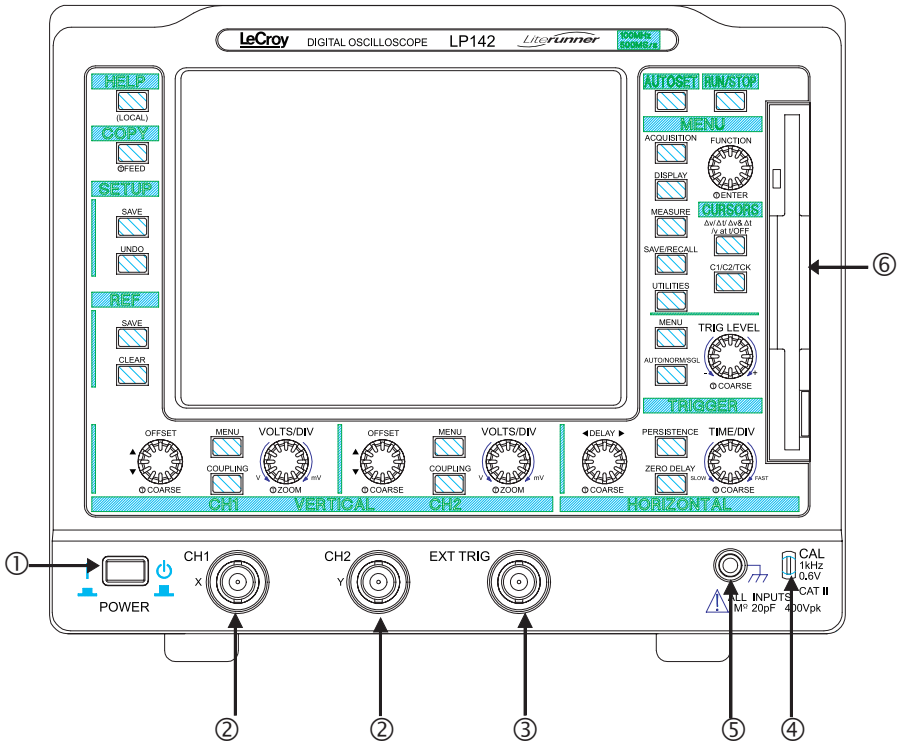# Section 1   Basic Operation
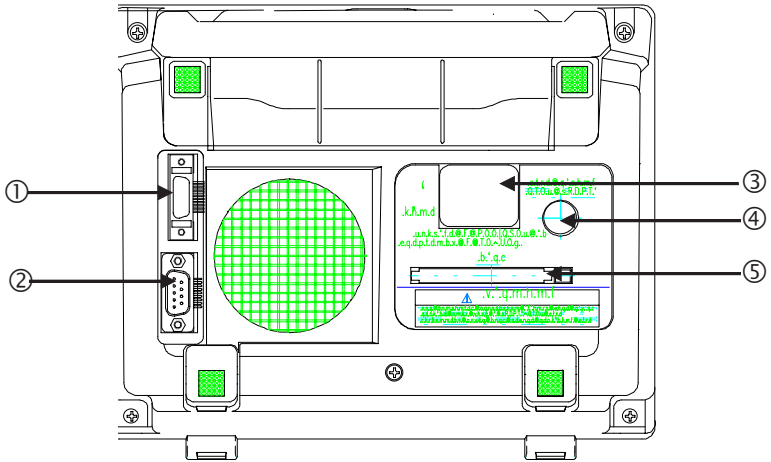
This section describes the basic operation including start-up.
See Section 2, "Explanation of Functions" for details.

Appearance

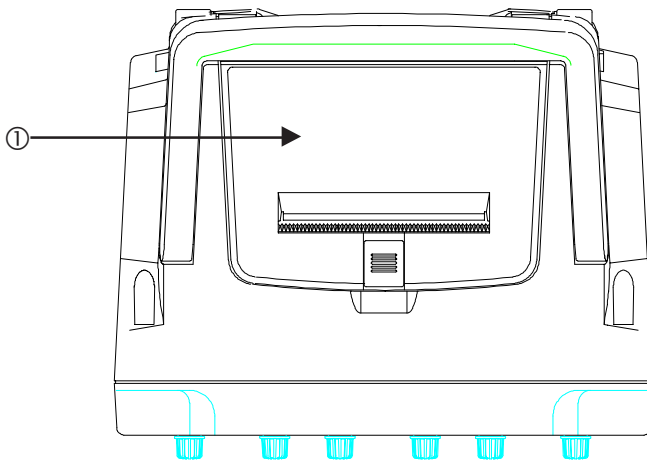**Front View**

① Power switch

② Input terminal

③ External trigger input terminal

④ CAL terminal/calibration signal output terminal

⑤ Ground terminal

⑥ Floppy disk drive

Rear View

① Centronics port

② RS-232C port

③ AC power inlet

④ Fuse holder

⑤ PCMCIA Type II slot

Upper View

① Built-in printer

Operating buttons and knobs

Buttons

Single function button: Pressing the button executes the associated function.
AUTOSET, RUN/STOP, HELP, COPY, SETUP SAVE, SETUP UNDO, REF SAVE, REF CLEAR, ZERO DELAY

Function selection button: Pressing the button changes the function.

Cursor: ΔV/Δt/ΔV&Δt/V at t/OFF, C1/C2/TCK
Sweep mode: AUTO/NORM/SGL
Coupling: COUPLING, PERSISTENCE

[Example] COUPLING DC **1:**10mV → GND **1:**10mV ⊓ → AC **1:**10mV

Menu display button: Pressing the **MENU** button displays the menu screen. (For the menu hierarchy, see 0-14 to 19.) The color of the button is gray.
ACQUISITION, DISPLAY, MEASURE, SAVE/RECALL, UTILITIES, CH1, CH2, TRIG

Knobs

Single function knob: Turning or pressing the knob sets a range or level.
CH1/CH2-VOLTS/DIV, CH1/CH2-OFFSET, TIME/DIV, DELAY, TRIG LEVEL

FUNCTION knob: Selects and fixes an item on the menu screen and controls the V/H cursor position during cursor measurement.

Operation when knob is pressed

CH1/CH2-VOLTS/DIV: Toggles the function 1-2-5 sequence or 1 to 2.5 times ZOOM when the knob is rotated.

CH1/CH2-OFFSET: The trace shifts in 1-division steps in the direction the knob was last turned.

TIME/DIV: The sweep rate changes 10 times in the direction the knob was last turned.

DELAY, TRIG LEVEL: The setting value changes in 1-division steps in the direction the knob was last turned.

Menu (FUNCTION) operation

There are two ways of selecting a setting item in the menu; one is to turn the FUNCTION knob to select an item, and then press the knob to fix it, and the other is to fix the item by pressing the menu button while the item is displayed.

```
Contrast
  51 %
  Join
  Off
  Type
  YT
 Scale
  Grid
  Math
  Off
 Status
 Counter
 20.0 mV
 Display
```

[Example] Set "Scale" to "Grid" in the Display menu.

Selection method with FUNCTION

1. Press the DISPLAY button to show the display menu.

2. Turn the FUNCTION knob to select `Scale`.
3. Press the FUNCTION knob to fix the menu item.
The setting item is displayed in reverse video.
4. Turn the FUNCTION knob to select `Grid`.
5. Press the FUNCTION knob to fix the setting item.
The selected menu item is displayed in reverse video.

Bear in mind!!

From the following explanations, the operation of setting Scale in the Display menu to Grid (a series of operations 2 to 5 enclosed with dotted line above) is expressed as follows:
Through [FUNCTION operation], set Scale menu to Grid.

Selection method with MENU
1. Press the DISPLAY button to show the display menu.
2. Turn the FUNCTION knob to select `Scale`.
3. Pressing the DISPLAY button selects Frame, Grid or Axes.

Setting a numerical value

Set the numerical value of Hold off in the trigger menu, Interval of Event trigger or Line of TV as follows:
For the setting of File No. in SAVE/RECALL, Copy menu, see pages 34 to 37.

```
  ↑
Hold off
5.16ms
Coarse
```

← Pressing the FUNCTION knob changes the numerical value displayed in reverse video one by one. Pressing the FUNCTION knob again after the numerical setting is done changes the settable menu to "Coarse" after the values are confirmed.

← Pressing the FUNCTION knob changes the numerical value in rough steps. The set value is displayed in reverse video. Pressing the FUNCTION knob again after the numerical setting is done changes the settable menu to "Hold off" after the values are confirmed.

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Description of operation section

Shown in ( ) is the reference page.

[CH1/CH2 MENU] button: Displays the CH-1 and CH-2 menus. (P14, P15, P42, 43)
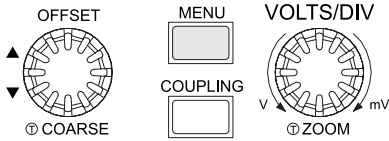
[COUPLING] button: Selects the input signal coupling from DC → ⏚ Ground → AC. (P15)

[OFFSET] knob: Sets the vertical position of a trace. (P14)

[VOLTS/DIV] knob: Continuously selects the deflection factor in 1-2-5 sequence or ´1 to ´2.5 zoom as fine adjustment of the vertical deflection factor. Pressing the knob switches between 1-2-5 sequence and zoom. (P14)
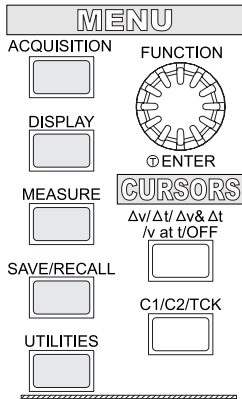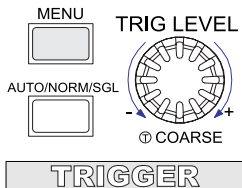
[MENU] button: Displays the ACQUISITION, DISPLAY, MEASURE, SAVE/RECALL and UTILITIES menus.

[FUNCTION] knob: Selects and fixes an item on the menu screen and controls the V/H cursor position during cursor measurement. (P5)

[ΔV, Δt, ΔV/Δt, V at t, Off] button: Selects the cursor measurement item from ΔV → Δt → ΔV/Δt → V at t → Off. The selected item is displayed at the top of the screen. (P22)
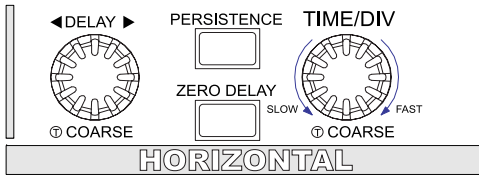
[C1/C2/TCK] button: Selects active cursors (C1, C2, or tracking) to be moved by the FUNCTION knob during cursor measurement. (P22)

[TRIG MENU] button: Displays the TRIGGER menu. (P18)

[TRIG LEVEL] knob: Sets the trigger level. (P18)

[AUTO/NORM/SGL] button: Selects the sweep mode from Auto → Normal → Single. (P20)

[DELAY] knob: Sets the trigger delay time. (P16)

[ZERO DELAY] button: Set the trigger delay time to zero. (P16)

[PERSISTENCE] button: Sets overwrite ON or OFF. When ON, waveforms are accumulated on the display. (P17)

[TIME/DIV] knob: Selects the sweep rate in 1-2-5 sequence. (P16)

[AUTOSET] button: Automatically sets the vertical, horizontal and trigger condition to show the input signal. (P12)

[RUN/STOP] button: Sets capturing a new signal or stops capturing. The selected condition is displayed at the top right of the screen. (P21)

[HELP] button: Displays an explanation of the currently selected function. (P10). In remote mode, all buttons and knobs on the front panel are disabled except for the [HELP].
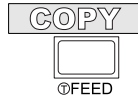
[COPY] button: Outputs a hardcopy of the screen or setup condition to a specified output device. (P24)

SETUP [SAVE] button: Saves the current setup to the internal memory. (P26)
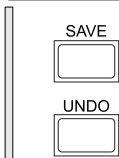
SETUP [UNDO] button: Recalls the saved setup from the internal memory. Pressing the button again undoes the recalling and returns to the previous setup. (P26)

REF [SAVE] button: Saves the waveform data displayed on the screen to the internal memory as a reference waveform. (P27)
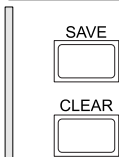
REF [CLEAR] button: Displays the reference menu. Pressing the button again erases all displayed reference waveforms. (P27)

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How to read screen

```
100ns 500MS/s    Run    D:-99.0ns  Smpl Equ  S    ②

                                    Contrast
                                    50 %
                                    Join
                                    Off
                                    Type
          ①Waveform display area    YT              ③
                                    Scale
                                    Grid
                                    Math
                                    Add
                                    Status
                                    Counter

1:200mV + 2:200mV   Auto CH2  HF-R    -99.9 mV?      ④
   ********************   f: 999.9kHz   Display       ⑤
```

① Waveform display area

Displays a waveform and scale.
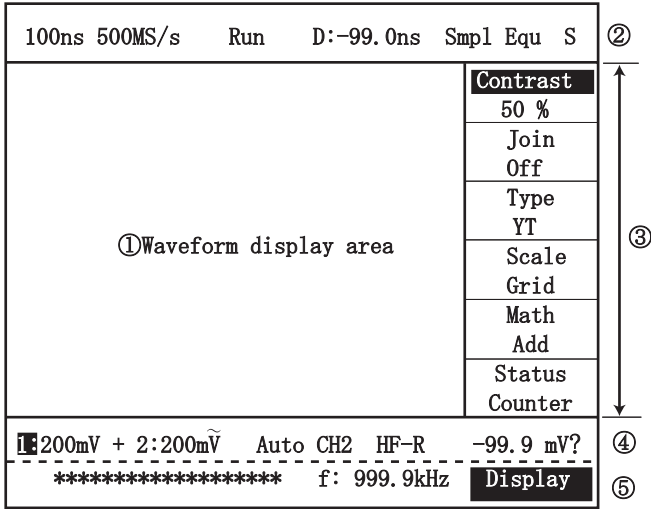
Displays with a marker GND reference (1) of the CH1 waveform, GND reference (2) of the CH2 waveform and trigger level (T) at the left end of the screen.

② Horizontal axis and acquisition display area

a	b	c	d	e	f	g
100ns	500MS/s	Run	D:-99.0ns	Smpl	Equ	S/L

a: Time/div
b: Sampling rate
c: Run/Stop state
d: Delay time
e: Acquisition mode
f: Roll/equal sampling
g: Short/long

③ Menu display area

Displays the selected menu.

Displays a cursor measuring item during cursor measurement and displays a interface menu during remote control.

④ Vertical axis/trigger display area

h	i	j	k	l	m	n
1:	200mV	+ 2:200mV	AUTO	CH2	+HF-R	-99.9mV?

h: Trace ON/OFF (when ON, displayed in reverse video)
i: VOLTS/div
j: Operation setting
   (addition (Add) = +,
   subtraction (Sub) = −,
   multiplication (Mult) = ×)
k: Sweep mode
l: Trigger source
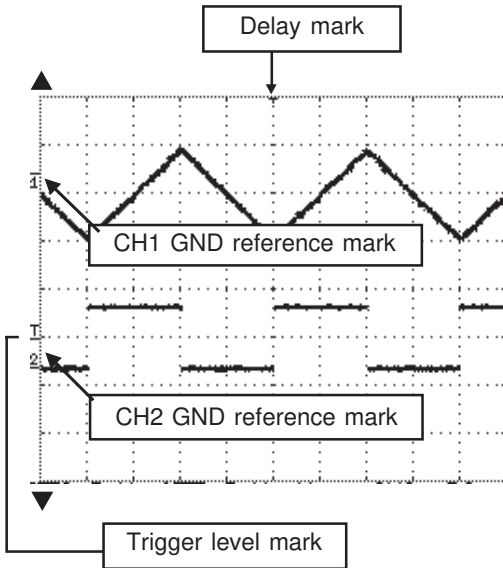m: Trigger slope/trigger coupling
n: Trigger level

⑤ Message status display area

Displays a selected status, temporary message or alarm.

The selected menu is displayed in reverse video.

Marks on waveform display

Delay mark

CH1 GND reference mark

CH2 GND reference mark

Trigger level mark

GND: Reference mark display

Indicates the GND position with '_'. Up/down arrows ▲ or ▼ are displayed at the upper or lower position when the channel position is outside of the display area.

Trigger level mark display

Indicates the trigger position with 'T' when the trigger coupling is DC or HF-REJ.

Up/down arrows ▲ or ▼ are displayed at the upper or lower position when the trigger delay position is outside the display area.

Delay mark display

Indicates the trigger position with '▼'.

Right or left arrows ◀ ▶ are displayed when the trigger position is outside the display area.

Understanding the menu structure

| Sweep |
| Auto |
| Trig Type |
| Event |
| Type |
| Burst |
| Interval |
| 200us |
| Coarse |
| ⬇ |
| 0.00 V |
| Trigger |

← Menu item: Displays the selection status in reverse video.

← Menu setting: Displays the current setting. If the setting is selected in [FUNCTION operation], it is displayed in reverse video.

Numerical value setting menu

Press the FUNCTION **knob** at this position to change the numerical value one by one.

Press the FUNCTION **knob** at this position to change the numerical value in rough steps.

← Indicates that there are more items below.

← Shows the menu displayed in the menu display area.

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Before starting the measurement

Make the following adjustments if necessary.

Contrast setting

Adjusts the contrast of the screen.

The contrast is automatically set initially according to the ambient light when the power is turned on. You may adjust the contrast manually if necessary.

This manually-adjusted condition is maintained until the power is turned off.

1. Press the DISPLAY button to show the Display menu.

2. Adjust Contrast between 0 and 100% with [FUNCTION operation] to get the appropriate screen brightness.

Selection of language

Selects the HELP language.

1. Select Config in the UTILITIES menu with [FUNCTION operation].

2. Press the FUNCTION knob to show the Config menu.

3. Select Language in the Language menu with [FUNCTION operation].

HELP function

Press the HELP button at the top left. An explanation of the last operated function is displayed.

HELP is canceled by any operation.

Setting of date

The date is used for time display but also for the time stamp when saving a file and capturing a waveform.

1. Select Date in the UTILITIES menu with [FUNCTION operation].

2. Press the FUNCTION knob to show the Date menu.

3. Select Month from 1 to 12 with [FUNCTION operation].

Set Date, Year, Hours and Minutes in the same way.

The seconds are set to zero when fixing the date menu.

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Display date on the screen

To display the date in the message area, select Date in the Status menu.

1. Press the DISPLAY button.

2. Select Date in the Status menu with [FUNCTION operation].

3. The date is displayed at the bottom right of the screen.

Reverse display function (LCD)

Toggles the screen between Normal (white background) and Reverse (blue background).
This function affects only the LCD display and does not affect the copy output.

1. Select Config in the UTILITIES menu with [FUNCTION operation].

2. Press the FUNCTION knob to display the Config menu.

3. Set the LCD menu to Normal or Reverse with [FUNCTION operation].

How to restore the setting at time of purchase

1. Through [FUNCTION operation], set the SAVE/RECALL menu to DEFAULT.

2. Pressing the FUNCTION knob shows a message "Push the FUNCTION to go on".

3. Pressing the FUNCTION knob again returns the panel setting (readout and part of menu) to the factory setting.
   Copy-related or interface-related settings, etc. are not changed (see Document 4).

Displaying CAL waveform by AUTOSET

If you are not sure about the amplitude or frequency of a signal, or how to operate the scope, press the AUTOSET button. The scope then automatically sets the vertical, horizontal and trigger condition for displaying the input signal.
(For details of AUTOSET, see the appendix 3.)

Auto setup function

After the signal is input, press the AUTOSET button first. Optimal setting according to the input signal is automatically performed.

Auto setup UNDO function

Holding down the AUTOSET button for 1 sec or more allows the panel setting (setup) before execution of AUTOSET to be restored.

Probe connection

The following procedure explains how to display the CAL signal through the probe to CH1.

Select a probe to use for CH1 from two probes and attach the color ring (e.g., orange). Keep the remaining color rings as spares.

1. Connect the probe to the CH1 input terminal as shown in the left figure.

2. Connect the arrow chip of the probe to the CAL terminal and the earth leads to the ground terminal.
    The CAL signal is a 1 kHz rectangular wave of 0.6 Vp-p amplitude.

Displaying CH menu

3. Press the CH1 MENU button to display the CH-1 menu.

Trace setting

4. Turn on TRACE to display the CH1 waveform with [FUNCTION operation].
    CH1 and CH2 Trace cannot be turned off simultaneously.

COUPLING setting

DC **1**:10mV → GND **1**:10mV ⊓ ·

5. Set the input coupling to DC with the CH1 Coupling button.

Probe setting

6. Set the Probe menu to Auto with [FUNCTION operation]. This Auto setting converts and displays the CH1 deflection factor automatically depending on the probe attenuation ratio (10:1, 100:1).

Execute Autoset

7. Press the AUTOSET button. The waveform as shown on page 13 appears (when CH2 TRACE is OFF).
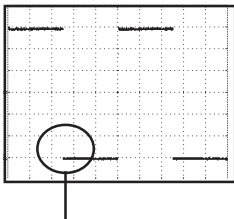
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Probe compensation

Before using a probe, it is necessary to perform a probe compensation adjustment. Probe compensation adjusts the frequency characteristic of the probe to match the oscilloscope input. If a probe is used without such probe compensation adjustment, the measured signal may contain a significant error.
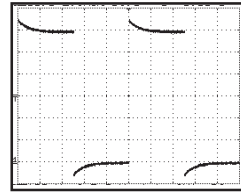
Procedures

Adjust the variable capacitor of the probe by turning with a screwdriver to achieve a flat response on a square wave.
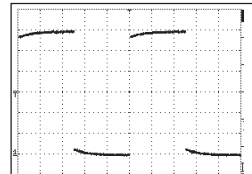
Correctly compensated waveform

Excessive compensation

Insufficient compensation

Adjust it so that this part may be flat.

10:1 PURPOSE OF THE PROBE

The probe is used to provide a convenient, reliable and repeatable method of coupling the DUT to the oscilloscope. The probe is used to minimize measurement error due to loading, poor shielding and limited frequency bandwidth.

Consider the problems that arise when a wire is connected directly from a DUT to the input terminal of an oscilloscope:

1) Susceptible to interference and noise
2) Limited frequency bandwidth
3) Large loading effect on DUT

The first problem can be remedied by using a coaxial cable or shielded wire. However, this does not resolve the second and third problems.

The second problem of limited frequency bandwidth is caused by the inductance and stray capacitance of the wire. Use of a 10:1 probe will eliminate such an effect.

The third problem, the large loading effect, is due to poor impedance matching between the DUT and oscilloscope. This can be minimized by using an appropriate probe.

Operating vertical axis

**CH1/CH2 MENU**   Displays CH1 and/or CH2 MENU.

Trace   Selects display(On) or non-display(Off) of CH1/CH2 waveform.

OFFSET   Sets the position of the waveform in the vertical direction.

Pressing OFFSET moves the waveform in 1-division steps in the direction it was last moved. The offset variable range is as follows:

Turn clockwise (moves up)

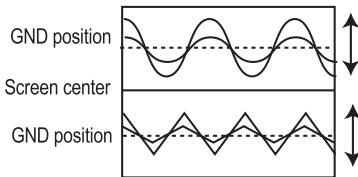| 2 mV to 50 mV/DIV: | ±1 V |
| 100 mV to 500 mV/DIV: | ±10 V |
| 1 V to 10 V/DIV: | ±100 V |

Turn counterclockwise (moves down)
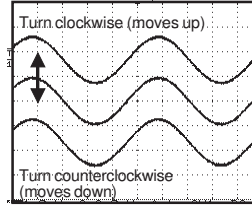
VOLTS/DIV   Selects the deflection factor in 1-2-5 sequence.

This function varies depending on the offset setting in the CH menu.

Division   Enlarges or reduces the waveform based on the GND reference mark (GND position).

GND position

Screen center

GND position

Used to observe waveform at other than the center of the screen, for example, to compare and measure two waveforms.

Volts   Enlarges or reduces the waveform based on the screen center.

Set the waveform to the screen center with the OFFSET knob. Useful for observing the exact part of the waveform you are interested in.
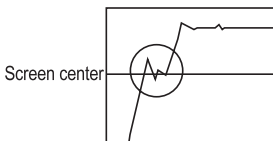
Screen center

Used to observe waveform at the center of the screen, for example, to measure a specific part of waveform or waveform carrying DC bias.

Zoom   Pressing the VOLTS/DIV knob allows the vertical deflection factor to be alternately switched between 1-2-5 sequence and Zoom. (The same function is available using the CH menu.)

If "Zoom" is selected, the setting varies continuously from ´1.00 to ´2.50 (maximum 0.8 mV/div). (Expansion by software)

The waveform is enlarged based on the screen center regardless of the offset setting.

COUPLING   Selects the input signal coupling from DC → Ground → AC.
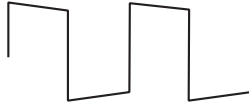
Square wave when   Square wave when
AC is selected   DC is selected

AC coupling ($\widetilde{V}$) : The signal is connected via a capacitor and the signal of 10 Hz or below is attenuated and the DC component is blocked.

This coupling is used to observe the signal while canceling the DC level.

DC coupling (V) : All signal frequency components including the DC component are passed.

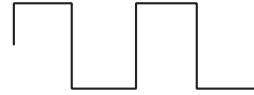**GND ($\frac{1}{\overline{\overline{\pi}}}$)** : Displays the ground level (0 V).

BW   **BW ON/OFF**: The AC component of 10 MHz or higher is attenuated when ON is selected.

BW is used to reduce noise of 10 MHz or higher in the signal.

The same function is available using the CH menu.

Caution   Do not apply a voltage exceeding the specified voltage to the input terminal.
Direct connection : ±400 V (DC+AC peak)

How to use Volts

If ripple or noise occurs in the power output, it is better to use Volts than AC coupling.

[e.g.]
Observe signal in DC 1 V.   →   Turn [OFFSET] knob to set offset level to –1 V.

100 mVp–p

DC 1V

GND

+50 mV

–50 mV

VOLTS/DIV allows noise component to be observed in an enlarged view relative to the center of the screen.
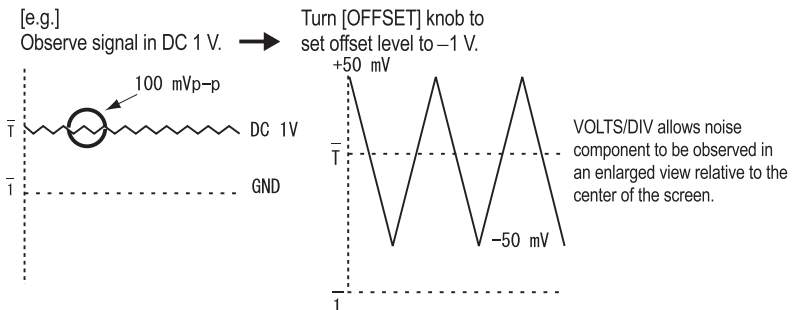
Operating the horizontal axis

TIME/DIV Select the sweep rate per scale (approximately 9 mm). The setting range is 5 ns to 50 s/div in 1-2-5 sequence. The waveform is expanded or reduced based on the screen center. (See the figure below.) The operation varies depending on the delay setting.

When trigger delay is zero
Trigger point

When trigger delay is non-zero
Trigger point

Screen center

Screen center

Trigger point does not change according to sweep time.

Trigger point changes according to sweep time.
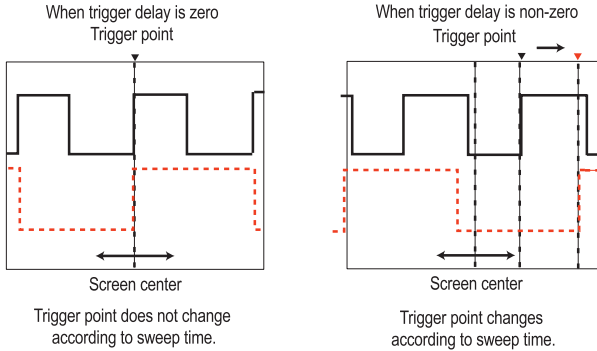
DELAY Sets the position of the trigger point in the horizontal direction.

The Delay time shows from the trigger point to the screen center as the zero point.

Note that the setting range of the delay time varies depending on the sweep rate and memory length setting. (See Section 2.)

POST TRIGGER

PRE TRIGGER

Observe waveform 1 ms after trigger is generated.

Observe phenomenon before trigger is generated.

Trigger delay=1 ms

Input signal

Trigger generation

Wave display screen→ Waveform data acquired

Screen center

Trigger generated at right end of screen (minus 5 div)
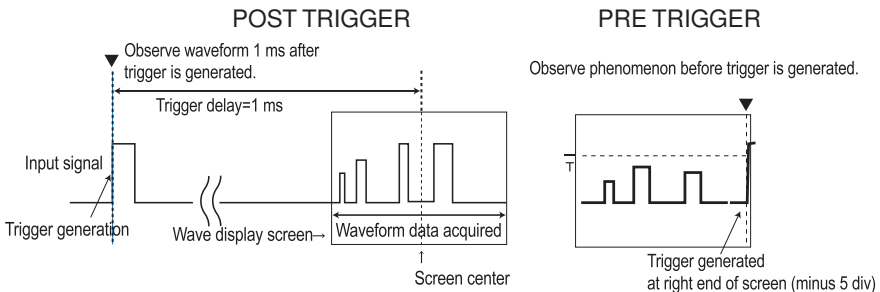
ZERO DELAY Sets the trigger delay time to zero.

The trigger point comes to the screen center when zero.

How to use trigger delay (DELAY) zero

To expand/reduce waveform relative to trigger point, set trigger delay time to zero.

Sampling rate This is the number of data points acquired in one second. It is determined by the memory length and sweep rate (see Section 2). This instrument shows the sampling rate next to TIME/DIV at the top left of the screen.

Memory length This is the total number of data points. Short (5 k word) or Long (100 k word) is selectable with Length in the ACQUISITION menu. There are some restrictions of function when memory length Long is selected. (See Section 2).

PERSISTENCE The newly acquired waveform is overwritten on the screen. Pressing this button toggles between ON and OFF. (This function can also be set in the ACQUISITION menu.)

While PERSISTENCE mode is active, the waveform is always displayed in dots regardless of whether the Join setting in the Display menu is ON.

Press STOP to stop the new writing. Press RUN to get new waveforms but erase the former waveform.

The overwritten waveforms are erased when any keys, buttons or knobs are operated while PERSISTENCE is ON.

Memory length and waveform observed

Compare a waveform acquired at 20 µs/div sweep rate.

20 µs (1/10 of screen)

Data acquired at 40 ns intervals (25 MS/s)

Short 500 data pieces acquired in 20 µs

Long 10000 data pieces acquired in 20 µs

Data acquired at 2 ns intervals (500 MS/s)
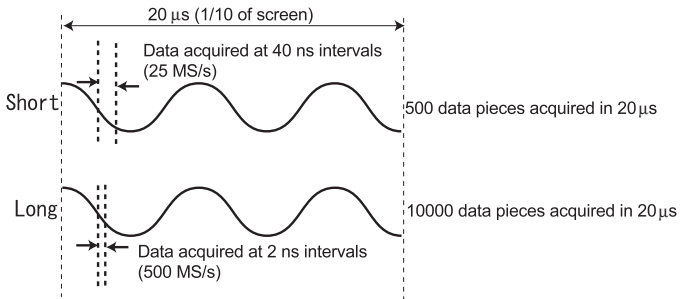
At the same sweep rate, Long allows the waveform to be observed with more details.

Trigger

Trigger signal: Sets the trigger level within the range of the signal amplitude to trigger.

Level

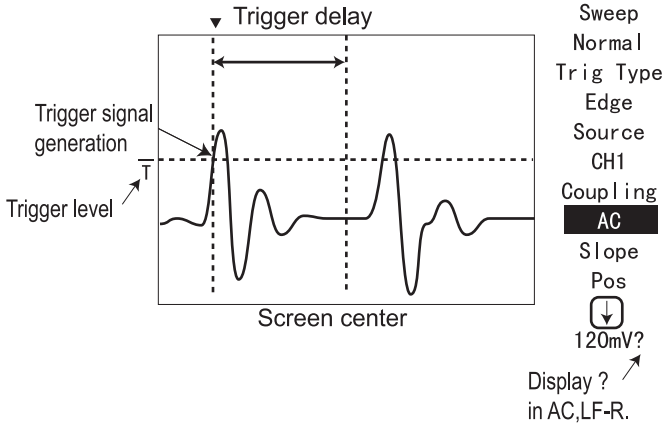A trigger signal is generated at the cross point of the input signal and the trigger level.

The relation between the trigger level, delay time and captured waveform is shown in the figure below.

Sets the trigger level voltage to generate a trigger signal.

The trigger level setting range is ±5 div from the screen center.

A T mark is shown at the left end of the screen when the trigger coupling is DC or HF-REJ.

A "?" mark is displayed following the trigger level voltage display when the trigger coupling is AC or LF-REJ or the vertical coupling of the trigger source channel is set to AC.

The T mark position does not change when the voltage deflection factor (VOLTS/DIV) is varied but the trigger level value is varied.

Press the trigger level knob to set the trigger level in rough steps.

Trig Type	Selects "Edge", "EVENT" or "TV" Type in the TRIG menu.
	(For EVENT and TV, see Section 2.)
	The trigger signal is generated at the cross point of the input signal and the trigger level in the edge trigger as shown in the figure on page 19.
Slope	Selects the rising slope (Pos) or the falling slope (Neg) of the input signal to generate a trigger signal.
Source	Selects the trigger signal source from CH1, CH2, EXT or LINE. LINE generates a trigger signal the same as the power line frequency. It is used for observing a signal synchronizing with the power supply frequency.
Coupling	Selects coupling of a trigger signal.
	AC coupling is useful for observing a signal on a DC voltage.
	HF-REJ rejects high frequency signal components such as noise to ensure stable triggering.

AC	Blocks the DC component of a trigger signal.
DC	Passes all frequency components of a trigger signal.
HF-REJ	Low pass filter coupling. Rejects the frequency components above 10 kHz.
LF-REJ	High pass filter coupling. Rejects the frequency components below 10 kHz.

Hold off	Specifies the trigger ignoring the period from the former trigger time.
	Setting range: 200 ns to 2 s and OFF

Generation of trigger signal   Generation of trigger signal

Hold off time

Waveform display screen   End of   waveform acquisition   Waveform display screen
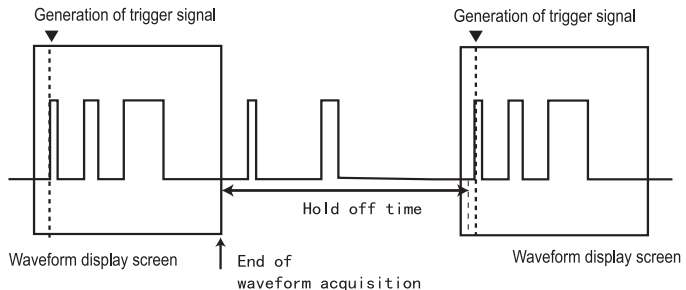
EVENT trigger and TV trigger

Use of EVENT trigger allows waveform to be acquired when a specific pattern is established by specifying trigger generation count and synchronization.

Use of TV trigger allows stable observation of TV signal.

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Sweep mode

**AUTO/
NORM/SGL**

Changes the sweep mode from AUTO → NORMAL → SINGLE.

(The same operation can also be set by Sweep in the TRIG menu.)
The selection conditions of [Auto] [Norm] [Sngl] are displayed at
the bottom of the screen.

**AUTO
(automatic
sweep)**

Free run sweep starts when no trigger signal is available. When the
trigger signal frequency is low, triggering may be unstable. In this
case, change to NORM.

**NORMAL
(normal sweep)**

Captures a waveform every time a trigger signal is generated.

Sweep stops when no trigger signal is available. The last waveform
remains on the screen.

**SGL
(single)**

When a trigger signal is generated, captures a waveform only once.

To capture the waveform again, press the RUN/STOP button to
enable the waveform to be captured.

**Sweep mode
in
roll function**

While roll mode is set, the sweep mode is set as follows:

Endless: Continues to capture and display a waveform until the
STOP key is pressed.

Trigger'd: When a trigger is generated, stops capturing a waveform.
(See Section 2, for details.)

Difference between sweep modes Auto and Norm

When the input signal does not cross the trigger level while the sweep mode
has been set to NORMAL or SINGLE, no new waveform is acquired. Selecting
Auto automatically acquires new waveforms when no trigger signal is
generated.

Trigger level
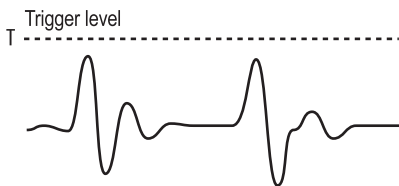
The conditions of Auto, Norm, Sngl are
displayed at the bottom of the screen.

1:1V 2:5.0V Auto CH1 1.00V

AUTO:Auto
NORMAL:Norm
SINGLE:Sngl

RUN/STOP   Sets start/stop of waveform capturing.

Toggles between Run/Stop and displays the current condition at the top center of the screen.

Operation while STOP   Stops capturing a new waveform in the STOP condition. The already captured waveform (currently displayed waveform) can be enlarged or reduced or its position can be varied for both the vertical and horizontal axes.

VOLTS/DIV   Can be set to any range.

OFFSET   Can be set to any range.

TIME/DIV   Can be set to any range. However, there are some limitations of the expansion setting as follows.

When memory length is Short: Max. 7 ranges expansion

When memory length is Long: Max. 11 ranges expansion

The reduction setting is limited to a maximum of 7 ranges irrespective of memory length.

DELAY   It is limited up to the screen center at both the top and tail of the waveform.

Left limit

Right limit

Screen center
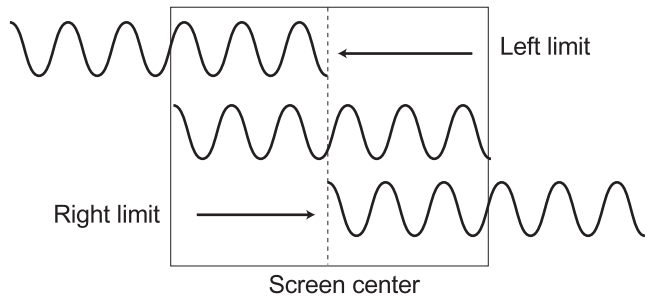
RUN   Starts the waveform capturing. Pressing RUN again while Run mode stops the waveform capturing and captures a new waveform under new conditions.

Cursor measurement

It is possible to measure the voltage and time difference between two cursors.

Horizontal (H cursor) and vertical (V cursor) are displayed simultaneously.

ΔV/Δt/ΔV & Δt/ΔV at t/ OFF

Cycles among the types of cursor measurement. The menu display area shows the cursor measurement item and result.

When another menu is operated

Operating another menu erases the cursor measurement display. To show it again, press the cursor button again.

FUNCTION

The cursor can be moved with the FUNCTION knob when cursor measurement is selected. (Normal menu operation is not possible during cursor measurement.)

Pressing the button of another menu returns to normal menu operations.

Pressing the FUNCTION knob moves the cursor in 1-division steps in the direction the knob was last turned.

C1/C2/TCK

Selects the active cursor, either cursor 1 (C1) or cursor 2 (C2).

When TCK (Tracking) is selected, C1 and C2 can move simultaneously.

The active cursor is displayed in the Select menu.

(In the following example, H-C2 is selected.)

It is selectable from V-C1, V-C2, V-TRACK, H-C1, H-C2 and H-TRACK in ΔV&Δt measurement.

ΔV & Δt measurement

Operating cursors

1. Pressing the ΔV/Δt/ΔV&Δt/ΔVat t/OFF button displays the Cursors menu. Every depressing of the button changes Type (measurement type) from ΔV→Δt→ΔV&Δt→ΔV at t→OFF. Here, ΔV/Δt is set.

2. Every depressing of the C1/C2/TCK button switches Select (operable cursor) from V-C1→V-C2→V-TRACK→H-C1→H-C2→H-TRACK. Here, V-C1 is set.

3. Turn the FUNCTION knob to set the V-C1 cursor.

   Repeat the operation in 2-3 to set V-C2, H-C1 and H-C2 likewise.

4. Display the measured value of ΔV/Δt in the menu.

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[Example] ΔV&Δt measurement

```
200µs  2.5MS/s Stp D:-156 us Avg       S
                                    Type
         V-C1                       ΔV/Δt
                                    Select
              ↑ΔV                   H-C2
                                    CH1 ΔV
H-C1 ◄─────────────────► H-C2       ********
              ↓    Δt               CH2 ΔV
                                    8.00mV
                                    Δt
         V-C2                       1.16ms
                                    1/Δt
                                    862 Hz
1:2.0 V  2B2.0mV  Norm CH1 -DC      2.16 V
                  f=    0 Hz        Cursor
```
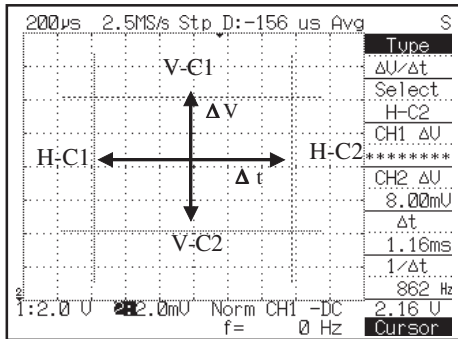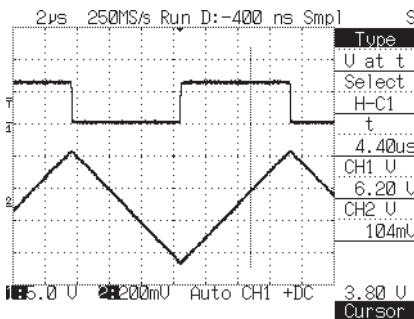
→ Measurement item currently selected

→ Cursor that can be operated by FUNCTION knob

→ ΔV measurement result at CH1 voltage sensitivity (When trace is OFF, *** is displayed)

→ ΔV measurement result at CH2 voltage sensitivity

→ Period Δt measurement

→ 1/Δt measurement

Type of cursor measurement

Measurement type	Description	Usable cursor
ΔV	Voltage difference between V cursors	V-C1, V-C2
Δt, 1/Δt	Time difference between H cursors and 1/Δt	H-C1, H-C2
ΔV&Δt	Voltage difference between V cursors	V-C1, V-C2
	Time difference between H cursors and 1/Δt	H-C1, H-C2
V at t	Voltage at point that crosses H cursor	H-C1
	Time difference between trigger point to H cursor	

V at t measurement

```
2µs  250MS/s Run D:-400 ns Smpl        S
                                    Type
                                    V at t
                                    Select
                                    H-C1
                                    t
                                    4.40us
                                    CH1 V
                                    6.20 V
                                    CH2 V
                                    104mV
1B5.0 V  2B200mV  Auto CH1 +DC      3.80 V
                                    Cursor
```

Use of V at t allows measurement of the voltage at the point at which waveform crosses the H cursor and the time until the trigger point.

Using H cursors for other than cursor measurement

Use of the MEASURE function allows automatic measurement of the amplitude of waveform, period and other 13 measurement items. (See Section 2.)

The H cursors are also used to specify the measurement area of automatic measurement.

Copy function

Outputs a hard copy of the screen to the built-in printer, floppy disk, ATA card and Centronics port.

Copy

Outputs a hard copy of the screen to a specified device.

See Section 2, for details.

UTILITIES

Displays the UTILITIES menu. Select Copy in the UTILITIES menu with [FUNCTION operation].

Copy Menu Select an output device, format and source. (See Section 2 for details.)

Making a hard copy

Device
Printer
Auto Copy
Off
Source
Screen
Exit

1. Display the Copy menu in the UTILITIES menu.
2. Through [FUNCTION operation], set the Device menu to Printer.
3. Through [FUNCTION operation], set the Autocopy menu to OFF.
4. Through [FUNCTION operation], set the Source menu to Screen.
5. Every depressing of the Copy button outputs a hard copy of the screen to the built-in printer.

Copy to floppy/ATA card

• If the output device is set to a floppy disk or ATA card, every depressing of the Copy button allows a hard copy of the screen to be saved in TIFF or BMP format. See Section 2 for details.

Auto Copy

• When Auto Copy is selected, every acquisition of waveform allows a hard copy of the screen to be output to a specified device. See Section 2 for details.
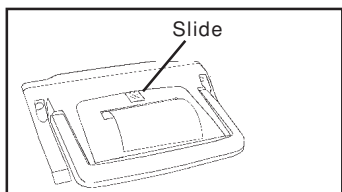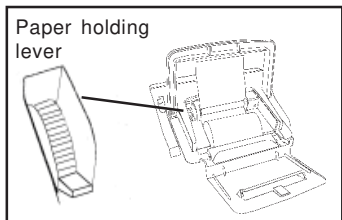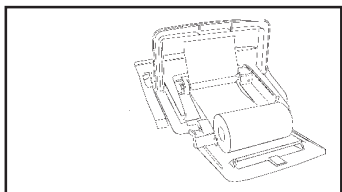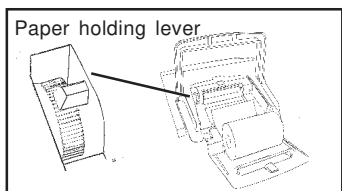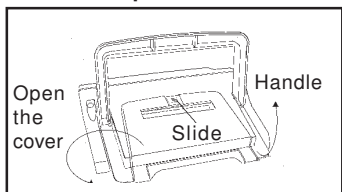
Built-in printer

Paper feed

Pressing the Copy button for 1 second or more starts paper feed when the built-in printer is used. The paper feed stops when the button is released.
(Pressing this button for less than 1 sec simply performs normal copy operation.)

Attachment procedure

Loading printer roll paper

Open the cover   Handle   Slide

Turn on the power of the scope.
Pull up the handle. Unlock the slide button on the printer cover toward the rear.
Open the cover.

Attention

Be sure to raise the handle before opening the cover.

Paper holding lever

Cut the roll paper end straight, and pull out the paper end by about 10cm.
Put the paper on the cover between the paper guides. Set the holding lever to the center position (lease) from the rear side position (lock).

Insert the paper end beneath the roller until the paper is fed about 15 seconds automatically.

Paper holding lever

Move the paper from the cover to the paper holder. Rewind the roll paper slightly to straighten the paper. Set the paper holding lever toward the rear to lock it.

Attention

Printing is not possible if the paper holding lever is set to the Release position at the center.

Slide

Insert the paper end into the hole of the cover, and then close the cover.

Lock the slide button on the printer cover toward the front (lock).

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SAVE/UNDO of SETUP

Simply pressing these buttons saves the current panel setting to internal memory or recalls the saved setting.

SETUP SAVE

Saves the current panel setting in internal memory. The internal memory stores the condition immediately before the last pressing of the button.

SETUP UNDO

Recalls the saved setup from the internal memory. Pressing this button again undoes the recalling and returns to the previous setup.
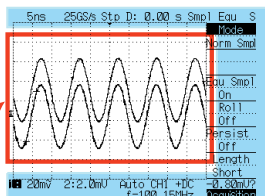

How to use SAVE/UNDO of SETUP

[Example] When two settings of measurement are switched alternately, one at a sweep rate of 1 ms and the other at a sweet rate of 0.1 ms.

1. After measurement is performed at a sweep rate of 1 ms/div, press the SAVE button.
2. Set a sweep rate of 0.1 ms/div and carry out measurement.
3. Pressing the UNDO button recalls the panel setting at a sweep rate of 1 ms/div.
4. Pressing the UNDO button again recalls the 0.1 ms/div panel setting. Pressing the UNDO button toggles the sweep rate between 1 ms/div and 0.1 ms/div.

Saves/recalls the displayed CH1/CH2 waveforms simultaneously.

Saves/recalls part of readout and menu. (For save content, see Document 4.)

Save/recall of reference waveform

Internal memory

Save/recall of panel setting

SAVE/CLEAR button of REF

Displays the reference menu. Pressing the button again erases all reference waveforms displayed.

REF SAVE

Stores the currently displayed waveform as a reference waveform on the screen and saves the waveform data to internal memory with panel setting data as reference data. (The CH1 and CH2 current traces are available, but the calculated waveform is not available.)

The oldest record is erased automatically when this button is pressed 6 times or more as the internal memory has 5 units.

Reference waveform save format

REF1	←Saves the last recorded data.
REF2	↓
REF3	↓ Every depressing of the button shifts the number to be saved.
REF4	↓
REF5	←Depressing the button erases the saved data and replaces it with the data stored in REF4.

REF CLEAR

Displays the REF menu. Pressing the button again erases all reference waveforms on the screen.

How to operate the REF menu

1. Press the REF SAVE button to store the REF waveform on the screen.
2. Press the REF CLEAR button to display the REF menu.
3. Press the REF CLEAR button to erase all the displayed REF waveforms.

Display
Ref1
Recall
Setup

4. Select REF 1 to 5 in the Display menu with [FUNCTION operation]; the saved reference waveform is displayed on the screen. The recorded waveform can be restored onto the screen by pressing the FUNCTION knob.
5. Select Recall and press the FUNCTION knob with [FUNCTION operation].
   Press the knob to restore the panel setting for capturing REF waveforms.

REF waveform

The waveform recorded by REF cannot be enlarged or reduced.

REF operation cannot be executed in the XY display.

Acquisition menu

ACQUISITION Displays the acquisition menu.

Sets various functions related to waveform capturing.
(See Section 2 for details.)

ACQUISITION Selects from the following 3 functions. At the top right of the screen,
mode setting the selection conditions of [Smpl] [Peak] [Avg] are shown.

Normal sampling Samples the input signal in sweep rate related pitch.
(Norm Smpl)

Peak detect   Always samples the input signal at 500 MS/sec regardless of the
(Peak Det)   sweep rate, and displays the waveform with Min/Max peak values
between the sweep rate related sample pitch.
Peak detect can capture glitches without missing events that cannot
be captured by normal sampling.

Averaging   Averages the same sample point data on the time axis by plural sweeps
(Average)   and displays the averaged waveform. The averaging times (count)
can be set by the menu. Averaging can reduce random noise in the
signal.

EQU Sample Sets the equivalent sampling ON or OFF.
setting   When ON, detects the trigger position of the captured waveform with
a time resolution quicker than the sampling cycle and superimposes it
on the waveform, increasing the apparent sampling speed (max. 25
GS/s). This setting is used to observe repetitive signals.

Roll setting Sets roll mode ON or OFF.

Displays the waveform in real time when ON. Set to ON to roll incoming
data continuously across the screen. Roll is useful for continuously
observing low frequency signals. The waveform can be output
simultaneously to the built-in printer.

Note: The sweep mode function is varied when roll is ON. (See page
20.)

Operation in persistence mode

In persistence mode, the overwritten waveform display is erased when you change
the V/H axis setting, and the scope restarts overwriting under the new setting.

The overwritten waveform display is erased, except when the waveform is acquired
just before pressing the RUN/STOP button when you change the V/H axis setting
in the STOP condition.

Persist setting
Sets persistence ON or OFF. (Can also be set with the Persistence button.)

The captured waveform is overwritten on the display when ON. Persist is useful for a fluctuating signal such as jitter.

Length setting
Sets the memory length to Short (5 k word) or Long (100 k word).

Note: Some functions and operations vary depending on the memory length. See page 52.

Acquisition mode vs. Sweep range
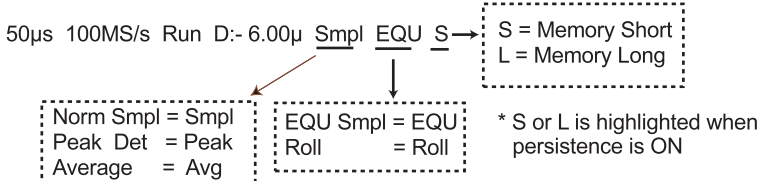
Memory length: Short ☐   Long ▬▬▬

Acquisition	5 ns↔500 ns↔1 μs↔2 μs ↔ 10 μs↔50 μs↔100 ms↔2 s ↔ 5 s ↔ 50 s
Peak Det	Short: from 2 μs to 50 s Long: from 50 μs to 50 s
EQU Smpl	Short: 5 ns to 500 ns
Roll	Short: from 100 ms to 50 s Long: from 2 s to 50 s
Roll print	Short: 5 s to 50 s Long: 5 s to 50 s
Average	Short: 5 ns to 50 s
Norm Smpl	Short: 5 ns to 50 s Long: 5 ns to 50 s

Limitation of acquisition

EQU sampling and averaging are not available for long memory.

Averaging and persistence are not available in Roll mode.

Display of acquisition setting condition

Displays the acquisition condition at the upper part of the screen. If acquisition is not operating even if it is not valid, it is not displayed.

50μs 100MS/s Run D:- 6.00μ <u>Smpl</u> <u>EQU</u> <u>S</u>→ S = Memory Short
                                                        L = Memory Long

Norm Smpl = Smpl   EQU Smpl = EQU   * S or L is highlighted when
Peak Det   = Peak   Roll   = Roll   persistence is ON
Average   = Avg

DISPLAY menu

DISPLAY   Displays the DISPLAY menu related to the waveform or readout display. (See Section 2 for details.)

Contrast setting   Sets the contrast between the waveform and background. (0 to 100%)
The contrast is automatically set initially according to the ambient light when the power is turned on.
You may adjust the contrast manually if necessary.
This manually-adjusted condition is maintained until the power is turned off.

Join setting   Sets joining of dots ON or OFF.
Off: Displays the waveform as dots. All data in the display area is always displayed.
On: Joins the dots of waveform data. Useful for observing a pulse waveform or enlarged waveform. Peak compression is automatically performed according to the display data count.

Interpolation data exists (Join = On)

No acquired data in this interval
(Join = OFF)
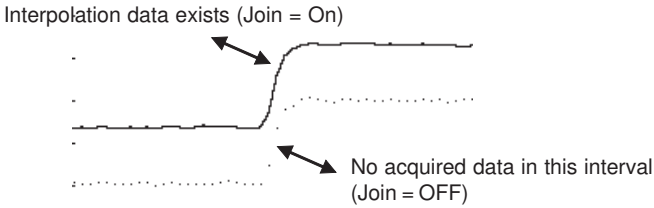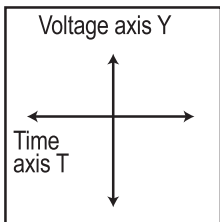
Restrictions on join display

While waveform acquisition is under Run in long memory, waveforms are displayed as joined dots.

If persistence is set to ON, the waveform is always displayed as dots.

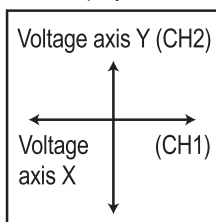**Display TYPE setting**   Allows selection of YT/XY of waveform display format.

YT display

Voltage axis Y

Time axis T

Displays waveform by expressing vertical direction on the voltage axis and horizontal direction on the time axis.
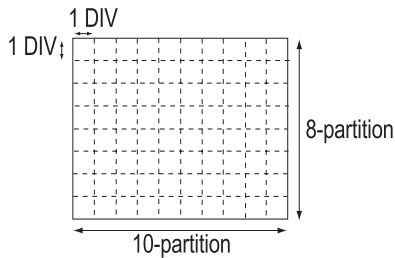
XY display

Voltage axis Y (CH2)

Voltage axis X   (CH1)

Displays waveform by expressing the horizontal direction on the CH1 voltage axis and the vertical direction on the CH2 voltage axis.
This is used to show phase relationship between CH1 and CH2.

Scale setting   Sets the scale for display (Grid, Axis, Frame) in the waveform display area.

Example of selecting Grid

Grid:
Displays the grid, which divides the vertical direction into eight divisions and the horizontal direction into ten divisions.
The unit of this grid is expressed as 1DIV. Voltage sensitivity VOLTS/DIV and sweep time range TIME/DIV are set using this as the unit.

Math setting   Selects the following 3 types of waveforms calculation.

Add: Displays addition of the CH1 and CH2 waveforms.
Sub: Displays subtraction of the CH1 from CH2 waveforms.
Mult: Displays multiplication of the CH1 and CH2 waveforms.

Status setting   Sets one of the following 4 display items in the temporary display area.

Counter: Displays the frequency of a trigger signal.
Date: Displays the time and date.
Measure: Displays the auto measurement result.
Comment: Displays the edited comment.

Comments can be edited by setting the UTILITIES menu to Comment through [FUNCTION operation]. (See page 39.)

The status display is erased when CH1/CH2 offset is set or a temporary message is displayed, but can be displayed again by operating the menu and functions.

Counter measurement

Selecting Counter in Status makes it possible to always measure the frequency of the input signal selected as the trigger signal source.

The measurement is performed irrespective of waveform acquisition.

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MEASURE (auto measurement) menu

MEASURE

Selects any of the 4 items A, B, C and D from 13 auto-measurement items such as Tr (rise time) and freq (frequency) of a signal, which are executed simultaneously. For some measurement items, parameters need to be set and the measurement points are displayed (+ marks). See Section 2, for details.

**Setting measurement items**

Measured value →
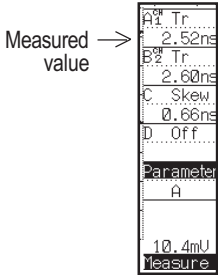
1. Through [FUNCTION operation], set the MEASURE menu to item A (it is possible to select measurement items in the order shown in the figure at the center left).

← Selects item B likewise.
← Selects item C likewise.
← Selects item D likewise.

2. Depressing the [FUNCTION] knob displays "Parameter setting for measurement items" corresponding to items A to D as shown in the figure at the bottom left.
   The measurement point of the item currently selected is indicated with a + mark. This example shows the measurement interval at the rising edge of the CH1 waveform as shown in the figure at the bottom left.

Measurement item selection order
(it is possible to select CH1, CH2 for each item)
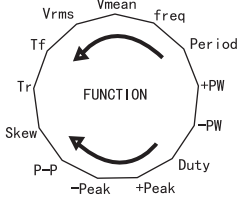
3. Use cursors to set the automatic measurement interval. Select Δ1 measurement from cursor measurement, display H cursors and set it using the FUNCTION knob. (See "Cursor measurement" on page 22.)

4. Carry out measurement in the interval between cursors (if H cursors are not displayed, the measurement interval corresponds to the entire screen).

Setting example Rise time (Tr)

This example shows the parameter menu of item A (Tr measurement of CH1).
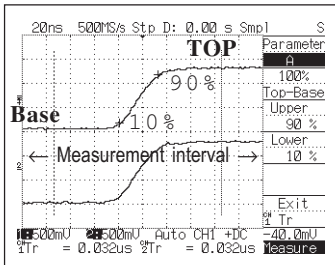
← Sets top and base from the histogram calibration and regards this as 100%.
← Sets the rise time measurement end level.
← Sets the rise time measurement start level.

← Exits the parameter menu.

+ mark display

The level A, B, C or D specified when the menu is displayed is indicated with plus marks. However, no plus mark appears when the reference waveform is displayed.

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Measurement item

For the types of auto-measurement and details of the measurements, see the References.

Item	Menu-Symbol	Parameter menu	Measuring point + display
Rise time	CH1/CH2 Tr	①	Yes
Fall time	CH1/CH2 Tf	①	Yes
RMS measurement	CH1/CH2 Vrms	No	No
Average voltage	CH1/CH2 Vmean	No	No
Frequency	CH1/CH2 freq	②	Yes
Cycle	CH1/CH2 Period	②	Yes
+ pulse width	CH1/CH2 +PW	②	Yes
− pulse width	CH1/CH2 −PW	②	Yes
Duty ratio	CH1/CH2 Duty	②	Yes
Maximum value	CH1/CH2 +PEAK	No	No
Minimum value	CH1/CH2 −PEAK	No	No
Peak to peak value	CH1/CH2 P-P	No	No
CH1/CH2 skew	Skew	③	Yes

Auto-measurement parameter

(The following 3 parameters are available depending on the measurement item.)

Parameter menu	Setting item	Set value
①	100% value	Top-Base/P-P
	Upper	5 to 95%
	Lower	5 to 95%
②	Level	5 to 95%
③	CH1 Edge	Rise/Fall
	CH1 Level	5 to 95%
	CH2 Edge	Rise/Fall
	CH2 Level	5 to 95%

To perform automatic measurement while operating another menu

The automatic measurement value is erased when operating other menu. To show the automatic measurement values, use the following procedure.
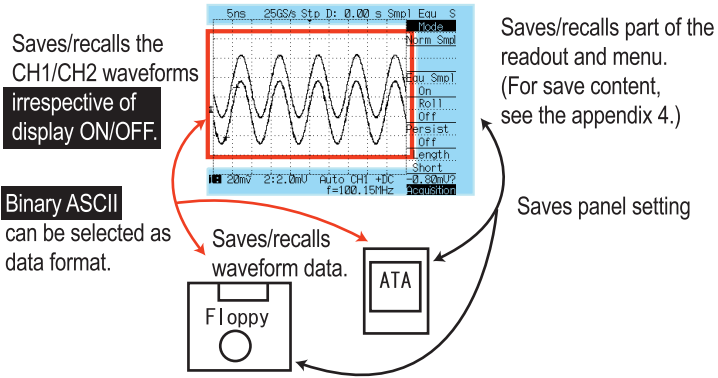
Display the Display menu and select Measure from Status through [FUNCTION operation]. This allows the measured results of items A and B to be displayed at the bottom of the screen all the time.

SAVE/RECALL menu

SAVE/ RECALL

Saves and recalls SETUP (panel setting) and WAVEFORM (waveform data) to a floppy disk or ATA card. Both the CH1 and CH2 waveforms are saved simultaneously. Both the panel setting and the waveform data are recalled simultaneously.

Saves/recalls the CH1/CH2 waveforms irrespective of display ON/OFF.

Binary ASCII can be selected as data format.

Saves/recalls waveform data.

Saves/recalls part of the readout and menu. (For save content, see the appendix 4.)

Saves panel setting

Device setting

Selects a floppy disk or ATA card.

Type setting

Selects Setup (panel setting) or Waveform (waveform data).
Note: Select the save type (next item) when selecting the waveform.

Style setting

Selects Binary or ASCII. The SAVE type of the panel settings is Binary format.
Note: There is a setting item at the end of the Save/Recall menu.
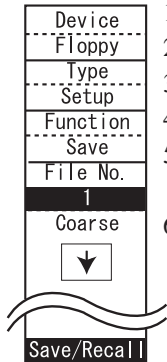
Function

Selects Save, Recall or Delete.
Execute the function by specifying file No.

Setup: Saves, recalls or deletes panel settings in Binary format.
The file extension is set.

WAVE: Saves, recalls or deletes waveform data in Binary format.
The file extension is wfm.

ASCII: Saves or deletes waveform data in ASCII format.
The file extension is csv.

The above directory is automatically created when save is executed, and the data is saved as the specified file number.

The selected file is found automatically from the above directory, and is recalled or deleted when Recall or Delete is executed.

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Saving panel settings to floppy disk

```
Device
 Floppy
  Type
 Setup
Function
 Save
File No.
   1
 Coarse
   ↓

Save/Recall
```

1. Press the SAVE/RECALL button to display the SAVE/RECALL menu.
2. Set Device to Floppy with [Function operation].
3. Set Type to Setup (panel setting) with [Function operation].
4. Set Function to Save with [Function operation].
5. Specify the File No. (e.g. specify "1").

   You can set the file No. in steps of 10 when Course is set.
6. After specifying the File No., press the FUNCTION knob.

   The message "Press FUNCTION to save" appears.

   Press the knob again to execute SAVE.

   If the specified file already exists, the message "Press FUNCTION again to overwrite" appears.

   Press the FUNCTION knob again.

Recalling panel settings from floppy

1 to 3. Set in the same way as "Save panel setting to floppy disk."

```
Function
 Recall
```
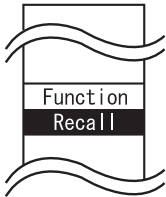
4. Select Recall in Function with [Function operation].
5. Specify the File No. with [Function operation]. (e.g. specify "1").

   All saved files are displayed. When the panel setting is recalled, only file No. of existing files are selected and displayed.

   You can set the file No. in steps of 10 when Course is set.

   If there is no file, "*****" is displayed.
6. After specifying the File No., press the FUNCTION knob. The message "Press FUNCTION to recall" appears. Press the knob again to execute RECALL.

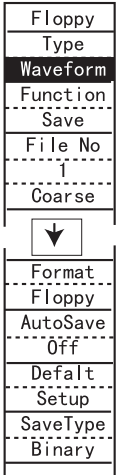### Number and capacity of files that can be saved

It is possible to save the panel settings and waveform data (Binary/ASCII) in files (No.1 to 200).
It is also possible to save the panel settings and waveform data (Binary/ASCII) in an ATA Card (No.1 to 9999).
The number of files that can be saved depends on the remaining capacity of a floppy disk or ATA card.

Type of file	File capacity	Storage time
Panel setting	1 kB	Approx. 5 sec.
Waveform data for short memory (Binary)	11 kB	Approx. 12 sec.
Waveform data for short memory (ASCII)	56 kB (max.)	Approx. 30 sec.
Waveform data for long memory (Binary)	201 kB	Approx. 90 sec.
Waveform data for long memory (ASCII)	1101 kB (max.)	Approx. 9 min.

Saving waveform to floppy disk

| Floppy |
| Type |
| **Waveform** |
| Function |
| Save |
| File No |
| 1 |
| Coarse |

| ↓ |
| Format |
| Floppy |
| AutoSave |
| Off |
| Defalt |
| Setup |
| SaveType |
| Binary |

1. Press the SAVE/RECALL button to display the SAVE/RECALL menu.
2. Set Device to Floppy with [Function operation].
3. Set Type to Waveform with [Function operation].
4. Set Style to Binary with [Function operation].
5. Set Function to Save with [Function operation].
6. Specify the File No. with [Function operation] (e.g. specify "1").

    You can set the file No. in steps of 10 when Coarse is set.
7. After specifying the File No., press the FUNCTION knob.

    The message "Press the FUNCTION knob to save" appears.

    Press the knob again to execute SAVE.

    If the specified file already exists, the message "Press the FUNCTION knob again to overwrite" appears.

    Press the FUNCTION knob again.

Note: Saving or recalling waveform data saves or recalls both the CH1 and CH2 waveform data at the same time without any relation to whether trace is ON or OFF.

Recalling waveform data from floppy disk

| Floppy |
| Type |
| Waveform |
| Function |
| **Recall** |
| File No |
| 1 |
| Coarse |

1 to 4. Set in the same way as saving waveform data to floppy disk.
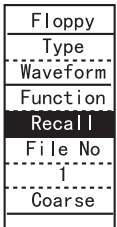
5. Select Recall in Function with [Function operation].
6. Specify the File No. with [Function operation] (e.g. specify "1").

    All saved files are displayed. When the waveform data is recalled, only file No. of files in which the data was saved are selected and displayed.

    You can set the file No. in steps of 10 when Coarse is set.

    If there is no file, "*****" is displayed.
7. After specifying the File No., press the FUNCTION knob. The message "Press FUNCTION to recall" appears. Press the knob again to execute RECALL.

Operation during floppy disk access
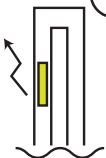
Do not operate any other function while the scope is accessing the floppy disk (green lamp is lit).

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Save/Recall menu (continuation)

Format setting Formats a medium inserted to a specified device. Note that formatting the medium will erase all data saved in the medium. Using a medium such as floppy disk or ATA card requires formatting.

Formatting the floppy disk

The format operation erases all stored data.

1. Set Format to Floppy with [Function operation].
2. Press the FUNCTION knob. The message "Push the FK to format Floppy" appears.

   Press the knob again to execute formatting.

   Note: Before using a new floppy disk or ATA card, the device must be formatted.

Auto save Saves waveform data to the specified device sequentially when a new waveform is captured.

Press ON to start Auto save.

Press STOP to stop Auto save.

Press RUN to restart Auto save.

When the Auto save function is active, all operations except RUN/STOP are ignored.

During Auto execution, the data is saved as binary data.

Default Resets the settings to the factory settings. (See page 10.)

Delete Deletes the specified file.

Waveform data format (Style)

Binary coded waveform data (CH1/CH2) is saved with the panel settings, time and comment.

In Binary format, the data is saved as binary data. The saved data is recalled by the scope.

ASCII waveform data (CH1/CH2) is saved in CSV format with limited panel settings and time. (CSV: Comma Separated Value)
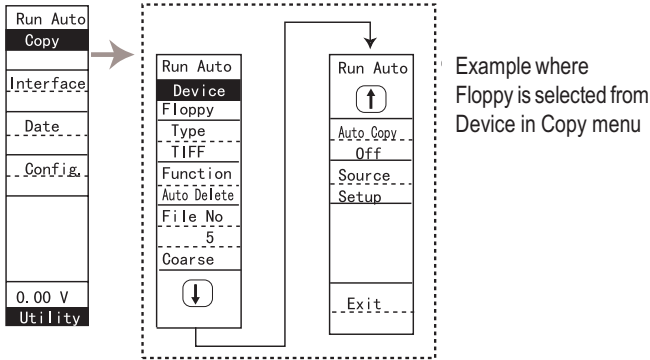
ASCII data can be displayed using Windows applications such as Excel (not provided with the scope).

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UTILITIES menu

UTILITIES

Displays the Copy, Interface, Comment, Date or Config menu.

Copy menu setting

Selects a device or sets the output format (Style) and output destination (Source), etc.

Example where
Floppy is selected from
Device in Copy menu

Output device	Menu	Output format	Output source
Built-in printer	Printer	- - -	Screen, Panel Setup
Floppy disk	Floppy	BMP, TIFF	Screen, Panel Setup
ATA card	ATA CARD	BMP, TIFF	Screen, Panel Setup
Centronics	Centro	DPU-414	Screen, Panel Setup
		ESC-P09	
		ESC-P24	
		PC-PR201	

A hard copy of the screen can be output when the output destination is set to the screen, and the setup settings can be output when the output destination is set to the panel.

The File No. can be specified when the output destination is set to floppy disk or ATA card.

The file No. is incremented by 1 automatically after copying by pressing the Copy button.

Interface menu setting

Sets the delimiter, baud rate and data length (Data) of the RS-232C (no parity, stop bit is 1 bit).

When the GP-IB Card is inserted to the card slot, any address and the delimiter can be set by the GP-IB menu.

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Comment menu setting
Displays the following comment menu.

The edited comment is displayed at the bottom of the screen when Comment is selected for Status of the Display menu.

The comment is stored as auxiliary information with the waveform and panel setting data, and is recalled with those data.
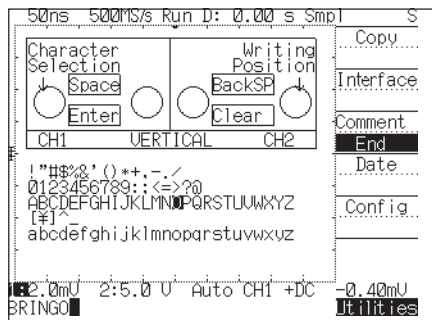
Comment display/edit area

Editing the comment

1. Select the comment edit position by the CH2 VOLTS/DIV knob.
2. Select the comment characters by the CH1 OFFSET knob.
3. Press the CH1 COUPLING button to set the comment characters.
4. Select END in the Utilities menu above and press the FUNCTION button. The comment is saved.

   Press Cancel to cancel the saving.

Date menu setting
Sets the year, month, day, hour, and minute. Seconds are set to zero when the new setting is set. The date is displayed at the bottom of the screen when Date is selected for Status of the Display menu.

The date data is used for time display, and also for the time stamp when saving a file and for the time stamp of captured waveform data.

Config menu setting
Sets the Help language (Screen Display: Language), LCD display (LCD), Self-calibration (Self cal) and software version.

Self cal
Performs self-calibration for the vertical axis, offset and trigger automatically. While self cal is executing, do not apply any signal to CH1, CH2 or EXT input.