HIOKI

GUIDE BOOK

8855

MEMORY HiCORDER

HIOKI E. E. CORPORATION

Introduction

Thank you for purchasing the HIOKI "8855 MEMORY HiCORDER." To obtain maximum performance from the product, please read this manual first, and keep it handy for future reference.

About This Manual

The manual "Measurement Guide for the 8855" contains the minimum information necessary for operation of the 8855 MEMORY HiCORDER. For a detailed explanation of operating methods, please refer to the 8855 Quick Start Manual and 8855 Instruction Manual. Be sure to read and understand the sections entitled "Safety Notes" and Chapter 2 "Installation and Preparation" in the 8855 Instruction Manuals before using the product.

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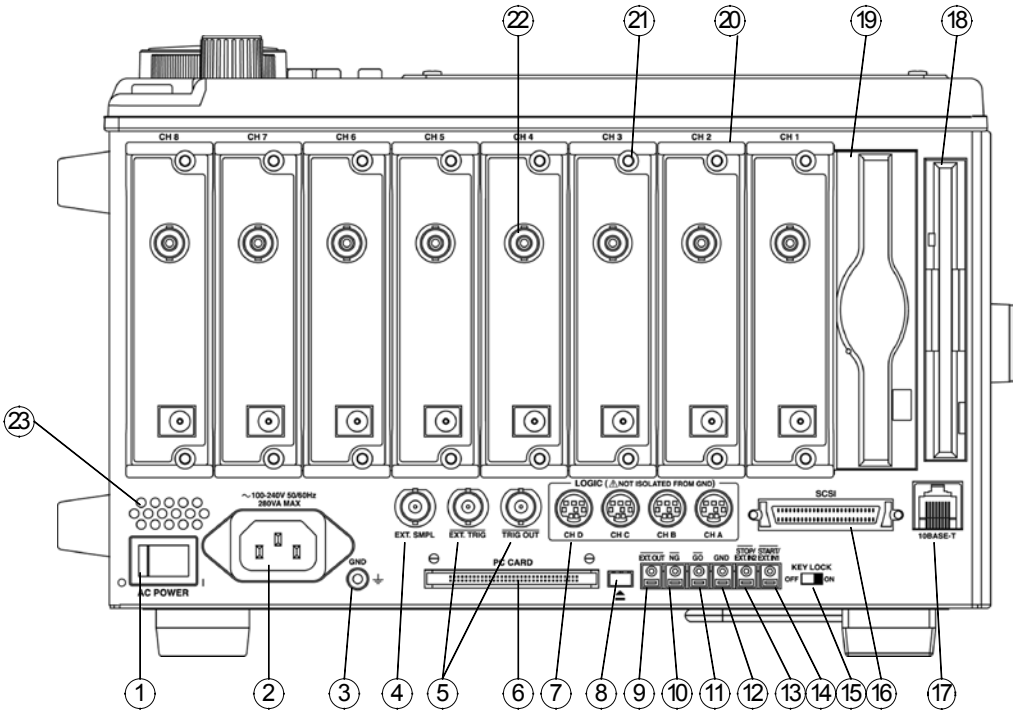
Identification of Controls and Indicators

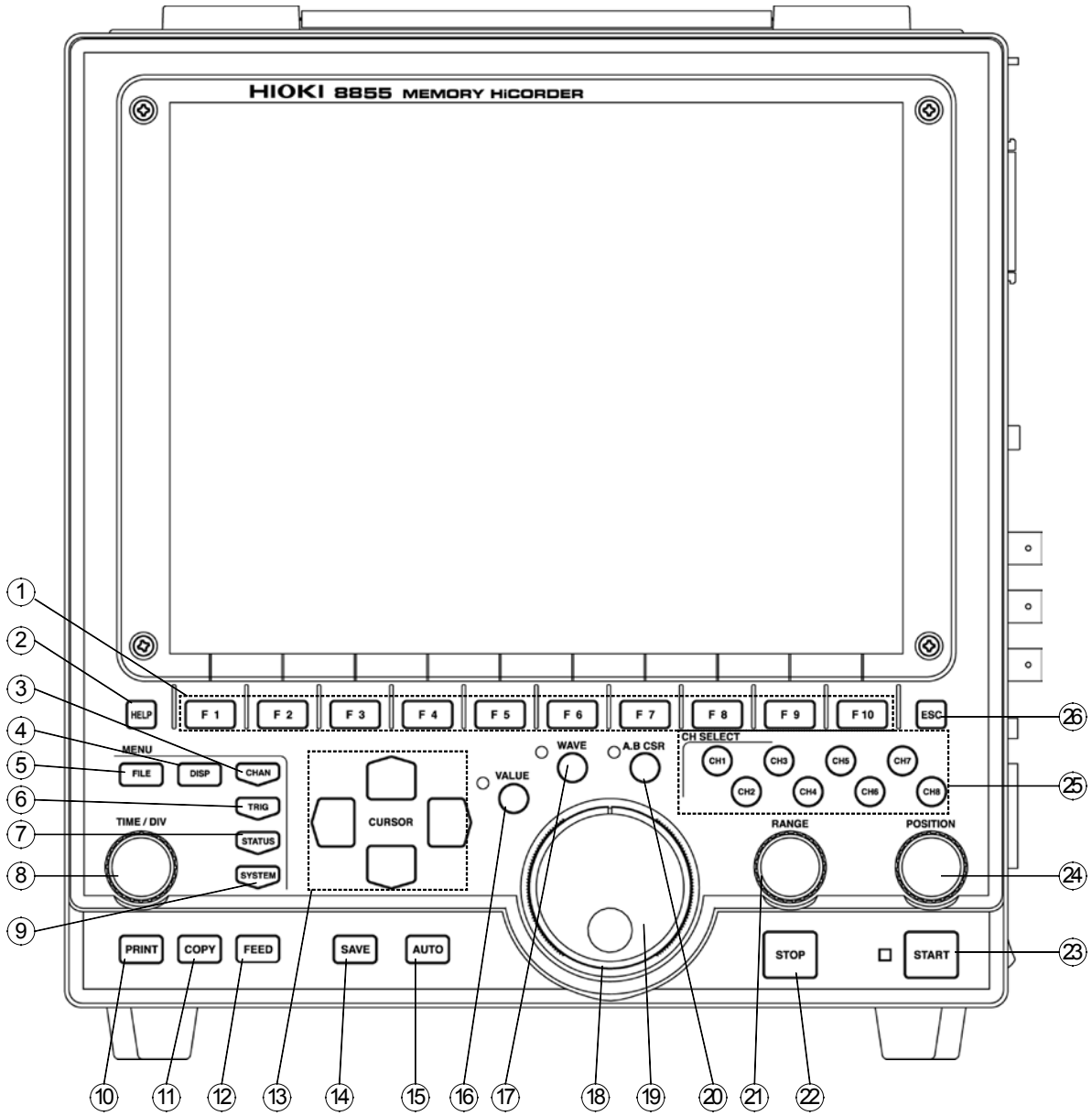


Right Side Panel

①	Power switch	Switches on or off the power supply.
②	AC connector	The supplied power cord must be plugged in here.
③	Function ground terminal (GND)	Connects to the earth.
④	External sampling terminal	Allows input of an external sampling clock. (in the Memory function)
⑤	Trigger terminals	Can be used to synchronize multiple products, using the EXT TRIG input and TRIG OUT output.
⑥	PC card slot	Inserts the PC card.
⑦	Logic probe connectors	Input connector for the logic input section, designed for the dedicate logic probes (CH A to D).
⑧	Eject button	Removes the PC card.
⑨	External output terminal	Various output signals can be selected, such as the BUSY, storage, or probe offset (1 kHz, 5 V Rectangle wave output)
⑩	NG evaluation output terminal	When NG results from the numerical evaluation and waveform evaluation, a signal is output from this terminal.
⑪	GO evaluation output terminal	When GO results from the numerical evaluation and waveform evaluation, a signal is output from this terminal.
⑫	Ground terminal (GND)	Uses with ⑨ to ⑭ (except ⑫) terminals.
⑬	External stop terminals	Stop operation can be controlled.
⑭	External start terminals	Start operation can be controlled.
⑮	Key lock	Locks the operation of keys.

⑯	SCSI connector	An MO drive can be connected.
⑰	LAN connector	Can be connected to a network through a LAN.
⑱	FD slot	Floppy disk is inserted.
⑲	MO slot	MO disk is inserted. (when the 9646 is installed)
⑳	Input unit slots	These slots accept input units.
㉑	Fastening screw	Secures the plug-in product.
㉒	Analog input connector	Unbalanced analog input. (on ANALOG UNIT)
㉓	Blowing slot	

Operation Method of the Panel Key



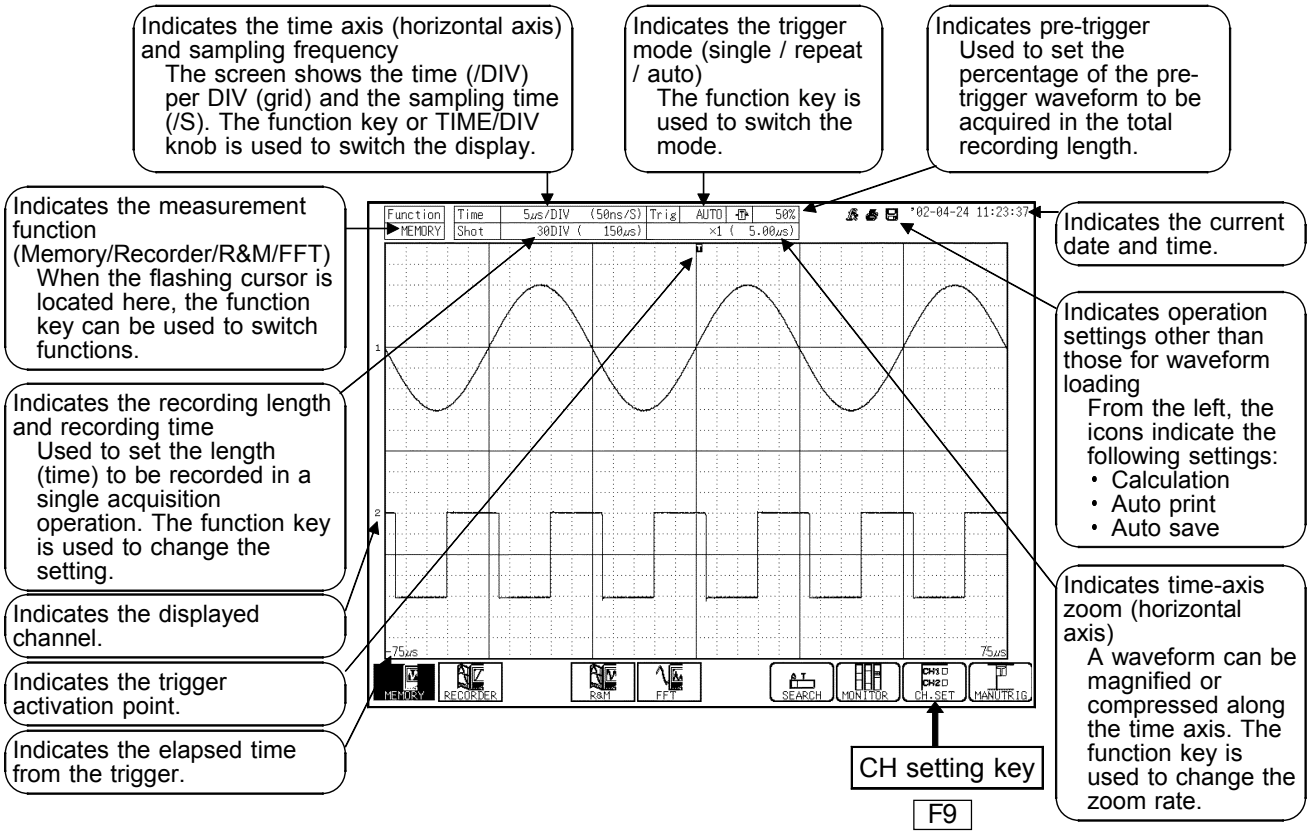
Front Panel

①	**F1** to **F10** key	Serve to select setting items.
②	**HELP** key	Provides on-line help.
③	**CHAN** key	Causes the display to show the Channel screen which serves for making input channel settings.
④	**DISP** key	Causes the display to show measurement and analysis results.
⑤	**FILE** key	Causes the display to show the File screen which serves for reading, storing, etc. the waveform data etc.
⑥	**TRIG** key	Causes the display to show the Trigger screen. Setting the trigger functions.
⑦	**STATUS** key	Causes the display to show the Status screen which serves for setting most measurement parameters.
⑧	**TIME/DIV** key	Serves to set the speed for inputting and storing the input signal.
⑨	**SYSTEM** key	Causes the display to show the System screen. Makes all the settings of common functions, such as the initial settings and various other settings.
⑩	**PRINT** key	Serves to print out stored waveforms.
⑪	**COPY** key	Serves to print out a hard copy of the current screen display.
⑫	**FEED** key	Causes the printer paper to advance for as long as the key is pressed.
⑬	**CURSOR** key	These keys serve to move the flashing cursor in the four directions.
⑭	**SAVE** key	Saves the data on the specified media.
⑮	**AUTO** key	Pressing this key activates automatic setting of time axis range and voltage range values of input waveform.
⑯	**VALUE** key	Uses to select the numerical values setting.
⑰	**WAVE** key	Uses to select the the waveform scrolling.
⑱	JOG	Rotary control knob that serves to change values, move the A/B cursors, and scroll the waveform.
⑲	SHUTTLE	Concentric ring that serves to change values, move the A/B cursors, and to scroll the waveform. The speed of movement is proportional to the rotation angle.
⑳	**A.B CSR** key	Uses to select the the A/B cursor moving.
㉑	**RANGE** knob	Sets the measurement range for the channel.
㉒	**STOP** key	Stops measurement and analysis. Pressing this key twice stops measurement.
㉓	**START** key	Initiates the measurement and analysis. During measurement, the LED above the key is lit.
㉔	**POSITION** knob	Sets the zero position for the channel.
㉕	Channel select keys	Selects channel.
㉖	**ESC** key	Exits the Input or Set up screen.

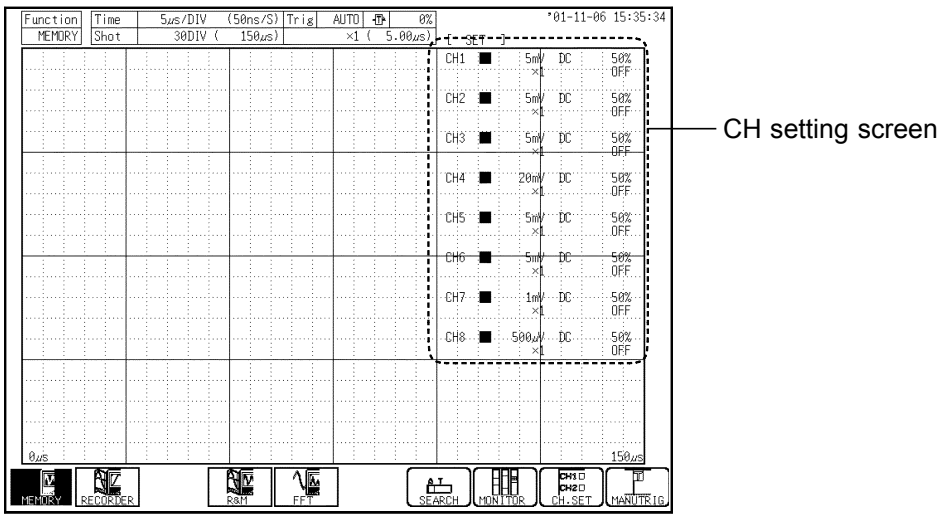
Display Screen and Setting Screen

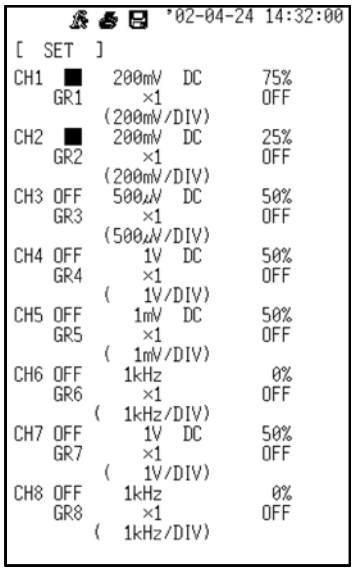
Waveform display screen

The screen shown below appears immediately after the power switch is turned on. The waveform display screen can also be displayed by pressing the red DISP key. The following explains the displayed items and the items that can be set in the waveform display screen.

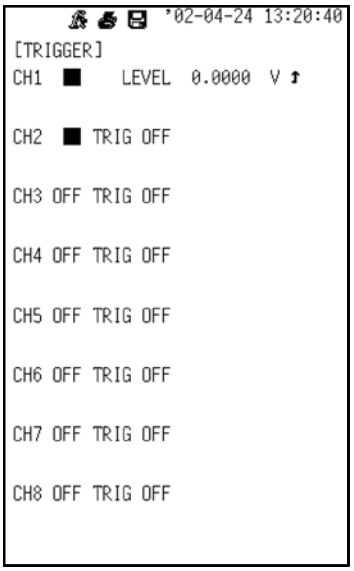


Other settings can be made by pressing the CH setting key (F9 function key) in the waveform display screen. Each time the F9 key is pressed, the CH setting screen changes as shown on the next page, and displays channel information or allows setting to be performed.





CH setting F9



CH setting F9

Input unit setting

The following settings can be entered for each channel:

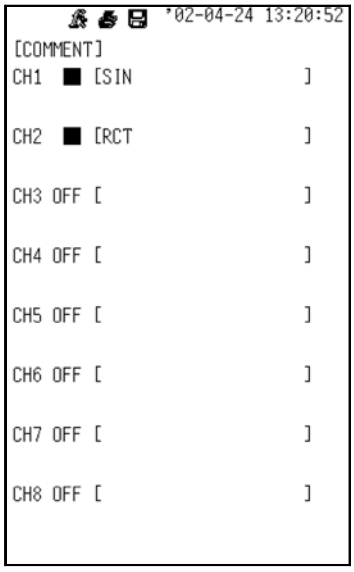
- Display ON/OFF
- Voltage axis range (vertical axis) setting
- Zero-position setting
- Display graph setting
- Coupling setting
- Magnification / compression of the vertical axis
- Low-path-filter setting

Trigger setting

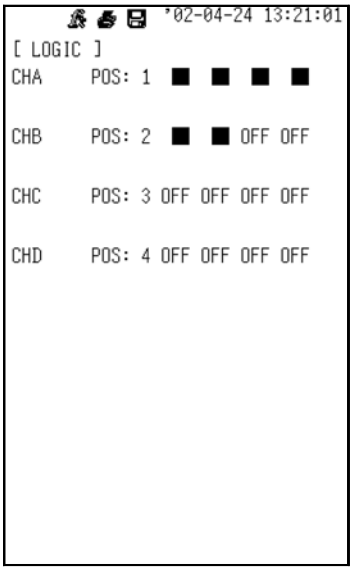
The following settings can be entered for each channel.
(Analog only)

- Display ON/OFF
- Trigger type setting
- Trigger level setting
- Trigger slope setting

For the setting of other items, use the trigger screen.



CH setting F9



CH setting F9

OFF

CH setting F9

Back to the input unit setting screen.

Comment display

Comments for each channel can be displayed. Comments cannot be input in the waveform display screen. To enter a comment, press the CHAN key to display the comment setting screen.

Logic waveform display

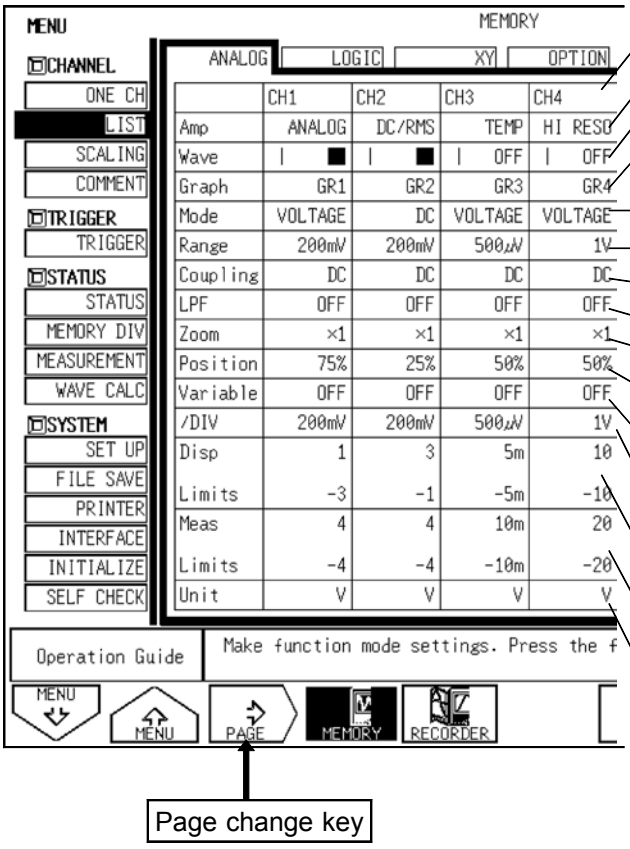
Display settings for each logic waveform can be adjusted. The following settings can be entered on this screen:

- Logic display ON/OFF
- Display position

Channel screen

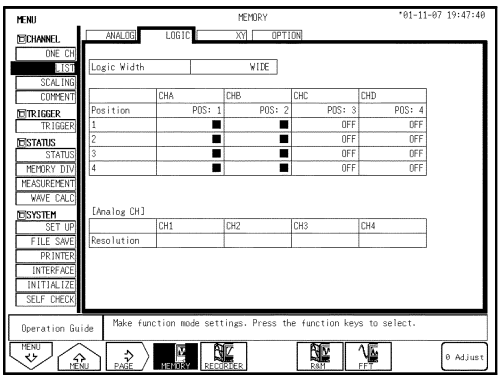
The channel screen can be displayed by pressing the CHAN key located on the left side of the unit. This screen is used to set units (analog input) and to enter logic input, display the settings for each channel, and to enter scaling settings, comments, and other detail settings.

List

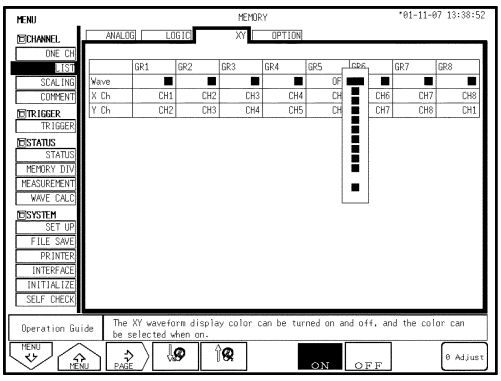


Indicates the channel. Settings can be copied between channels.
Indicates the unit type.
Used to select waveform display ON/OFF.
Used to select waveform graph ON/OFF. This item is enabled when the display shows multiple screens.
Used to select the measurement mode. (voltage, current, temperature, etc.)
Used to select the vertical axis (voltage axis) range.
Used to select the input coupling setting. (AC, DC, GND)
Used to select the low path filter ON/OFF.
Used to select vertical axis (voltage axis) zoom.
Used to set the zero position . This allows selection of the zero-level setting point in the screen.
Used to select variable ON/OFF. The position and size of the displayed waveform can be changed.
Indicates the voltage value per DIV (grid). This setting can be entered when Variable is ON.
Indicates the upper- and lower-limit values of the display screen. This setting can be entered when Variable is ON.
Indicates the upper- and lower-limit values within the selected measurement range. Measurement cannot exceed these levels.
Indicates the measurement unit of the vertical axis.

The above screen shows the analog-setting list page. Press the Page Switch key (F3 function key) to change the display to pages for logic input setting, X-Y setting, and details (options) setting. The following describes each of these pages.



Page
F3



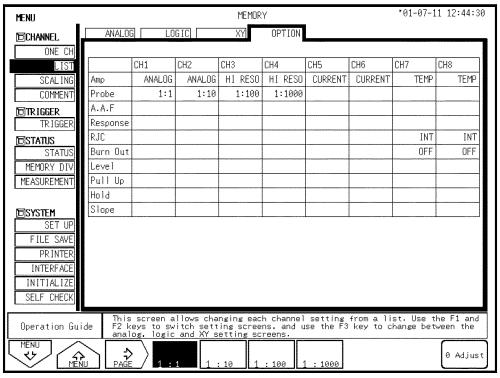
Page
F3

Logic page

Selection of logic waveform display ON/OFF, display position, display width, and analog input waveform resolution display ON/OFF (For details, refer to section 6.3.10 of the Quick Start Manual.)

XY page

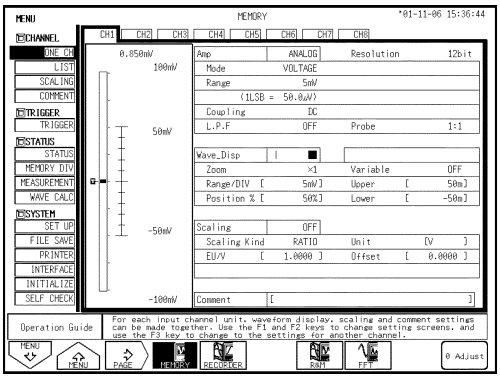
This screen is enabled when the display mode (setting item in the status screen) is set to "XY screen."
XY waveform setting (ON/OFF) and channel selection for the X- and Y-axes



Options page

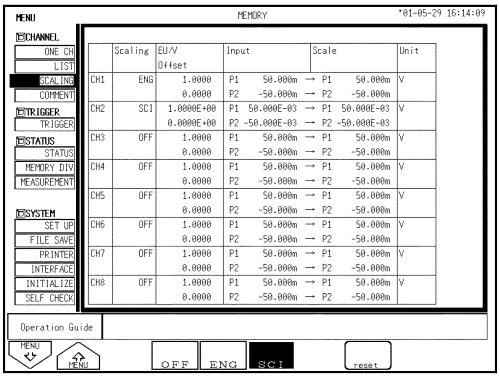
Selection of the probe pressure-distribution ratio when the 9665, 9666, or 9322 is used
Setting of the antialiasing filter (enabled when used with the 8953-10 unit)
Setting of details (reference contact, burnout) for temperature measurement when used with the 8954 unit
Setting of details (threshold, hold, level, etc.) when used with the 8955 unit

In addition to the list page shown on the previous page, the channel screen includes the three types of pages specified below. To change pages, press the menu key (F1 F2 function keys) or CHAN key.



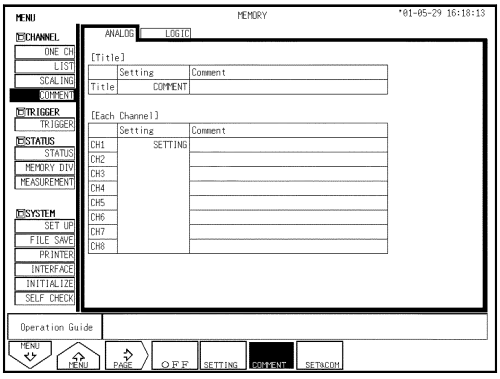
ONE CH

These pages are used to enter settings for individual channels. Since the page displays a level monitor and numerical values, variable and scaling settings can be entered while the input level is monitored.



SCALING

This page is used to enter scaling settings. It allows the setting of scaling values for all channels. For details, refer to 5.3 "Scaling Function" in the Instruction Manual.



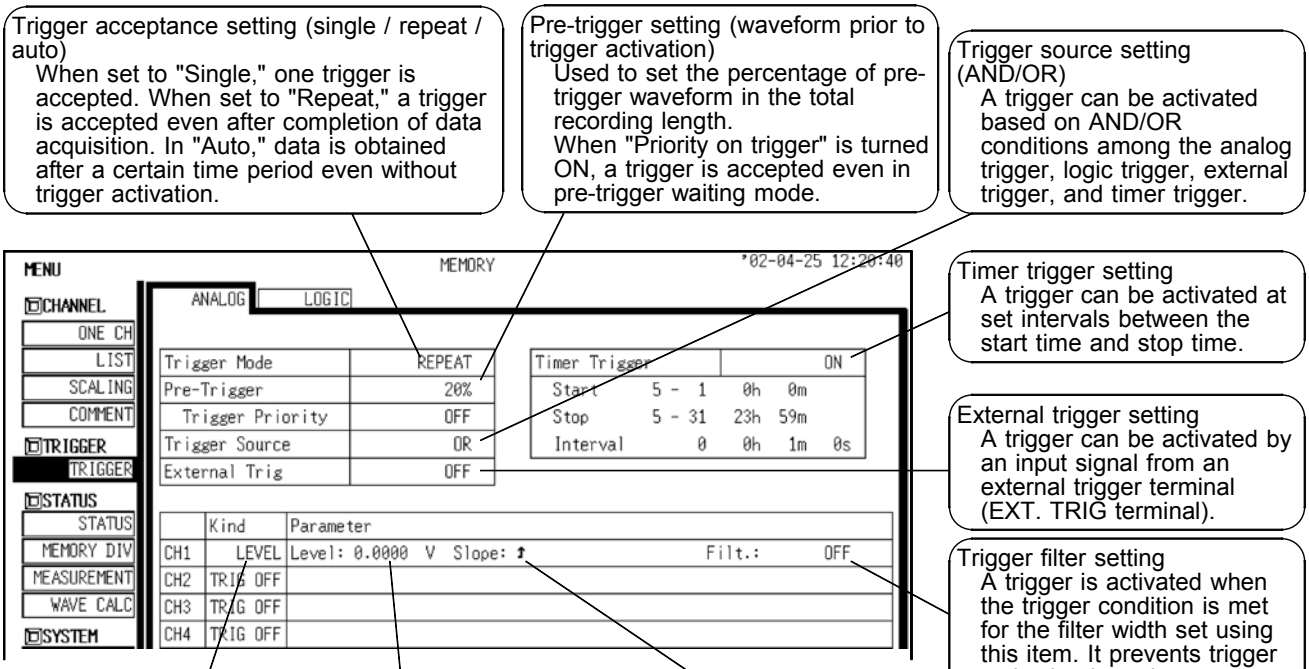
COMMENT

This page is used to enter comments. It allows the input of comments for all channels (logic). For details, refer to 5.4 "Comment Function" in the Instruction Manual.

Trigger screen

The trigger screen can be displayed by pressing the TRIG key located on the left side of the unit.
This screen is used to set the trigger for each channel.
To switch the page between analog and logic, press the Page Switch key (F3 function key).

Analog trigger setting



Trigger acceptance setting (single / repeat / auto)
When set to "Single," one trigger is accepted. When set to "Repeat," a trigger is accepted even after completion of data acquisition. In "Auto," data is obtained after a certain time period even without trigger activation.

Pre-trigger setting (waveform prior to trigger activation)
Used to set the percentage of pre-trigger waveform in the total recording length.
When "Priority on trigger" is turned ON, a trigger is accepted even in pre-trigger waiting mode.

Trigger source setting (AND/OR)
A trigger can be activated based on AND/OR conditions among the analog trigger, logic trigger, external trigger, and timer trigger.

Timer trigger setting
A trigger can be activated at set intervals between the start time and stop time.

External trigger setting
A trigger can be activated by an input signal from an external trigger terminal (EXT. TRIG terminal).

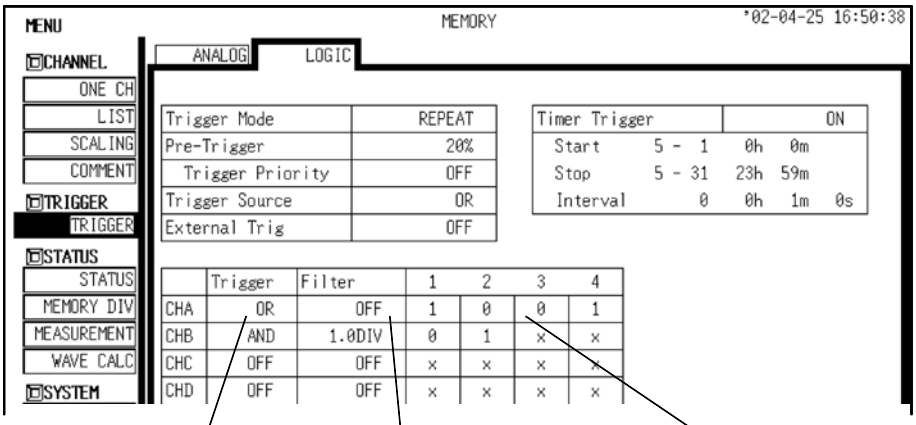
Trigger filter setting
A trigger is activated when the trigger condition is met for the filter width set using this item. It prevents trigger activation by noise.

Trigger kind setting
The trigger type can be selected from among the level trigger, window trigger, frequency trigger, glitch trigger, and event trigger.

Trigger level setting
A trigger is activated when an input signal crosses the trigger level set using this item.

Trigger slope setting
A trigger is activated when an input signal complies with the trigger slope (rising edge, falling edge) set using this item.

Logic trigger setting



Logic trigger AND/OR setting
The trigger AND/OR condition can be set for each logic probe.

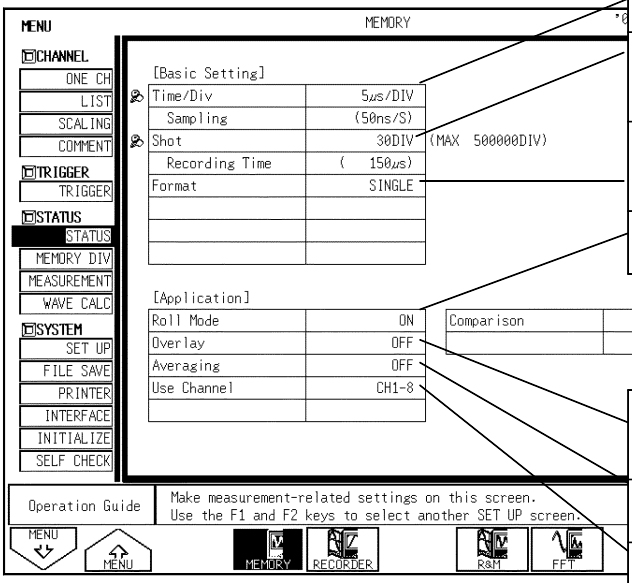
Logic trigger filter setting
A trigger is activated when the trigger condition is met for the filter width set using this item. It prevents trigger activation by noise.

Logic trigger pattern setting
A logic input-signal trigger pattern can be set for each probe.

Status screen

The status screen can be displayed by pressing the STATUS key located on the left side of the unit. This screen is used to enter basic waveform data-acquisition settings, memory allocation settings, and calculation settings.

STATUS



Used to set the time axis (horizontal axis). The sampling speed changes automatically.

Used to set recording length. The recording time changes automatically.
The recording length can be set in increments of 1 DIV.

Used to set the number of screens for split display
The display mode can be selected from among four types: 1-screen, 2-screen, 4-screen, 8-screen, and X-Y1 screen.

When roll mode is set, the screen changes (scrolls) in sync with waveform recording at time axis slower than 10 ms/DIV.

The waveform judgment function can be used when this is turned ON. For details, refer to Chapter 9 "Waveform Evaluation Function" in the Instruction Manual.

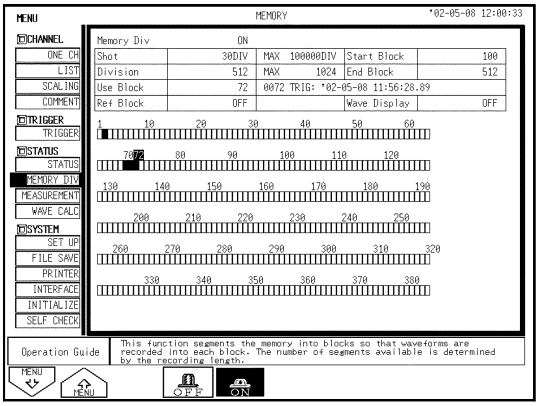
When "Superimposition" is turned ON, a new waveform is displayed over the previous waveform if the trigger mode is set to "Repeat" or "Auto."

When "Averaging" is turned ON, waveform data is obtained the set number of times, and the average of all data is displayed.

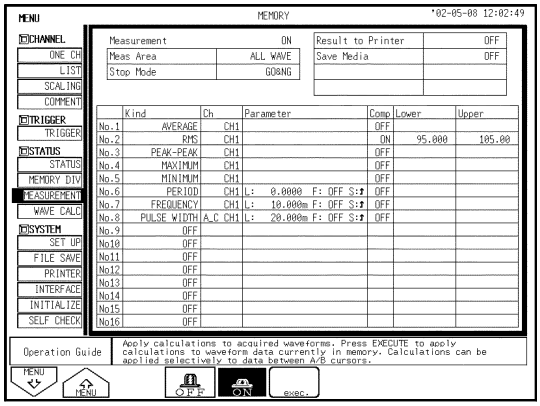
The "Channel in use" item is used to set the number of channels for measurement-data memory allocation.

In addition to the basic setting page shown above, the status screen includes the three pages specified below. To change pages, press the menu key (F1 F2 function keys) or CHAN key. Regarding the setting method, refer to the Instruction Manual provided with the product.

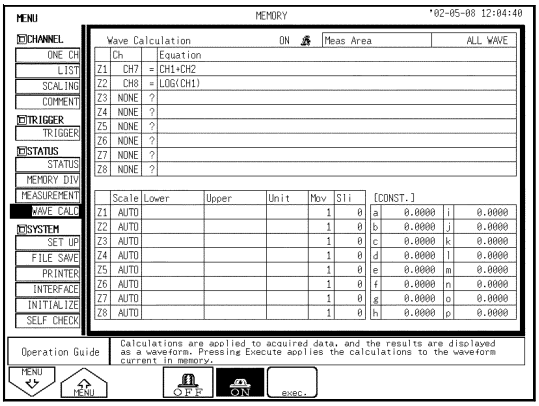
MEMORY DIV (Chapter 6 "Memory Segmentation Function" in the Instruction Manual)



MEASUREMENT (Chapter 7: 7.1 "Numerical Calculation" in the Instruction Manual)

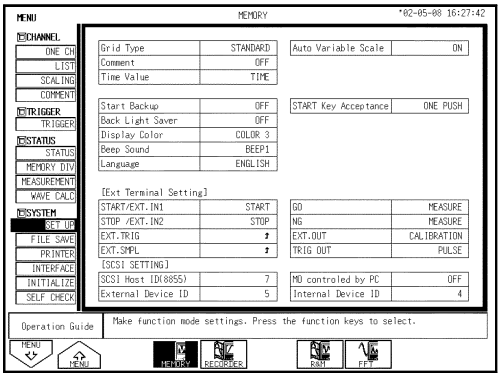


WAVE CULC (Chapter 7: 7.2 "Waveform Calculation" in the Instruction Manual)



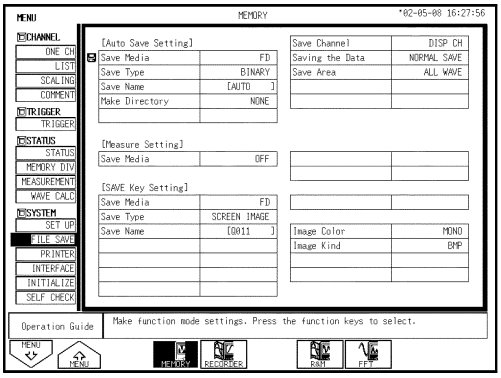
System screen

The system screen can be displayed by pressing the SYSTEM key located on the left side of the unit.
To change pages, press the menu key (F1 F2 function keys).
The system screen is used to enter settings common to all functions; settings for printer, files, and communication; 8855 initial settings; and self-diagnosis settings.
The following briefly describes each of these setting pages.



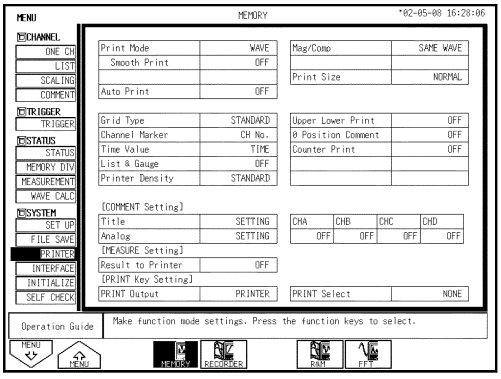
SET UP (Refer to 9.2 "Set Up Screen" in the Quick Start Manual.)

- Display settings (grid display, comment display, etc.)
- Start condition settings (start backup, etc.)
- External control terminal settings (GO. NG terminal, probe correction output setting)
- SCSI settings (ID setting, external MO setting, PC connection setting)



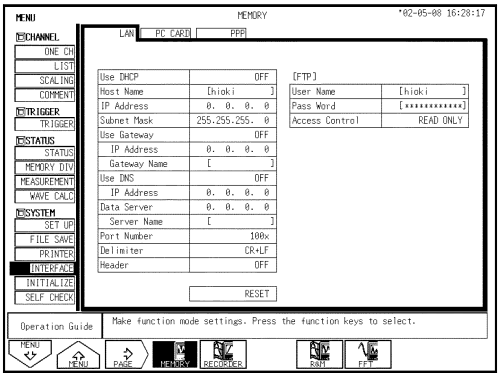
FILE SAVE (Refer to 9.3 "File Screen" in the Quick Start Manual.)

- Auto-save settings (destination, file save format, saving range, etc.)
- Storage of numerical processing results (destination, saving method)
- SAVE key setting (saving operation performed when the SAVE key is pressed)



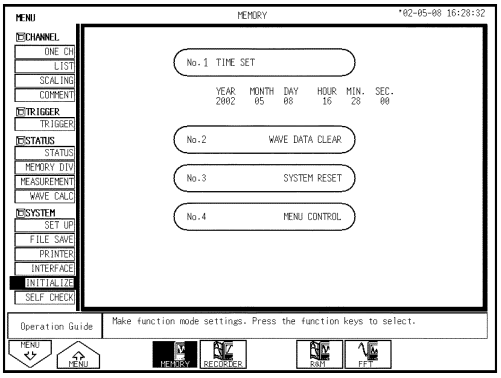
PRINTER (Refer to 9.4 "Printer Screen" in the Quick Start Manual.)

- Printer settings (Grid, density, gauge, marker, size, etc.)
- Printing format settings
- Comment printing settings
- Printing destination setting (printer, LAN equipment)
- Real-time print settings (recorder function, R&M)



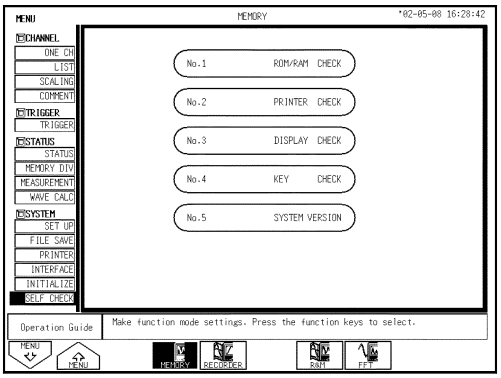
INTERFACE (Refer to Chapter 11 "Communication Settings" in the Instruction Manual.)

- LAN settings
- FTP settings
- PC card settings (RS-232C, GP-IB, modem)
- PPP settings (transmission, reception, etc.)



INITIALIZE (Refer to 9.5 "Initialize Screen" in the Quick Start Manual.)

- Clock setting
- Waveform data initialization
- System reset
- Menu control (display/hide setting)



SELF CHECK (Refer to 9.6 "Self-check" in the Quick Start Manual.)

- ROM/RAM check
- Printer check
- Display check
- Key check
- System component list (option information, version information, etc.)

Measurement Method

Operation flow

Pre-measurement operations

1	What is the measurement target object? What is the voltage of the target object?	Check the maximum input voltage. Check the maximum ground input voltage.
2	Connect the power cord to the 8855 unit.	Confirm that the power-supply voltage is 100 VAC to 200 VAC. Confirm that the power-supply frequency is 50/60 Hz (sine wave).
3	Connect to the measurement target object.	Confirm that the power switch of the measurement target object is turned off.
4	Turn on the power switch. Turn on the power switch located on the right side of the unit.	

Setting up the main unit

5	Select a measurement function.	In each screen, move the flashing cursor to the top (upper left) item. There are four selectable items: memory, recorder, R&M, and FFT.
6	Set the time axis. Press the DISP or STATUS key.	Make settings in the display or status screen. Sampling frequency (s) = Time axis (s/DIV) / 100 (number of pieces of data per DIV)
7	Set the recording length. Press the DISP or STATUS key.	Make settings in the display or status screen. Measurement times (s) = Time axis (s/DIV) / recording length (DIV)
8	Set the input channel. Press the CHAN key.	Make settings in the channel screen. Voltage axis range, zero position, coupling, filter, etc.
9	Make trigger settings. Press the TRIG key.	Make settings in the trigger screen. Trigger mode, pre-trigger, trigger type, trigger level, etc.

Starting measurement

10	Begin measurement. Press the START key.	On the front panel of the main unit, press the green START key located at the lower right corner. The LED lights up, and measurement starts.
11	End measurement. Press the STOP key. (Trigger mode: Continuous/Auto)	In the single-trigger mode, measurement ends when data of the set recording length is obtained. In the continuous or auto trigger mode, measurement ends when the STOP key is pressed. To abort measurement, press the STOP key twice.

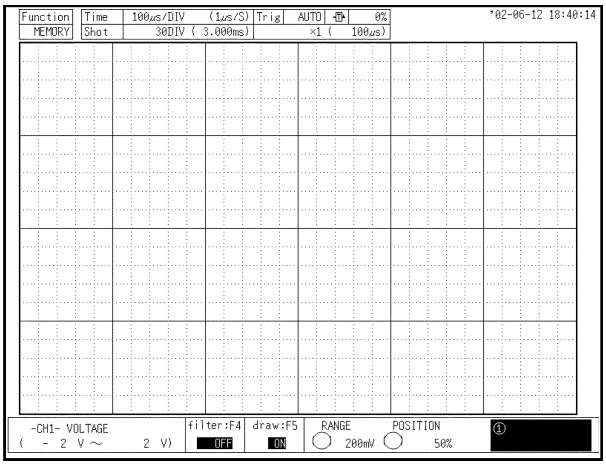
Starting analysis

12	Begin analysis.	Waveform zoom (Refer to Chapter 8 in the 8855 Quick Start Manual.) A-B cursors (Refer to Chapter 8 in the 8855 Quick Start Manual.) Numerical processing, waveform processing (Refer to Chapter 7 in the 8855 Instruction Manual.) Waveform search (Refer to Chapter 8 in the 8855 Instruction Manual.)

Simple measurement operations

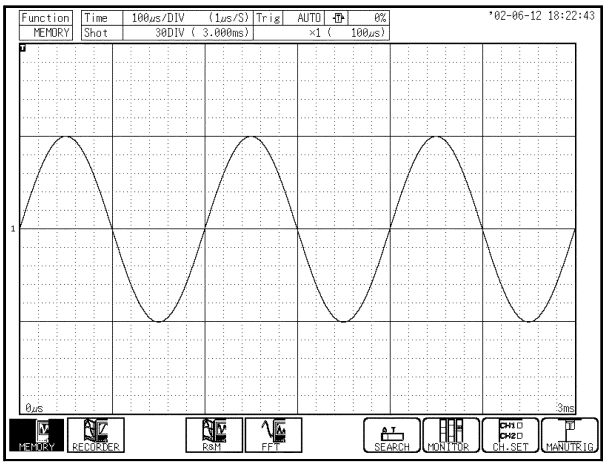
The following describes the simple operating procedures with a waveform input into Channel 1 (CH1) of the 8855 HiCORDER.

(Example) Input of a sine wave of 1 kHz and ±1 V, and observation of the waveform



Procedure

(1) Press the DISP key to display the waveform display screen.
(2) Move the flashing cursor to the "Function" indication at the upper left corner of the screen, then press the F1 key and select "**Memory**."
(3) Press the CH1 button key of the CH. SELECT key.
(4) Turn the RANGE knob to set the voltage axis range to "**200 mV/DIV**."
(5) Turn the POSITION knob to set the zero position to "**50%**."
The above settings set the full scale (upper- and lower-limit values) on the display to "±**2 V**."
(6) Turn the TIME/DIV knob to set the time axis to "**100 µs/DIV**."
(7) Move the flashing cursor to "Trig" in the screen, and press the F3 key to set to "**AUTO**."
Regarding the trigger setting method, refer to the "Trigger screen" section of this manual or Chapter 7 "Trigger Functions" in the Quick Start Manual.



The settings for waveform observation have been entered in the above steps.

(8) Start measurement. Press the START key located at the lower right corner of the front panel. The green LED located next to the START key remains lit while waveform data is being acquired.
(9) To abort the measurement, press the STOP key located next to the START key. When the measurement is aborted, the green LED next to the START key turns off.

< Key point >
The voltage axis range, position, and time axis range can be changed during a starting operation. To make changes, use the RANGE, POSITION, and TIME/DIV knobs.

Measurement of instantaneous power interruption in a commercial power line

⚠ DANGER

To prevent electric shock and equipment damage, make sure each unit's maximum input voltage and maximum rated ground voltage (described in Chapter 2 "Installation and Preparation" in the Instruction Manual provided with the product) are not exceeded.

1. Method

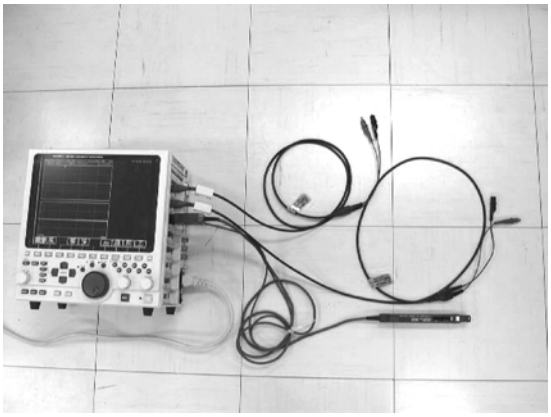
Use the 8950 ANALOG UNIT to measure instantaneous power interruption in a commercial 100-V power supply (50 Hz). The 8951 VOLTAGE/CURRENT UNIT and 3273 CLAMP ON PROBE are also used at the same time to measure the amount of current flowing to equipment.

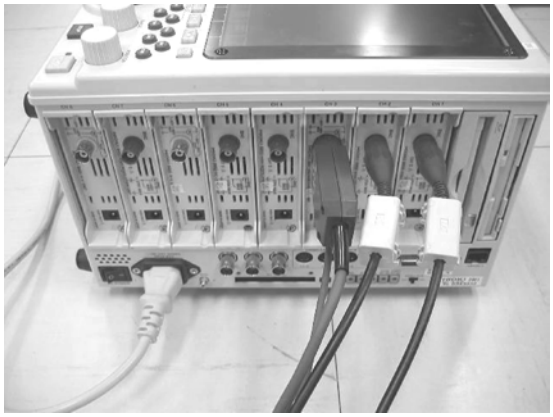
2. Connection

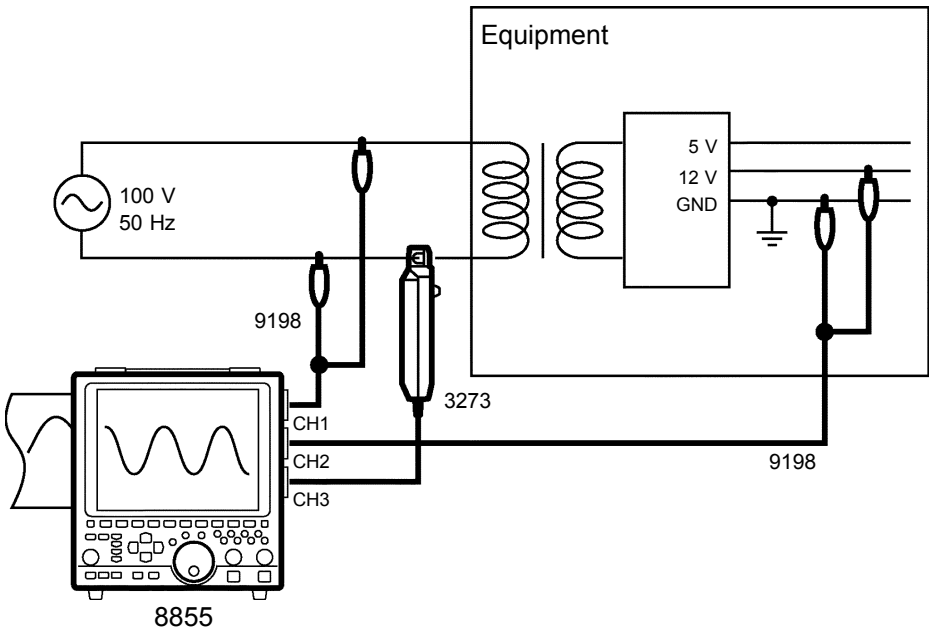
CH1: Connection of the 9198 to the 8950 ANALOG UNIT
Connect the cord and measure the commercial power supply.

CH2: Connection of the 9198 to the 8950 ANALOG UNIT
Connect the cord and measure the internal voltage of equipment likely to be affected by instantaneous power interruption.

CH3: Connect the 3273 CLAMP ON PROBE to the 8951 VOLTAGE/CURRENT UNIT, and measure the current flowing in the equipment during instantaneous power interruption.



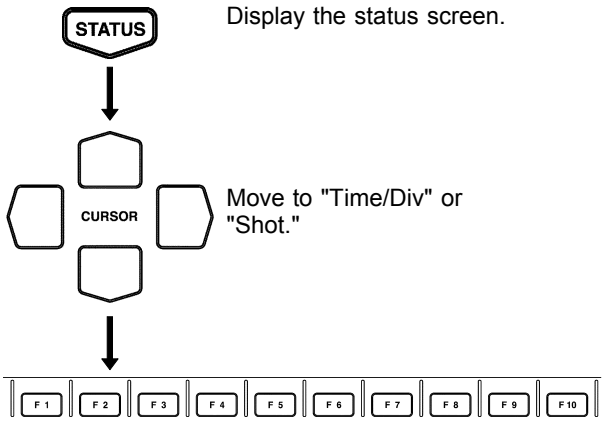




3. Setup

Display	Setting item		Setting
Status screen	Time axis (Time/Div)		20 ms/DIV
	Recording length (Shot)		30DIV
	Display mode (Format)		Dual
Channel screen	Graph	CH1	GR1
		CH2	GR2
		CH3	GR2
	Mode	CH1	Voltage
		CH2	Voltage
		CH3	3273
	Range	CH1	20 V
		CH2	2 V
		CH3	1 A
Trigger screen	Trigger mode		Single
	Pre-trigger		20%
	Kind	CH1	In
	Parameter	CH1	Lower (limit): -100.00 V Upper (limit): 100.00 V Filt. (Filter): 1.5 DIV

4. Details



Display the status screen.

Move to "Time/Div" or "Shot."

Press the function key corresponding to the setting displayed in the screen.

Set to 20 ms/DIV.

Set to 30 DIV.

Status screen

1. Setting the time axis and recording length

For the observation of waveforms before and after an instantaneous power outage, follow the setting procedure described below.

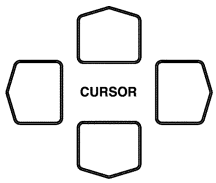
Press the STATUS key to display the status screen.

Move the flashing cursor to "Time/Div" or "Shot."

Since the frequency of the commercial power supply to be measured is 50 Hz (20 ms), use the functions to set the "Time/Div" to "**20 ms/DIV**," and the "Shot" to "**30 DIV**."

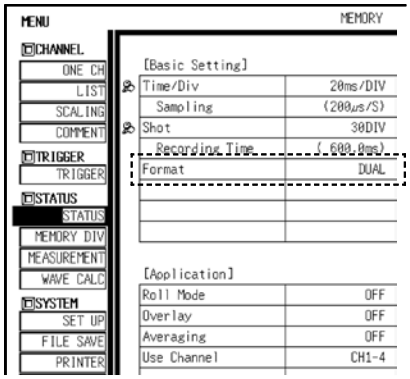
2. Window display

(1) Separate the display of commercial power-supply waveforms from the display of other waveforms to prevent overlapping.
Using the cursor keys, move the flashing cursor to "Format." Then, press the function key to set the "Format" to "**DUAL**."



Move to "Format."

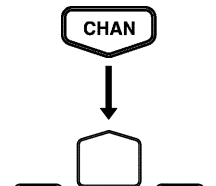
Press the function key corresponding to the setting displayed in the screen.



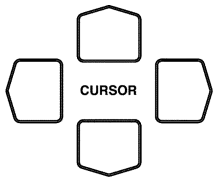
Set to DUAL.

Status screen

(2) Press the CHAN key to display the channel screen.
Move the flashing cursor to "Graph," and set Graph CH1 to "**GR1**," and CH2 and CH3 to "**GR2**."



Display the channel screen.

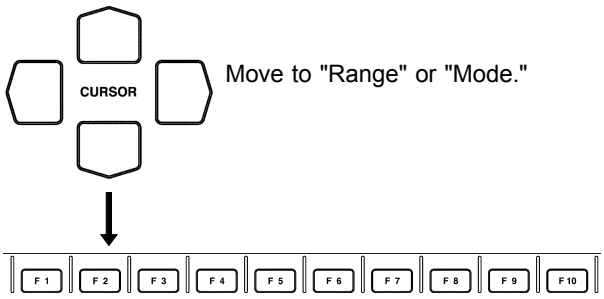


Move to "Graph."

Press the function key corresponding to the setting displayed in the screen.

Set to GR1 or GR2.

Channel screen



Press the function key corresponding to the setting displayed in the screen.

Set to 3273.
Set each range.
These settings change according to the range.

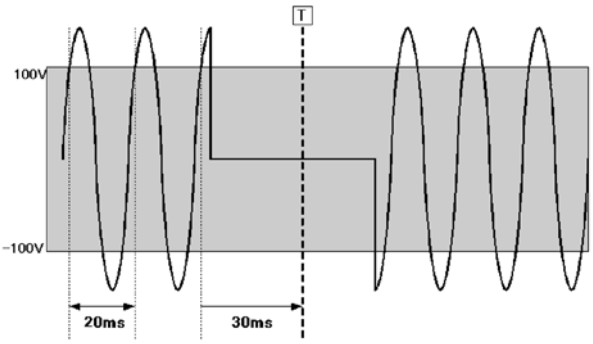
Channel screen

3. Channel setting

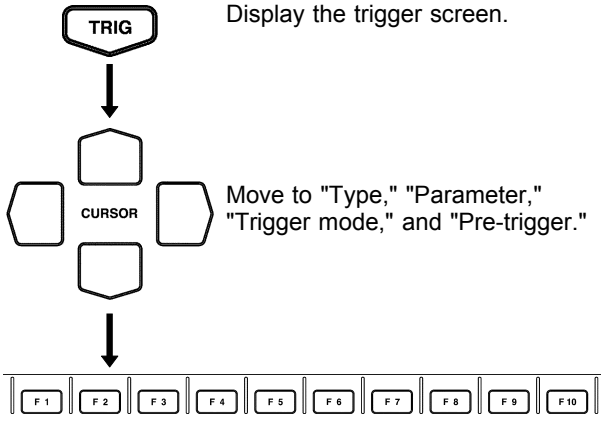
Using the cursor keys, move the flashing cursor to "Range" or "Mode."
Since CH1 receives a commercial 100-V power supply (approx. 141 Vp), press the function key to set the range (vertical axis) to "**20 V/DIV**."
Since CH2 is used to observe the interval voltage (12 VDC) of the equipment, press the function key to set the range (vertical axis) to "**2 V/DIV**."
CH3 measures the amount of current. Press the function key to set the mode to "**3273**." Although the current flowing in the equipment is normally 1A, it can increase to 10 times that level at the time the power switch is turned on. Therefore, press the function key and set the range (vertical axis) to "**1 A/DIV**."

< Key point >
When ranges are set in the channel screen, the displayed upper- and lower-limit values and the upper- and lower-limit values for measurement vary according to the entered ranges. Refer to these limit values when setting the ranges.

4. Trigger setting



The following describes the trigger condition setting method.
To activate the trigger at the time of instantaneous power outage, use "Window In trigger."
A commercial 100 V power supply has a sine waveform that ranges from -141 V to 141 V.
In the following setting, the lower limit of the Window In trigger is set to "-100 V" and the upper limit to "100 V," and the trigger is activated when the waveform enters the shaded range (window) in the left diagram. This setting activates the trigger every time the waveform enters the window. Therefore, a time duration (trigger filter) is set so that the trigger is activated only when the waveform remains in the window for longer than the set time.
The frequency of a commercial power supply is 50 Hz, meaning that one cycle is 20 ms.
Instantaneous power outage is a condition in which the voltage drops for a period longer than 20 ms. Therefore, the trigger filter is used to set a period in units of DIV. Since the time axis is set to 20 ms/DIV, the trigger filter is set to be longer than 20 ms. In the example, the trigger filter is set to "1.5 DIV." With this setting, the trigger is activated when waveform remains in the window for 30 ms or longer.

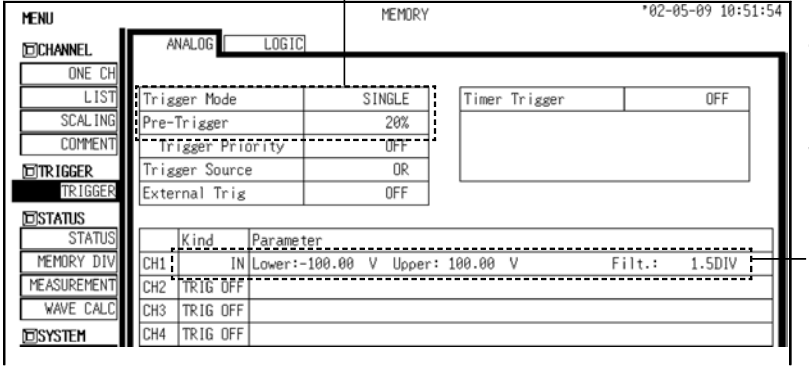


Display the trigger screen.

Move to "Type," "Parameter," "Trigger mode," and "Pre-trigger."

Press the function key corresponding to the setting displayed in the screen.

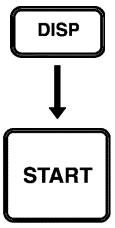
(1) Press the TRIG key to display the trigger screen.
(2) Using the cursor keys, move the flashing cursor to CH1 "Kind," and press the function key to change the type to "**In**."
(3) Move the flashing cursor to CH1 "Parameter," and set the lower (limit) to "**-100.00 V**," the upper (limit) to "**100.00 V**," and the filter (Filt.) to "**1.5 DIV**."
(4) Move the flashing cursor to "Trigger mode," and set the trigger mode to "**Single**" (stops after instantaneous power outage occurs and a waveform is acquired).
(5) Move the flashing cursor to "Pre-trigger," and set the pre-trigger to "**20%**" (for observation of waveforms prior to the trigger).



Trigger screen

< Key point >
By combining the Window In trigger upper- and lower-limit values with the filter, it is possible to detect not only a trigger caused by an instantaneous power outage but also waveform chipping and voltage dips in repeated waveforms.

5. Starting measurement



Display the display screen.

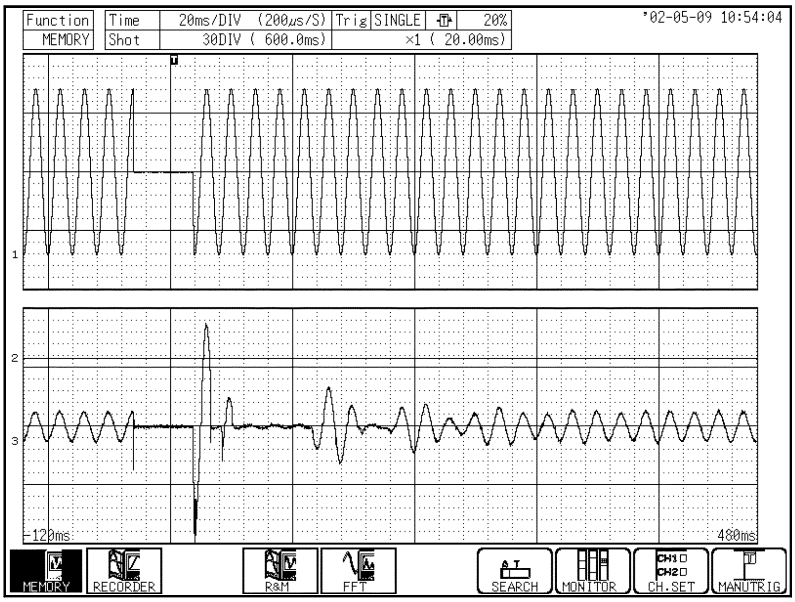
Start measurement.

(1) Press the DISP key to display the display screen.
(2) Press the START key to begin measurement.

When an instantaneous power outage occurs, the trigger is activated and a waveform is acquired. Until then, the unit stands by. The following shows an actual waveform obtained based on the conditions listed below.

CH1: Commercial power supply
CH2: Equipment internal 12 VDC power
CH3: Equipment current

The equipment's internal 12 VDC power supply did not drop in voltage even when a power outage of approximately 50 ms occurred. The data also shows that a current with a CH3 waveform flowed inside the equipment during the instantaneous power outage (see the screen below).



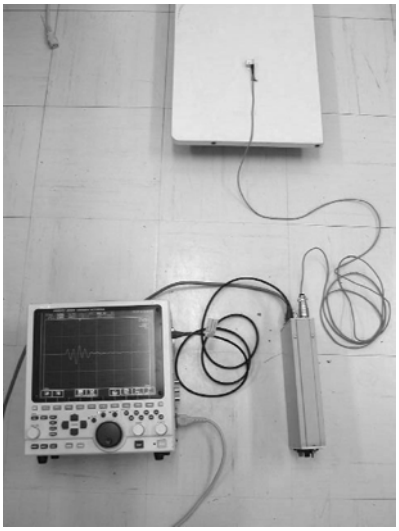
Measurement of the sensor output

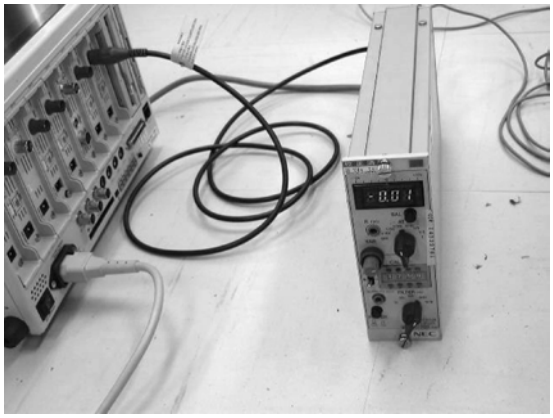
1. Method

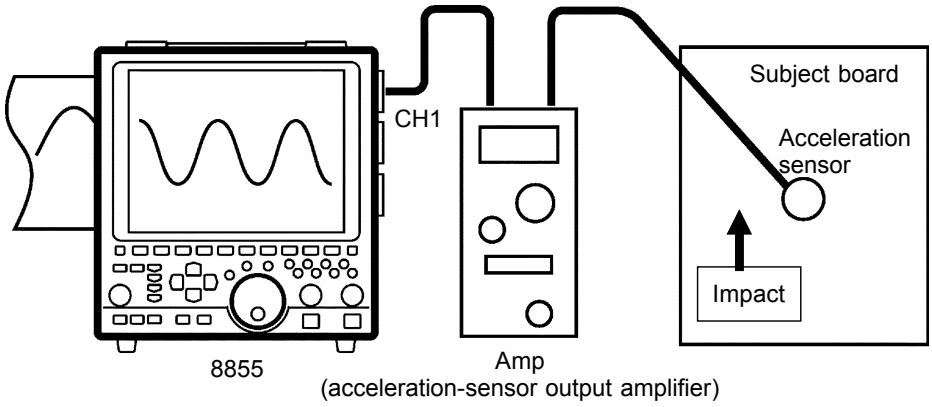
Use the 8953-10 HIGH RESOLUTION UNIT to measure the output of the acceleration sensor. Observe the waveform of the effect caused by an impact applied to the subject board.

2. Connection

Connect the sensor output (output from the amp that magnifies the sensor output in this example) to the input terminal of the 8953-10 HIGH RESOLUTION UNIT (CH1). The external sensor amp used in the example has a full scale of ±2 V. The external amp also produces an output of 0 V at 0 G, and ±2 V at ±5 G.



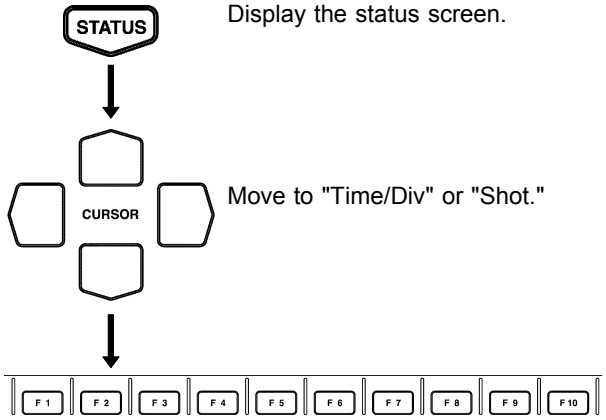




3. Setup

Display	Setting item		Setting
Status screen	Time axis (Time/Div)		1 ms/DIV
	Recording length (Shot)		1000DIV
Channel screen	Range	CH1	200 mV
	Scaling	CH1	In decimals (ENG)
	Setting method (Scaling Kind)	CH1	Set with 2 points (POINT)
	Input P1 - Scale P1	CH1	[2.000] - [5.000]
	Input P2 - Scale P2	CH1	[-2.000] - [-5.000]
	Unit	CH1	G
Trigger screen	Trigger mode		Single
	Pre-trigger		5%
	Kind	CH1	Level
	Parameter	CH1	Level: 200 mV Slope: ⎍

4. Details



Display the status screen.

Move to "Time/Div" or "Shot."

Press the function key corresponding to the setting displayed in the screen.

Set to 1 ms/DIV.

Set to 1000 DIV.

Status screen

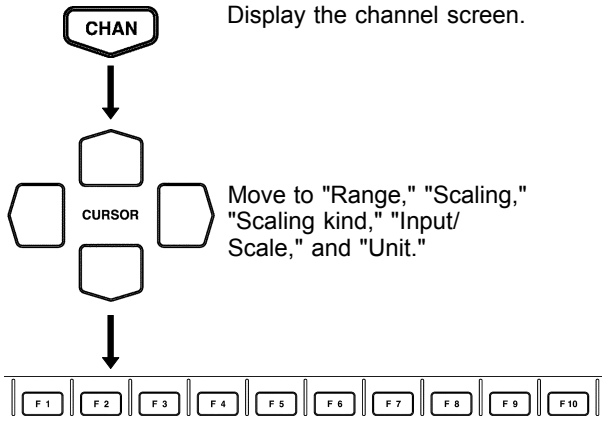
1. Setting the time axis and recording length

For measurement of the output of the acceleration sensor, follow the setting procedure described below.

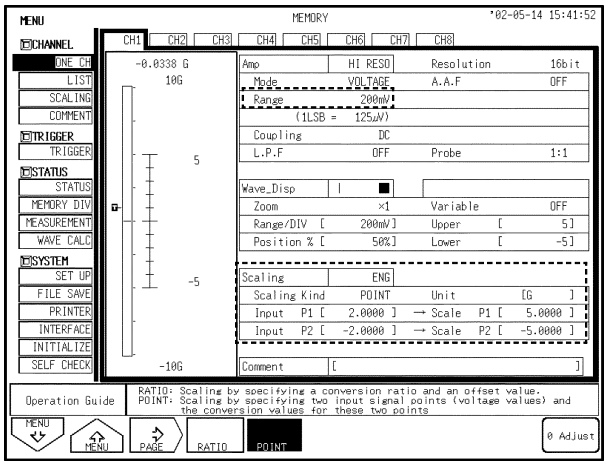
Press the STATUS key to display the status screen.

Move the flashing cursor to "Time/Div" or "Shot."

To capture a waveform for a period of one second at a 100 k sampling rate, use the function keys to set the "Time/DIV" to "**1 ms/DIV**" and the "Shot" to "**1000 DIV**."



Press the function key corresponding to the setting displayed in the screen.



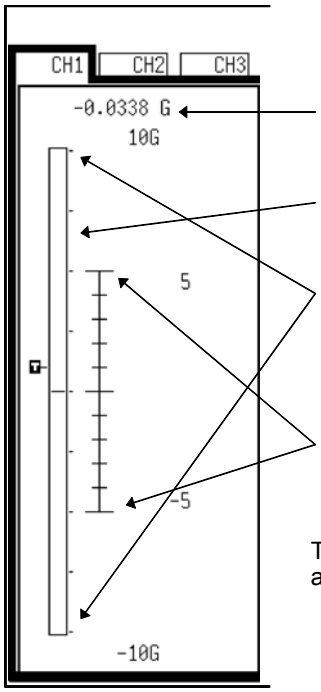
Channel screen

2. Channel setting

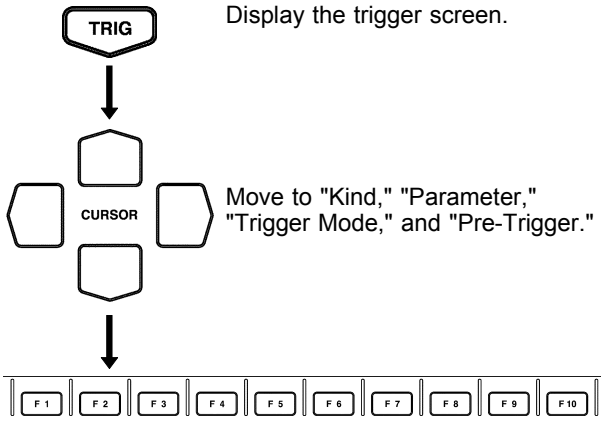
(1) Press the CHAN key to display the channel screen.
(2) Make sure CH1 is selected. Using the cursor keys, move the flashing cursor to "Range." If CH1 is not selected, press the F3 key to select CH1 before moving the cursor to "Range."
(3) Press the function key to set the range to "**200 mV**" (200 mV/DIV x 20 DIV results in ±2 V because the full scale of the external sensor amp is ±2 V).
(4) Convert voltage (V) to acceleration (G).
Move the flashing cursor to "Scaling," and set the scaling to "**ENG**."
Move the flashing cursor to "Scaling Kind," and set the "Scaling Kind" to "**POINT**."
(5) Move the flashing cursor to "Input P1 - Scale P1," and set it to "**[2.0000] - [5.0000]**."
(6) Move the flashing cursor to "Input P2 - Scale P2," and set it to "**[-2.0000] - [-5.0000]**."
(7) Move the flashing cursor to "Unit," and set the unit to "**G**."
Since the external amp produces a ±2 V output at ±5 G, the above settings allow the direct reading of measured values (level monitor value, cursor reading value).

< Key point >

For easier range and scaling settings, observe the level monitor, measurable range, and display upper-/lower-limit values shown on the left side of each channel screen. If the external amp has a calibration or maximum output function, it is recommended to confirm that the set ranges are correct by observing the level monitor and numerical values.



This screen displays values and units according to the entered scaling settings.



Display the trigger screen.

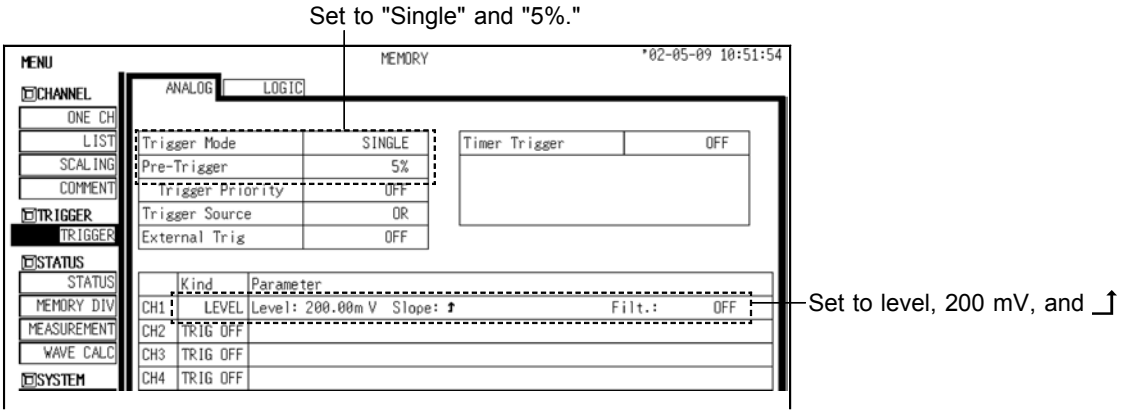
Move to "Kind," "Parameter," "Trigger Mode," and "Pre-Trigger."

Press the function key corresponding to the setting displayed in the screen.

3. Trigger setting

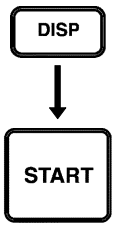
The following describes the procedure for setting trigger conditions.
When there is a change from 0 V (0 G), the trigger is activated and waveform acquisition starts.

(1) Press the TRIG key to display the trigger screen.
(2) Using the cursor keys, move the flashing cursor to CH1 "Kind," and press the function key to change the "Kind" to "**LEVEL**."
(3) Move the flashing cursor to CH1 "Parameter," and set the level to "**200 mV**" and the slope to "⌐↑."
(4) Move the flashing cursor to "Trigger Mode," and set the trigger mode to "**SINGLE**."
(5) Move the flashing cursor to "Pre-Trigger," and set the pre-trigger to "5%."



Trigger screen

5. Starting measurement

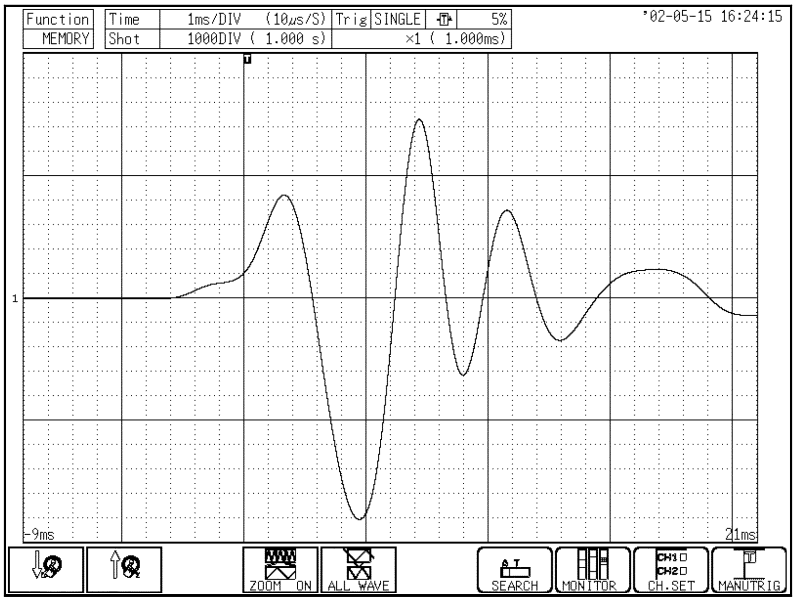


Display the display screen.

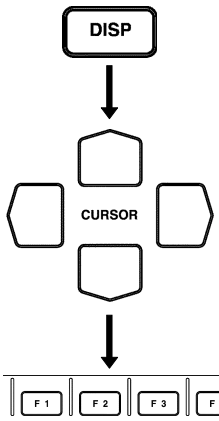
Start measurement.

Press the DISP key to display the display screen.
Press the START key to begin measurement.

- When the START key is pressed, "Waiting for trigger" is displayed at the upper right corner of the screen.
- When "Waiting for trigger" is displayed, apply an impact to the subject board.
- The trigger is activated, and "Storing" is displayed at the upper right corner of the screen.
- The measurement is completed in approximately one second, and a waveform is displayed.



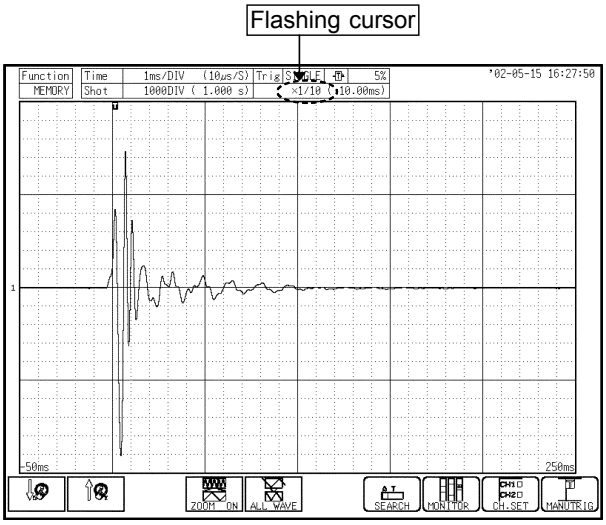
6. Analysis of waveforms



Display the display screen.

Move the flashing cursor.

Use the F1 or F2 key to magnify or compress the waveform.



F1 F2 F5

ALL WAVE

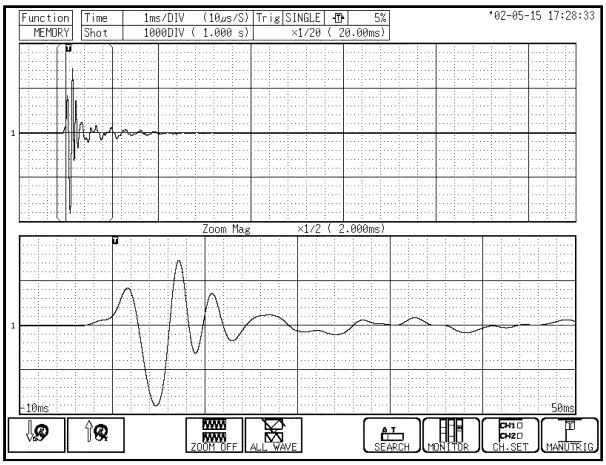
(1) Waveform zoom

Using the cursor keys, move the flashing cursor to the location shown in the diagram. Using the F1 or F2 function key, magnify or compress the displayed waveform. To view the entire waveform on a single screen, press the F5 key.

(2) Zoom

The display can be divided into two screens for the display of an enlarged waveform.

Press the F4 key for "Zoom ON" to display an enlarged image. The waveform in each graph can be magnified or compressed. The waveform can also be scrolled.



F4

ZOOM ON

(3) A-B cursors

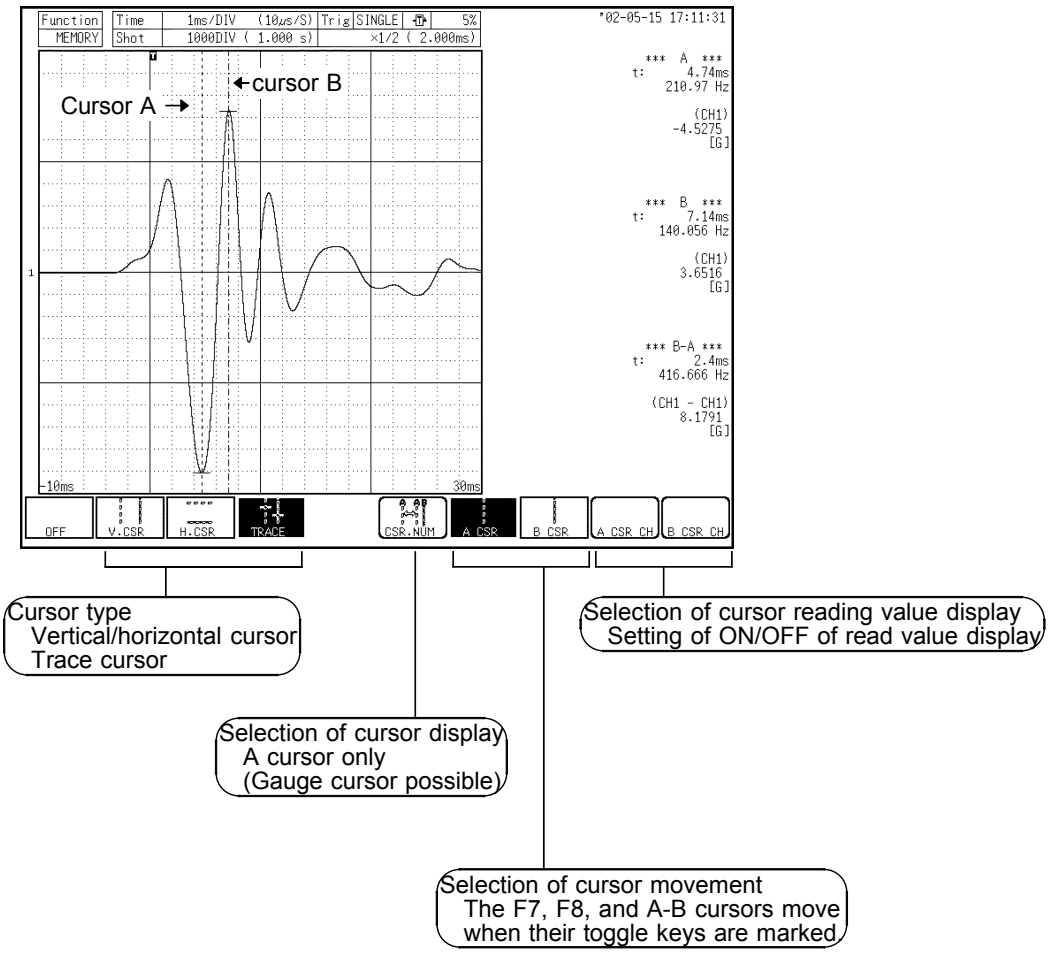
A-B cursors are used to read frequency and numerical values such as maximum values. When the A.B CSR key is pressed, the red LED lights up and the GUI for A-B cursor settings appears. Select the type of cursor, ON/OFF of A-B cursors, and movement for reading a numerical value.

< Key point >

The waveform display screen can be switched between 30 DIV and 20 DIV by pressing the DISP key.

The aforementioned allows easier reading, since values such as those read by the cursors do not overlap with a waveform or grid.

To exit from the A-B cursor setting mode, press the A.B CSR key again, or press the WAVE, VALUE, or ESC key.

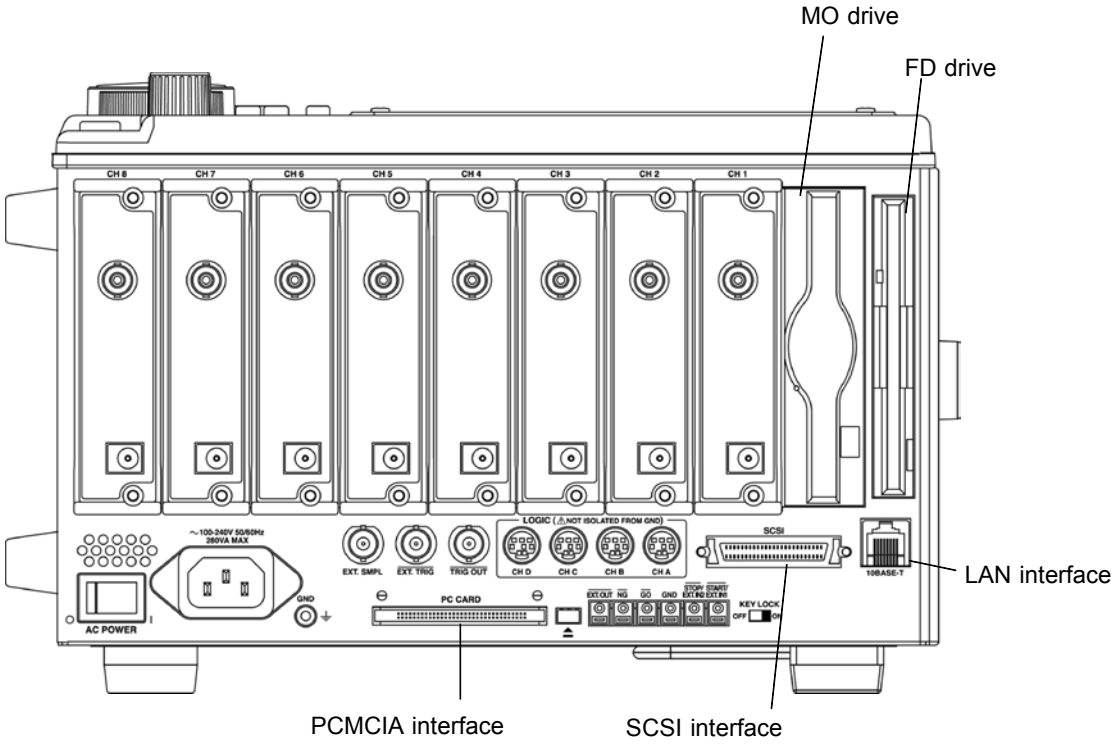


External Memory Devices

The following memory devices and data recording methods can be used with the 8855. By selecting a device or method, data can be saved in the specified media. Data saved on any of these media in the 8855 recording format can be loaded into the 8855 for display and analysis.

1. Internal memory devices
   - FD drive (floppy disk)
   - MO drive (MO disc)
   - HD drive (hard disk)
2. Interfaces
   - PCMCIA interface (PC card)
   - SCSI interface (external MO drive)
   - LAN (10BASE-T) interface (PC)

The following describes commonly used methods of storing and loading data.
For details on drives, interfaces, and data saving/loading methods, refer to Chapter 10 "Storing and Recalling Measurement Data" in the 8855 Quick Start Manual.
Regarding the LAN interface, refer to Chapter 11 "Communication Settings" in the 8855 Instruction Manual.

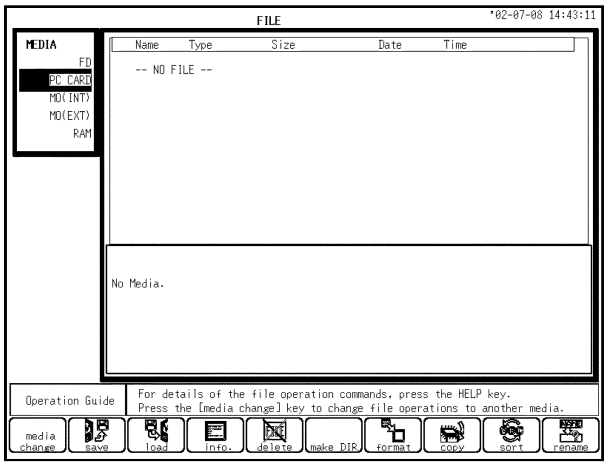


Selection of recording media

(1) Press the FILE key. The file screen is displayed.
(2) Press the media change F1 key.
(3) Press the function key, and select a media for file saving and loading operations from among "FD," "PC CARD," "MO/HDD," "MO (EXT)," or "RAM." In this example, "Internal MO/HDD" is selected.

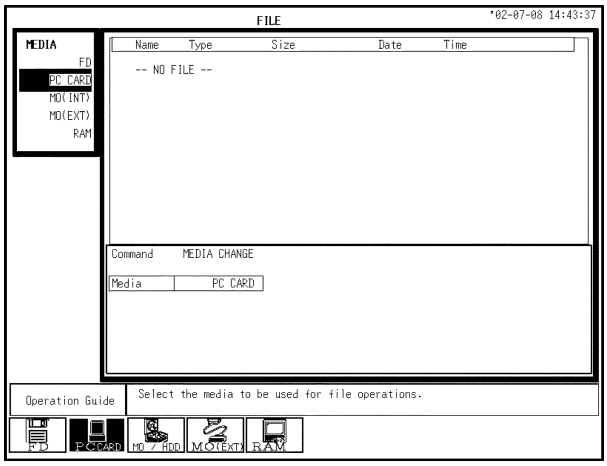
Display the file screen.

Press the F1 key.

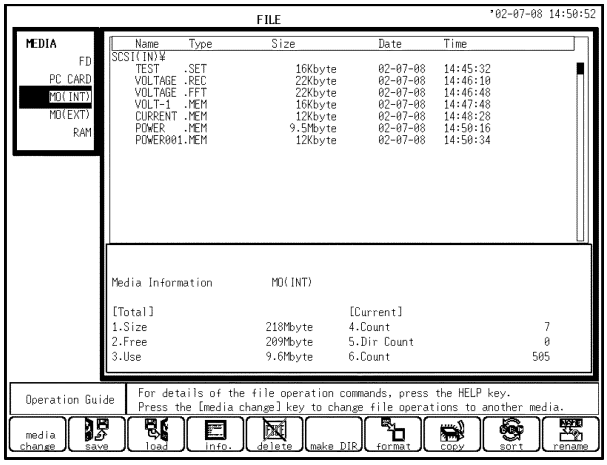


F1
media change

File screen

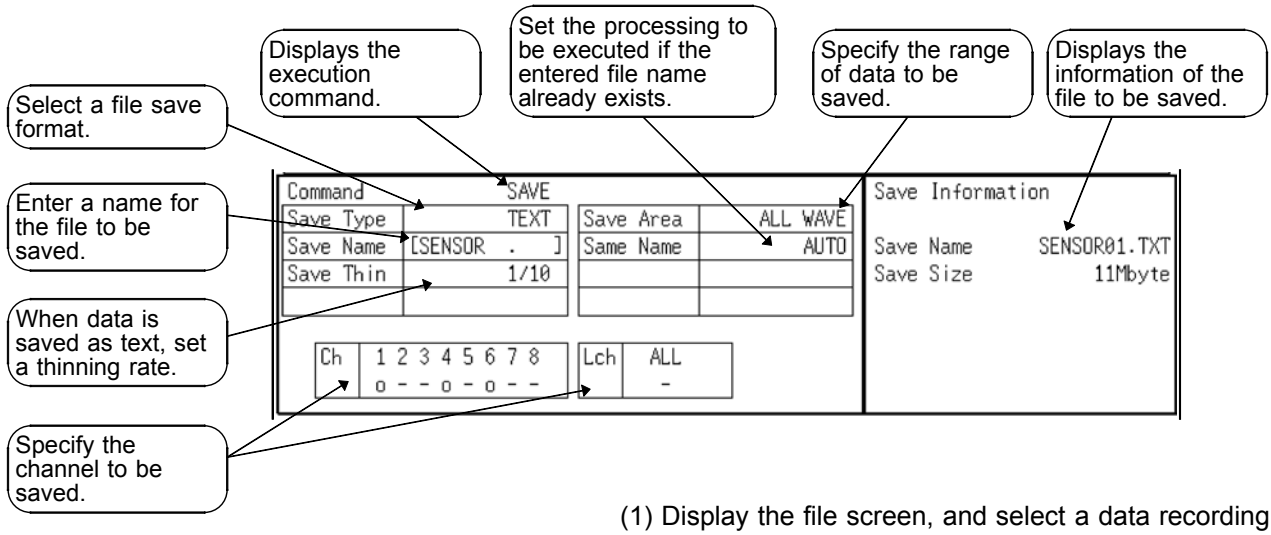


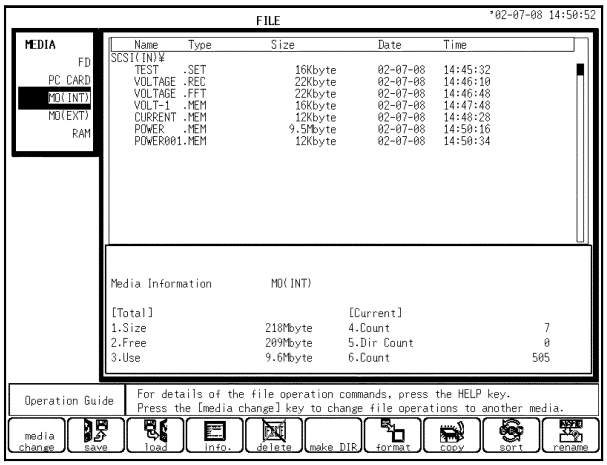
F3
MO/HDD



Press the function key corresponding to the media used for file operations such as saving and loading. In this example, "Internal MO/HDD" is selected.

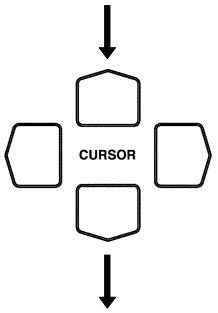
Storage of measurement data





F2
SAVE

(1) Display the file screen, and select a data recording media (refer to "Selection of recording media").
(2) Press the SAVE F2 key.



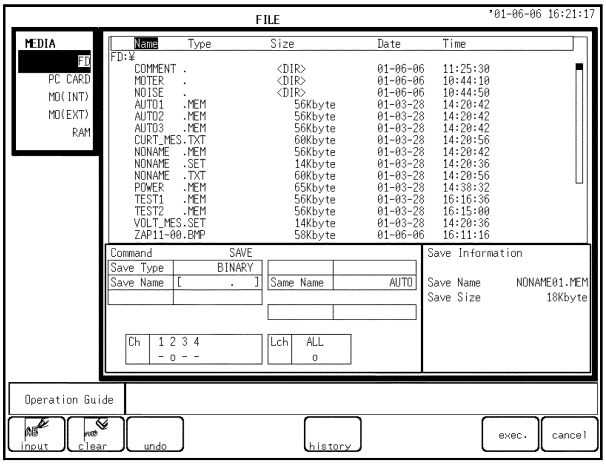
Move to the item to be set.

Press the function key corresponding to the setting displayed in the screen.

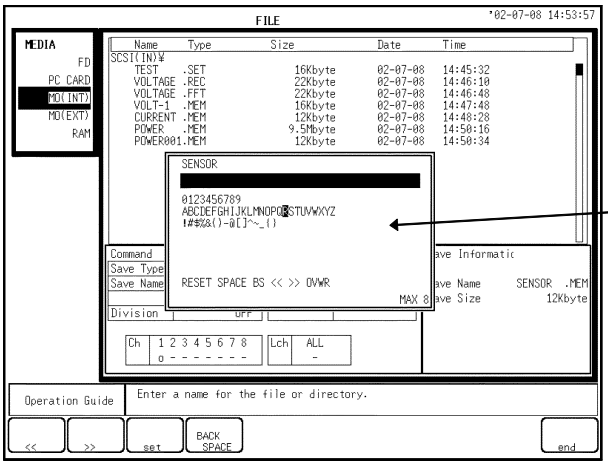
(3) Select a file save format.
Using the cursor keys, move the flashing cursor to "Save Type," and select a save setting using the function key.

Setting	Stores setting conditions
Wave binary	Stores waveform data in binary format (for 8855)
Wave text	Stores waveform data in text format (for Excel). Data stored in text format cannot be loaded into the 8855.

(4) Specify a saving range.
Move the flashing cursor to "Save Area," and specify the range of data to be saved.
When A-B cursors are used, specify the range to be saved.
Select either "ALL WAVE" or "A-B WAVE."

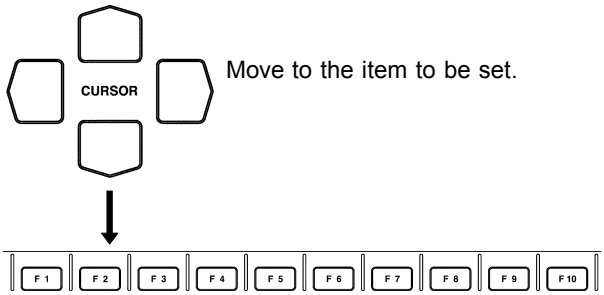


F1
input



Character input screen

(5) Enter a name (file name) for the data to be saved.
Move the flashing cursor to "Save Name." Press the input F1 key to display the character input screen. Enter a file name.
Regarding the input method, refer to "5.3.3 Character Entry Procedure" in the 8855 Instruction Manual.

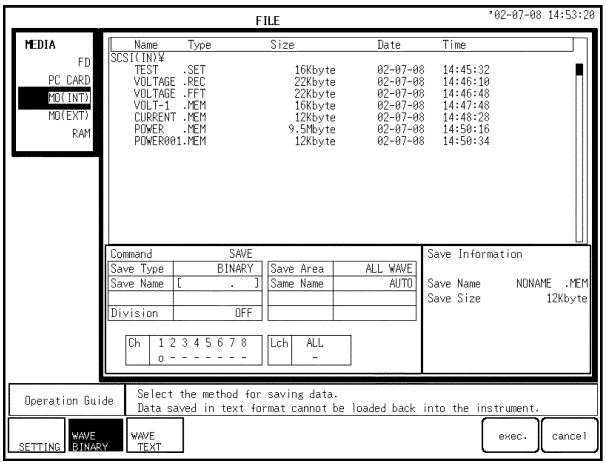


Move to the item to be set.

Press the function key corresponding to the setting displayed in the screen.

(6) Specify the method of processing to be executed if the entered file name already exists.
Move the flashing cursor to "Same Name," and select a processing method.

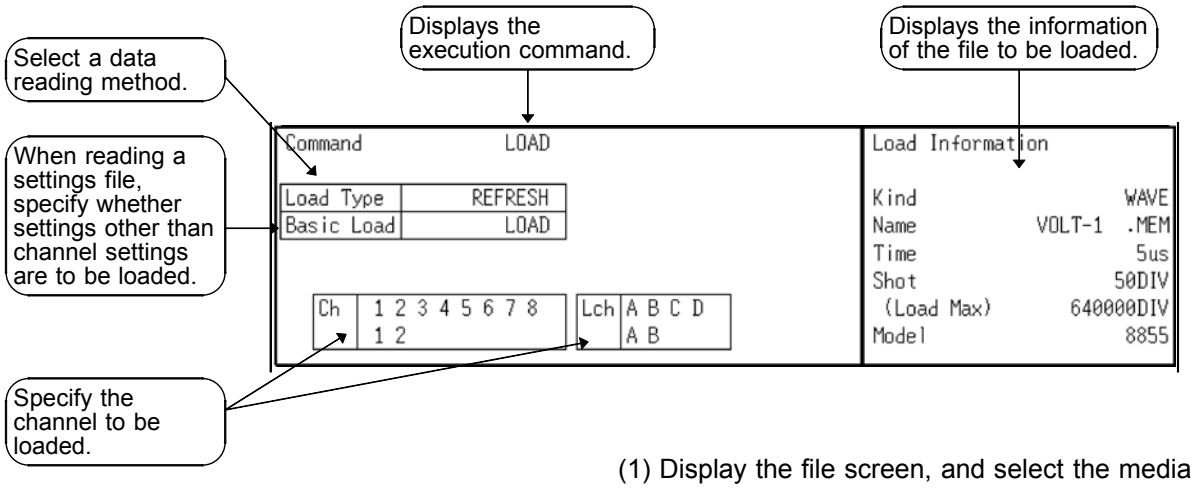
Auto	Automatically adds a number after the entered file name
Overwrite	Deletes the old file and saves the new file
Error	Displays an error message and stops saving the data



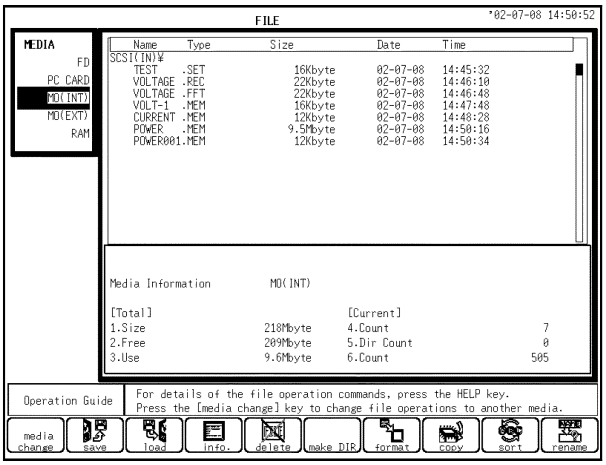
F9 F10
exec. cancel

(7) When saving data in text form, set a data thinning rate.
Move the flashing cursor to "Save Thin," and select a thinning rate.
(8) Set the channel to be saved.
Move the flashing cursor to the position of the channel to be saved. For an analog channel, make settings individually for each unit. For a logic channel, make all settings at once.
(9) Save data.
Press the exec. F9 key to save the data.
To cancel the data saving command, press the cancel F10 key.

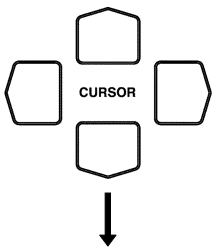
Reading measurement data



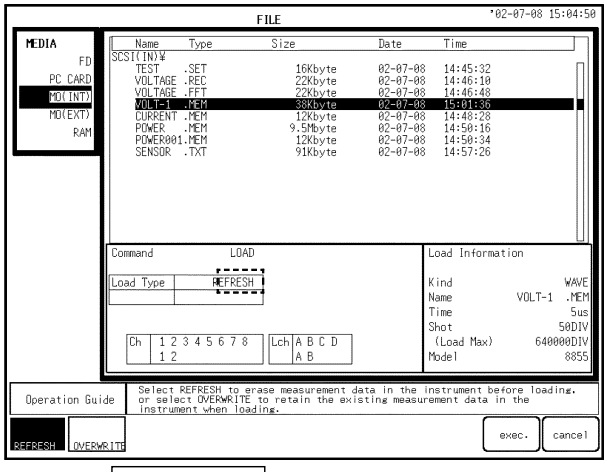
(1) Display the file screen, and select the media used to load data (refer to "Selection of recording media").
(2) Press the load F3 key.



F3
load



Move to "Loading type.

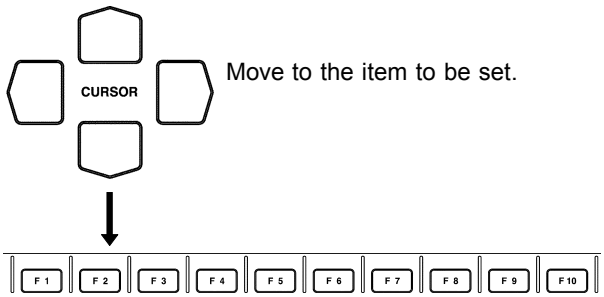


F1 F2 OVERWRITE
REFRESH

(3) Select a reading type (method).
Using the cursor keys, move the flashing cursor to "Load Type," and select a loading method using the function key.

Refresh	Erases the waveform on the screen (in the memory), and loads new data.
Overwrite	Loads data while retaining waveform data for channels other than that used to read data

Note Data saved in text format or BMP format cannot be loaded into the 8855. Only binary data saved by the 8855 can be loaded.

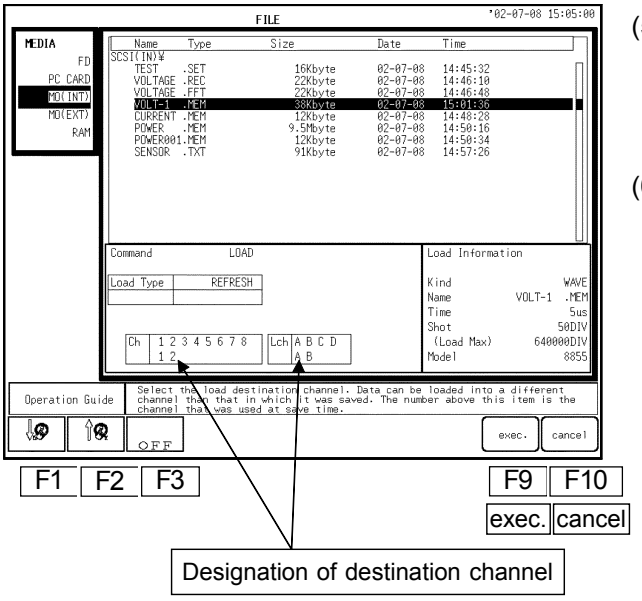


Move to the item to be set.

Press the function key corresponding to the setting displayed in the screen.

(4) Setting of a basic loading operation (for loading of settings files only)
Move the flashing cursor to "Basic Load," and select a loading method.

None	Does not load settings other than channel settings. All main-unit settings other than channel settings are retained.
Load	Loads settings other than channel settings. Loads all setting data.

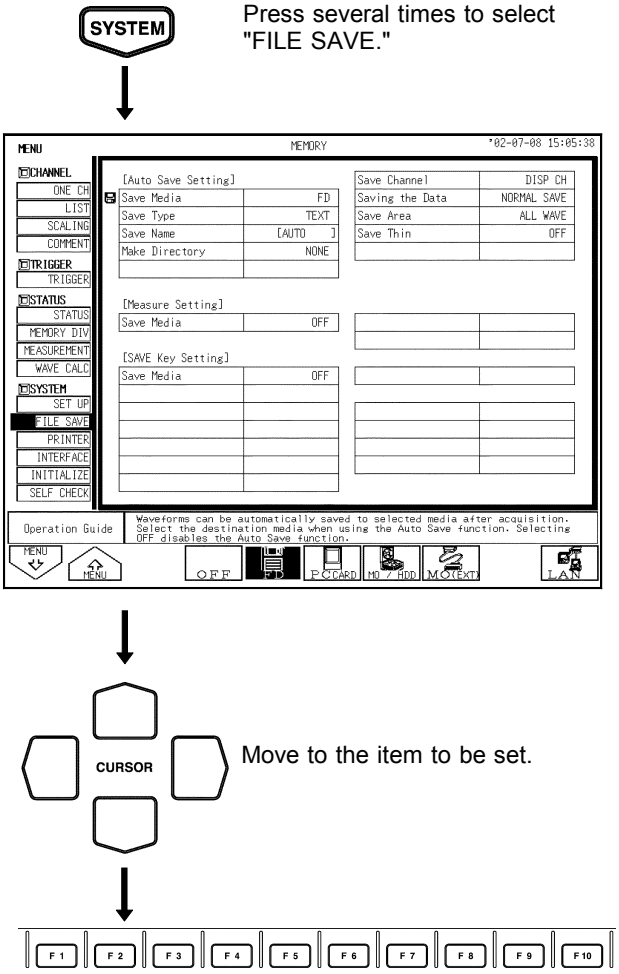


(5) Setting of a destination channel
Move the flashing cursor to the position of the channel for loading, and press the function key to enter the setting.

(6) Load data.
Press the exec. F9 key to load data.
To cancel the data loading command, press the cancel F10 key.

Automatic saving of measurement data

After measurement, data can be automatically saved in a specified media. For details, see 9.3.1 "Setting the Auto Save Function" in the 8855 Quick Start Manual.



(1) Press the SYSTEM key several times, and select "FILE SAVE" in the menu screen.

(2) Using the cursor keys, move the flashing cursor to "Save Media," and use the function key to select a media for automatic saving of data.

(3) Move the flashing cursor to "Save Type," and select a save setting for auto save.

Wave binary	Saves waveform data in binary format (for 8855)
Wave text	Stores waveform data in text format (for Excel). Data stored in text format cannot be loaded into the 8855.

(4) Enter a file name.
Move the flashing cursor to "Save Name." Press the input F1 key to display the character input screen. Enter a file name.
Regarding the input method, refer to "5.3.3 Character Entry Procedure" in the 8855 Instruction Manual. The entered file name is assigned to the saved data file. When files are saved continuously, file names are attached with sequential numbers. If a file name is not entered, the first file is named "AUTO," the second file is named "AUTO0001," and so on.

(5) Move the flashing cursor to "Make Directory," and select whether to create a new directory for each start of waveform data-acquisition. When "EXIST" is selected, a directory is created at each waveform data-acquisition. The maximum number of files in a directory is 5,000.

(6) Move the flashing cursor to "Save Channel," and select the channel to be saved.

DISP CH	Saves the data of channels whose waveform display is ON
ALL CH	Saves the data of all channels

(7) Move the flashing cursor to "Saving the Data," and select a saving method.

Normal save	Stops auto save when the recording media becomes full.
Delete save	When the recording media becomes full, old data is deleted for continued auto-save operation.

(8) Specify a saving range.
Move the flashing cursor to "Save Area," and specify a saving range.
When A-B cursors are used, specify the range to be saved.
Select either "ALL WAVE" or "Between A-B WAVE."

Starts measurement

Stops measurement

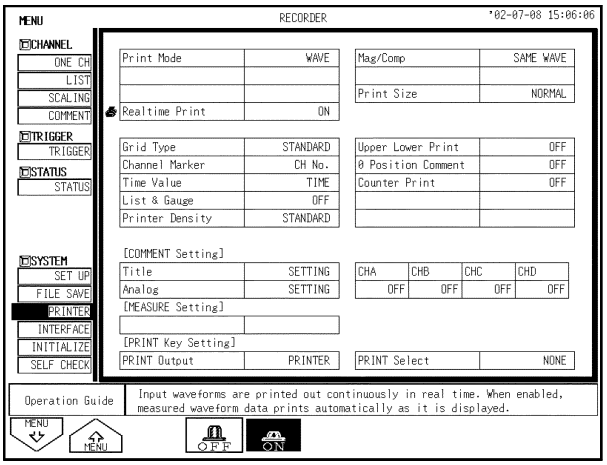
(9) When saving data in text form, set a data thinning rate.
Move the flashing cursor to "Save Thin," and select a thinning rate.

(10) Start measurement.
Press the START key to start measurement. After data of the set recording length is obtained, the data is automatically saved. To stop the measurement or auto-save operation, press the STOP key. To forcibly stop the operation, press the STOP key twice.

Real-time printing of measurement data (using the 8994 printer unit)

Real-time printing is possible only when "Recorder" is selected as the function
Measurement data can be continuously printed in real time. A measured waveform is automatically printed at the same time it is displayed on the screen. For details, refer to 9.4 "Printer Screen" and 9.4.3 "Real Time Print" in the 8855 Quick Start Manual.

Press several times to select "PRINTER."



Start measurement

Pauses and resumes printing

(1) Press the SYSTEM key several times and select "PRINTER" in the menu screen.

(2) Using the cursor keys, move the flashing cursor to "Realtime Print," and select a setting using the F4 and F5 keys.

OFF	Does not print in real time
ON	Prints in real time

(3) Start measurement.
Press the START key to start measurement. When measurement starts, the printer prints as soon as the screen begins displaying a waveform. By pressing the PRINT key during the measurement, printing can be paused and resumed.

Note

- For a long time-axis range of 200 ms/DIV or more, there will be a delay in printing. If the recording length is set to "Continuous," real-time printing is not possible.
- The printing density may vary depending on the time-axis setting and ambient temperature.

Useful Information

1. About the function keys

(1) Memory function
Stores A/D-converted data in the memory for each sampling operation. Changing the time axis also alters the sampling frequency.
(2) Recorder function
The sampling frequency is fixed. Because changing the sampling frequency does not alter the time axis, measurement at a fast sampling speed is possible even with a slow time axis. (Envelope recording)
Real-time printing is possible (time axis: 500 ms/DIV and up).
(3) Recorder & memory function (Chapter 3 in the Instruction Manual)
Even when the recorder mode is used, abrupt signal waveforms can be captured in the memory mode.
(4) FFT function (Chapter 4 in the Instruction Manual)
Spectrum analysis and a transfer function can be obtained.
(5) Power monitor function (requires installation of the optional software "9549 FUNCTION UP DISK")
An instantaneous waveform and trend graph can be observed.

2. About the time axis and sampling

(1) When using the memory function
The sampling frequency equals 1/100 of the time axis. In the case of a 100-ms/DIV time axis, the sampling frequency becomes 1 ms.
(2) When using the recorder function
With 1/100 of the time axis as one point, the minimum and maximum values (MIN and MAX data) at the fixed sampling frequency are displayed as one-point two-data.
One point on the time axis of 10 ms/DIV equals 100 ms. When the sampling frequency is set to 1 ms, one point corresponds to 100 samples. Two pieces of data - the maximum and minimum values of these 100 samples -- are displayed as one point on the screen (envelope recording).

3. About the recording lengths

The number of pieces of data in a recording length of 1 DIV is 100.
The total number of pieces of data in the entire recording length is as follows: set recording length (number of DIV) x 100 pieces of data + 1.
(Example) Number of pieces of data in a set recording length of 500 DIV is as follows: 50 DIV x 100 data + 1 = 5001 pieces of data.

4. About the pre-trigger

The pre-trigger setting is set by entering the percentage of the pre-trigger recording length (number of pieces of data) in the total recording length (all data).
(Example) Setting of a pre-trigger of 5% for a recording length of 1000 DIV
The recording length (number of pieces of data) prior to the trigger is as follows: 1000 DIV x 5% = 50 DIV (5000 data).

5. About the voltage axis and resolution

- The resolution of the 8950, 8951, and 8952 with a voltage axis of 1 DIV is 100 (100 LSB). The full scale of the screen is 20 DIV, so the resolution is 2000 LSB (at a voltage axis magnification rate of 1).
  (Example) With a voltage axis of 5 V/DIV, the minimum resolution is as follows: 5 V / 100 = 50 mV.
- The resolution of the 8953-10 with a voltage axis of 1 DIV is 1600 (1600 LSB). The full scale of the screen is 20 DIV, so the resolution is 32000 LSB (at a voltage axis magnification rate of 1).
  (Example) With a voltage axis of 5 V/DIV, the minimum resolution is as follows: 5 V / 1600 = 3.125 mV.
  For further details, refer to 6.3.8 "Setting the Zero Position" in the Quick Start Manual.

6. About the screen display and DIV

The 8855 is equipped with an SVGA (800 x 600) LCD. The waveform area uses 750 dots horizontally and 500 dots vertically. As there are 30 DIV horizontally and 20 DIV vertically, one grid (1 DIV) on the screen measures 25 dots horizontally and 25 dots vertically.

- 1 grid (1 DIV) on the screen: 25 dots horizontally x 25 dots vertically
- 1 grid (1 DIV) in data: 100 samples horizontally x 100 LSB vertically

The grid size (1 DIV) of data changes according to the magnification/compression of the time axis and voltage axis.

7. Data saving speed

The following shows the speeds of saving binary data (reference values) using different media and interfaces. Note that the data saving speed varies depending on the saving conditions, device manufacturer, device capacity, communication conditions, and others.

Storage media	Saving speed (reference value)
Floppy disk	15 kB/s
MO disc	150 kB/s
HD	160 kB/s
PC card	200 kB/s
PC via LAN	200 kB/s

8. Conducting probe compensation

When using Model 9665 10:1 Probe or Model 9666 100:1 Probe and conducting probe compensation, please configure according to the following settings:

1. Press the SYSTEM key to display the Set up screen (refer to "System screen").
2. Move the flashing cursor to the "EXT.OUT" item.
3. Use the function keys to select the **Calibration**.

Based on these settings, a 1 kHz 5 V rectangular waveform will be output from the external output terminal (EXT.OUT terminal) in order to compensate the probes.

HIOKI 8855 MEMORY HiCORDER

GUIDE BOOK

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