the following screen.



### Viewing System Information (Overview)

Overview			
-Model	DL850	RecordLength	2GW
Serial No / ProductID	9TK225889 / 501A1uA0 (MAC: )		
-Slot			
1:	701260		5: 701270
2:	701280	1.01	6: -
3:	720230		7: 701271
4:	720220		8: -
-Options			
/M2	Memory expansion 2G		
/B5	Built-in printer		
/HD1	Internal HDD		
/C20	IRIG,GP-IB interface		
/G2	User defined math function		
/P4	4 Probe power outputs		
-Default Language	Japanese		
-Information			
Firm Version	1.01	10/05/31	12:20
FPGA1 Version	ACQ(99.05.42, 20100519)		PCI(99.05.54, 20100522)
FPGA2 Version	GDC(0.50)		GD(0.38)

#### Displayed Contents

Displayed Contents	Model
Serial No / ProductID	The serial and product numbers
Slot	The module models that are installed in each slot
Options	The options installed in the DL850/DL850V
Default Language	The default language
Information	Information such as the firmware version and the date

## 19.5 Recommended Replacement Parts

YOKOGAWA guarantees the DL850/DL850V for the period and under the conditions of the product warranty.

Under the conditions of the three-year warranty, the following parts are excluded. For part replacement, contact your nearest YOKOGAWA dealer.

<b>Part Name</b>	<b>Lifetime</b>
Built-in printer	Under normal conditions of use, equivalent of 500 rolls of printer paper (part number: B9988AE)
LCD backlight	Under normal conditions of use, approximately 25,000 hours

<b>Part Name</b>	<b>Warranty Period</b>
Internal hard disk	One year after the DL850/DL850V is purchased (however, the data that is stored on the hard disk is not included in this warranty).

The following are consumable parts. We recommend replacing them at the intervals listed below. For part replacement, contact your nearest YOKOGAWA dealer.

<b>Part Name</b>	<b>Recommended Replacement Interval</b>
Cooling fan	3 years
Backup battery (lithium battery)	5 years

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