

INSTRUCTION MANUAL

7075
7075-01

WAVEFORM GENERATOR

HIOKI E. E. CORPORATION

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Introduction

Thank you for purchasing the HIOKI "7075 WAVEFORM GENERATOR". To obtain maximum performance from the product, please read this manual first, and keep it handy for future reference.

About the Warranty

Our warranty does not cover direct or indirect damage that might occur on the user's premises.

Inspection

When you receive the product, inspect it carefully to ensure that no damage occurred during shipping. In particular, check the accessories, displays, and connectors. If damage is evident, or if it fails to operate according to the specifications, contact your dealer or Hioki representative. Before shipping the unit, always remove the floppy disk, and preferably use the original packing.

Accessories

7990 WAVEFORM CREATION SOFTWARE
Power cord
Instruction Manual

Options

9165 CONNECTION CORD
9166 CONNECTION CORD
9151-02 GP-IB CONNECTOR CABLE (2 m)
9151-04 GP-IB CONNECTOR CABLE (4 m)

Safety Notes

DANGER

This product is designed to conform to IEC 61010 Safety Standards, and has been thoroughly tested for safety prior to shipment. However, mishandling during use could result in injury or death, as well as damage to the product. Be certain that you understand the instructions and precautions in the manual before use. We disclaim any responsibility for accidents or injuries not resulting directly from product defects.

This manual contains information and warnings essential for safe operation of the product and for maintaining it in safe operating condition. Before using the product, be sure to carefully read the following safety notes.

Safety symbols



- The  symbol printed on the product indicates that the user should refer to a corresponding topic in the manual (marked with the  symbol) before using the relevant function.
- In the manual, the  symbol indicates particularly important information that the user should read before using the product.



Indicates AC (Alternating Current).

The following symbols in this manual indicate the relative importance of cautions and warnings.

DANGER

Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.

WARNING

Indicates that incorrect operation presents a significant hazard that could result in serious injury or death to the user.

CAUTION

Indicates that incorrect operation presents a possibility of injury to the user or damage to the product.

NOTE

Advisory items related to performance or correct operation of the product.

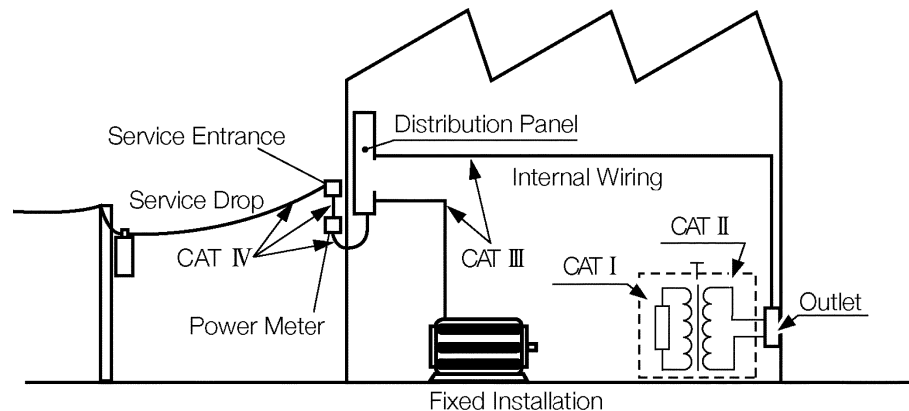
Overvoltage Categories (CAT)

This product conforms to the safety requirements for CAT II measurement products.

To ensure safe operation of measurement products, IEC 60664 establishes safety standards for various electrical environments, categorized as CAT I to CAT IV, and called overvoltage categories. These are defined as follows.

CAT I	Secondary electrical circuits that are connected to a wall outlet through a transformer or similar device.
CAT II	Primary electrical circuits in equipment connected to a wall outlet via a power cord (portable tools, household appliances, etc.)
CAT III	Primary electrical circuits of heavy equipment (fixed installations) connected directly to the distribution panel, and feeders between the distribution panel and outlets.
CAT IV	The circuit from the service drop to the service entrance, then to the power meter and to the primary overcurrent protection device.

Higher-numbered categories correspond to electrical environments with greater momentary energy, so a measurement product designed for CAT III environments can endure greater momentary energy than one designed for CAT II. Using a measurement product in an environment designated with a higher-numbered category than that for which the product is rated could result in a severe accident, and must be carefully avoided.





Notes on Use

Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

DANGER

To avoid electric shock, do not remove the product's cover and panel. The internal components of the product carry high voltages and may become very hot during operation.

WARNING

- **Before turning the product on, make sure the source voltage matches that indicated on the product's power connector. Connection to an improper supply voltage may damage the product and present an electrical hazard.**
- **To avoid electric shock and ensure safe operation, connect the power cable to a grounded (3-contact) outlet.**
- **To avoid electric shock, do not allow the product to get wet, and do not use it when your hands are wet.**
- **Do not use the product where it may be exposed to corrosive or combustible gases. The product may be damaged or cause an explosion.**

CAUTION

- To avoid damage to the product, protect it from vibration or shock during transport and handling, and be especially careful to avoid dropping.
- Do not use excessive force on the touch panel, and do not use sharp objects that could damage the touch screen.
- This product should be installed and operated indoors only, between 0 and 40°C and 85% RH or less.
- Do not store or use the product where it could be exposed to direct sunlight, high temperature or humidity, or condensation. Under such conditions, the product may be damaged and insulation may deteriorate so that it no longer meets specifications.
- This product is not designed to be entirely water- or dust-proof. To avoid damage, do not use it in a wet or dusty environment.
- If an abnormal display or other condition occurs while operating the unit, immediately turn the power switch off, and contact your supplier or our offices.
- The top of the product normally gets hot during operation, so be careful when touching the case.

Before using the product

Before using the product the first time, verify that it operates normally to ensure that no damage occurred during storage or shipping. If you find any damage, contact your dealer or Hioki representative.

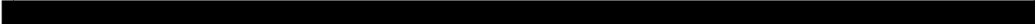
WARNING

Before using the product, make sure that the insulation on the cable is undamaged and that no bare conductors are improperly exposed. Using the product in such conditions could cause an electric shock, so contact your dealer or Hioki representative for repair.



Chapter 1

Overview



1.1 Product Overview

The 7075 is a multi-channel waveform generator with function generator and arbitrary waveform generator function. The function generator provides eight basic waveform types, such as sine and square waves. The arbitrary waveform output allows generating long-duration, high-quality waveforms. Basic capabilities include 128,000-word-long memory, 10-MHz clock rate and 16-bit resolution.

The function generator and arbitrary waveform output can be swept according to each waveform parameter, so this waveform generator is ideal for simulating a variety of signal sources and test situations. A large LCD with touch panel provides very easy operation.

1.2 Features

(1) Easy operation

Interactive operation is provided by the touch panel. Frequently used keys are arranged on the panel for easy operation.

(2) Built-In 4-channel generator

The compact unit includes an internal 4-channel waveform generator. The single unit can generate all signals to simulate a 3-phase motor.

(3) Independent channel operation capability

Sweep sequences can be controlled separately for each channel by rear-panel control signals.

(4) Multiple units can be operated synchronously (providing up to 16 channels)

Up to 16 channels can be synchronously output to test multiple phenomena.

(5) Various conditions of the waveform output (frequency, amplitude, offset, etc.) can be swept

The sweep is easily set, and by using the sequence function, complex patterns can be output easily.

(6) Long-duration arbitrary waveforms can be generated from 128,000 words/channel memory

The 128,000-word arbitrary waveform memory allows long-duration waveform output.

(7) 16-bit amplitude resolution

The 16-bit amplitude resolution provide high-quality waveforms.

(8) Actual waveforms can be used by downloading from the Memory HiCorder

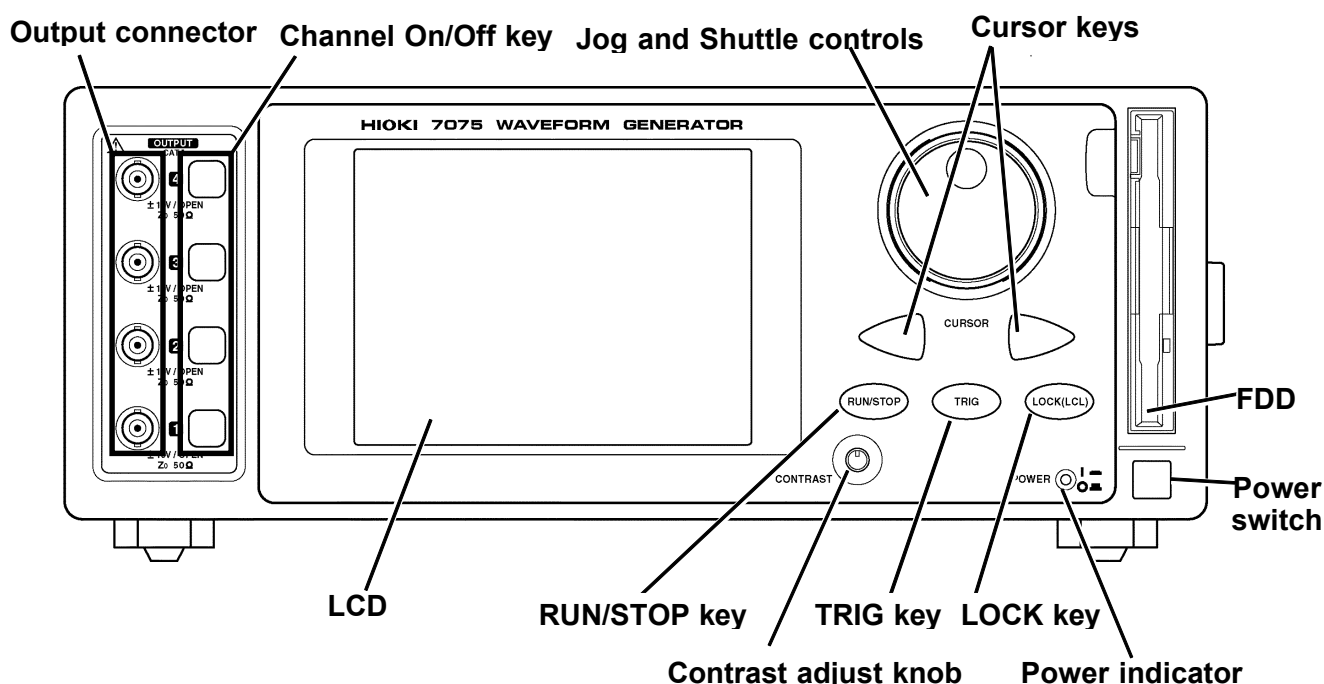
Waveform voltage and time axis data can be downloaded from our Memory HiCorder and the same waveform immediately output.

(9) Waveform creation software included

Our Model 7990 WAVEFORM CREATION SOFTWARE for Windows95/NT is provided for easy arbitrary waveform creation on a PC.

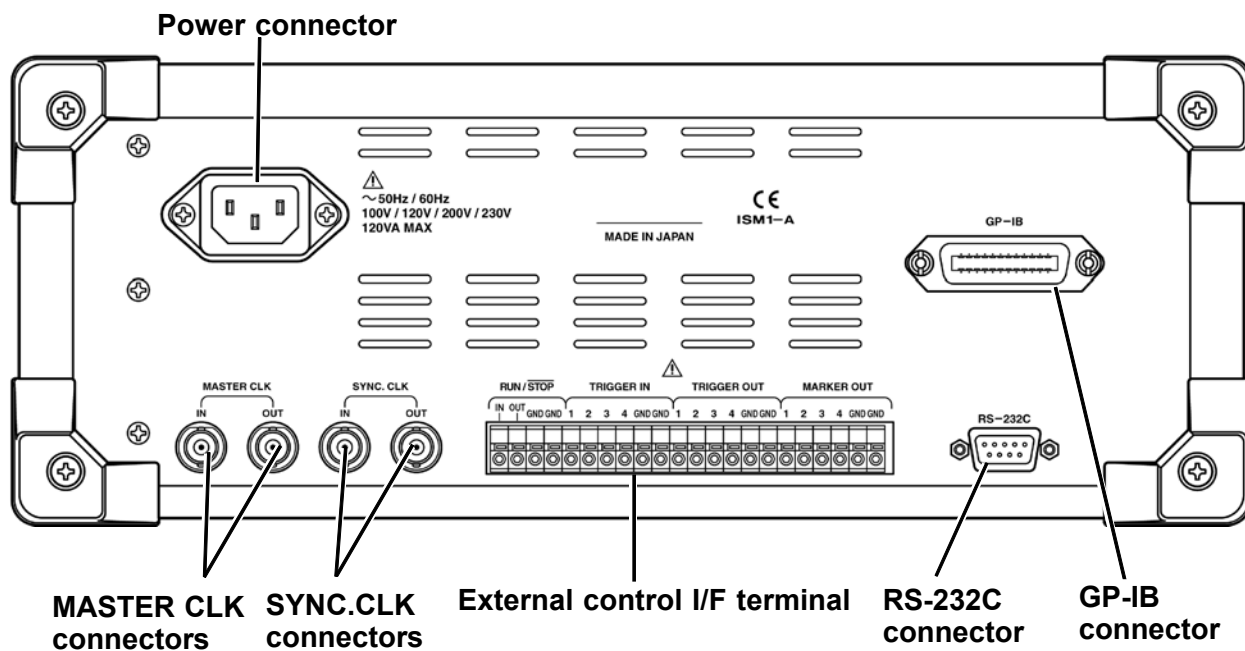
1.3 Names and Functions of Parts

1.3.1 Front Panel



Output connector	These waveform output connectors for channels 1 to 4 are ordered from the bottom up.
Channel On/Off key	These analog output on/off keys light red when on (during output).
LCD	The touch panel over the 5.7-inch LCD accepts direct input by finger touch.
Jog and Shuttle controls	These controls adjust numeric levels and select rows in the sweep table.
Cursor keys	These keys are used together with the Jog and Shuttle controls to adjust numeric levels and shift digit selection.
RUN/STOP key	This key runs and stops waveform output. The key lights red during waveform output.
TRIG key	During sweep operation, this key interrupts an infinite loop or the specified hold. This key is disabled when it lights red.
LOCK key	This key lights red during remote GP-IB operation, and when the keys are locked. All keys are disabled in this case. Pressing LOCK(LCL) for more than 2 seconds unlocks the keys.
Contrast adjust knob	This dial adjusts screen contrast. Turning it to the left darkens the display, and turning it to the right lightens the display.
Power indicator	Indicator flashes red when the power of the unit is ON.
FDD	The 3.5-inch floppy disk (2HD/2DD) can be used.
Power switch	The power of the unit is turned on and off.

1.3.2 Rear Panel



Power connector

Connect the supplied power cord.

MASTER CLK connectors

These connectors link the master and slave units for synchronized operation.

SYNC.CLK connectors

External control I/F terminals

Trigger terminals for RUN/STOP control and sequence control. For details on each terminal, see Chapter 7.

RS-232C connector

9-pin connector for the RS-232C interface

GP-IB connector

24-pin connector for the GP-IB interface

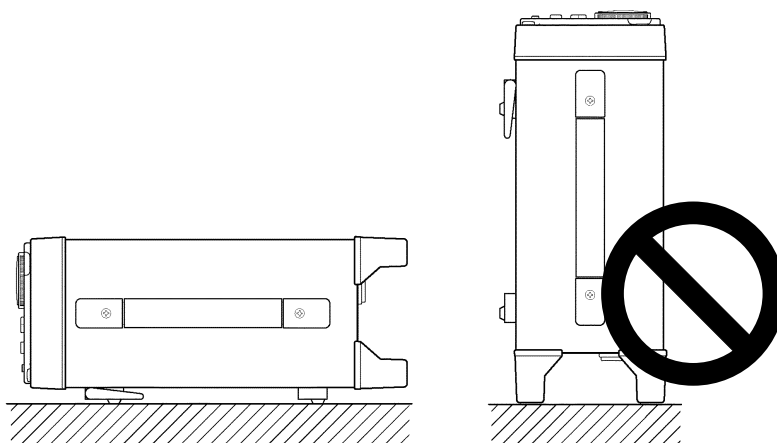
Chapter 2

Preparation for Use

2.1 Installation of the Unit

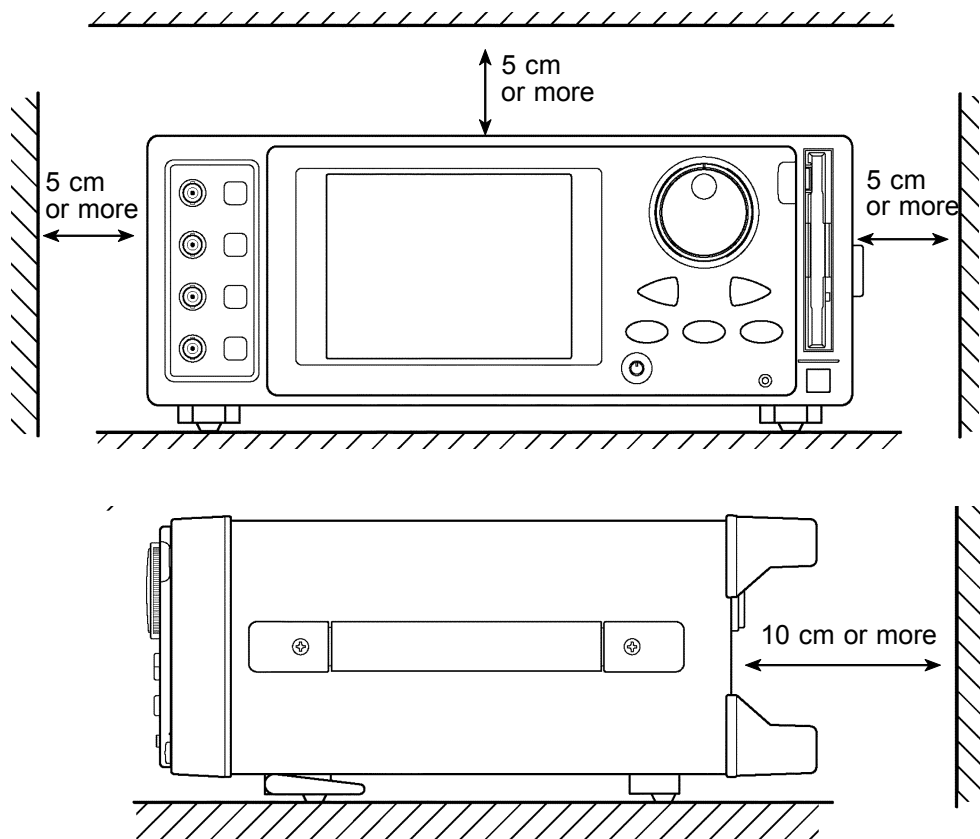
CAUTION

Do not install the product with any side except the bottom facing down. This may cause a fire or other malfunction in the product.



CAUTION

Ventilation holes for heat radiation are provided on the top of the product. Leave sufficient space around the ventilation holes and install the product with the holes unobstructed. Installation of the product with the ventilation holes obstructed may cause a malfunction or fire.



Installation Conditions

Locate the unit so that the following conditions are met.

Temperature: 10 to 40°C, Humidity: 85%RH or less (with no condensation)

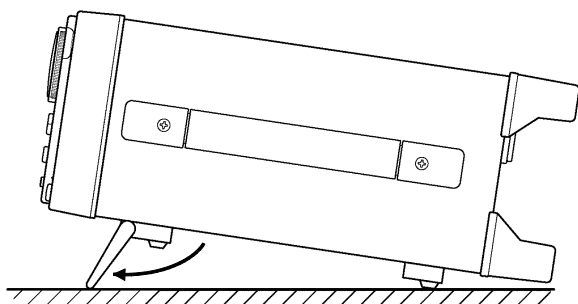
Avoid the following locations:

- Subject to direct sunlight
- Subject to high levels of dust, steam, or corrosive gases
- In intense electromagnetic fields, near high-voltage equipment or power lines.
- Near a heat source.
- On an unstable or vibrating surface.

Placement

CAUTION

Do not apply strong downward pressure with the stand extended. Damage to the stand will result.



The unit should be placed either level, or tilted using the bail.

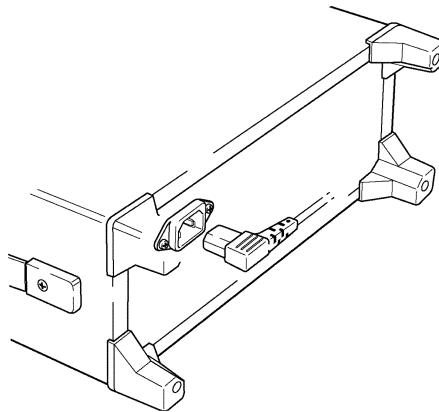


2.2 Connecting the Power Cord

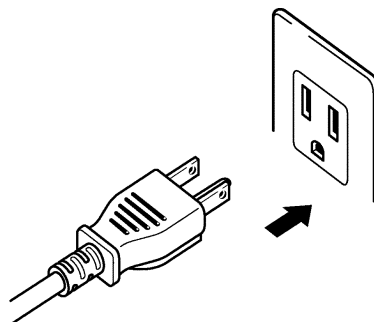
⚠ WARNING

- Before turning the product on, make sure the source voltage matches that indicated on the product's power connector. Connection to an improper supply voltage may damage the product and present an electrical hazard.
- To avoid electric shock and ensure safe operation, connect the power cable to a grounded (3-contact) outlet.

1. Verify that the power switch of the unit is set to OFF.
2. Make sure that the power supply matches the ratings, and plug the power cord into the power connector on the rear panel.



3. Plug the power cord into the outlet.





2.3 Output Terminal

Waveforms are output from the analog output terminals, with the lowest terminal being channel 1. BNC cables can be directly connected.

WARNING

The minimum load impedance of the analog output terminals is 40 Ω . Avoid connecting loads with less than 40 Ω , or short-circuiting the output, as the unit could be damaged or overheat.

CAUTION

Avoid applying external voltage to the analog output terminals, as the unit could be damaged.

NOTE

To obtain optimum quality high-frequency waveform output, the load should be terminated at 50 Ω impedance. In this case, the waveform amplitude is half of the value set on the 7075.

2.4 Basic Operation

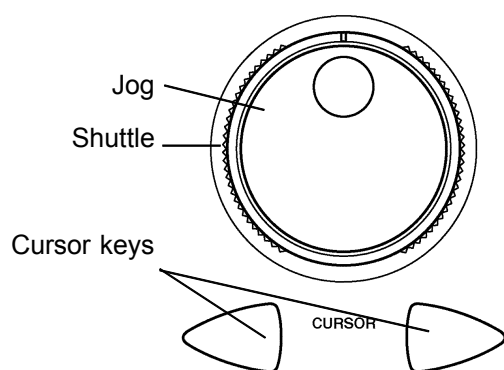
CAUTION

Do not use excessive force on the touch panel, and do not use sharp objects that could damage the touch screen.

Touch panel

Various settings and adjustments can be made with the touch panel on the 7075. Press the buttons on the screen gently to open windows and make selections.

Jog and Shuttle controls



The Jog and Shuttle controls are used in combination with the cursor keys to set and change values.

Shuttle Used to move between items.

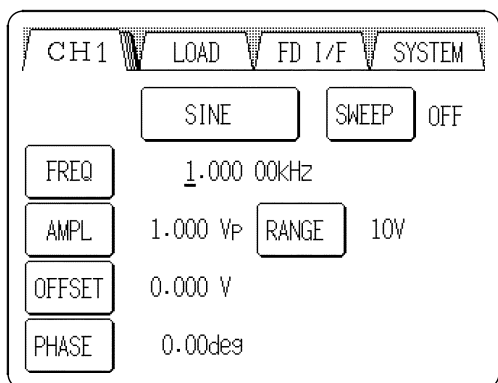
Jog Changes the value of the flashing item selected by the cursor, and moves the selection.

Cursor keys Shifts the selected digit within an item. The upper or lower digit within an item can be selected.

2.5 Screen Description

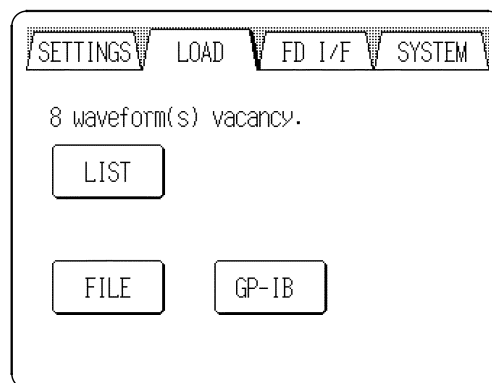
The 7075 has the following four main screens.

Pressing the tabs at the top of the LCD selects each main screen. The tabs do not appear on lower level screens, but pressing the Return button returns to the higher level at which the main screen selection tabs are accessible.



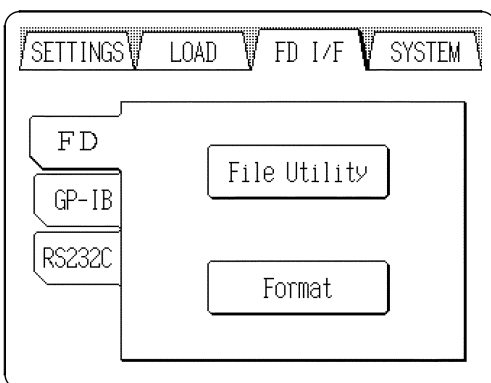
Output Setting screen

The output channels and waveforms, and various waveform parameter settings can be selected and set from this screen. The output values of each item are displayed.



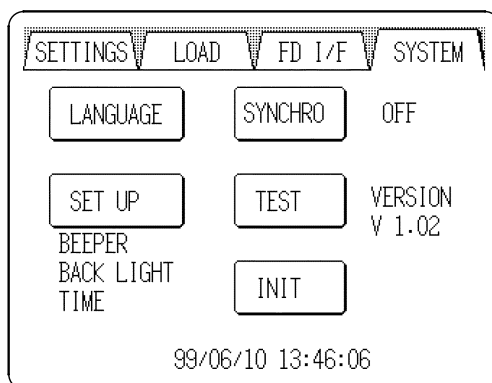
Waveform Input screen

Custom waveform data can be entered from this screen.



FD I/F screen

The output state can be saved to floppy disk and the interface can be set up from this screen.

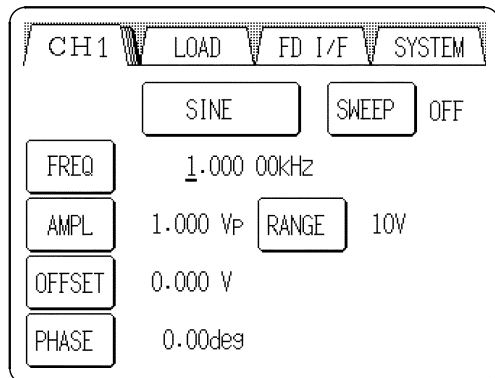


SYSTEM screen

Various conditions of the unit can be set and self testing can be performed from this screen.

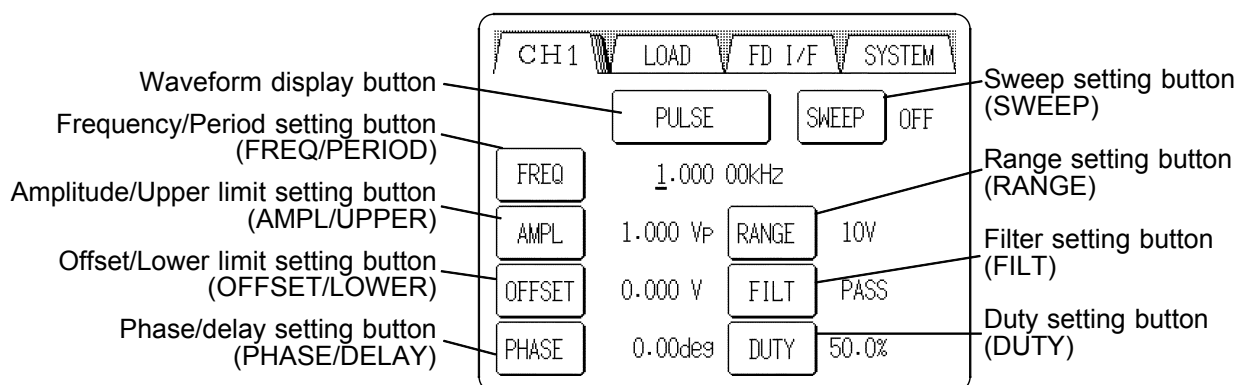
2.6 Example of Basic Operations

2.6.1 Before Operations



1. Connect the power cord and connecting cables to the unit.
2. Turn on the power.
3. The Output Setting screen is displayed after the opening message screen.

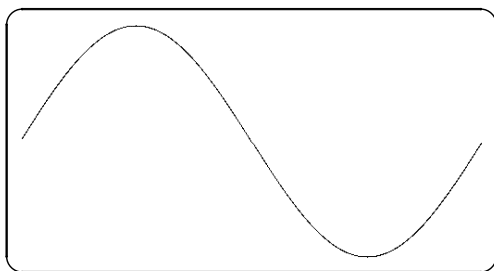
2.6.2 Output Setting Screen Buttons



NOTE

The above buttons may not appear or may appear grayed out depending on the waveform and output conditions. In such cases, they are disabled.

2.6.3 Simple Waveform Output



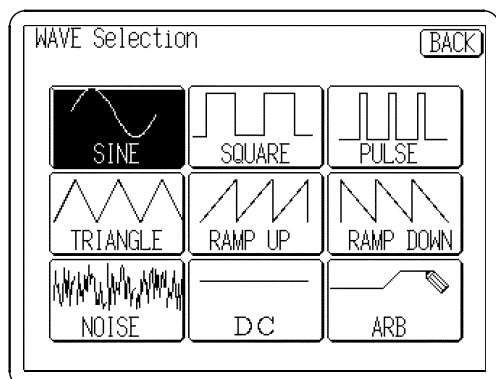
Example

Waveform: Sine waveform

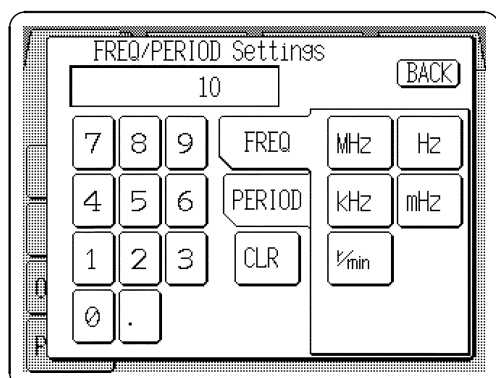
Output channel: Channel 1

Output frequency: 10 kHz

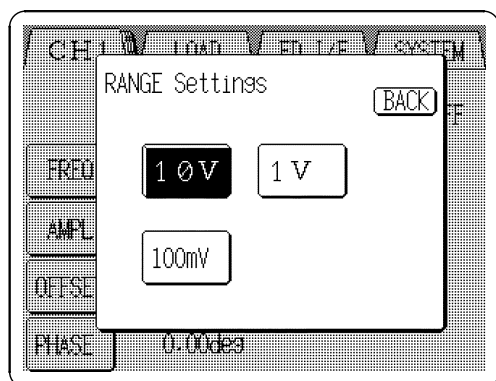
Output amplitude: 5 V_p



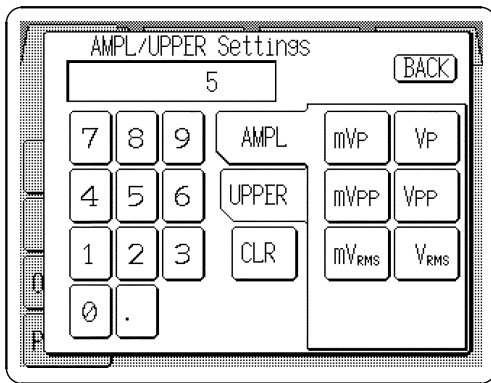
1. Press the Waveform display button on the Output setting screen, and the WAVE Selection screen appears.
2. Press the **SINE** button.



3. Press the Frequency/Period setting button (**FREQ/PERIOD**) on the Output setting screen, and the FREQ/PERIOD Settings window appears.
4. Set to **10 kHz**.

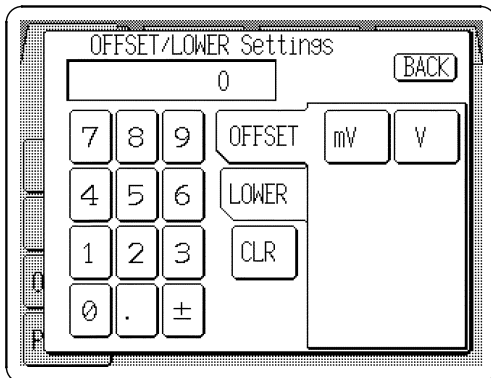


5. Press the Range setting button on the Output setting screen, and the Range setting window appears.
6. Select the **10 V** button.



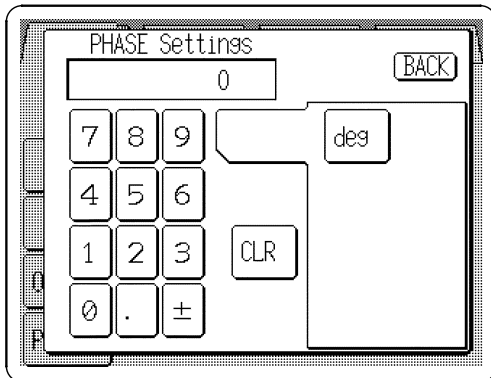
7. Press the Amplitude/Upper limit setting button (**AMPL/UPPER**) on the Output setting screen, and the AMPL/UPPER (amplitude/upper limit) Settings window appears.

8. Set to **5 Vp**.



9. Press the Offset/lower limit setting button (**OFFSET/LOWER**) on the Output setting screen, and the OFFSET/LOWER(lower limit) Settings window appears.

10. Set to **0 V**.



11. Press the Phase/delay setting button (**PHASE/ DELAY**) on the Output setting screen, and the PHASE Settings window appears.

12. Set to **0 deg**.

13. When finished settings, press the Channel On/Off key (CH1) at the lower left front panel. The key will light red to indicate standing by for output.

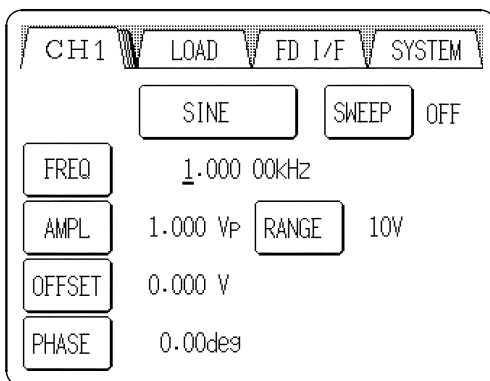
14. Press the **RUN/STOP** key at the lower right front panel. The key will light red as the waveform is output.

Chapter 3

Output Setting Screen

On this screen, the output channel, waveform, waveform parameters can be set.

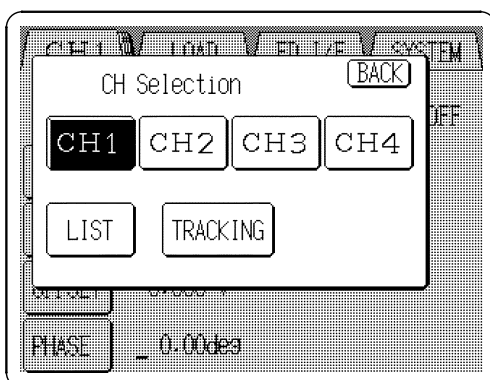
3.1 Selecting the Output Settings Screen



Pressing the **SETTINGS** tab at the upper left of the screen causes the main Output settings screen to appear.

If the tabs are not visible at the top of the screen, a lower level screen is currently displayed. Press the **BACK** button to return to a higher level, and then perform the above step.

3.2 Selecting the Channel



1. Pressing a tab to display channel numbers opens the CH Selection window.
2. Pressing the button for the channel to be set selects that channel number and returns to the main Output settings screen.

Pressing the **LIST** button in the CH Selection window displays a list of the status of all channels.

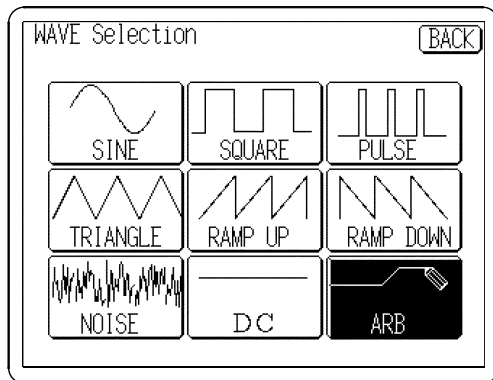
Pressing the **TRACKING** button enables setting the waveform, frequency, etc. of all channels simultaneously.

3.3 Selecting the Waveforms

Select the waveform to be output from the following list.

Function generator: Sine, square, pulse, triangle, ramp-up, ramp-down, noise and DC waveforms

Arbitrary waveforms (8 pre-stored waveforms)

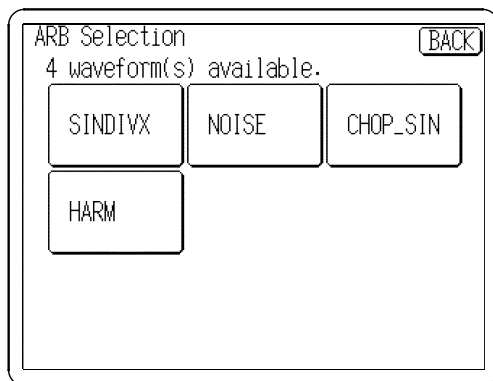


1. Press the Waveform display button, and the Waveform selection window opens.

2. Select the waveform to be output.

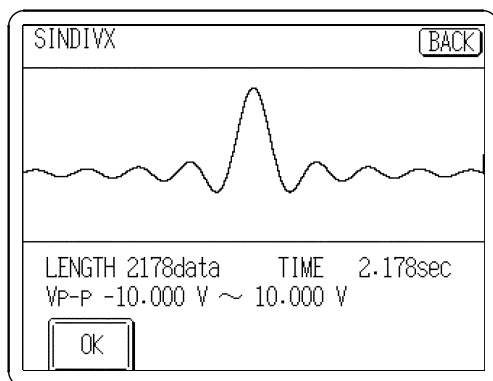
For arbitrary waveforms, select ARB to display a list of the arbitrary waveforms that have been stored in the unit.

Otherwise, choose the desired waveform and return to the main Output settings screen.



(Arbitrary waveform selection)

1. On the arbitrary waveform screen, select the waveform to be output.



The information of waveform size, output time, and amplitude for the specified waveform is displayed.

2. To set the waveform, press the **OK** button.

To change the waveform, press the **BACK** button to return the ARB selection screen and select the waveform again.

NOTE

- The waveform cannot be selected while RUN is active.
- Arbitrary waveforms cannot be selected until they have been stored in the unit. See Chapter 4, "Waveform Input Screen" to enter waveforms.

3.4 Setting the Waveform Parameter

Waveform parameters can be set by two methods.

Direct numeric entry

Pressing the button for an item to be set opens the numeric entry window. A value can then be entered by the tenkeys. Pressing the **CLR** button clears the entered value.

Changing with the Jog dial

The currently selected (blinking) digit can be changed by turning the dial to the right to increase, or to the left to decrease. Other digits can be selected with the cursor keys.

Items can be selected by any of the following methods:

- Turn the Shuttle ring to the right or left
- Press a cursor key
- Press the field of the item to be selected

NOTE

Depending on the setting format, some settings cannot be performed with the Jog dial.

3.4.1 Frequency/Period Settings

Set the frequency of the output waveform.

Setting range

The setting range and resolution

• Function generator

Sine and square waveforms	0 to 10 MHz (10 mHz)
Pulse, triangle, ramp-up, ramp-down waveforms	0 to 200 kHz (10 mHz)
Noise, DC	_____

• Arbitrary waveforms

Determined by the sampling clock and waveform size.
0 to 10 MHz (10 mHz)

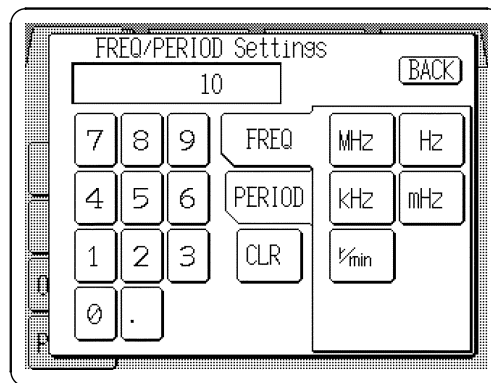
Setting units

Hz	Output and arbitrary waveform sample blocks are set in frequency units.
r/min	Output and arbitrary waveform sample blocks are set in rpm (revolutions per minute) units.
s	Output and arbitrary waveform sample blocks are set in period units.

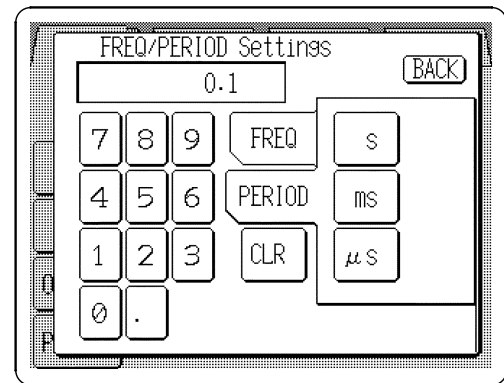
Method

■ Direct Entry

1. Press the Frequency/Period setting button (**FREQ/PERIOD**) to open the FREQ/PERIOD settings window.
2. Select either frequency or period entry format. For arbitrary waveforms, the setting affects both output values or sampling clock frequencies.
3. Enter the numeric value by the tenkeys.
4. Select the units. Pressing the unit button accepts the value entered in step 3, and returns to the main Output settings screen. The main screen shows the entered format, or if the setting is invalid, the entry is cleared.



When the frequency is set



When the period is set

■ Jog Dial Entry

The Jog dial can be used to set frequency or clock frequency. When an arbitrary waveform is selected, the clock frequency is displayed at the left side and the output frequency can be set within parentheses.

NOTE

- Setting is inhibited when sweep is active
- Setting is inhibited for noise or DC waveforms
- All settings are stored as frequencies within the 7075. Because rpm (r/min) and period (s) formats are converted to facilitate the internal analysis functions, entered values and actual setting values may differ slightly, in which case the actual setting is made as close as possible to the entered value.
- When changing a waveform, if the setting frequency exceeds the settable range of that waveform, the maximum allowable value is used.
- The Jog dial can be used to set frequency and clock frequency formats, but not the rpm (r/min) or period (s) formats.

3.4.2 Amplitude/Upper Limit Value Settings

Set the amplitude or upper limit value of the output waveform.

Setting range

Regardless of the output waveform, the settings can be made in the following range.

- When setting the amplitude

10V range	0 to 10 Vp (resolution 1 mVp)
-----------	-------------------------------

1V range	0 to 1 Vp (resolution 0.1 mVp)
----------	--------------------------------

0.1V range	0 to 0.1 Vp (resolution 0.01 mVp)
------------	-----------------------------------

- When setting the upper limit value

10V range	Lower limit value to 10 V (resolution 2 mV)
-----------	---

1V range	Lower limit value to 1 V (resolution 0.2 mV)
----------	--

0.1V range	Lower limit value to 0.1 V (resolution 0.02 mV)
------------	---

Setting units

Vp For amplitude setting, sets the amplitude of one polarity

Vpp For amplitude setting, sets peak-to-peak amplitude

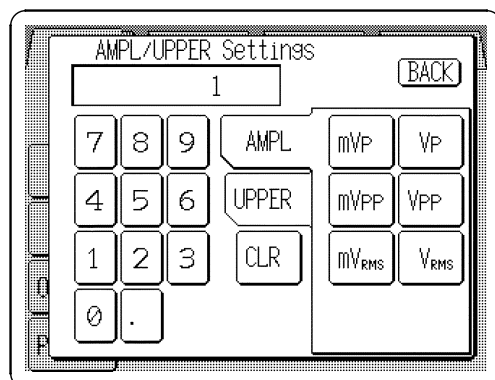
V_{RMS} For amplitude setting, sets the root-mean-square amplitude (only for sine waves)

V Sets the voltage when setting the upper limit

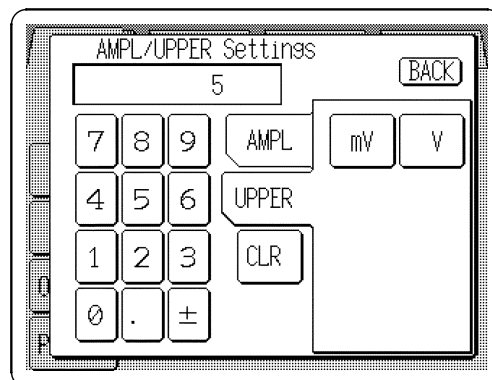
Method

■ Direct Entry

1. Press the Amplitude/Upper limit setting button (**AMPL/UPPER**) to open the AMPL/UPPER Settings window.
2. Select either amplitude or upper limit entry format.
3. Enter the numeric value by the tenkeys.
4. Select the units. Pressing the unit button accepts the value entered in step 3, and returns to the main Output settings screen. The main screen shows the entered format, or if the setting is invalid, the entry is cleared.



When the amplitude is set



When the upper limit is set

■ Jog Dial Entry

NOTE

The Jog dial can be used to set amplitude or upper limit value.

- Setting is inhibited for DC waveforms
- Amplitude/offset and upper/lower limit settings are interdependent: a change to the setting format of one item is automatically applied to the other.
Amplitude --- upper limit
Offset --- lower limit
- The output voltage range is the setting at high-impedance load.
- The sum of the peak amplitude and the absolute value of the offset is limited to the set range. Overrange setting is not possible.
- The RMS amplitude unit selection is automatically changed to Vp units if the waveform selection is changed.

3.4.3 Offset/Lower Limit Value Settings

Set the offset voltage or lower limit value of the output waveform.

Setting range

Offset

10 V range	-10 V to 10 V (resolution 1 mV)
1 V range	-1 V to 1 V (resolution 0.1 mV)
0.1 V range	-0.1 V to 0.1 V (resolution 0.01 mV)

Lower limit value

10 V range	-10 V to upper limit value (resolution 2 mV)
1 V range	-1 V to upper limit value (resolution 0.2 mV)
0.1 V range	-0.1 V to upper limit value (resolution 0.02 mV)

Setting unit

V: Set the voltage value

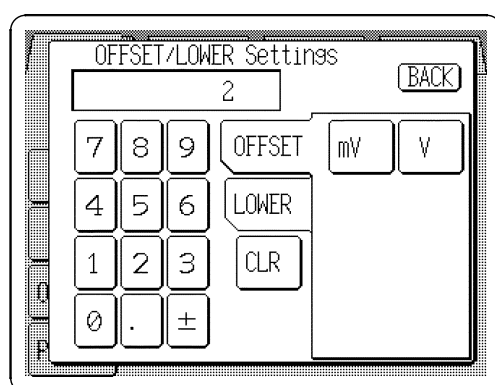


When the Channel ON/OFF key is ON, the preset offset value is output regardless of whether the RUN/STOP key is on or off. (When the channel is on, the key lights in red.)

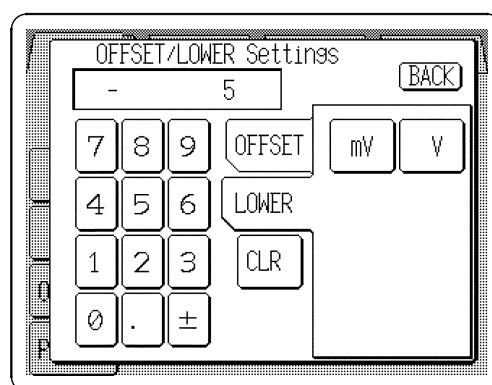
Method

■ Direct Entry

1. Press the Offset/Lower limit setting button (**OFFSET/LOWER**) to open the OFFSET/LOWER Setting window.
2. Select either offset voltage or lower limit value entry format.
3. Enter the numeric value by the tenkeys.
4. Select the units. Pressing the unit button accepts the value entered in step 3, and returns to the main Output settings screen. The main screen shows the entered format, or if the setting is invalid, the entry is cleared.



When the offset is set



When the lower limit is set

■ Jog Dial Entry

The Jog dial can be used to set offset voltage or lower limit value.

NOTE

- Setting is inhibited when sweep is active
- Setting is inhibited for DC waveforms
- Amplitude/offset and upper/lower limit settings are interdependent: a change to the setting format of one item is automatically applied to the other.
Amplitude --- upper limit
Offset --- lower limit
- The output voltage range is the setting at high-impedance load.
- Settings exceeding the range are not possible. The voltage to which the absolute amplitude and offset voltage values has been added must be within the range set.

3.4.4 Phase/Delay Settings

For the function generator (Sine, square, pulse, triangle, ramp-up, and ramp-down waveforms), set the phase. For the arbitrary waveforms, set the delay.

Setting range The setting range and resolution

- Function generator

Sine, square, pulse, triangle, ramp-up, ramp-down waveforms	-360.00 to 360.00 deg (0.01 deg)
Noise, DC	_____

- Arbitrary waveforms
-128000 to 128000

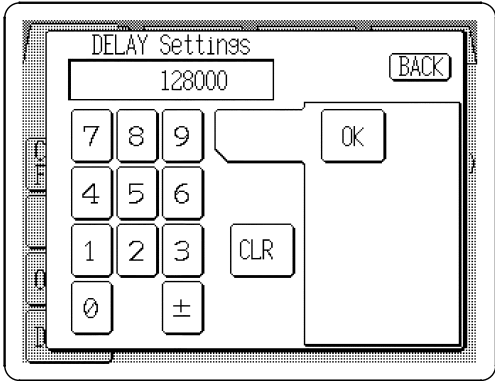
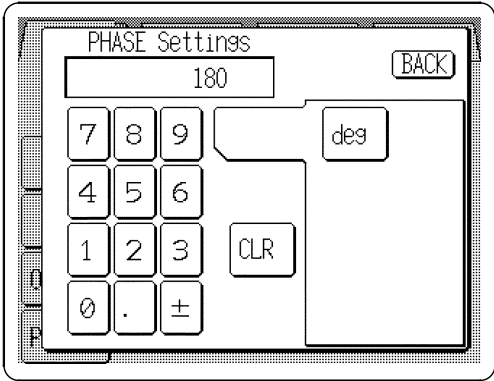
Setting unit

deg A phase angle can be set for the function generator. There are no units for the delay setting.

Method

■ **Direct Entry**

1. Press the Phase/Delay setting button (**PHASE/DELAY**) to open the PHASE/DELAY Setting window.
2. Enter the numeric value by the tenkeys.
3. Pressing the **deg** or **OK** button returns to the main Output Settings screen. If the setting is invalid, the entry is cleared.



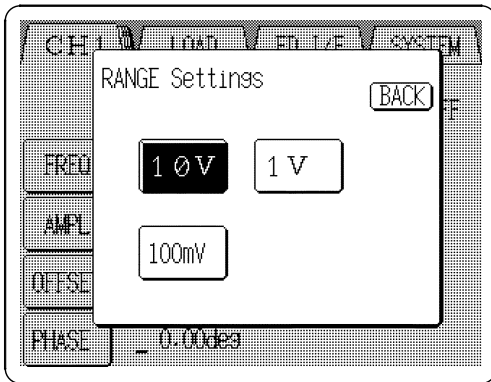
■ **Jog Dial Entry**

The Jog dial can be used to set phase or delay.

NOTE

- Phase and delay values are positive, indicating leading phase.
- The delay is set to 0 when changing the waveform type from function generator to arbitrary waveform.

3.4.5 Range Settings



Select the output range.

10 V: output range upto $\pm 10\text{V}$

1 V: output range upto $\pm 1\text{V}$

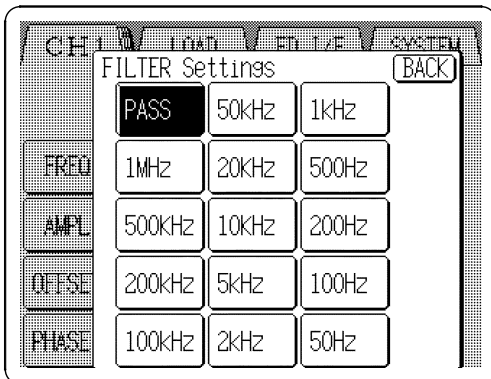
100 mV: output range upto $\pm 100\text{ mV}$

1. Press the Range setting button (**RANGE**) to open the RANGE Settings window.
2. Press the button for the desired range to select that range and return to the main Output settings screen.

NOTE

When changing ranges, the amplitude/upper limit and offset/lower limit values are automatically changed to correspond with the new range selection.

3.4.6 Filter Settings



Select the cut-off frequency of the low pass filter.

1. Press the Filter setting button (**FILT**) to open the FILTER Settings window.
2. Press the button for the desired cut-off frequency to select that range and return to the main Output Settings screen.

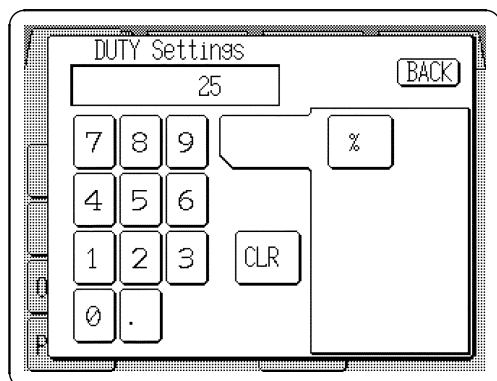
NOTE

Filter selection is not available for sine wave, square wave and DC waveforms.

3.4.7 Duty Settings

The duty cycle of pulse waveforms can be set.

Setting range	1 to 99% (resolution 0.1%)
Setting unit	%: the percentage of high level in each cycle
Method	■ Direct Entry



1. Press the Duty setting button (**DUTY**) to open the DUTY Settings window.
2. Enter the numeric value by the tenkeys.
3. Select the units. Pressing the % button accepts the value entered, and returns to the main Output Settings screen. If the setting is invalid, the entry is cleared.

■ Jog Dial Entry

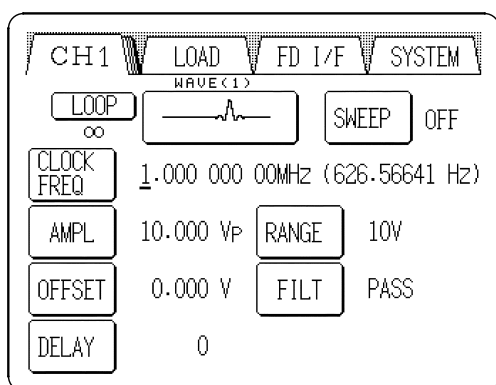
The Jog dial can be used to set duty.

NOTE

- Setting is inhibited when sweep is active
- Setting is inhibited for waveforms excluding pulse.
- Waveforms with less than 100 ns pulse width may not be output correctly.
- Pulse width generates 100 ns jitter.

3.4.8 Setting the Number of Loops

Set the number of loops for arbitrary waveforms.



Setting range: 1 to 65535 or ∞

1. Select the arbitrary waveform on the output setting screen, the **LOOP** button is displayed.
2. Press the **LOOP** button and the Arbitrary waveform setting window opens.
3. Enter the number of loops by the tenkeys.

NOTE

- Can be set individually for each channel.
- The number of loops of sweep data is set to ∞ when shipped from the factory, and when the device is reset.
- This setting is not effect on sweep data of the arbitrary waveforms.
- Even when one channel is inactive because of a setting for the number of loops of sweep data (total number of loops), the LED on the **RUN/STOP** key remains lit if outputs are being made on other channels.

3.5 Displaying the States of All Channels List

CHANGE	BACK			
	CH1	CH2	CH3	CH4
WAVE	SINE	SQUARE	PULSE	SINDIVX
RANGE	10V	←	10V	10V
FREQ (Hz/r/min) PERI (s)	F 1.0000k	F 100.00	F 200.00k	F 100.00
AMPL (V) UPPER (U)	P 10.000	P 10.000	P 10.000	P 10.000
OFFS (V) LOWER (L)	O 0.000	O 0.000	O 0.000	O 0.000
PHASE (deg) DELAY	P 0.00	P 0.00	P 0.00	P 0.00
DUTY	-----	-----	50.0	-----
FILTER	-----	-----	PASS	PASS
SWEEP	OFF	OFF	OFF	OFF

1. Press the channel number tab to open the CH Selection window.
2. Press the **LIST** button to display a list of the states of all channels.
3. Turn the Jog dial to change the selected (reverse display) setting item.
Press the **CHANGE** button to modify the selected item.
Other setting items can also be selected by pressing the desired item itself. Pressing a selected (reverse display) item allows editing its contents.

The meanings of the symbols in the table are as follows:

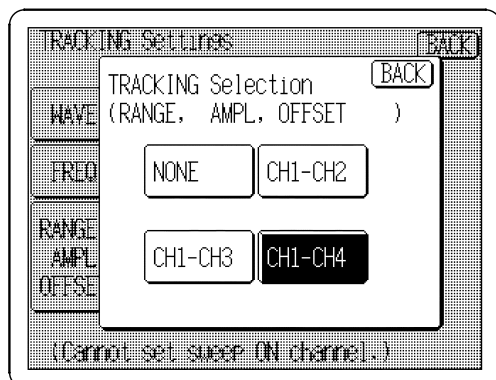
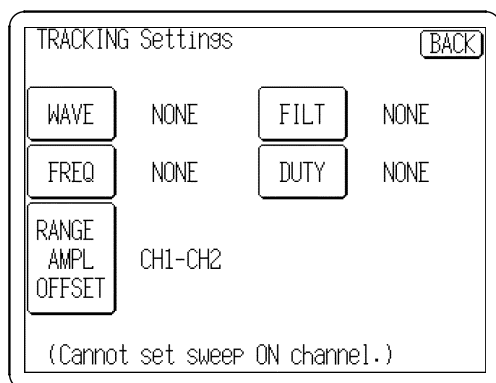
Item	Meanings of the symbols
Frequency/period display column [FREQ/ PERI]	F frequency (Hz) r frequency (r/min) P period (s)
Amplitude/upper limit value display column [AMP/ UPPER]	P amplitude (V _{peak}) PP amplitude (V _{pp}) R amplitude (V _{RMS}) U upper limit (V)
Offset/lower limit displays value [OFFS/LOWER]	O offset (V) L low limit value(V)
Phase/delay display column [PHASE/DELAY]	P phase (deg) D delay

3.6 Setting Multiple Channels at the Same Time

Setting items Waveform, frequency (period), amplitude, offset, filter, duty

Selections

None	All channels are set independently
CH1-CH2	Channels 1 and 2 are set simultaneously
CH1-CH3	Channels 1 and 3 are set simultaneously (7075-01 is not possible)
CH1-CH4	All channels are set simultaneously (7075-01 is not possible)



1. Press the channel number tab to open the CH Selection window.
2. Press the **TRACKING** button to display a list of the states of all channels.
3. Press the button for the channels to be set simultaneously. The selection window for simultaneous settings opens. Select the channels to be set simultaneously and the Channel 1 settings to be copied to the other channels.
4. For other settings, select the channels to be set simultaneously in the same way.
5. When an item is set on a channel to be set simultaneously with another, the setting for the other channel is also set in the same way.

NOTE

- Setting is inhibited when sweep is active
- Some settings cannot be set for multiple channels simultaneously.

3.7 Waveform Sweep Settings

(1) Overview

The frequency, amplitude, offset and duty cycle of waveforms can be swept. A table display allows easy entry of sweep time, sweep start value, end value and number of loops. Frequency or duty cycle, amplitude and offset can be swept simultaneously.

(2) Sweep waveforms

All waveforms selectable in "3.3 Selecting the Waveforms" can be swept.

(3) Sweep items

Frequency (DC waveform, waveforms excluding noise)

Amplitude (Waveforms excluding DC)

Offset (All waveform)

Duty (Pulse waveform)

(4) Sweep settings (lines)

The sweep time, sweep start value, end value and number of loops are set at one time (in the same row of the table). Up to 128 lines can be created.

(5) Number of loops of sweep data

The number of loops of sweep data (up to 128 lines) can be set. (1 to 65535, or ∞ see Section 3.7.17)

(6) Marker Output Function

When the sweep data takes a value within the specified range, or when the data is at a specified line, signals can be output externally from the marker output terminal on the rear panel.

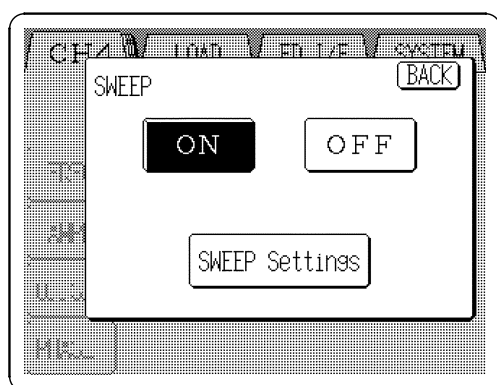
(7) Monitor function

Approximate instantaneous values output during RUN on the Output Setting screen can be monitored.

NOTE

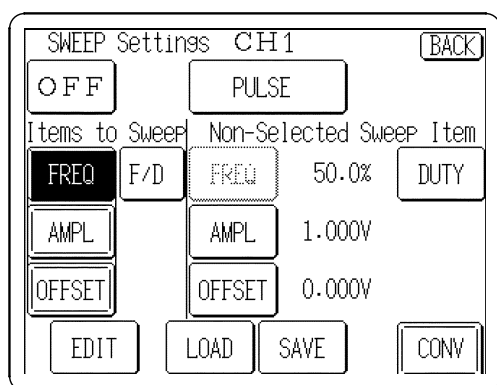
- The monitor values are updated approximately every 200 ms.
- Switching the display channel allows the specified channel values to be monitored.
- The element number of loops monitor can display up to 1024 cycles. When the number of cycles exceeds 1024, the count is reset to zero and counting continues.
- The total number of loops monitor displays up to 65535 cycles. If the number of cycles exceeds 65535, the display shows "----".

3.7.1 Selecting the Sweep Settings Screen



Select the Sweep Settings screen

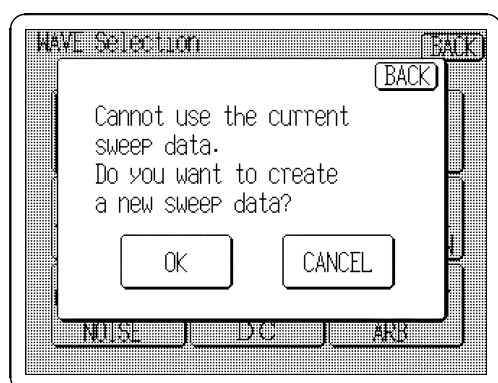
1. Press the **SWEEP** button on the Output Settings screen, and the Sweep selection window opens.
2. Press the **SWEEP Settings** button, and the SWEEP Settings screen opens.



3.7.2 Selecting the Sweep Waveform

Press the Waveform display button to select the waveform.

The method of settings is same as the procedure in Section 3.3.



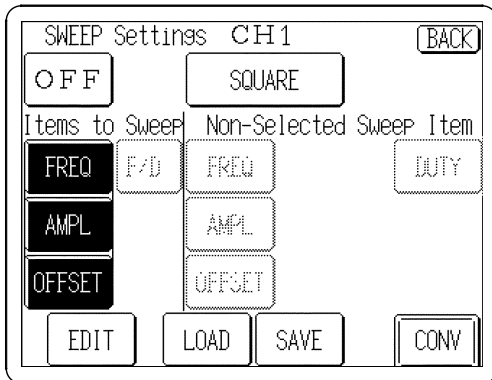
When selecting a waveform, the display shown at the left may appear.

Press the **OK** button to delete all sweep data, or press **CANCEL** to leave the waveform unchanged.

This display can appear for the following reasons:

- The frequency setting cannot be changed after changing the waveform (when changing from a sine or square wave to another waveform).
- The offset setting cannot be changed after changing the waveform (when changing from DC to another waveform).

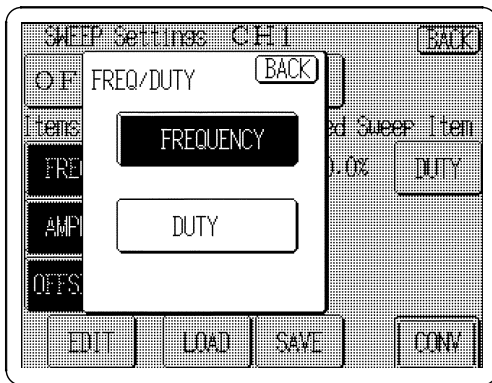
3.7.3 Selecting Items to Sweep



Press the **FREQ**, **AMPL** or **OFFSET** buttons so that the items to be swept are displayed in reverse.

Buttons displayed in reverse (white on black) indicate the items that are settable on the SWEEP Editor screen, described later.

3.7.4 Sweep Settings (Pulse Waveforms)



The frequency or duty cycle of pulse waveforms can be swept.

Simultaneous sweeping is not possible.

Press the **F/D** button to open the FREQ/DUTY window.

Press the **FREQUENCY** or **DUTY** button to sweep that item.

3.7.5 Non-Selected Sweep Item Settings



When the Channel ON/OFF key is ON, the preset offset value is output regardless of whether the RUN/STOP key is on or off. (When the channel is on, the key lights in red.)

Non-selected items (non-reversed buttons) can be selected for setting according to "3.7.3 Selecting Items to Sweep." Grayed-out items are not settable.

Frequency

Press the **FREQ** button to set the frequency.

The setting method is the same as direct entry in "3.4.1 Frequency/Period Settings." However, note that even when the period or r/min units have been used for setting, the display shows equivalent frequency units.

Amplitude

Press the **AMPL** button to set the amplitude.

The setting method is the same as direct entry in "3.4.2 Amplitude/Upper Limit Settings." However, note that the upper limit value cannot be set and even when the pp or RMS units have been used for setting, the display shows equivalent peak units.

Offset

Press the **OFFSET** button to set the offset.

The setting method is the same as direct entry in "3.4.3 Offset/Lower Limit Settings." However, note that the lower limit value cannot be set.

Duty

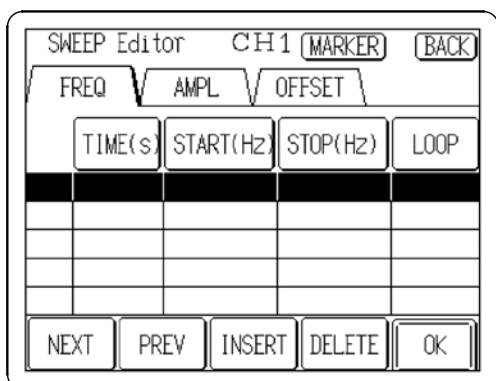
Press the **DUTY** button to set the duty.

The setting method is the same as direct entry in "3.4.7 Duty Settings."

NOTE

Phase (delay) and range setting values are valid when the sweep is off. Use the Output setting screen to set.

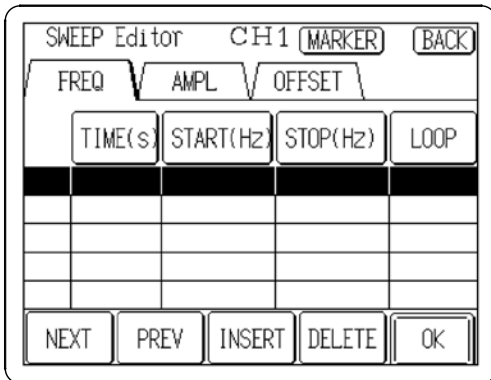
3.7.6 Selecting the Sweep Editor Screen



To select the screen for setting the sweep selection items:

Press the **EDIT** button on the SWEEP Settings screen, and the SWEEP Editor screen appears.

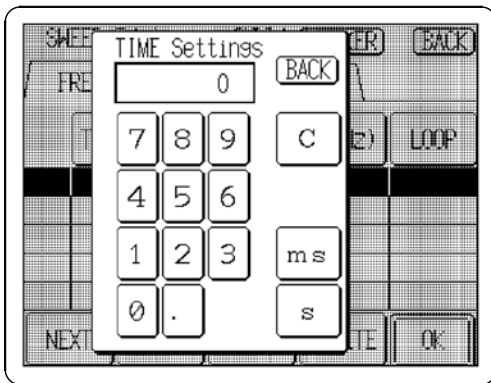
3.7.7 Selecting the Sweep Items to Edit



Select the item to edit among those that were selected in "3.7.3 Selecting the Items to Sweep."

Select the item to sweep.

3.7.8 Setting the Sweep Time



Set the time from start to finish of the sweep item.

Setting the value: 0.01 ms to 1000 s (resolution 10 μ s or 5 digits)

1. Click the **TIME(s)** button or the reversed row in the time entry area to open the Sweep Time Settings window.
2. Enter the numeric value by the tenkeys.
3. Select the units. Pressing the unit button accepts the value entered in step 2, and returns to the Sweep table edit screen. If the setting is invalid, the entry is cleared.

3.7.9 Setting the Start Value

Set the starting value of the item selected in "3.7.7 Selecting the Sweep Items to Edit." Pressing the **START** (unit) button or the Start Value entry area on the reversed row enables entry of the starting sweep value.

Frequency

Press the **START(Hz)** button to set the frequency.

The setting method is the same as direct entry in "3.4.1 Frequency/Period Settings." However, note that even when the period or r/min units have been used for setting, the display shows equivalent frequency units.

Amplitude

Press the **START(V)** button to set the amplitude.

The setting method is the same as direct entry in "3.4.2 Amplitude/Upper Limit Settings." However, note that the upper limit value cannot be set and even when the pp or RMS units have been used for setting, the display shows equivalent peak units.

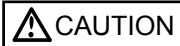
Offset

Press the **START(V)** button to set the offset. The setting method is the same as direct entry in "3.4.3 Offset/Lower Limit Settings." However, note that the lower limit value cannot be set.

Duty

Press the **START(%)** button to set the duty. The setting method is the same as direct entry in "3.4.7 Duty Settings."

3.7.10 Setting the End Value

**CAUTION**

When the Channel ON/OFF key is ON, the preset offset value is output regardless of whether the RUN/STOP key is on or off. (When the channel is on, the key lights in red.)

Set the ending value of the item selected in "3.7.7 Selecting the Sweep Items to Edit." Pressing the **END(Unit)** button or the End Value entry area on the reversed row enables entry of the ending sweep value.

Frequency

Press the **END(Hz)** button to set the frequency.

The setting method is the same as direct entry in "3.4.1 Frequency/Period Settings." However, note that even when the period or r/min units have been used for setting, the display shows equivalent frequency units.

Amplitude

Press the **END(V)** button to set the amplitude.

The setting method is the same as direct entry in "3.4.2 Amplitude/Upper Limit Settings." However, note that the upper limit value cannot be set and even when the pp or RMS units have been used for setting, the display shows equivalent peak units.

Offset

Press the **END(V)** button to set the offset. The setting method is the same as direct entry in "3.4.3 Offset/Lower Limit Settings." However, note that the lower limit value cannot be set.

Duty

Press the **END(%)** button to set the duty. The setting method is the same as direct entry in "3.4.7 Duty Settings."

3.7.11 Setting the Number of Loops

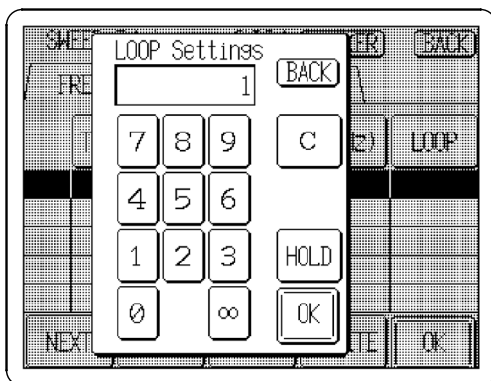
Set the number of loops of item set in sections 3.7.8 to 3.7.10.

1 to 1024 Loop for the specified time

∞ Sweeping repeats from the starting value to the ending value until the front panel TRIG key is pressed, or until a signal is input at one of the four TRIGGER IN external trigger input terminals.

HOLD This function can be used with specific number of loops, but not with infinite looping. The last data value is saved until the front panel TRIG key is pressed, or until an external trigger signal is received. This action is repeated for the specified number of number of loops.

After the specified number of loops is completed, or after canceling infinite looping or HOLD, the sweep action specified in the subsequent line is performed. When the last sweep line has completed, the first line is repeated.



1. Press the **LOOP** button to open the LOOP Settings window.
2. Press the **∞** button on the tenkeys to select infinite looping, or press the **HOLD** button so that it displays in reverse. Specify the number of loops using the tenkeys.
3. Press the **OK** button to accept the settings and return to the SWEEP Editor Screen. If a setting is invalid, its entry is cleared.

3.7.12 Entering Multiple Lines

Repeat the procedures in Sections 3.7.8 to 3.7.11 to enter multiple lines.

1. Turn the Jog dial to the right or press the **NEXT** button so that the next row is displayed in reverse.
2. Follow the procedures in Sections 3.7.8 to 3.7.11.
3. Repeat preceding steps 1 and 2.

3.7.13 Inserting a Line

1. Turn the Jog dial or press the **NEXT** or **PREV** buttons so that the line following the one to be inserted is displayed in reverse.
2. Press the **INSERT** button to insert the new line above the selected line.

NOTE

Line cannot be inserted after 128 lines have been set.

3.7.14 Deleting a Line

1. Turn the Jog dial or press the **NEXT** or **PREV** buttons so that the line following the one to be deleted is displayed in reverse.
2. Press the **DELETE** button to insert the new line above the selected line.

3.7.15 Creating Sweep Data

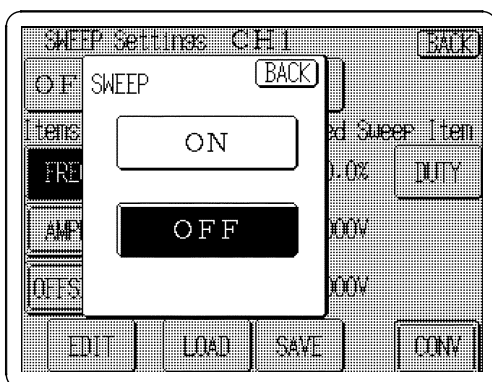
Sweep data can be created from the parameters entered for each item. When a sweep parameter is changed, the waveform data is automatically recalculated and the sweep progresses linearly from the original value to the new value.

1. Pressing the **OK** button displays the "Converting..." message while the sweep data is created, and then the Sweep Settings screen reappears.
2. Pressing the **BACK** button on the Sweep Table Edit screen returns to the Sweep Settings screen without creating the waveform data. Pressing the **CONV** button on this screen does create the sweep data.

NOTE

- If a selection does not have sweep settings, when changing items, be sure to press the **CONV** button to create the sweep data.
- Waveforms are not created when RUN is active.

3.7.16 Sweep Data Output



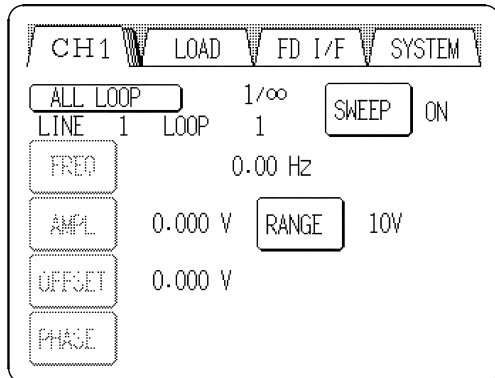
1. Press the Sweep setting button on the Sweep Settings screen to open the **Sweep ON/OFF** switching window.
2. Press the **ON** button to enable sweep output.
3. Press the **Channel ON/OFF** keys of the channels to be output to activate the output relays (awaiting output). The keys of the channels to be output light red.
4. Press the **RUN/STOP** key to output the waveform. This key lights red during output.
5. When the sweep output setting is on, you can monitor approximate instantaneous values output during RUN on the Output Setting screen.

NOTE

- With sweep enabled on CH1 and CH2
Simultaneous setting on all channels is disabled. (For details, see Section 3.6)
- With sweep enabled on CH3
Simultaneous setting on channels CH3 and CH4 is disabled. (For details, see Section 3.6)
- With sweep enabled on CH4
Simultaneous setting on channel CH4 is disabled. (For details, see Section 3.6)

3.7.17 Setting the Total Number of Loops

Set the output time of sweep data created in Sections 3.7.8 to 3.7.14.



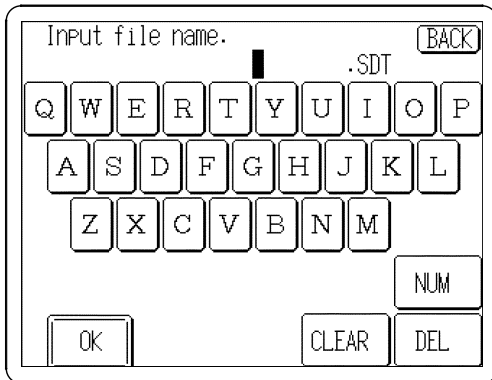
1. Press the **BACK** button with sweep ON in Section 3.7.16 to return to the Output setting screen (see Section 2.5). The **ALL LOOP** button appears on the upper left of the Output setting screen.
2. Press the **ALL LOOP** button to open the All loop setting window. Specify the number of loops to repeat sweep using the tenkeys. The setting range is 1 to 65535 or ∞ (infinite).

- 1 to 65535** Outputs are repeated as many times as specified. When the last data is output, operations stop. (The last offset value is output.) If the last line is set to HOLD or ∞ (see 3.7.11), operations stop after the last trigger is input.
- ∞ Outputting repeats until it is stopped by the **RUN/STOP** key or the external RUN/STOP signal input. (The offset value when operations stop is output.)

NOTE

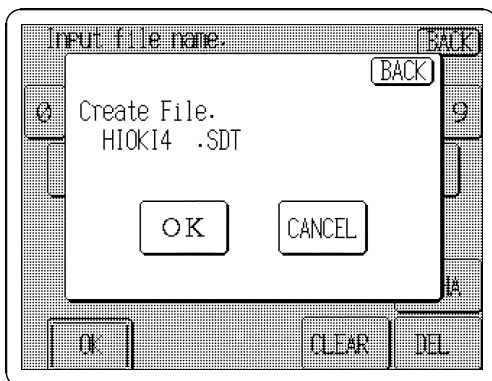
- The number of loops of sweep data is set to ∞ when shipped from the factory, and when the device is reset.
- Even when one channel is inactive because of a setting for the number of loops of sweep data (total number of loops), the LED on the **RUN/STOP** key remains lit if outputs are being made on other channels. When all channels stop because of a setting for the number of loops of sweep data (total number of loops), the LED on the **RUN/STOP** key goes off.
- When the synchronized operation, see Section 7.3.

3.7.18 Saving Sweep Settings

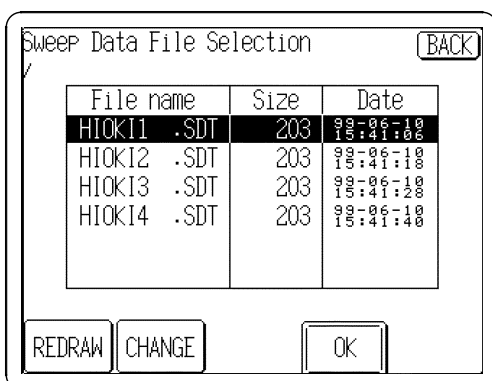


To save the sweep settings (output waveform, sweep items and item settings) to floppy disk:

1. Press the **SAVE** button to display the Sweep Filename entry screen.
2. Enter a file name (up to 8 characters).
3. Press the **OK** button. A confirmation window appears. If no file name is entered, the data will be stored in the file named TEMPDATA.SDT.
4. Click the **OK** button to save the sweep settings file to the floppy and return to the Sweep Settings screen, or click the **CANCEL** button to return to the Sweep Settings screen without saving the data.



3.7.19 Loading Sweep Settings



Sweep settings that have been saved to floppy disk can be loaded back into the unit:

1. Press the **LOAD** button to display the Sweep Data File Selection screen.
2. Turn the Jog dial to select (or just press on) the file name of the file to be loaded.
3. Press the **OK** button to load the sweep settings file to the unit. The sweep data is automatically regenerated.

NOTE

Sweep setting files cannot be loaded while RUN is active.

3.8 Marker Output Function

When the sweep data takes a value within the specified range, or when the data is at a specified line, signals can be output externally from the marker output terminal on the rear panel.

(1) Output value marker

You can set an output range for the preset line of the sweep data. (Only one line can be selected.)

(2) Line number marker

A line can be selected for the sweep data you wish to output. (More than one line can be set.)

NOTE

- The output value marker and the line number are output from the same output terminal.
- The type of marker (output value marker or the line number) can be selected for each channels.
- The output value marker and the line number marker cannot be set simultaneously for a channel.

3.8.1 Selecting the Marker Screen

Shift to the screen for marker output settings.

The screenshot shows the 'SWEEP Editor' screen for 'CH 1'. At the top, there are tabs for 'FREQ', 'AMPL', and 'OFFSET', with 'MARKER' being the active tab. Below these tabs is a table with columns: 'L-M', 'TIME(s)', 'START(V)', 'STOP(V)', and 'LOOP'. The table contains five rows of data. At the bottom of the screen are buttons for 'NEXT', 'PREV', 'INSERT', 'DELETE', and 'OK'.

L-M	TIME(s)	START(V)	STOP(V)	LOOP
001	1.0000	1.000	2.000	5
002	1.0000	2.000	3.000	4
003	1.0000	3.000	4.000	3
004	1.0000	4.000	5.000	2
005	1.0000	5.000	6.000	1

Press the **MARKER** button on the SWEEP Editor screen (see Section 3.7.6, "Selecting the Sweep Editor Screen") to display the Marker Settings screen.

The screenshot shows the 'Marker Settings' screen. At the top, there is a 'BACK' button. Below it are three buttons: 'VALUE', 'LINE No.', and 'OFF'. The 'VALUE' button is currently selected and highlighted.

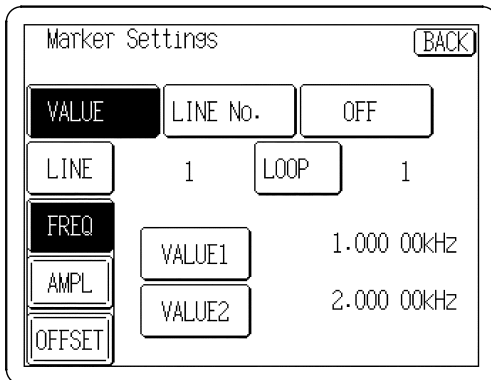
Select the **VALUE** or **LINE No.** button on the Marker Settings screen.

If there is no sweep data, the marker cannot be selected.

NOTE

The maker selection is set to OFF when shipped from the factory, and when the device is reset.

3.8.2 Setting the Output Value Marker



Press the **VALUE** button on the Marker Settings screen so that it displays in reverse. The screen shown on the left is displayed.

Specify the following output items.

Example

When the second item (second line) on the SWEEP Editor screen in Section 3.8.1 is output by the following marker settings

Output line: 002

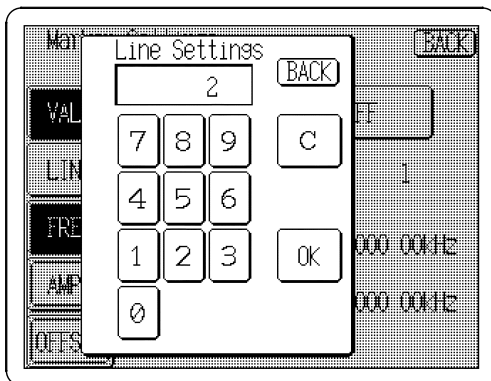
Number of loops before outputting: third loop

Amplitude: 2.4 V to 2.8V

(1) Setting the output line

Specify the line number to be output.

1. Press the **LINE** button to open the Line Setting window.
2. Specify the output number "2" (second line in this example) using the tenkeys.(up to 128) You cannot specify numbers you are not using.
3. Press the **OK** button to return to the Marker Settings screen. The specified number is displayed.
(The default setting is 1.)

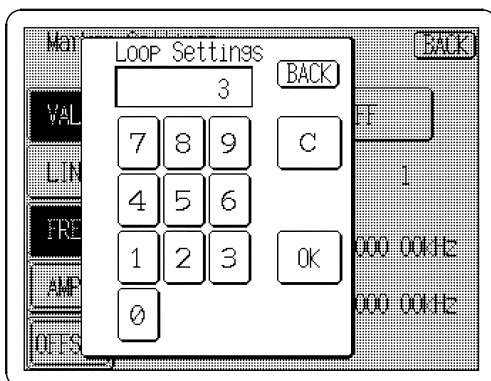


(2) Setting the output loop.

Specify the number of loops required before outputting the line.

1. Press the **LOOP** button to open the Loop setting window.
2. Specify the number of number of loops before output "3" using the tenkeys.
3. Press the **OK** button to return to the Marker Settings screen. The specified number of loops until output is displayed.

This setting is disable when the setting value exceeds the number of loops set in "3.7.11 Setting the number of loops." (The default setting is 1.)

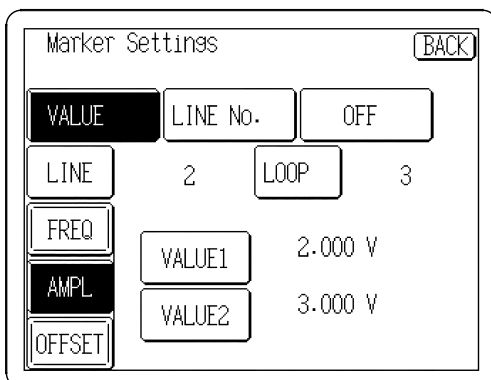


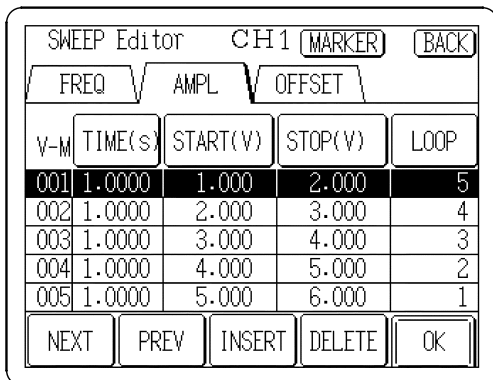
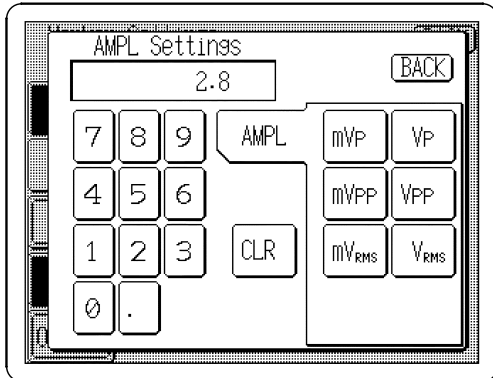
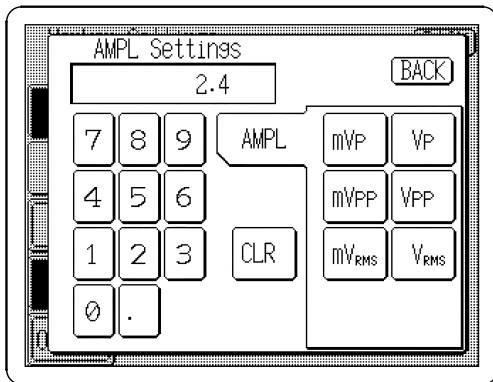
(3) Selecting a marker output item

Select the item you wish to output [frequency, amplitude, offset, or duty(pulse waveform only)]. Only one item can be selected for the output marker on the screen and it is highlighted.

Press the **AMPL** button.

Only the items set in "3.7.3 Selecting Items to Sweep" and "3.7.4 Sweep Settings (Pulse Waveforms)" are effective.





(4) Setting the output range

Specify the output range (VALUE1/VALUE2) of the item selected for the output marking.

When the output value is in the setting range (VALUE1 to VALUE2), the output marker is active.

1. Press the **VALUE1** button to open the marker output range setting window (in this example, AMPL Settings window).
2. Enter a setting value "2.4 Vp" using the tenkeys.
3. Press the **VALUE2** button and enter an another value "2.8Vp".
The settable range is within start and stop values (START/STOP) set in step (1).

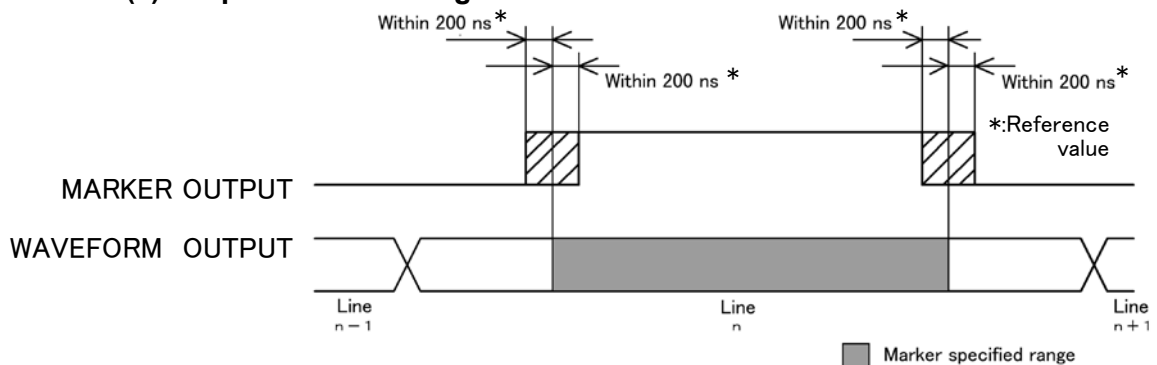
4. Press the **BACK** button to return to the SWEEP Editor screen.

5. Press the **OK** button to update.

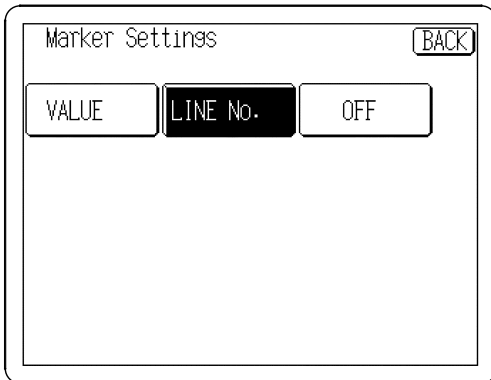
NOTE

- The output marker is effective after the sweep data is updated.
- Only one line can be selected for output marking.
- It does not matter which of Setting 1 or Setting 2 is higher.
- When the item for output marking is frequency and if the setting value is entered in period format, the value is converted to the frequency which is made as close as possible to the entered value.
- When the item for output marking is amplitude and if the setting value is entered in units, the value is converted to the amplitude value (Vp) which is made as close as possible to the entered value.

(5) Output marker timing

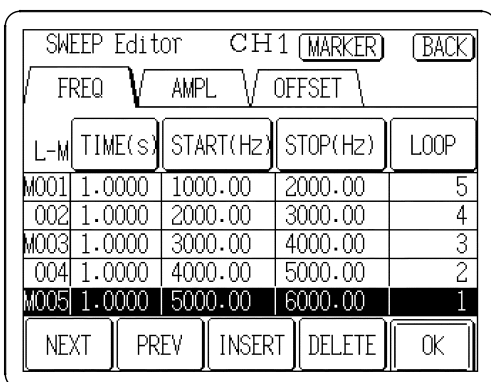


3.8.3 Setting the Line Marker



Press the **LINE No.** button on the Marker Settings screen so that it displays in reverse.

The line number marker can be set for all lines simultaneously.



(1) Setting the output line (output line)

Select the line to be output.

1. Press the **LINE No.** button on the Marker Settings screen so that it in reverse.
2. Press the **BACK** button to return to the SWEEP Editor screen.
3. Selecting from the lines in Sections 3.7.8 through 3.7.14, move the cursor to the number of the line you wish to output.
4. Press the number of line, an "M" mark will appear to the left of the number to indicate that the marker applies to this line number. (To erase the mark, press the line number again.)
5. Make sure that all lines you wish to output are marked with "M." Then press the **OK** button. The 7075 creates sweep data including information on the marked lines.

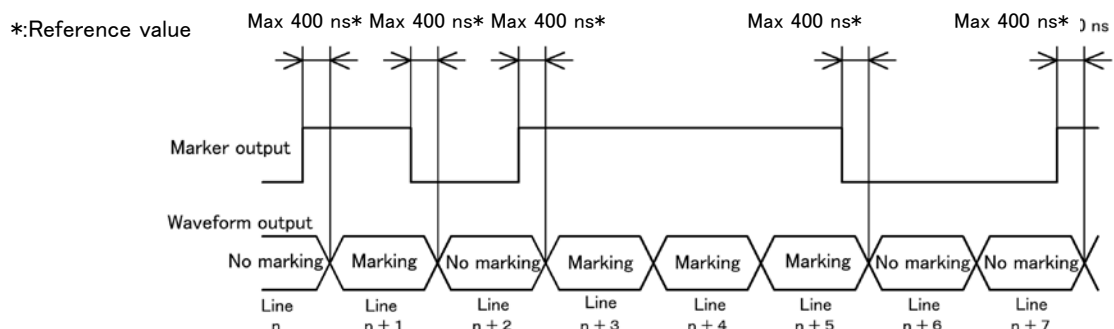
NOTE

The line number marker becomes effective only when sweep data is created. See Section 3.7.15, "Creating Sweep Data."

The line number marker is output during sweeping of the line, regardless of whether the loop is effective or not.

(2) Output timing

Indicates the output timing for line numbers.

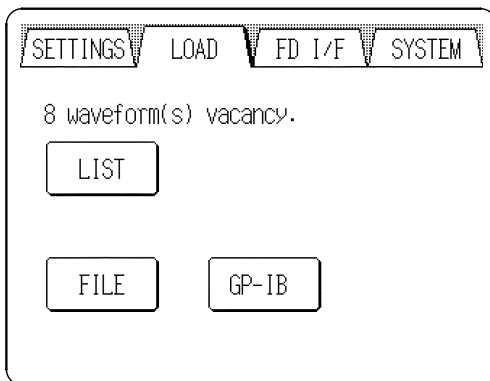


Chapter 4

Waveform Input Screen

Arbitrary waveform settings are entered on this screen.

4.1 Selecting the Waveform Input Screen



Pressing the "**LOAD**" tab at the upper left of the screen causes the Waveform Input screen to appear.

If the tabs are not visible at the top of the screen, a lower level screen is currently displayed. Press the **BACK** button to return to a higher level, and then perform the above step.

4.2 Waveform Input

4.2.1 Using the Floppy Disk

Input the waveform data saved on a floppy disk to the unit.

WAVE File Selection [BACK]

File name	Size	Date
NOISE .WFG	4848	98:11:14
CHOP_SIN.WFG	2512	98:11:25
DIP .WFG	2788	98:11:25
HARM .WFG	2512	98:11:25
AMPSWP .WFG	4848	98:11:25
OVERSHT .WFG	2100	98:11:25

[REDRAW] [CHANGE] [OK]

WAVE FILE: HARM .WFG [BACK]

MODEL 7075

CH NUM 1

LENGTH All(1000)

ATT 1/1 [LOAD]

1. Press the **FILE** button to display the file list of the floppy disk.
2. Rotate the Jog dial, or press the file name to select the file. To change the current directory, press the **CHANGE** button.
3. Press the **OK** button to display the screen on which to select the source device^{*1} and amount of data (number of words) to be loaded.
4. When finished making the settings, press the **LOAD** button.
5. If changing the waveform name, enter the new name and press the **OK** button. If not changing the waveform name, just press the **OK** button to load the waveform.

MODEL *1 Source Device Models

The device model is selected automatically, but can also be specified manually.

HIOKI WAVEFORM GENERATOR data	7070/7075/7075-01
Waveform Creation Software data	7990
Binary data of the HIOKI MEMORY HiCORDER	8806/8806-01/8807-01/8807-51 8808-01/8808-51/8825/8826/8835 8835-01/8840/8841/8842/8852 8853/8855
Text file in CSV format *2	TEXT1/TEXT2 (reserved)

*2 Text file: Files with the extensions .TXT, .CSV and .PRN are all recognized as text files. Non-numeric data at the head of a line causes that line to be treated as a header, and not processed.

Strings separated by a comma and a space are recognized as separate channels. Up to 32 data lines can be specified.

CH NUM

Channel Number

When binary data is loaded from the MEMORY HiCORDER, the channel number of the MEMORY HiCORDER is specified. The default channel to be loaded is the lowest-numbered channel. A line is specified for the text.

LENGTH

Words to be read

The number of words to load is specified.

ATT

Damping Ratio

The voltage damping ratio is specified. For example, if a 1/10 ratio is specified, 5 V data is read as 0.5 V.

4.2.2 Using the GP-IB Interface

Waveforms stored in the MEMORY HiCORDER's memory can be input directly through the GP-IB cable connector.

⚠ CAUTION

The GP-IB connection cable should be used only with this controller model.

NOTE

Set the MEMORY HiCORDER to send GP-IB data. This is normally when data has been stored with the MEMORY function, and it is in the STOP state.

1. Press the **GP-IB** button to display the screen on which to select the source device ^{*1} and amount of data (number of words) to be loaded.
2. Enter a waveform name and press the **OK** button. You can either specify a name for the waveform, or leave the entry blank, in which case a default name (WAVE_1 to WAVE_8) is assigned when you press the **OK** button.
3. Confirm your settings, and press the **LOAD** button.

MODEL *1 Compatible Models

Select the model to read from the following.

8845, 8846, 8841, 8842, 8835, 8826, 8840, 8852, 8853, 8825, 8830

ADDRESS Specify the GP-IB address.

CH NUM **Channel number**

Specify the channel number of the Memory HiCorder.

LENGTH **Words to be read**

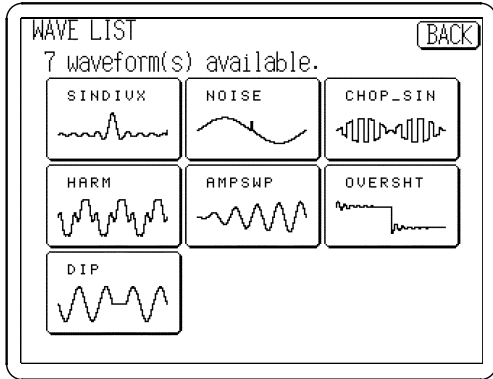
The number of words to load is specified.

ATT **Damping Ratio**

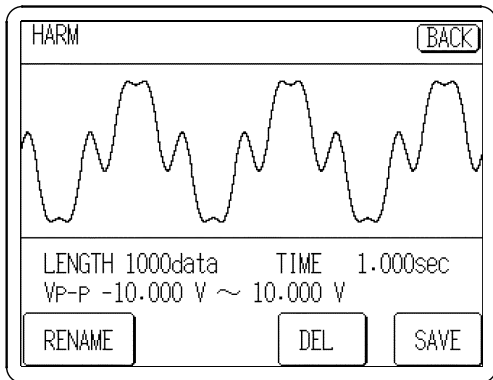
The voltage damping ratio is specified. For example, if a 1/10 ratio is specified, 5 V data is read as 0.5 V.

4.3 Input Waveform List Display

Waveforms read into the unit are displayed in a list, and can be saved to floppy disk. The waveforms can be renamed and deleted from the list.



1. Press the **LIST** button, and the input waveform list is displayed.
2. To display the detailed waveform information, press the **Waveform** button.



The selected waveform is displayed.

(1) Saving

Waveforms read into the unit can be saved to floppy disk.

1. Confirm that the floppy disk is inserted. Move the current directory to the directory to be saved. For details see Section 5.2.3 (1) "Moving the current directory."
2. Press the button of the waveform to be saved on the Waveform list screen.
3. Press the **SAVE** button.
4. Enter a file name (the extension is fixed as '.WFG'). If the file name is cleared, the file is automatically named TEMPDATA.WFG. Press the **OK** button to save the waveform in the specified file.

(2) Deleting

The specified input waveform can be deleted.

1. Press the button of the waveform to be deleted.
2. Press the **DEL** button.

(3) Renaming

The name of specified input waveform can be changed.

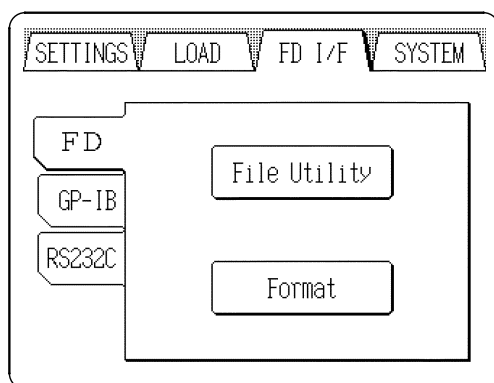
1. Press the button of the waveform name to be changed.
2. Press the **RENAME** button.
3. Input the waveform name to rename. Pressing the **OK** button renames.

Chapter 5

FD I/F Screen

From this screen you can load and save floppy disk data, and make settings for the GP-IB and RS-232C interfaces.

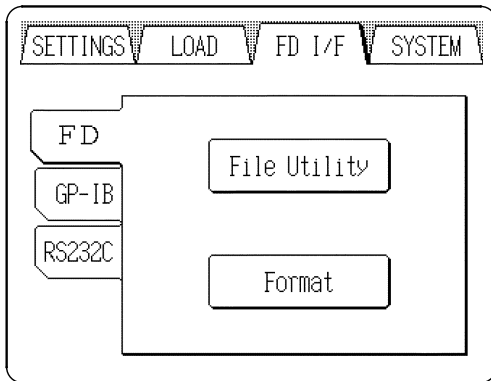
5.1 Selecting to the FD I/F Screen



Pressing the **FD I/F** tab at the upper right of the screen causes the FD I/F screen to appear.

If the tabs are not visible at the top of the screen, a lower level screen is currently displayed. Press the **BACK** button to return to a higher level, and then perform the above step.

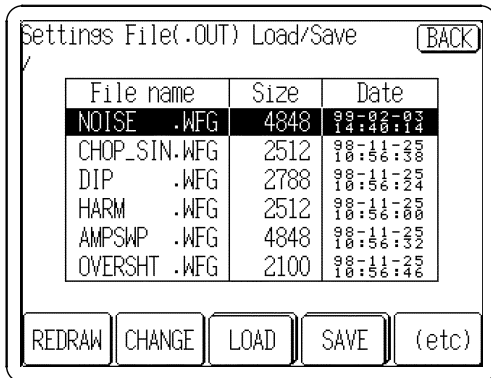
5.2 Floppy Disk



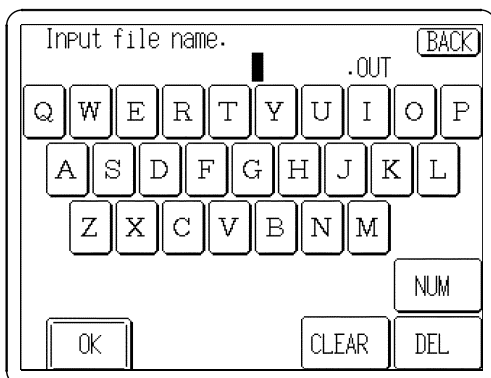
Settings can be saved to and later reloaded from a floppy disk. Files can also be deleted and directories created. The floppy drive uses MS-DOS* formatting.

*MS-DOS is a registered trademark of Microsoft Corporation.

5.2.1 Saving the Settings



1. Insert the floppy disk and press the **File Utility** button on the FD I/F screen.
2. Press the **SAVE** button. If the button is not displayed, press the **(etc)** button to display the **SAVE** button.



3. Enter a file name and after that press the **OK** button.

NOTE

- Before inserting the floppy disk, release the write-protect of the floppy to save the settings.
- When there is no entry or when the **OK** button is pressed after pressing **CLEAR**, the file is automatically named TEMPDATA.OUT.

Setting Contents

Setting contents are stored as follows.

(1) Waveform File

The data for an arbitrary waveform specified for output can be saved.

NOTE

- Sweep settings for the arbitrary waveform data are also saved.
- Waveforms not currently in use are not saved. They can be saved, however, from the Waveform Input screen.

(2) Tracking Settings

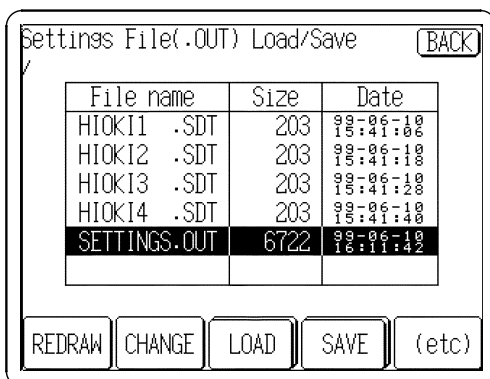
Tracking setting selections are saved, if enabled.

(3) Status Settings

The following settings affecting output status are saved for all channels:

Output waveform, arbitrary waveform, sweep on/off, sweep waveform, range, selecting frequency and period, frequency of arbitrary waveform, selecting clock, selecting Hz/r/min, frequency, selecting amplitude and offset, selecting upper limit and lower limit, phase, delay, duty, filter, custom sweep waveform name, selecting sweep frequency/period, sweep frequency, selecting frequency, sweep duty, sweep amplitude, sweep offset, sweep item, sweep data.

5.2.2 Reading the Settings



1. Insert the floppy disk and press "File Utility" on the FD I/F screen. If the **LOAD** button is not displayed, press (etc) to display the **LOAD** button.
2. Move the cursor to select a file by using the Jog control or touching directly the file name on the screen.
3. Press the **LOAD** button to read the settings of the specified file.

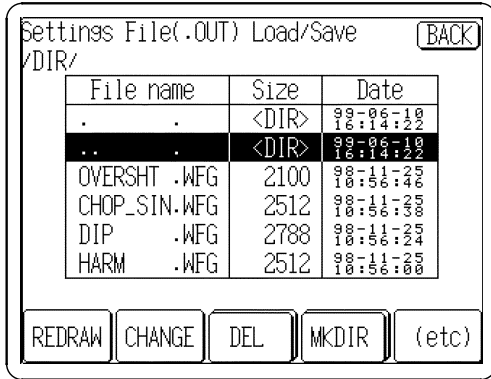
NOTE

If the file other than settings is specified, an error occurs.

5.2.3 Other Operations

On the FD I/F screen, it is also possible to move the current directory, delete files, create directories.

(1) Moving the current directory



1. Insert the floppy disk and press "File Utility" on the FD I/F screen.
2. Move the cursor to select the directory by using the Jog control or touching directly the file name on the screen.
3. Press the **CHANGE** button.

".." moves up one directory

(2) Deleting files

1. Insert the floppy disk and press "File Utility" on the FD I/F screen.
2. Move the cursor to select a file by using the Jog control or touching directly the file name on the screen.
3. Press the **DEL** button to delete the specified file. If the **DEL** button is not displayed, press **(etc)** to display the **DEL** button.
The directory can be deleted. First delete all of the contents of the directory, and then delete it.

NOTE

Before inserting a floppy disk, release a write-protect. To delete a file, write protection on the floppy disk must be disabled before inserting it.

(3) Creating directories

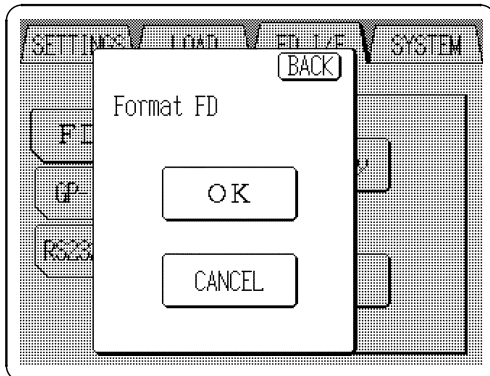
1. Insert the floppy disk and press **File Utility** on the FD I/F screen.
2. Press the **MKDIR** button. If the button is not displayed, press **(etc)** to display the **MKDIR** button.
3. Enter the directory name and after that press the **OK** button to create a directory.

NOTE

Before creating directories, release a write-protect. To delete a file, write protection on the floppy disk must be disabled before inserting it.

5.2.4 Formatting the Floppy Disk

The floppy disk is formatted in MS-DOS* format. A formatted 2HD disk has 1.44 MB of space, and a 2DD disk has 720 KB.



1. Insert the floppy disk and press **Format** on the FD I/F screen.
2. Press the **OK** button to format a disk.

NOTE

- When formatting, all contents on the floppy disk are erased.
- Wait for a few minutes for formatting to finish.
- Formatting cannot be interrupted in progress.

*MS-DOS is a registered trademark of Microsoft Corporation.

5.3 Interfaces

5.3.1 Setting the GP-IB Interface

The screenshot shows a menu-driven interface. At the top, there are four tabs: 'SETTINGS', 'LOAD', 'FD I/F', and 'SYSTEM'. The 'SETTINGS' tab is selected. On the left side of the 'SETTINGS' screen, there are three sub-menus: 'FD', 'GP-IB', and 'RS232C'. The 'GP-IB' sub-menu is selected. The main area displays two settings: 'ADDRESS' with a value of '1 5' and 'TERMINATOR' with a value of 'LF+EOI'.

The GP-IB setting is used when the 7075 is to be controlled remotely by GP-IB.

5.3.2 Setting the RS-232C Interface

The screenshot shows a menu-driven interface. At the top, there are four tabs: 'SETTINGS', 'LOAD', 'FD I/F', and 'SYSTEM'. The 'SETTINGS' tab is selected. On the left side of the 'SETTINGS' screen, there are three sub-menus: 'FD', 'GP-IB', and 'RS232C'. The 'RS232C' sub-menu is selected. The main area displays three settings: 'BAUD RATE' with a value of '9600bps', 'STOP BITS' with a value of '1 bit', and 'HARD FLOW' with a value of 'ON'.

The RS-232C setting is used to transfer waveform data from the 7990 WAVEFORM CREATION SOFTWARE via the RS-232C interface.

Connecting to the Personal Computer

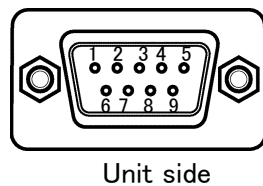
⚠ WARNING

To avoid electrocution, turn off the power to all devices before plugging or unplugging any of the interface connectors.

⚠ CAUTION

To avoid damage to the product, do not short-circuit the output terminal and do not input voltage to the output terminal.

Connect the RS-232C connector on the unit to the serial port on the PC with an RS-232C cable. The RS-232C connector on the 7075 is configured as a data terminal (DTE) device.

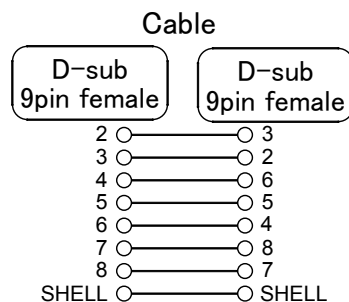


Connector (Dsub) Pin number	Signals		Function
	RS-232C	CCITT	
1			Unused
2	BB(RxD)	104	Reception data
3	BA(TxD)	103	Transmission data
4	CD(DTR)	108/2	Data terminal ready
5	AB(GND)	102	Signal ground
6			Unused
7	CA(RTS)	105	Ready to send
8	CB(CTS)	106	Clear to send
9			Unused

(1) Required cable wiring

Connection lines: reverse type (straight-through wiring)
Cable wiring is as shown.

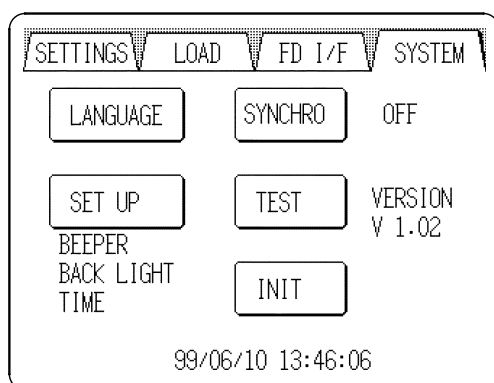
(2) Connection with PC/AT compatible computers.



Chapter 6

System Screen

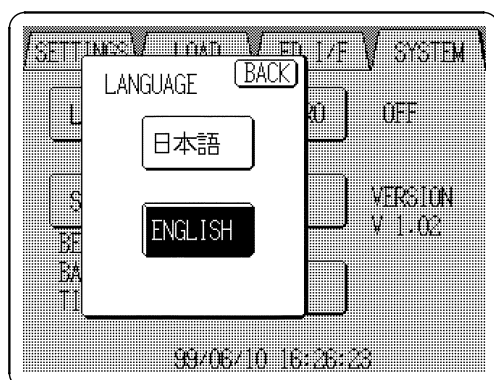
6.1 Selecting to the System Screen



Pressing the **SYSTEM** tab at the upper right of the screen causes the SYSTEM screen to appear.

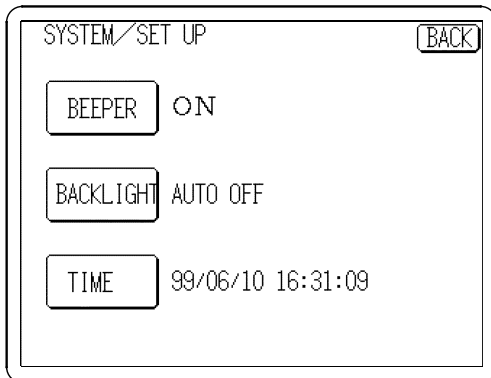
If the tabs are not visible at the top of the screen, a lower level screen is currently displayed. Press the **BACK** button to return to a higher level, and then perform the above step.

6.2 Setting the Display Language (LANGUAGE)

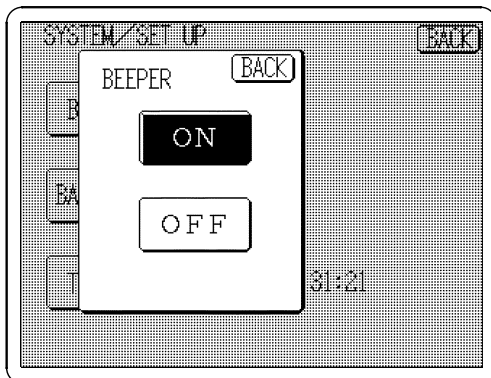


This window is used for changing the display language. Either English or Japanese can be selected.

6.3 Miscellaneous Settings (SET UP)

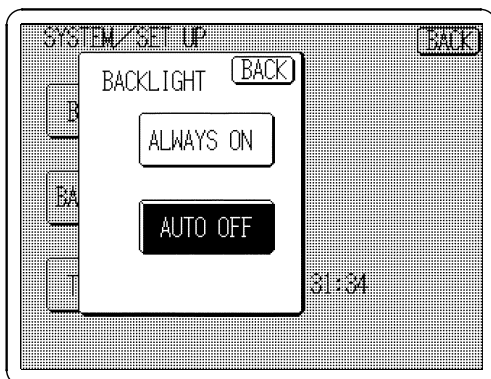


This screen is for miscellaneous settings. The beeper, automatic backlight off and time can be set.



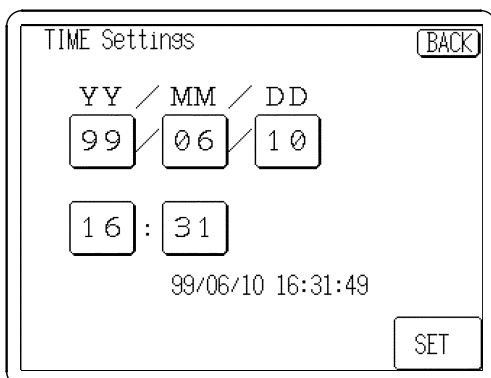
Beeper

The beeper is set from this window. Select whether the beeper should sound when a key is pressed.



Backlight

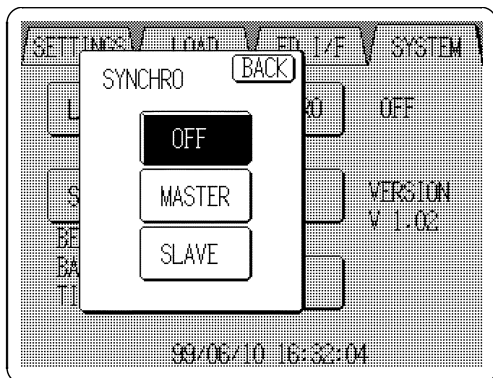
Automatic backlight off is selected from this window. Select **ALWAYS ON** to have the backlight always lit, or select **AUTO OFF** to have the backlight automatically turn off if there is no key input for more than 3 minutes, which saves power and extends the life of the backlight.



Clock

The internal clock is set from this screen. Press the **SET** button to change its contents, then press the **SET** button to accept the new settings.

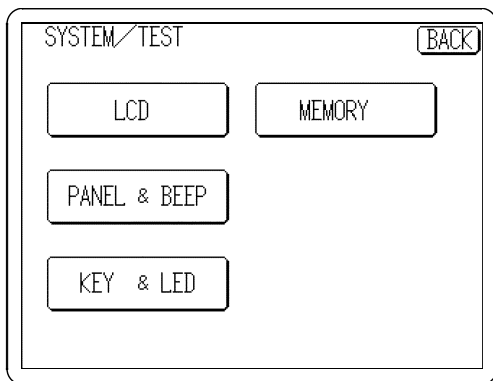
6.4 Setting the Synchronized Operation (SYNCHRO)



These settings control synchronized drive operation. For details, see Chapter 7.

- OFF** Disables synchronized drive. There is no output from the synchronized drive terminal of the external interface.
- MASTER** Set this unit to be the master device for synchronized drive.
- SLAVE** Set this unit to be a slave device for synchronized drive.

6.5 Self Testing (TEST)



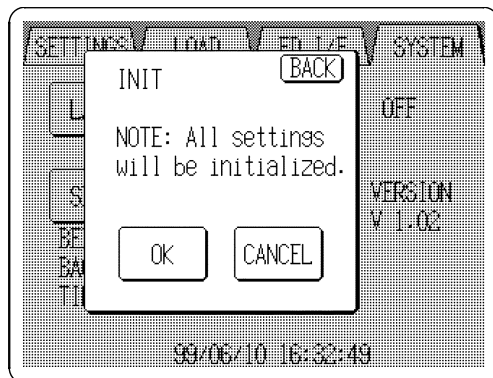
Activates main unit self testing.

- LCD** Tests the LCD screen.
- PANEL&BEEP** Tests the touch panel and beeper.
- KEY&LED** Tests other keys and LED lighting.
- MEMORY** Tests internal memory.

NOTE

If the MEMORY is pressed, the settings of the unit are initialized.

6.6 Initialization (INIT)



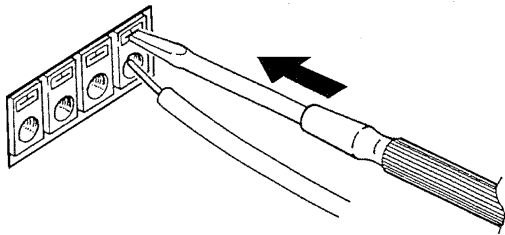
The unit is initialized with the following default settings.
Press the **OK** button.

RUN/STOP key	STOP
CH1 to CH4 ON/OFF key	OFF
Output settings (applied to all channels)	
Waveform	Sine wave
Sweep	OFF
Sweep waveform	Sine wave
Units of frequency	Hz
Frequency	1 kHz
Amplitude and offset/upper and lower limits	Amplitude&offset
Voltage setting	Peak voltage
Amplitude	1 V
Offset	0 V
Phase angle	0 deg
Delay	0
Duty	50%
Filter	Pass
Range	10 V
Sweep frequency	1 kHz
Sweep amplitude	1 V
Sweep offset	0 V
Sweep phase	0 deg
Sweep delay	0
Sweep duty	50%
Sweep item	Frequency, amplitude, offset
Sweep data	None
Marker Output	OFF
Simultaneous setting	All OFF
Synchronized operation	OFF
Custom waveform data	None
BEEP	ON
LCD backlight auto-off	Auto off
RS-232C	
Baud rate	9600 bps
Stop bit	1 bit
Hard flow	ON
Waveform input	
Input model	8845/46
Reading GP-IB address	5
GP-IB	
Address	15
Terminator	LF+EOI

Chapter 7

External Input/Output

Connecting to the terminals



1. Use suitable wires bared at their ends for a length of about 10 mm.
2. Depress the knob on the terminal with a screwdriver, and push the end of the wire into the connection hole as shown in the figure on the left.
3. Release the screwdriver, and the wires will be locked into place.
4. Use the same procedure to remove the wires.

Recommended wire

Single strand: 1.2 mm dia. (AWG #16)

Multi-strand: 1.25 mm² (AWG #16)

Usable limits

Single strand: 0.4 to 1.2 mm dia. (AWG #26 to #16)

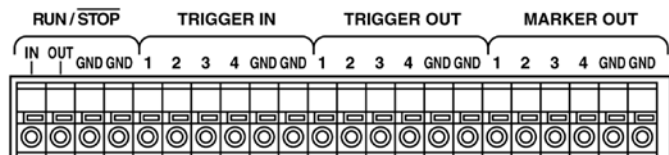
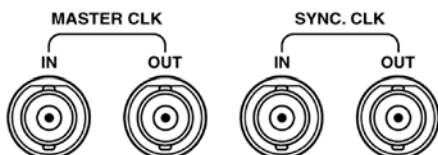
Multi-strand: 0.3 to 1.25 mm² (AWG #22 to #16)

Strand diameter: minimum 0.18 mm

Standard insulation stripping length: 11 mm

Length: Within 1 m

External input terminal



7.1 Output Terminals and Functions

7.1.1 MASTER CLK OUT

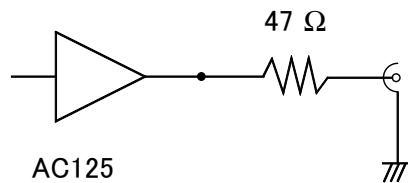
(1) Function

During synchronized drive operation, this clock signal is output to synchronize waveform data.

NOTE

- This clock signal is not output when synchronized drive is not enabled.
- When set as a slave unit, this signal is output only if there is a signal at the MASTER CLK IN terminal.

(2) Output format



Logic level
 $(4.0 \text{ V} \leq V_H \leq 5.0 \text{ V},$
 $0 \text{ V} \leq V_L \leq 0.8 \text{ V},$
 with no loading)
 Output impedance: $47 \text{ } \Omega$

7.1.2 SYNC CLK OUT

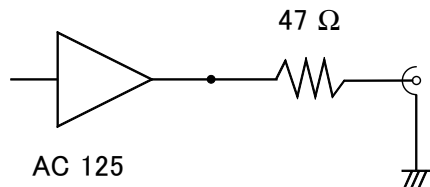
(1) Function

During synchronized drive operation, this clock signal is output to synchronize multiple 7075 units.

NOTE

- This clock signal is not output when synchronized drive is not enabled.
- When set as a slave unit, this signal is output only if there is a signal at the MASTER CLK IN terminal.

(2) Output format



Logic level
 $(4.0 \text{ V} \leq V_H \leq 5.0 \text{ V},$
 $0 \text{ V} \leq V_L \leq 0.8 \text{ V},$
 with no loading)
 Output impedance: $47 \text{ } \Omega$

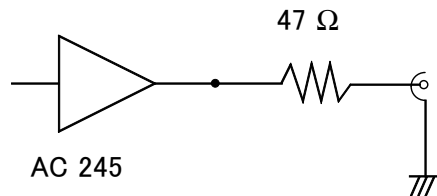
7.1.3 RUN/STOP OUT

(1) Function

Outputs the RUN/STOP state. (H: RUN/ L: STOP)

This output is high when either the **RUN/STOP** key or the RUN/STOP IN input is in the RUN state.

(2) Output format



Logic level
 $(4.0 \text{ V} \leq V_H \leq 5.0 \text{ V},$
 $0 \text{ V} \leq V_L \leq 0.8 \text{ V},$
 with no loading)
 Output impedance: $47 \text{ } \Omega$

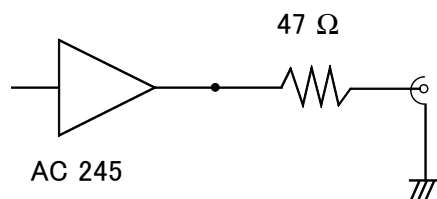
7.1.4 TRIGGER OUT

(1) Function

Outputs the trigger signal state.

This output is the logical sum of the front panel trigger key and the TRIGGER IN input.

(2) Output format



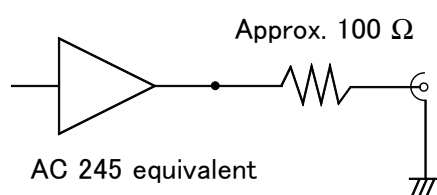
Logic level
 $(4.0 \text{ V} \leq V_H \leq 5.0 \text{ V},$
 $0 \text{ V} \leq V_L \leq 0.8 \text{ V},$
 with no loading)
 Output impedance: $47 \text{ } \Omega$

7.1.5 MARKER OUT

(1) Function

Outputs the marker signal.

(2) Output format



Logic level
 $(4.0 \text{ V} \leq V_H \leq 5.0 \text{ V},$
 $0 \text{ V} \leq V_L \leq 0.8 \text{ V},$
 with no loading)
 Output impedance: $100 \text{ } \Omega$

7.2 Input Terminals and Functions

7.2.1 MASTER CLOCK IN

(1) Function

The clock signal input here controls waveform data output during externally controlled synchronized drive operation.

(2) Input format

Logic level ($4.0\text{ V} \leq V_H \leq 5.0\text{ V}$, $0\text{ V} \leq V_L \leq 0.8\text{ V}$, with no loading)

Input impedance: $47\text{ k}\Omega$

Synchronized drive requires that this terminal be connected to the MASTER CLK OUT terminal of another 7075.

NOTE

- With the slave setting, no waveform is output unless a clock signal is input.
- Even with no clock input, the RUN/STOP indicator on the front panel lights red.
- Improper operation may occur if input is supplied from a source other than the MASTER CLK OUT terminal of a 7075.

7.2.2 SYNC CLOCK IN

(1) Function

This clock input is for synchronization with the master unit during synchronized drive operation.

(2) Input format

Logic level ($4.0\text{ V} \leq V_H \leq 5.0\text{ V}$, $0\text{ V} \leq V_L \leq 0.8\text{ V}$, with no loading)

Input impedance: $47\text{ k}\Omega$

Synchronized drive requires that this terminal be connected to the SYNC CLOCK OUT terminal of another 7075.

NOTE

- With the slave setting, no waveform is output unless a clock signal is input.
- Even with no clock input, the RUN/STOP indicator on the front panel lights red.
- Improper operation may occur if input is supplied from a source other than the MASTER CLK OUT terminal of a 7075.

7.2.3 RUN/STOP IN

(1) Function

This input terminal allows external RUN/STOP control.

(V_H : RUN/ V_L : STOP)

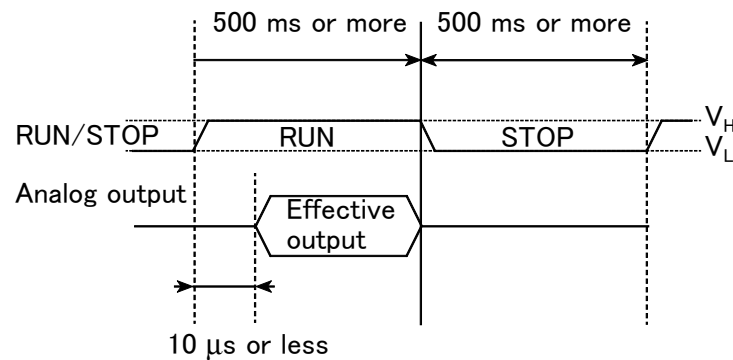
Operation duplicates that of the **RUN/STOP** key on the front panel.

(2) Input format

Logic level ($4.0\text{ V} \leq V_H \leq 5.0\text{ V}$, $0\text{ V} \leq V_L \leq 0.8\text{ V}$, with no loading)

Input impedance: $47\text{ k}\Omega$

(3) Operation Timing



NOTE

- Waveforms are output when either the front panel **RUN/STOP** key or the RUN/STOP input is in the RUN state. Both the **RUN/STOP** key and the RUN/STOP input must be in the STOP state for waveform output to be disabled.
- Waveforms cannot be changed when RUN is active.

7.2.4 TRIGGER IN

(1) Function

This is the input terminal for a trigger signal to control sweep output. It functions in the same way as the front panel **TRIG** key. When the TRIG indicator on the front panel is lit, trigger input is enabled.

Triggering is valid only when the loop time is infinite or the HOLD function is enabled in the sweep settings.

(2) Trigger Precautions

The trigger indicator shows the logical sum of each channel, so it lights when the trigger condition is satisfied on any channel. The input is ignored if no channel satisfies the trigger receiving condition.

(3) Input format

Logic level ($4.0\text{ V} \leq V_H \leq 5.0\text{ V}$, $0\text{ V} \leq V_L \leq 0.8\text{ V}$, with no loading)

Input impedance: $47\text{ k}\Omega$

Minimum pulse width: $1\text{ }\mu\text{s}$ (rising edge)

Minimum input pulse interval: $5\text{ }\mu\text{s}$

NOTE

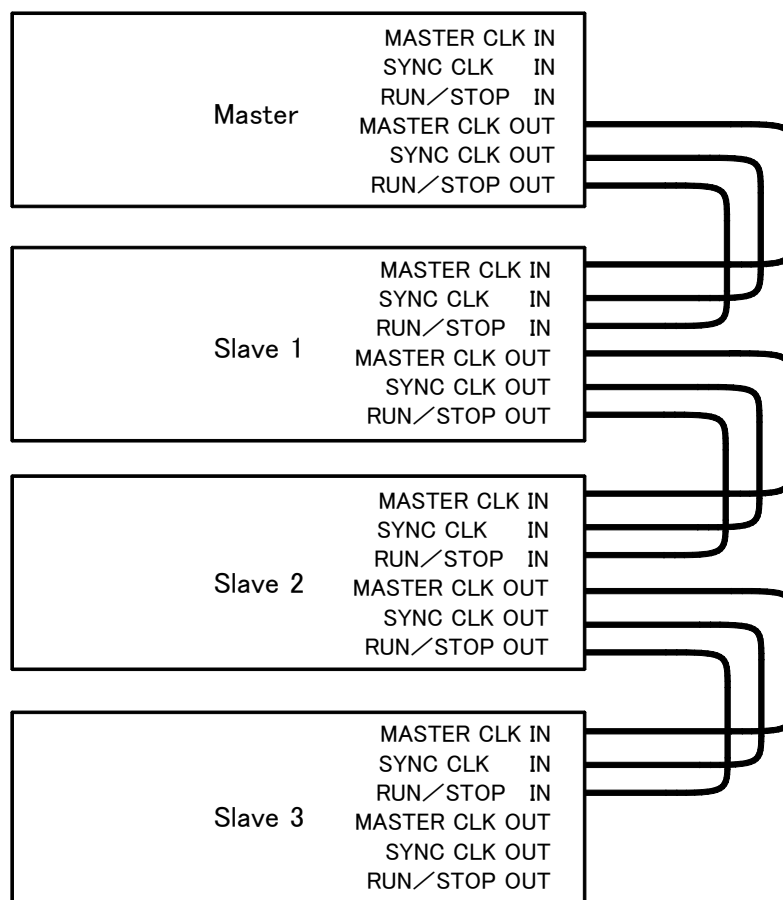
The input is invalid when the **TRIG** key on the front panel is pressed.

7.3 Description of Synchronized Operation

Up to four units can be connected via their external control terminals to operate synchronously (as a master and three slaves). For synchronized operation, the 7075s are connected in cascade so that all slaves are governed by the following control signals from the master unit: RUN/STOP, MASTER CLK and SYNC CLK.

7.3.1 Connection

One master unit and up to three slave units can be used in synchronized drive. The control signal connections are shown here.



NOTE

Never turn on any slave unit before turning on the master unit. If this occurs, the slave unit may not output the proper waveforms.

With the connections above, if the system stops at a setting made according to "3.7.17 Setting the Total Number of Loops," the following events occur:

- When the master unit is stopped:
All slave units stop. (For the offset value, the last data continues to be output.)
- When a slave unit is stopped:
Only the involved slave unit stops. No other units are affected. The RUN/STOP key on the stopped slave unit remains lit until the master unit stops. (For the offset value, the last data continues to be output.)

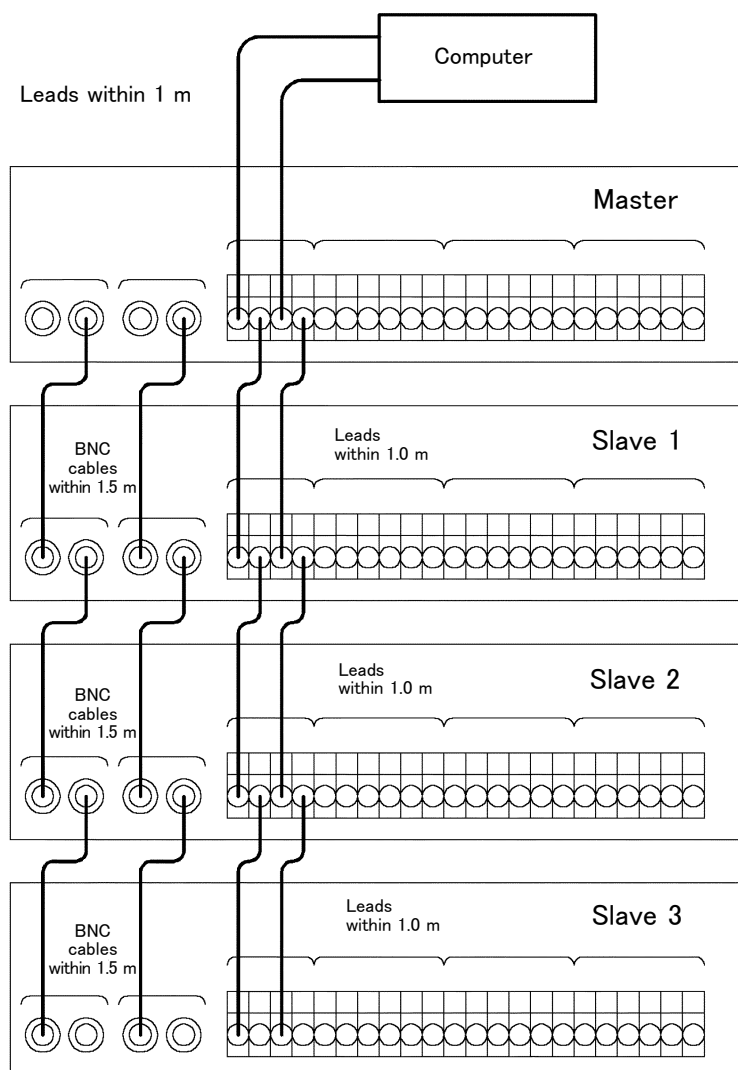
7.3.2 Connecting the Cables

⚠ CAUTION

The input logic level is 0 to 5 V. To avoid damage to the product, do not apply voltage other than this level.

Example of connecting

The MASTER CLK, SYNC CLK and RUN/STOP signals are each connected by daisy chaining the units together.



7.3.3 Synchronized Operation Settings

Master/Slave Selection

Synchronized drive settings are made on the System screen.

SYNC OFF

Select this setting to disable synchronized drive.

The MASTER CLK and SYNC CLK signals will not be output, and signals at the MASTER CLK IN and SYNC CLK IN will be ignored.

SYNC Master

Set the 7075 to Master.

The MASTER CLK and SYNC CLK signals will be output, and signals at the MASTER CLK IN and SYNC CLK IN will be ignored.

SYNC Slave

Set the 7075 to Slave.

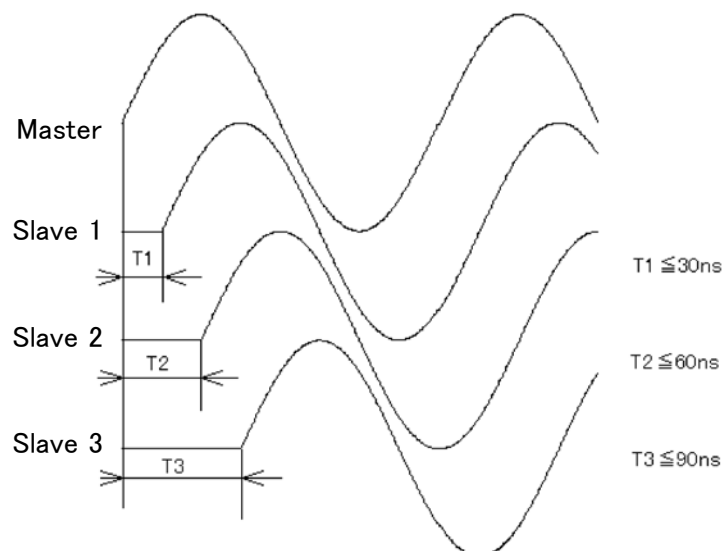
Clock signals input at the MASTER CLK IN and SYNC CLK IN terminals substitute for the internal clock.

The clock signals input at the MASTER CLK IN and SYNC CLK IN terminals are passed through to the MASTER CLK OUT and SYNC CLK OUT terminals.

7.3.4 Precautions for Using Synchronized Operation

The total skew when using synchronized drive is as follows.

- (1) Synchronized operation with 2 Units
T1 (inter-unit skew) less than ± 25 ns (from inter-channel skew)
- (2) Synchronized operation with 3 Units
T2 (inter-unit skew) less than ± 25 ns (from inter-channel skew)
- (3) Synchronized operation with 4 Units
T3 (inter-unit skew) less than ± 25 ns (from inter-channel skew)
* $T1 \leq 30$ ns, $T2 \leq 60$ ns, $T3 \leq 90$ ns



Chapter 8

GP-IB/RS-232C Interface Implementation

8.1 Overview

(1) Compliance and reference standards

The 7075 includes the GP-IB interface as a standard feature.

Compliance standard: IEEE Standard 488.1-1987

Reference standard: IEEE Standard 488.2-1987

(2) Codes used for device-dependent messages

The following are the codes used for device-dependent messages.

ASCII codes are used.

(3) Interface function sub-set

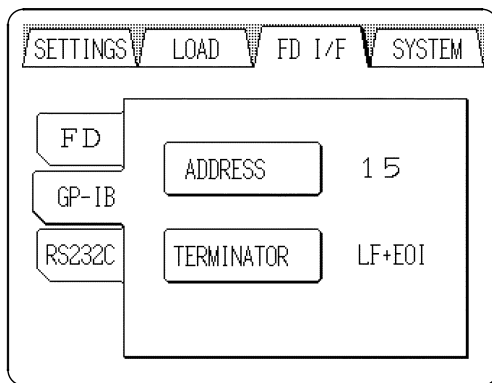
SH1	All source handshake functions
AH1	All acceptor handshake functions
T6	Basic talk functions Serial poll function The talker cancellation function with MLA (My Listen Address) is provided
TE0	Extension talker function is not provided.
L4	Basic listener functions The listener cancellation function with MTA (My Talk Address) is provided.
LE0	Extension listener function is not provided.
SR 1	All service request functions
RL 1	All remote/local functions
PP0	Parallel polling is not provided.
DC 1	All device clear functions
DT0	Device trigger functions are not provided.
C 1	System controller
C 2	IFC transfer, controller, in-charge
C 3	REN transmit
C 28	Do not transfer interface, message sending and control

8.2 Operations

⚠ WARNING

Never connect another device to operate as controller when the unit's control function is in use, as this could cause malfunctions and, in the worst case, damage to the unit.

8.2.1 Settings of the GP-IB Interface



Set the function, address, transmit terminator on the GP-IB screen.

Select GP-IB on the FD I/F screen.

(1) Address

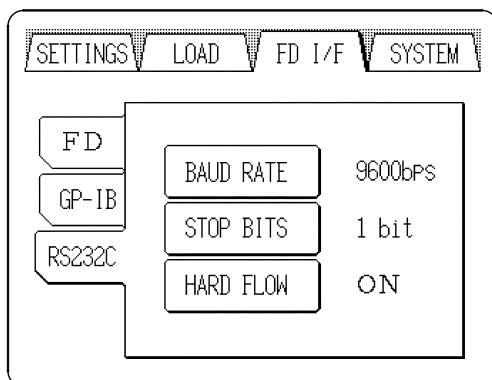
Set the GP-IB device address. (0 to 30: Address number)

The device address is set to 15 when shipped from the factory, and when the device is reset.

(2) Terminator

Select the appropriate delimiter sequence for the plotter being used. (LF+EOI / CR+LF+EOI)

8.2.2 Settings of the RS-232C Interface



Set the baud rate, stop bit, and hardflow on the RS232C screen.

Select RS232C on the FD I/F screen.

(1) Baud rate

Set the baud rate of the RS-232C interface.

(4800 bps/ 9600 bps/ 19200 bps)

The baud rate is set to 9600 bps when shipped from the factory, and when the device is reset.

(2) Stop bit

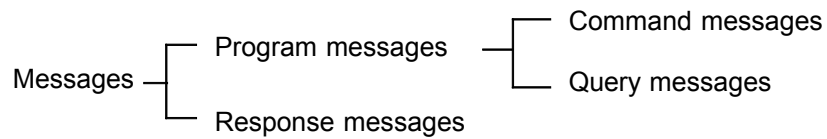
Set the stop bit of the RS-232C interface. (1 bit / 2 bits)

(3) Hardflow

Set the flow control of the RS-232C interface. (ON/ OFF)

8.2.3 Receive and Send Protocols

Messages Data received or sent by the GP-IB interface is called a message. The following are the message types:



Of these, program messages are those received by the unit from the controller, while response messages are those sent from the unit to the controller. During addressable, program messages are those received by the unit from the external controller, while response messages are those sent from the unit to the controller.

(1) Program messages

Program messages can be divided into either command messages or query messages.

Command program messages

Orders for control of the device, such as for making settings for output or waveform output/stop or the like.

Example: When sending the messages from the personal computer to the 7075.

```
:OSET:AMPL 1,10.000
```

This message sets the amplitude of channel 1 of the 7075 to 10.000 V.

Query program messages

Orders for responses relating to the results of operation, results of self-test, or the state of device settings.

These commands are identified by "?" at the end of their comments in "8.4 GP-IB Command Summary."

(2) Response messages

Sent in response to query program messages. After a query message sent from the external controller has been received, a response message is produced the moment that its syntax has been checked.

Command syntax

When no ambiguity would arise, the term "command" is henceforth used to refer to both command and query program messages.

The 7075 accepts commands without distinction between lower case and upper case letters. It generates response messages in the long form (when headers are enabled) and in upper case letters.

The names of commands for the 7075 is as far as possible mnemonic. Furthermore, all commands have a long form, and an abbreviated short form. In command references in this manual, the short form is written in upper case letters, and then this is continued in lower case letters so as to constitute the long form. (Either of these forms will be accepted during operation, but intermediate forms will not be accepted. Further, during operation both lower case letters and upper case letters will be accepted without distinction.)

NOTE

If a command consists of more than four characters it can be truncated to the first four characters, unless the fourth character is a vowel, in which case the proper truncated form consists of only the first three characters.

Example

For "FILTer", either "FILTER" (the long form) or "FILT" (the short form) will be accepted. However, any one of "FILTE", "FIL", or "FI" is wrong and will generate an error.

For "MEMory", either "MEMORY" (the long form) or "MEM" (the short form) will be accepted. However, any one of "MEMOR", "MEMO", or "ME" is wrong and will generate an error.

Command program headers

Commands must have a header, which identifies the command in question. There are three kinds of header: simple command type, compound command type, and common command type.

Simple command type header

The first word constitute the header.

```

:HEADer ON
  [ ] [ ]
Simple command Data
type header

```

Compound command type header

A header made up from a plurality of simple command type headers marked off by colons.

```

:SYSTEM:BEEPer OFF
  [ ] [ ] [ ]
Simple command Data
type headers
  [ ]
Compound command type header

```

Common command type header

A command beginning with an asterisk (*) and stipulated by IEEE 488.2

```
*RST
```

Query program headers

These are for commands used for interrogating the unit about the result of an operation or about a setting.

These can be recognized as queries by a question mark appearing after the program header. The structure of the header is identical to that of a command program header, with "?" always being affixed to the last command. There are queries possible in each of the three previously described types of command form.

```

:HEADer?
  └───┘
Query program header

```

Response messages

Response messages relating to queries are made up from header portions (which also may be absent due to header disablement) and data portions identical to those of program messages, and as a general rule are sent in an identical format to the format of the program message corresponding to their originating query.

Terminators and separators**Message terminator**

A terminator is used in order to separate the transmission of one message from another, and this terminator is not itself included in the message. On the unit, LF, EOI (GP-IB only), or LF+EOI (GP-IB only) is used as the message terminator. LF+EOI or CR+LF+EOI is used as the response message terminator. (Select on the GP-IB setting screen or set by the :COM:TERM command for RS-232C interface)

Message unit separator

A semicolon ";" is used as a message unit separator when it is desired to set out several messages on a single line.

```

:SYSTEM:BEEPER ON;:SYSTEM:TIME 10,20,30
                        ↑
Message unit separator

```

Header separator

With a message which has both a header and data, a space " " is used as a header separator to separate the header from the data. The space " " is used by way of explanation, but it does not appear on the actual program.

```

:SYSTEM:BEEPER ON
                        ↑
Header separator

```

Data separator

Commas are used as data separators for separating several data items from one another.

```

:SYST:TIME 10,20,30
              ↑ ↑
Data separator

```

Command tree

When multiple compound command messages are sent to the 7075, if there is no colon (:) in the header following the semi-colon (;) separator, the header of the latter command is considered to be the same as that before the previous colon. (As this construction is similar to the concept of the current directory in Unix and MS-DOS directory structures, we call the previous header the current path.)

```
:SYST:TIME 10,20,30;;SYST:BEEPER ON
:SYST:TIME 10,20,30;BEEPER ON
```

Both examples set the internal clock to 10:20'30" and then enable the beeper. In the first case, a colon follows the semicolon, so the current path is from the root, and the command search in the 7075 begins at the root. In the second case, the current path of "SYS:TIME 10,20,30" is ":SYST", so the following ":BEEPER" command can omit ":SYST".

Data format

The 7075 uses character data, decimal data and character string data.

Character data

The first character must be alphabetic. The characters after the first character can only be alphabetic characters, numerals, or underline characters (_). As alphabetic characters, during sending only upper case letters are used, but during receiving both upper case and lower case letters are permitted.

Decimal data

Decimal data values are represented in what is termed NR format.

There are three types of NR format from NR1 to NR3, and each of these can appear as either a signed number or an unsigned number. Unsigned numbers are taken as positive.

Further, if the accuracy of a numerical value exceeds the range with which the 7075 can deal, it is rounded off. (5 and above is rounded up; 4 and below is rounded down.)

NR1 format: integer data (Examples) +15, -20, 25	} NRf format
NR2 format: fixed point numbers (Examples) +1.23, -4.56, 7.89	
NR3 format: floating point numbers (Examples) +1.0E-3, -2.3E+3	

The term "NRf format" includes all these three formats.

When the 7075 is receiving it accepts NRf format, but when it is sending it utilizes whichever one of the formats NR1 to NR3 is indicated in the particular command.

Character string data

The data is composed of 7 bit ASCII characters and character string data is enclosed within quotation marks. When the 7075 is sending, only the double quotation mark (") is used as a quotation mark, but when receiving both this double quotation mark and also the single quotation mark (') are accepted. Characters which cannot be handled by the 7075 are replaced by spaces.

8.2.4 Usable Message Bytes (GP-IB)

Message bytes usable by the unit are as follows.

(1) Address command group

GTL (Go To Local): Enables local operation of the 7075.

SDC (Selected Device Clear): Sets the 7075 to initialized state.

(2) Universal command group

LLO (Local Lock-Out): Disables local operation of the 7075.

DCL (Device Clear): Sets the 7075 to initialized state.

8.2.5 LOCK (LCL) Key and Indicator (GP-IB)

(1) Status Indicator Display

The LOCK(LCL) key at the front panel lights red to indicate that the unit is under remote control by an external device.

(2) LOCK (LCL) key

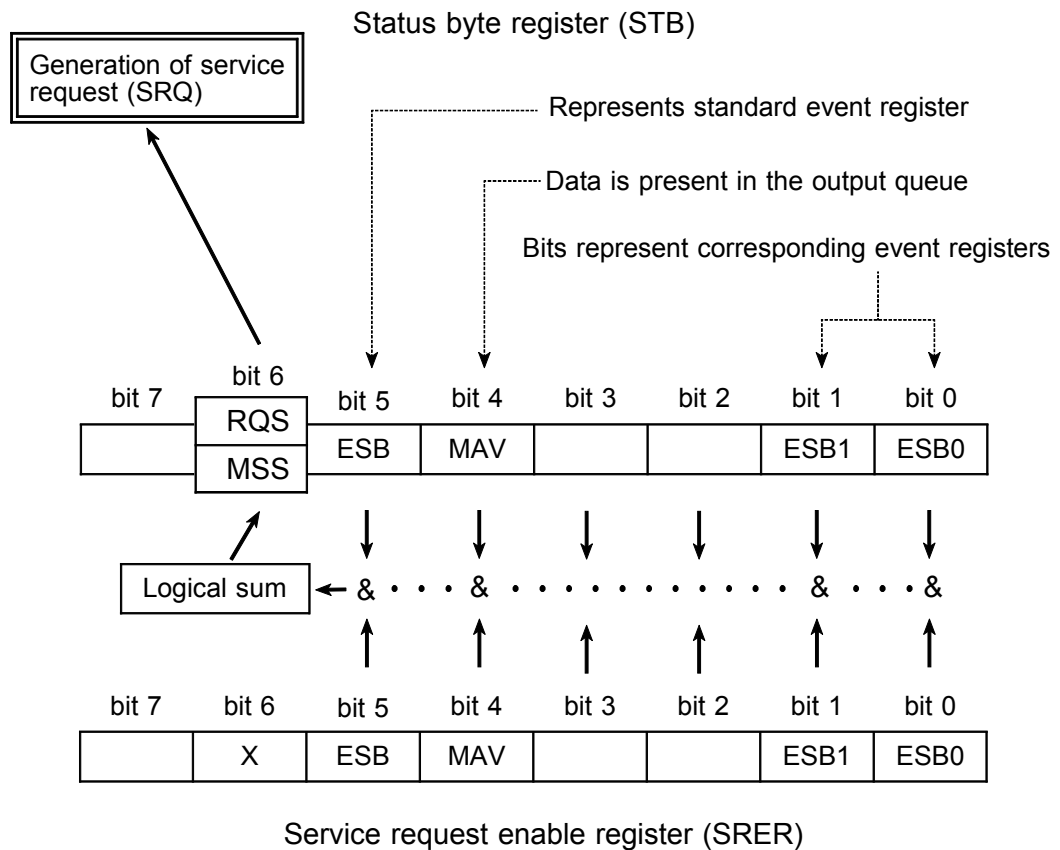
This key cancels remote control by GP-IB and activates local operation.

However, if the Local Lock-Out state has been set by the GP-IB, this key is disabled.

8.2.6 Status Model

In its implementation of the serial polling function using service requests, the 7075 employs the status model specified by IEEE 488.2.

The term "event" refers to any phenomenon which generates a service request.



The status byte register holds information relating to the event registers and the output queue. It is further possible to use the service request enable register as a mask to select the items required. If any of the bits selected by the mask becomes 1, bit 6 (the master summary status or MSS bit) is also set to 1, an RQS message is generated, and this generates a service request.

8.2.7 Status Byte Register

Each bit of the status byte is a summary (logical OR) of the event register corresponding to that bit. Further, the status byte and each event register has an enable register corresponding to it, and according to the setting of this enable register (which starts off at zero when the power is turned on) it is possible to mask the service requests originating from each event.

Status byte register bit assignments

Bit 7	Unused
Bit 6 RQS	Set to 1 when a service request is dispatched.
MSS	Logical sum of the other bits of the status byte register
Bit 5 ESB	Standard event summary (logical sum) bit Shows a logical sum of the standard event status register.
Bit 4 MAV	Message available Indicates that there is at least one message in the output queue.
Bit 3	Unused
Bit 2	Unused
Bit 1	Unused
Bit 0 ESB0	Event summary bit 0 Bitwise logical sum of event status register 0

The following commands are used for reading the status byte, and for setting the service request enable register and for reading it.

Reading the status byte	*STB?
Setting the service request enable register	*SRE
Reading the service request enable register	*SRE?

8.2.8 Event Registers

The summary of this register is set in bit 5 of the status byte.

Each bit is masked by setting the standard event status enable register (which starts off at zero when the power is turned on).

The circumstances when the contents of the standard event status register are cleared are as listed below.

1. When the *CLS command is received.
2. When the contents have been read by an *ESR? query.
3. When the power is turned off and turned on again.

Standard event status register (SESR) bit assignments

Bit 7 PON	Power on flag.
Bit 6 URQ	User request. Not used by the 7075.
Bit 5 CME	Command error. When a command which has been received contains a syntactic or semantic error, this bit is set to 1. • When a command is received that is not in the 7075 command set • There is a mistake in a program header. • The number of data parameters is wrong. • The format of the parameters is wrong.
Bit 4 EXE	Execution error. When for some reason a command which has been received cannot be executed, this bit is set to 1. • The designated data value is outside the set range. • The designated data value is not acceptable.
Bit 3 DDE	Device dependent error. When a command cannot be executed due to some cause other than a command error, a query error, or an execution error, this bit is set to 1. • Execution is impossible due to an abnormality inside the 7075. • Some other function is being performed (during holding and integrating).
Bit 2 QYE	Query error. This bit is set to 1 when a query error is detected by the output queue control. • When an attempt has been made to read the output queue when it is empty. • When the data overflows the output queue. • When data in the output queue has been lost. • When a query is detected after an *IDN query within the same line.
Bit 1 RQC	Request for controller authority. Not used by the 7075.
Bit 0 OPC	Operation terminated. This bit is set to 1 when an *OPC command is executed, when the operation of all the messages up to the *OPC command has been completed.

The following commands are used to read the standard event status register, and to set or read the standard event status enable register.

- | | |
|--|-------|
| Read the standard event status register | *ESR? |
| Set the standard event status enable register | *ESE |
| Read the standard event status enable register | *ESE? |

The bits of event status register 0

Bit 7	EOFO	End Of File Operation
Bit 6	EOWL	End Of Waveform Input Loading
Bit 5	EOSL	End Of Sweep File Loading
Bit 4	EORO	End Of Reset Operation
Bit 3		
Bit 2		
Bit 1		
Bit 0		

The following commands are used for reading the event status register 0, and for setting the event status enable register 0 and for reading it.

Reading event status register 0 :ESR0?
 Setting event status enable register 0 :ESE0
 Reading event status enable register 0 :ESE0?

8.2.9 The Input Buffer and the Output Queue

(1) Input buffer

The 7075 has an input buffer of 256 bytes capacity. Messages which are received are put into this buffer and executed in order.

When more than 256 bytes of data are sent so the buffer becomes full, the GP-IB bus enters the waiting state until buffer space becomes available.

(2) Output queue

The 7075 has an output queue of 256 bytes capacity.

Response messages are accumulated in this queue and are read out from the controller.

The circumstances when the output queue is cleared are as listed below:

1. When a device clear is issued.
2. When the power is turned off and turned on again.

When 256 bytes of response messages have been queued, the next response message is held in a waiting state until space becomes available. In this condition, if data in the input buffer also exceeds 256 bytes, a query error occurs and the output queue is cleared.

8.3 Command Reference

(1) Command Execution

Commands are loaded into the input buffer and executed in order.

(2) Response to Query

In response messages to queries, only the data portion is returned if headers are turned off. If headers are turned on, the data is returned with a header. In response messages, numeric data is returned in the format (NR1 to NR3) that was used for the parameter of the specific command table.

(3) Command Reference Description

The command reference lists common commands first, followed by 7075-specific commands. The 7075-specific commands are categorized in the following order: environment & miscellaneous settings, environment settings and self diagnostics, output settings, disk modes and others. Within each category, related commands are listed together. Command descriptions are structured as follows.

:Command

■ Indicates functions of message reference

Syntax : Indicates the command syntax.

< > : (Data portion)
Indicates the data format for a command that includes data.

Response syntax : Indicated only for commands for which a response message is returned.

Example : Shows a simple example illustrating the usage of the command. All transmissions are indicated in "short form."

Function : Describes the function of the command.

Note : Describes points that require special attention when using the command.

Error : Indicates the what kinds of errors might occur.

NOTE

" " in the syntax indicates a space.
"< >" mark should not be input.

8.3.1 Standard Command

*IDN?

■ Queries device ID (manufacturer's name, model name, software version).

Syntax *IDN?

Response syntax (Header: ON)
*IDN HIOKI,7075,0,V1.00
First field Manufacturer's name
Second field Model name
Third field "0" fixed
Fourth field Software version

Example
Transmission *IDN?
Response (Header: ON)
*IDN HIOKI,7075,0,V1.00
(Header: ON)
HIOKI,7075,0,V1.00

Function Queries device ID (manufacturer's name, model name, software version).

- Notes**
- The "*IDN?" query is the last query message in the program messages. Accordingly, if another query is detected after this query, a query error is generated, and no response message after the "*IDN?" query is produced.
 - With this query, if any error occurs, no response message is produced.

*RST

■ Initializes the settings.

Syntax *RST

Example
Transmission *RST

- Function**
- Resets the 7075 unit. The parameters which are reset are initialized by the reset function of the unit.
 - The following settings are not initialized. GP-IB address, input buffer, output que, transmit terminator, event register, enable registers
 - Processing time: approx. 5 seconds
 - Upon normal finish, EORO in Event Status Register 0 is set.

*TST?

■ Requests execution of, and queries the result of, the self test.

Syntax *TST?

Response syntax (Header ON)
*TST <0/1>
(Header ON)
<0/1>
0: no error
1: error occurs

Example
Transmission *TST?
Response (Header ON)
TST 0
(Header OFF)
0
Memory is normal.

Function Causes the 7075 to perform the self test, and returns the result thereof as a numerical data value in NR1 format (0 or 1).

- Notes**
- With this query, if any error occurs, no response message is produced.
 - Processing time: approx. 2 seconds.

- Errors** (Execution error)
The test cannot be executed in the following conditions. Initialization should be performed before executing this command.
- With the RUN state active
 - If an arbitrary waveform is present
 - If sweep is active on a channel

*OPC

■ After all action has been completed during execution, performs an SRQ request.

Syntax *OPC

Example *RST;:SYST:BEEP ON;*OPC;:HEAD
OFF
The specified bit is set to 1 after
*RST;:SYST:BEEP ON executes.

Function When multiple commands are issued on the same line, after the command in front of the *OPC command finishes, Standard Event Status Register (SESR) bit0 is set to 1.

*OPC?

■ Queries whether all action has been completed.

Syntax *OPC?

Response syntax (Header ON)
*OPC 1
(Header OFF)
1

Function Returns "1" as the response message instead of setting bit0 (the OPC bit) of the Standard Event Status Register (SESR) to 1.

Note With this query, if any error occurs, no response message is produced.

*WAI (GP-IB only)

■ Waits until sampling is fully completed.

Syntax *WAI

Function Forces the unit to wait until all previous commands have executed.

Note All 7075-specific commands are sequential type, so the WAI command has no effect. However, it is included for compliance with the IEEE-488.2 1987 standard.

*CLS

■ Clears the status byte register and the event registers.

Syntax *CLS

Function Clears all event registers corresponding to each bit of the status byte register.

Note This has no effect upon the output queue, the various enable registers, or bit 4 (the MAV bit) of the status byte register.

*ESE (GP-IB only)

■ Sets the standard event status enable register.

Syntax *ESE <NR1>
<NR1> = 0 to 255

Example

Transmission *ESE 36
Bits 5 and 2 of SESER are set to 1.

Function

- Loads the effective format of the Standard Event Status Register (SESR) into the Standard Event Status Enable Register (SESER).
- Decimals are rounded off.

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
PON	URQ	CME	EXE	DDE	QYE	RQC	OPC

Note When the power is turned on, the data is reinitialized to 0.

Error (Command error)
When <NR1> was not in NRf format.

*ESE? (GP-IB only)

■ Queries the standard event status enable register (SESER).

Syntax *ESE?

Response syntax (Headers: ON) (Headers: OFF)
*ESE <NR1> <NR1>

Example

Transmission *ESE?
Response 36

Function The contents of SESER as set by the *ESE command are returned as a NR1 value (0 to 255).

Note If any error occurs, no response message to this query is produced.

Error With this query, if any error occurs, no response message is produced.

*ESR?

■ Queries out and clears the contents of the standard event status register (SESR).

Syntax *ESR?

Response syntax (Headers: ON) (Headers: OFF)
*ESR <NR1> <NR1>

Example

Transmission *ESR?
Response 32
Indicates command error occurs.
(bit5 corresponds to CME.)

Function The contents of SESR are returned as NR1 value (0 to 255).

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
PON	URQ	CME	EXE	DDE	QYE	RQC	OPC

Error With this query, if any error occurs, no response message is produced.

*SRE (GP-IB only)

■ Sets the service request enable register (SRER).

Syntax *SRE <NR1>
<NR1> = 0 to 255

Example
Transmission *SRE 33
Bits 0 and 5 of SRER are set to 1.

Function • Loads the effective format of the Status Byte Register (STB) into the Service Request Enable Register (SRER).

• Decimals are rounded off.

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
Unused	-	ESB	MAV	-	-	-	ESB0

Notes • When the power is turned on, the data is reinitialized to 0.
• The setting of unused bit (bit 7, 3, 2, and 1) and the setting of bit 6 are ignored.

Error (Command error)
When <NR1> was not in NRf format.

*SRE? (GP-IB only)

■ Queries the service request enable register (SRER).

Syntax *SRE?

Response syntax (Header ON) (Header OFF)
*SRE <0-255> <0-255>

Example (Header ON) (Header OFF)
Transmission *SRE?
Response 33

Function Returns the value of the service request enable register (SRER) set by the *SRE command as a numerical data value in NR1 format (0 to 255)

Note With this query, if any error occurs, no response message is produced.

*STB? (GP-IB only)

■ Queries the status byte register.

Syntax *STB?

Response syntax (Header ON/OFF)
*STB <NR1> <NR1>

Example (Header ON) (Header OFF)
Transmission *STB?
Response 32
An event occurred at Status Register (ESB) bit 5.

Function Returns the set contents of the status byte register (STB) as a numerical data value in NR1 format (0 to 255).

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
Unused	MSS	ESB	MAV	Unused	Unused	Unused	ESB0

Notes • Bit 6 is the MSS bit.
• Even if service requests are cleared by serial polling, the MSS bit is not cleared.

8.3.2 Specific Commands for Environment/Miscellaneous Settings

:SYSTem:BEEPer

■ Enables and disables beep sound.

Syntax :SYSTem:BEEPer <ON/OFF>

Example :SYST:BEEP OFF
Disables the beep sound.

Function Enables or disables the beep sound.

Error (Command error)
When the setting data contains characters other than ON or OFF.

:SYSTem:BEEPer?

■ Queries the beep sound setting.

Syntax :SYSTem:BEEPer?

Response syntax (Header ON)
:SYSTEM:BEEPER <NR1>
(Header OFF)
<NR1>

Example
Transmission :SYST:BEEP?
Response (Header ON)
:SYSTEM:BEEPER OFF
(Header ON)
OFF

Function Queries the current setting of beep sound enablement.

Note With this query, if any error occurs, no response message is produced.

:SYSTem:CRTOff

■ Enables and disables the automatic LCD backlight off

Syntax :SYSTem:CRTOff <ON/OFF>
ON The backlight automatically turns off after a specific idle time.
OFF The backlight remains lit.

Example
Transmission :SYST:CRTOFF
Disables the auto backlight off function so the backlight remains lit.

Function Enables and disables the automatic LCD backlight off

Error (Command error)
When the setting data contains characters other than ON or OFF.

:SYSTem:CRTOff?

■ Queries the automatic LCD backlight off setting.

Syntax :SYSTem:CRTOff?

Response syntax (Header ON)
:SYSTEM:BEEPER <ON/OFF>
(Header OFF)
<ON/OFF>

Example

Transmission :SYST:CRTOFF?
Response OFF

Function Queries the current setting for automatic LCD backlight off.

Note With this query, if any error occurs, no response message is produced.

:SYSTem:DATE

■ Sets the date.

Syntax :SYSTem:DATE <year>,<month>,<day>
<year>= 0 to 99
<month>= 1 to 12
<day>= 1 to 31
(NR1 numerical data)

Example

Transmission :SYST:DATE 99,3,17
Sets the date to 3/17/99.

Function Sets the date.

Note <year>, <month> and <day> can be in NRf format, in which case extra digits are rounded off.

Errors (Command error)
When <year>, <month>, <day> was not in NRf format.
(Execution error)
When attempting to set an out-of-range value.

:SYSTem:DATE?

■ Queries the internal calender

Syntax :SYSTem:DATE?

Response syntax (Header ON)
:SYSTEM:DATE <year>,<month>,<day>
(Header OFF)
<year>,<month>,<day>

Example

Transmission :SYST:DATE?
Response (Header ON)
:SYSTEM:DATE 99,3,17
(Header OFF)
99,3,17

Function Returns the internal calender settings as NR1 numerical format (<year>, <month>, <day>).

Note With this query, if any error occurs, no response message is produced.

:SYSTem:TIME

■ Sets the time of the internal clock.

Syntax :SYSTem:TIME <hour>,<min>, <sec>
 <hour>= 0 to 23
 <min>= 0 to 59
 <sec>= 0 to 59
 (All NR1 numerical data)

Example

Transmission :SYST:TIME 12,34,56
 Sets the internal clock to 12:34:56

Function Sets the time of the internal clock.

Note <hour>, <min>, and <sec> can be in NRf format, in which case extra digits are rounded off.

Errors (Command error)
 When <hour>, <min>, and <sec> was not in NRf format.
 (Execution error)
 When attempting to set an out-of-range value.

:SYSTem:TIME?

■ Requests the time.

Syntax :SYSTem:TIME?

Response syntax (Header ON)
 :SYSTEM:TIME <hour>,<min>, <sec>
 (Header OFF)
 <hour>,<min>,<sec>

Example

Transmission :SYST:TIME?
 Response (Header ON)
 :SYSTEM:TIME 12,34,56
 (Header OFF)
 12,34,56

Function Returns the time on the internal clock in NR1 format (<hour>, <min>, <sec>).

Note With this query, if any error occurs, no response message is produced.

:SYSTem:SYNChro

■ Sets synchronized drive operation.

Syntax :SYSTem:SYNChro <OFF/MASTer/SLAVe>
 OFF Disables synchronized drive.
 MASTer Enables synchronized drive with this unit as master.
 SLAVe Enables synchronized drive with this unit as slave.

Example

Transmission :SYST:SYNC MAST
 Enables synchronized drive with this unit as master.

Function Sets synchronized drive operation.

Error (Command error)
 When characters are specified other than those at the left.

:SYSTem:SYNChro?

■ Queries the synchronized drive.

Syntax :SYSTem:SYNChro?

Response syntax (Header ON)
:SYSTEM:SYNCHRO <OFF/MASTer/
SLAVe>
(Header OFF)
<OFF/MASTer/SLAVe>

Example

Transmission :SYST:SYNC?
Response (Header ON)
:SYSTEM:SYNCHRO MASTER
(Header OFF)
MASTER

Function Returns a string describing the status of synchronized drive.

:SYSTem:LANGuage

■ Sets the display language.

Syntax :SYSTem:LANGuage
<ENGLish/JAPanese>
ENGLish Displays in English.
JAPanese Displays in Japanese.

Example

Transmission :SYST:LANG ENGL
Sets the display in English.

Function Sets the display language.

Error (Command error)
When characters are specified other than those at the left.

:SYSTem:LANGuage?

■ Queries the display language.

Syntax :SYSTem:LANGuage?

Response syntax (Header ON)
:SYSTem:LANGuage
<ENGLish/JAPanese>
(Header OFF)
<ENGLish/JAPanese>

Example

Transmission :SYST:LANG?
Response (Header ON)
:SYSTEM:LANGUAGE ENGLISH
(Header OFF)
ENGLISH

Function Queries the display language.
ENGLish Displays in English.
JAPanese Displays in Japanese.

8.3.3 Specific Commands for Output Settings

:OSET:AMPLitude

■ Sets the amplitude voltage.

Syntax :OSET:AMPLitude <ch>,<voltage>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 <voltage> Output voltage value (V)
 = 0 to 10.000 V (10 V range)
 0 to 1.0000 V (1 V range)
 0 to 100.00 mV (0.1 V range)

Example

Transmission :OSET:AMPL 1,5
 Sets the amplitude voltage of the
 output waveform for channel 1 to 5 V.

Function Sets the amplitude voltage.

Note The sum of the offset and amplitude is limited. For details, see Section 3.4.2.

Errors (Execution error)

- When the specified value cannot be set
- When DC is selected as the waveform type
- When sweep is on

:OSET:AMPLitude?

■ Queries the amplitude setting.

Syntax :OSET:AMPLitude? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
 :OSET:AMPLITUDE <ch>, <voltage>
 (Header OFF)
 <ch>,<voltage>

Example

Transmission :OSET:AMPL? 1
 Response (Header ON)
 :OSET:AMPLITUDE 1,8.345
 (Header OFF)
 1,8.34500

Function Returns the amplitude voltage for the specified channel as NR2 numerical data. Units: V

Note With this query, if any error occurs, no response message is produced.

Errors (Execution error)

- When DC is selected as the waveform type
- When sweep is on

:OSET:OFFSet

■ Sets the offset voltage.

Syntax :OSET:OFFSet <ch>,<voltage>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 <voltage> Offset voltage value (V)

Example

Transmission :OSET:OFFS 1,5
 Sets the offset voltage of output
 waveform for channel 1 to 5 V.

Function Sets the offset voltage value.

Note The sum of the offset and amplitude is limited. For details, see Section 3.4.2.

Errors (Execution error)

- When the specified value cannot be set
- When sweep is on

:OSET:OFFSet?

■ Queries the offset voltage value.

Syntax :OSET:OFFSet? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
 :OSET:OFFSET <ch>,<voltage>
 (Header OFF)
 <ch>,<voltage>

Example

Transmission :OSET:OFFS? 1
 Response (Header ON)
 :OSET:OFFSET 1,8.34500
 (Header OFF)
 1,8.34500

Function Returns the offset voltage for the specified channel as NR2 numerical data. Units: V

Note With this query, if any error occurs, no response message is produced.

Error (Execution error)
 When sweep is on

:OSET:UPLow

■ Sets the upper limit and lower limit of the output voltage.

Syntax :OSET:UPLow <ch>,<up>,<low>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 <up>
 Upper limit of the output voltage (V)
 <low>
 Lower limit of the output voltage (V)

Example

Transmission :OSET:UPL 1,5,-2.3
 Sets the output voltage range of the output waveform for channel 1 to from 5 to -2.3.

Function Sets the upper limit value of the output voltage.

Note The difference between the upper limit value and the lower limit value of the output voltage is limited.
 For details, see Section 3.4.2.

Errors (Execution error)
 • When the specified value cannot be set
 • When DC is selected as the waveform type
 • When sweep is on

:OSET:UPLow?

■ Queries the upper limit and lower limit of the output voltage.

Syntax :OSET:UPLow? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
 :OSET:UPLow <ch>,<up>,<low>
 (Header OFF)
 <ch>,<up>,<low>

Example

Transmission :OSET:UPL? 1
 Response (Header ON)
 :OSET:UPLow 1,2.38000,-2.38000
 (Header OFF)
 1,2.38000,-2.38000

Function Returns the offset voltage for the specified channel as NR2 numerical data (<up>, <low>). Units: V

Note With this query, if any error occurs, no response message is produced.

Errors (Execution error)
 • When DC is selected as the waveform type
 • When sweep is on

:OSET:PHASe

■ Sets the phase angle.

Syntax :OSET:PHASe <ch>,<phase>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 <phase> Phase (°)

Example
 Transmission :OSET:PHAS 1,180.00
 Sets the phase angle of the output waveform for channel 1 to 180.

Function Sets the phase angle.

Note The setting range is between -360.00 to 360.00.

Errors (Execution error)

- When the specified value cannot be set
- When DC, noise, or arbitrary waveform is selected as the waveform type
- When sweep is on

:OSET:PHASe?

■ Queries the phase angle.

Syntax :OSET:PHASe? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
 :OSET:PHAS <ch>,<data>
 (Header OFF)
 <ch>,<data>

Example
 Transmission :OSET:PHAS? 1
 Response (Header ON)
 :OSET:PHAS 1,90.00
 (Header OFF)
 1,90.00

Function Returns the phase angle for the specified channel as NR2 numerical data. Units: °

Note With this query, if any error occurs, no response message is produced.

Errors (Execution error)

- When DC, noise, or arbitrary waveform is selected as the waveform type
- When sweep is on

:OSET:DELAy

■ Sets the delay.

Syntax :OSET:DELAy <ch>,<data>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 <data> Delay (number of points)
 =-128000 to 128000

Example
 Transmission :OSET:DEL 1,128000
 Sets the delay for channel 1 to 128000.

Function Sets the delay

Errors (Execution error)

- When the specified value cannot be set
- When the specified waveform is not an arbitrary waveform
- When sweep is on

:OSET:DELaY?

■ Queries the delay.

Syntax :OSET:DELaY? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
 :OSET:DELaY <ch>,<data>
 (Header OFF)
 <ch>,<data>

Example

Transmission :OSET:DEL? 1
 Response (Header ON)
 :OSET:DEL 1,128000
 (Header OFF)
 1,128000

Function Returns the delay for the specified channel as NR1 numerical data (number of points).

Note With this query, if any error occurs, no response message is produced.

Errors (Execution error)

- When the specified waveform is not an arbitrary waveform
- When sweep is on

:OSET:FILTer

■ Sets the filter.

Syntax :OSET:FILTer <ch>,<data>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 <data> Frequency of filter
 = PASS
 F1MHZ 1 MHz
 F500KHZ 500 kHz
 F200KHZ 200 kHz
 F100KHZ 100 kHz
 F50KHZ 50 kHz
 F20KHZ 20 kHz
 F10KHZ 10 kHz
 F5KHZ 5 kHz
 F2KHZ 2 kHz
 F1KHZ 1 kHz
 F500HZ 500 Hz
 F200HZ 200 Hz
 F100HZ 100 Hz
 F50HZ 50 Hz

Example

Transmission :OSET:FILT 1,F100KHZ
 Sets the filter for channel 1 to 100 kHz.

Function Sets the filter.

Errors (Command error)
 When characters are specified other than those at the left.
 (Execution error)
 When the specified waveform is a sine or square wave, or DC

:OSET:FILTer?

■ Queries the filter.

Syntax :OSET:FILTer? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Example

Transmission :OSET:FILT? 1
 Response (Header ON)
 :OSET:FILTER 1,F100KHZ
 (Header OFF)
 1,F100KHZ

Function Returns the filter for the specified channel as a character data.

Note With this query, if any error occurs, no response message is produced.

Error (Execution error)
 When the specified waveform is a sine or square wave, or DC

:OSET:FREQuency

■ Sets the frequency.

Syntax :OSET:FREQuency <ch>,<freq>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 <freq>
 (Frequency of SIN and rectangular waveforms)
 = 0 to 10000000 [Hz]
 (Clock frequency of arbitrary waveform)
 = 0 to 10000000 [Hz]
 (Frequency of other waveforms)
 = 0 to 200000 [Hz]

Example

Transmission :OSET:FREQ 1,100000
 Sets the frequency for channel 1 to 100 kHz.

Function Sets the frequency of a basic waveform, or the clock frequency of a arbitrary waveform.

Errors (Execution error)

- When the specified value cannot be set
- When DC or noise is selected as the waveform type
- When sweep is on

:OSET:FREQuency?

■ Queries the frequency.

Syntax :OSET:FREQuency? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
 :OSET:FREQ <ch>,<frequency>
 (Header OFF)
 <ch>,<frequency>

Example

Transmission :OSET:FREQ? 1
 Response (Header ON)
 :OSET:FREQUENCY 1,100000.00
 (Header OFF)
 1,100000.00

Function Returns the frequency for the specified channel as NR2 numerical data.

Note With this query, if any error occurs, no response message is produced.

Errors (Execution error)

- When DC or noise is selected as the waveform type
- When sweep is on

:OSET:PERiod

■ Sets the period.

Syntax :OSET:PERiod <ch>,<period>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 <period>
 Period of SIN and rectangular waveforms
 = 100 to 0.0000001 (seconds)
 Clock period of an arbitrary waveform
 = 100 to 0.0000001 (seconds)
 Period of waveform other than custom
 = 100 to 0.000005 (seconds)

Example

Transmission :OSET:PER 1,1e-6
 Sets the frequency for channel 1 to 1 MHz.

Function Sets the frequency of a basic waveform, or the clock frequency of a arbitrary waveform.

Errors (Execution error)

- When the specified value cannot be set
- When DC or noise is selected as the waveform type
- When sweep is on

:OSET:PERiod?

■ Queries the period.

Syntax :OSET:PERiod? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
 :OSET:PER <ch>,<period>
 (Header OFF)
 <ch>,<period>

Example

Transmission :OSET:PER? 1
 Response (Header ON)
 :OSET:PERIOD 1,0.0000001
 (Header OFF)
 1,0.0000001

Function Returns the period for the specified channel as NR2 numerical data.

Note With this query, if any error occurs, no response message is produced.

Error (Execution error)
 When DC or noise is selected as the waveform type

:OSET:RANGe

■ Sets the range.

Syntax :OSET:RANGe <ch>,<range>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 <range>
 = R10V (10 V range)
 = R1V (1 V range)
 = R0_1V (0.1 V range)

Example

Transmission :OSET:RANG 1,R1V
 Sets the range for channel 1 to 1 V.

Function Sets the range.

Error (Command error)
 When characters are specified other than those at the left.
 (Execution error)
 When RUN is active.

:OSET:RANGe?

■ Queries the range.

Syntax :OSET:RANGe? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
 :OSET:RANGE <ch>,<range>
 (Header OFF)
 <ch>,<range>

Example

Transmission :OSET:RANG? 1
 Response (Header ON)
 :OSET:RANGE 1,R1V
 (Header OFF)
 1,R1V

Function Returns the range for the specified channel as a character data.

Note With this query, if any error occurs, no response message is produced.

:OSET:DUTY

■ Sets the duty.

Syntax :OSET:DUTY <ch>,<duty>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 <duty> = 1.0 to 99.0 %

Example

Transmission :OSET:DUTY 1,50
 Sets the duty for channel 1 to 50%.

Function Sets the duty cycle of a pulse waveform.

Errors (Execution error)

- When the specified value cannot be set
- When the specified waveform is not a pulse waveform
- When sweep is on

:OSET:DUTY?

■ Queries the duty.

Syntax :OSET:DUTY? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
 :OSET:DUTY <ch>,<duty>
 (Header OFF)
 <ch>,<duty>

Example

Transmission :OSET:DUTY? 1
 Response (Header ON)
 :OSET:DUTY 1,50.0
 (Header OFF)
 1,50.0

Function Returns the duty for the specified channel as NR2 numerical data.

Note With this query, if any error occurs, no response message is produced.

Errors (Execution error)

- When the specified waveform is not a pulse waveform
- When sweep is on

:OSET:TRACking

■ Perform simultaneous settings.

Syntax :OSET:TRACking <chno>,<item>
 <chno> Channels to be set
 = OFF
 = CH1_2 (Simultaneous settings for channels 1 and 2)
 = CH1_3 (Simultaneous settings for channels 1 to 3)
 = CH1_4 (Simultaneous settings for channels 1 to 4)
 <item> Item to be set simultaneously.
 = WAVE (The waveforms are set)
 = FREQuency (The frequency is set)
 = AMPLitude (The amplitude is set)
 = FILTEr (The filter is set)
 = DUTY (The duty is set)

Example

Transmission :OSET:TRAC CH1 2,AMPL
 The amplitude of channels 1 and 2 is set simultaneously.

Function Perform simultaneous settings.

Note CH1_3/CH1_4 cannot be specified on the 7075-01.

Errors (Command error)
 • When characters are specified other than those at the left.
 (Execution error)
 • When <chno> is set to CH1_3/CH1_4 with using the 7075-01
 • When sweep is on for the channel to be set simultaneously.
 • When the waveforms are set simultaneously during RUN is active.

:OSET:SWEep

■ Sets the sweep function.

Syntax :OSET:SWEep <ch>,<ON/OFF>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 <ON/OFF>
 ON: Enables the sweep function.
 OFF: Disables the sweep function.

Example

Transmission :OSET:SWE 1,ON
 Enables the sweep function for channel 1.

Function Enables or disables the sweep function.

Note Upon normal finish, EOSL in Event Status Register 0 is set.

Errors (Command error)
 When the setting data contains characters other than ON or OFF.
 (Execution error)
 • If a sweep setting, such as editing in the sweep table, has not be done at least once.
 • When RUN is active.

:OSET:SWEep?

■ Queries the sweep setting.

Syntax :OSET:SWEep? <ch>
<ch> Channel number
= 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
:OSET:SWEEP <ch>,<ON/OFF>
(Header OFF)
<ch>,<ON/OFF>

Example
Transmission :OSET:SWE? 1
Response (Header ON)
:OSET:SWEEP 1,ON
(Header OFF)
1,ON

Function Returns the sweep setting for the specified channel as a character data.

Note With this query, if any error occurs, no response message is produced.

:OSET:WAVE

■ Selects a basic waveform.

Syntax :OSET:WAVE <ch>,<wave>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 <wave>
 = SINE Sine waveform
 = SQUARE Square waveform
 = PULSE Pulse waveform
 = TRIangle Triangle waveform
 = RAMP1 Ramp-up
 = RAMP2 Ramp-down
 = NOISE Noise
 = DC DC
 = AWG Arbitrary waveform

Example

Transmission :OSET:WAVE 1,SIN
 Sets the waveform for channel 1 to SIN wave.

Function Selects a basic waveform.

- Notes**
- Frequency, amplitude and offset settings may be limited depending on the specified waveform.
 - When an arbitrary waveform is specified, the waveform is the previously specified arbitrary waveform. If no arbitrary waveform has been previously specified, an arbitrary waveform cannot be specified here.
 - Upon normal finish, EOWL in Event Status Register 0 is set.

- Errors** (Command error)
- When characters are specified other than those at the left.
- (Execution error)
- When sweep is on
 - When arbitrary waveform is specified without an arbitrary waveform having been previously specified.
 - When RUN is active.

:OSET:WAVE?

■ Queries the basic waveform

Syntax :OSET:WAVE? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
 :OSET:WAVE <ch>,<wave>
 (Header OFF)
 <ch>,<wave>

Example

Transmission :OSET:WAVE? 1
 Response (Header ON)
 :OSET:WAVE 1,SINE
 (Header OFF)
 1,SINE

Function Returns the waveform for the specified channel as a character data.

Note With this query, if any error occurs, no response message is produced.

Error (Execution error)
 When sweep is on

:OSET:AWG

■ Sets the name of the arbitrary waveform.

Syntax :OSET:AWG <ch>, "<name>"
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 "<name>" Name of the arbitrary waveform

Example
 Transmission :OSET:AWG 1,'WAVE(1)'
 Sets the name of the arbitrary waveform for channel 1 to WAVE(1).

Function Sets the name of the arbitrary waveform.

- Notes**
- The waveform name must be surrounded by single (' ') or double (" ") quotes.
 - Waveform names are case sensitive.
 - Although an arbitrary waveform can be given the name of a basic waveform, the arbitrary waveform will not be output when selected.
 - Upon normal finish, EOWL in Event Status Register 0 is set.

- Errors**
- (Command error)
 - When a waveform name is not surrounded by single (' ') or double (" ") quotes
 - (Execution error)
 - When the specified arbitrary waveform is not present
 - When RUN is active.

:OSET:AWG?

■ Queires the name of the arbitrary waveform.

Syntax :OSET:AWG? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
 :OSET:AWG <ch>,"<name>"
 (Header OFF)
 <ch>,"<name>"

Example
 Transmission :OSET:AWG? 1
 Response (Header ON)
 :OSET:AWG 1,"WAVE(1) "
 (Header OFF)
 1,"WAVE(1) "

Function Returns the name of the arbitrary waveform waveform name for the specified channel as a character data ("name")

- Notes**
- With this query, if any error occurs, no response message is produced.
 - Waveform names are displayed as up to eight characters, padded on the right with spaces.

Error (Execution error)
 If the name of the arbitrary waveform is not specified

:OSET:AWG:SIZE?

■ Queries the size of the specified arbitrary waveform.

Syntax :OSET:AWG:SIZE? "<name>"
 "<name>" Name of the arbitrary waveform

Response syntax (Header ON)
 :OSET:AWG:SIZE "<name>",<size>
 (Header OFF)
 "<name>",<size>

Example
 Transmission :OSET:AWG:SIZE? 'WAVE(1)'
 Response (Header ON)
 :OSET:AWG:SIZE "WAVE(1) ",1000
 (Header OFF)
 "WAVE(1) ",1000

Function Returns the size of the specified arbitrary waveform as NR1 numerical data.

- Notes**
- With this query, if any error occurs, no response message is produced.
 - The waveform name must be surrounded by single (' ') or double (" ") quotes.
 - Waveform names are case sensitive.
 - Waveform names of response syntax are displayed as up to eight characters, padded on the right with spaces.

- Errors** (Command error)
- When a waveform name is not surrounded by single (' ') or double (" ") quotes.
- (Execution error)
- When the specified arbitrary waveform is not present.
 - When the waveform name is not specified.

:OSET:AWG:NUMBER?

■ Queries the number of arbitrary waveform.

Syntax :OSET:AWG:NUMBER?

Response syntax (Header ON)
 :OSET:AWG:NUMBER <NR1>
 (Header OFF)
 <NR1>

Example
 Transmission :OSET:AWG:NUMB?
 Response (Header ON)
 :OSET:AWG:NUMBER 3
 (Header OFF)
 3

Function Returns the number of arbitrary waveforms as NR1 numerical data.

- Note** With this query, if any error occurs, no response message is produced.

:OSET:AWG:LIST?

■ Queries the list of arbitrary waveform names.

Syntax	:OSET:AWG:LIST?
Response syntax	(Header ON) :OSET:AWG:LIST "<name1>","<name2>","..." (Header OFF) "<name1>","<name2>","..."
Example	
Transmission	:OSET:AWG:LIST?
Response	(Header ON) :OSET:AWG:LIST "WAVE(1) ", "WAVE(2) ","WAVE(3) " (Header OFF) "WAVE(1) ","WAVE(2) ","WAVE(3) "

Function	Returns a list of arbitrary waveform names as a series of strings "<name1>,<name2> ,"
Notes	• With this query, if any error occurs, no response message is produced. • Waveform names of response syntax are displayed as up to eight characters, padded on the right with spaces.
Error	(Execution error) No waveform is present

:OSET:AWG:CLEAr

■ Deletes all arbitrary waveforms.

Syntax	:OSET:AWG:CLEAr
Example	
Transmission	:OSET:AWG:CLE

Function	Deletes all arbitrary waveforms.
Notes	• If an arbitrary waveform is assigned to a channel, it cannot be deleted. • Regardless of sweep on/off setting, if an arbitrary waveform is assigned to a channel, it cannot be deleted.
Errors	(Execution error) • If an arbitrary waveform is assigned to a channel • Regardless of sweep on/off setting, if an arbitrary waveform is assigned to a channel

:OUT

■ Sets the output relay.

Syntax	:OUT <ch>,<ON/OFF> <ch> Channel number = 1 to 4 (1 to 2 for the 7075-01) <ON/OFF> ON: Enables the output relay. OFF: Disables the output relay.
Example	
Transmission	:OUT 1,ON Enables the output relay for channel 1.

Function	Enables and disables the output relay.
Error	(Command error) When characters are specified other than those at the left.

:OUT?

■ Queries the output relay setting.

Syntax :OUT? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
 :OUT <ch>,<ON/OFF>
 (Header OFF)
 <ch>,<ON/OFF>

Example

Transmission :OUT? 1
 Response (Header ON)
 :OUT 1,ON
 (Header OFF)
 1,ON

Function Returns the relay setting for the specified channel as a character data.

Note With this query, if any error occurs, no response message is produced.

:RUN

■ Starts output.

Syntax :RUN

Example

Transmission :RUN

Function Starts output.

Note Output cannot be started during a system memory test.

Error (Execution error)
 During a system memory test.

:RUN?

■ Query the output status

Syntax :RUN?

Response syntax (Header ON)
 :RUN <0/1>
 (Header OFF)
 <0/1>

Example

Transmission :RUN?
 Response (Header ON)
 :RUN 1
 (Header OFF)
 1

Function Returns the output setting as NR1 numerical data.

0: stop
 1: output

Note With this query, if any error occurs, no response message is produced.

:STOP

■ Stops the output.

Syntax :STOP

Example
Transmission :STOP

Function Stops the output.

:TRIG

■ Execute trigger

Syntax :TRIG

Example
Transmission :TRIG

Function Execute trigger

- Notes**
- The TRIG key is lit when the trigger is enabled.
 - Executing when the trigger is disabled does not cause an error.

:LOAD:LOAD

■ Load waveform

Syntax :LOAD:LOAD "<name>",<model>,<ch>,<word>,<atn>
 "<name>" File name
 <model> Model number of originating device
 = 0 Auto detect model number
 = 1 8852
 = 2 8853
 = 3 8806, 8806-01
 = 4 Text (CSV)
 = 5 8835, 8835-01
 = 6 8841, 8842
 = 7 8826
 = 8 8840, 8825
 = 9 7990
 = 10 7075, 7075-01
 = 11 7070
 = 12 Text
 = 13 8807-01,8807-51,8808-01,8808-51
 = 14 8855
 <ch> Reading the channel number
 <word> Reading the number of data
 <atn> Damping ratio
 = AUTO
 Determine damping ratio automatically
 =A1
 Fix the damping ratio as 1
 =A0_1
 Fix the damping ratio as 1/10.
 =A0_01
 Fix the damping ratio as 1/100

Example

Transmission :LOAD:LOAD 'WAVE.MEM',0,1,1000,AUTO
 Automatically determine the model on which the WAVE.MEM file was created, and load 1000 data words for channel 1 with automatic damping ratio determination.

Function Loads the specified waveform data file, such as a waveform data file created by a Memory HiCorder, from the floppy disk.

- Notes**
- The file name must be surrounded by single (' ') or double (" ") quotes.
 - Long file names cannot be used. File names are case sensitive.
 - A file name cannot include a directory. Loading can be done only from the current directory.
 - Channel numbers can be confirmed by the ":LOAD:LOAD?" query. Unavailable channel numbers cannot be specified as channel numbers to load. Numbers other than 1 to 32 are treated as channel 1.
 - The maximum loadable data size is 128000 words.
 - File load data size can be confirmed by the ":LOAD:LOAD?" query.
 - A maximum of 8 waveforms can be loaded.
 - When the load finishes normally, EOWL in Event Status Register 0 is set.
 - When using the text data, set <word> to 128000 to read the maximum number of data.

- Errors** (Command error)
- When a waveform name is not surrounded by single (' ') or double (" ") quotes
 - When a string other than those at the left is specified for the damping ratio (Execution error)
 - When the specified file does not exist
 - When the specified file is not a data file
 - When an unavailable channel is specified as the channel to be loaded
 - When the specified load data size exceeds the size of the file data
 - When 8 waveforms have already been loaded
 - When RUN is active.

:LOAD:LOAD?

■ Query waveform file information

Syntax :LOAD:LOAD? "<name>"
 "<name>" File name

Response syntax (Header ON)
 :LOAD:LOAD "<name>",<model>,"<ch>",<data>
 (Header OFF)
 "<name>",<model>",<ch>",<data>

Example

Transmission :LOAD:LOAD? 'WAVE.MEM'
 Response (Header ON)
 :LOAD:LOAD "WAVE.MEM",1,"0100",1000
 (Header OFF)
 "WAVE.MEM",1,"0100",1000
 The examples shows that the waveform file is named WAVE.MEM, the source model name is 8852, and the channel 2 data is 1000 words in length.

Function

Loads waveform information about the specified file.

<model>

The default originating model number is returned in NR1 format.

1 8852
 2 8853
 3 8806, 8806-01
 4 Text (CSV)
 5 8835, 8835-01
 6 8841, 8842
 7 8826
 8 8840, 8825
 9 7990 (WAVEFORM CREATION SOFTWARE)
 10 7075, 7075-01
 11 7070
 12 Text
 13 8807-01, 8807-51, 8808-01, 8808-51
 14 8855

<ch>

Available channel information is returned as a string of four digits, signifying channels 1 to 4:

'1': indicates a available channel

'0': indicates an unavailable channel

Example:

"1010" indicates available channel data for channels 1 and 3, but none for channels 2 and 4.

<data>

The size of data available for loading is returned in NR1 numeric format.

Notes

- With this query, if any error occurs, no response message is produced.
- The file name must be surrounded by single (' ') or double (" ") quotes.
- Long file names cannot be used. File names are case sensitive.
- A file name cannot include a directory. Loading can be done only from the current directory.
- When the load finishes normally, EOWL in Event Status Register 0 is set.

Errors

(Command error)

- When a waveform name is not surrounded by single (' ') or double (" ") quotes

(Execution error)

- When the specified file does not exist
- When the specified file is not a data file

:LOAD:SWEep

■ Load sweep file

Syntax :LOAD:SWEep "<name>",<ch>
 "<name>" Sweep file name
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Example

Transmission :LOAD:SWE 'SWEEP.SDT',1
 Reads the sweep data of the SWEEP.SDT file into channel 1.

Function Loads a sweep data file from the floppy disk, and converts to sweep data for the specified channel.

- Notes**
- The file name must be surrounded by single (' ') or double (" ") quotes.
 - Long file names cannot be used. File names are case sensitive.
 - A file name cannot include a directory. Loading can be done only from the current directory.
 - Turn on the sweep setting to enable the sweep function.
 - To load the sweep file of an arbitrary waveform, confirm that the waveform is present. If the waveform is not present, the sweep status cannot be loaded.
 - When the load finishes normally, EOSL in Event Status Register 0 is set.

- Errors**
- (Command error)
 When a waveform name is not surrounded by single (' ') or double (" ") quotes
- (Execution error)
- When the specified arbitrary waveform as sweep waveform is not present.
 - When the sweep data is not converted such as RUN active.

8.3.4 Specific Commands for Floppy Disk

:FILE:SAVE

■ Writes to the floppy disk as the status settings file

Syntax :FILE:SAVE "<file>"
 "<file>" Name of status settings file

Example
Transmission :FILE:SAVE 'OUTSET.OUT'
Creates and saves output status settings in the OUTSET.OUT setting file.

Function Current settings are written to the floppy disk as the status settings file with the specified file name.

- Notes**
- The file name must be surrounded by single (' ') or double (" ") quotes.
 - Long file names cannot be used. File names are case sensitive.
 - A file name cannot include a directory. Loading can be done only from the current directory.
 - When the load finishes normally, EOFO in Event Status Register 0 is set.
 - The file name may consist of capital letters and ! # % \$ - ^ and _ characters. The name must conform to the "8.3" MS-DOS file naming format. Lower-case letters are converted to capitals.

Example
OUTSET.OUT, 123FILE, F-01.FIL

- Errors**
- (Command error)
When a waveform name is not surrounded by single (' ') or double (" ") quotes
- (Execution error)
- Writing is inhibited by the write-protect tab on the media.
 - When already existing file is specified.

:FILE:LOAD

■ Loads the status settings contained in the file.

Syntax :FILE:LOAD "<file>"
 "<file>" Name of status setting file

Example
 Transmission :FILE:LOAD 'OUTSET.OUT'
 Reads the OUTSET.OUT file.

Function Loads the status settings contained in the file with the specified name from the floppy disk.

- Notes**
- The file name must be surrounded by single (' ') or double (" ") quotes.
 - Long file names cannot be used. File names are case sensitive.
 - A file name cannot include a directory. Loading can be done only from the current directory.
 - When an arbitrary waveform file is specified for loading the status of a channel, the arbitrary waveform that has been entered is deleted.
 - When the load finishes normally, EOFO in Event Status Register 0 is set.

Errors (Command error)
 When a file name is not surrounded by single (' ') or double (" ") quotes
 (Execution error)
 While RUN is active

:FILE:DELeTe

■ Deletes files.

Syntax :FILE:DELeTe "<file>"
 "<file>"= File name

Example
 Transmission :FILE:DEL 'OUTSET.OUT'
 Deletes the OUTSET.OUT file.

Function Deletes the specified file or directory from the floppy disk.

- Notes**
- The file name must be surrounded by single (' ') or double (" ") quotes.
 - Long file names cannot be used. File names are case sensitive.
 - A file name cannot include a directory. Deleting can be done only from the current directory.
 - When the load finishes normally, EOFO in Event Status Register 0 is set.

Errors (Command error)
 When a waveform name is not surrounded by single (' ') or double (" ") quotes
 (Execution error)
 When deletion fails due to write protection

:FILE:FORMat

■ Formats the floppy disk.

Syntax :FILE:FORMat

Example
Transmission :FILE:FORMAT
Formats a disk.

Function Formats (initializes) the floppy disk in MS-DOS format.

Notes

- All contents of the floppy disk are deleted.
- A 2HD disk formats to 1.44 MB, and a 2DD disk formats to 720 KB.
- When the load finishes normally, EOFO in Event Status Register 0 is set.

Error (Execution error)
When deletion fails due to write protection

:FILE:CHDir

■ Changes the current directory

Syntax :FILE:CHDir "<dir>"
" <dir>" Directory name

Example
Transmission :FILE:CHD 'DIR1'
Moves the current directory to DIR1.

Function Changes the current directory to the specified directory.

Notes

- The file name must be surrounded by single (' ') or double (" ") quotes.
- Long file names cannot be used. Directory names are case sensitive.
- Multiple directories cannot be specified simultaneously. Move to the relative path from the current directory. The absolute path cannot be specified.
- When the load finishes normally, EOFO in Event Status Register 0 is set.

Errors (Command error)
When a waveform name is not surrounded by single (' ') or double (" ") quotes
(Execution error)
Specifying a non-existent directory results in an execution error.

:FILE:DIR?

■ Queries the current directory.

Syntax :FILE:DIR?

Example

Transmission :FILE:DIR?
 Response (Header ON)
 :FILE:DIR "/DIR1/DIR2/DIR3/"
 (Header OFF)
 "/DIR1/DIR2/DIR3/"
 The current directory is
 /DIR1/DIR2/DIR3/.

Function

Returns the current directory as character data.

"/dir 1/dir 2/.../"

Returns the absolute path from the root. The separator symbol is displayed as '/'.

Notes

- The longest directory name that can be returned is 48 characters.
- When the load finishes normally, EOFO in Event Status Register 0 is set.

Error

If the floppy disk is not inserted, an execution error occurs.

:FILE:FILE?

■ Queries the number of files in current directory.

Syntax :FILE:FILE?

Response syntax

(Header ON)
 :FILE:FILE <NR1>
 (Header OFF)
 <NR1>

Example

Transmission :FILE:FILE?
 Response (Header ON)
 :FILE:FILE 3
 (Header OFF)
 3
 The current directory contains three files and directories.

Function

Returns the number of files in current directory as NR1 numerical data including directories.

Notes

- When the load finishes normally, EOFO in Event Status Register 0 is set.
- The directories names "." and ".." are included in the count for all directories except the root. So the minimum <data> value is 0 for the root directory, and 2 for all other directories.

Error

If the floppy disk is not inserted, an execution error occurs.

:FILE:LIST?

■ Query a file list of the current directory

Syntax :FILE:LIST?

Response syntax (Header ON)
:FILE:LIST "<file1>","<file2>",...
(Header OFF)
"<file1>","<file2>",...

Example

Transmission :FILE:LIST?
Response (Header ON)
:FILE:LIST"FILE1.DAT","FILE2.DAT"
(Header OFF)
"FILE1.DAT","FILE2.DAT"
The current directory contains
FILE1.DAT and FILE2.DAT files.

Function The names of the files and directories in the current directory are returned as character strings.
"<file1>","<file2>" ,...

Notes

- When the load finishes normally, EOFO in Event Status Register 0 is set.
- All file and directory names are displayed in "8.3" MS-DOS file name format.

Error (Execution error)

- If the floppy disk is not inserted
- When there is no file in the root directory.

:FILE:INFor?

■ Query the file type

Syntax :FILE:INFor? "<name>"
"<name>" File name

Response syntax (Header ON)
:FILE:INFOR "<name>",<type>
(Header OFF)
"<name>",<type>
<type> = FILE/ DIRECTORY

Example

Transmission :FILE:INF? "FILE1.DAT"
Response (Header ON)
:FILE:INFOR "FILE1.DAT",FILE
(Header OFF)
"FILE1.DAT",FILE
"FILE1.DAT" shows a file.

Function Returns a string indicating the type of file: either FILE or DIRECTORY.

Notes

- When the load finishes normally, EOFO in Event Status Register 0 is set.
- With this query, if any error occurs, no response message is produced.
- The file name must be surrounded by single (' ') or double (" ") quotes.
- Long file names cannot be used. File names are case sensitive.
- A file name cannot include a directory. Loading can be done only from the current directory.

Error (Execution error)

- If the floppy disk is not inserted
- When the specified file does not exist

8.3.5 Specific Commands for Data Input

:MEMory:WAVE:RECeive? (GP-IB only)

■ Outputs the arbitrary waveform data.

Syntax :MEMory:WAVE:RECeive? "<name>"
 "<name>" Waveform name

Response syntax (Header ON)
 :MEMORY:WAVE:RECEIVE
 "<name>",<range>,<freq>,<amp>,<offset>,<no>,<#0<binary1u><binary1l><binary2u><binary2l>...<binaryNu><binaryNl>[NL]
 (Header OFF)
 "<name>",<range>,<freq>,<amp>,<offset>,<words>,<#0<binary1u><binary1l><binary2u><binary2l>...<binaryNu><binaryNl>[NL]

Example

Transmission :MEM:WAVE:REC? 'WAVE1'
Response (Header ON)
 :MEMORY:WAVE:RECEIVE "WAVE1",
 R10V,10000000.00,10.00000,0.00000,
 5,#000007D007D0083008300[NL]
 (Header OFF)
 "WAVE1",R10V,10000000.00,
 10.00000,0.00000,5,#000007D007D00
 83008300[NL]
 Reads the data of the waveform named WAVE1. The range is 10 V, clock frequency is 10 MHz, amplitude is 10 V, offset is 0 V and there are five data points: 0 V, 10 V, 10 V, -10 V and -10 V.
Reference
 0 V = 0000_D = 0000_H
 10 V = 32000_D = 7D00_H
 -10 V = -32000_D = 8300_H

*1:

<binary> format
 <binary1u><binary1l><binary2u><binary2l>...<binaryNu><binaryNl>
 <binary1u> The upper byte of the first waveform data word
 <binary1l> The lower byte of the first waveform data word
 <binaryNu> The upper byte of the Nth waveform data word
 <binaryNl> The lower byte of the Nth waveform data word
 Each data word consists of two bytes. The maximum amplitude is indicated by 32000 to -32000. (10 V to -10V). See Appendix 1.

Function <range>
 Returns the range as character.
 =R10 V (10 V range)
 =R1 V (1 V range)
 =R0_1 V (0.1 V range)
 <freq>
 Returns the clock frequency as NRf numerical data. Unit: Hz
 <amp>
 Returns the amplitude as NRf numerical data. Unit: V
 <offset>
 Returns the offset as NRf numerical data. Unit: V
 <no>
 Returns the number of data as NRf numerical data. Unit: V
 #0<binary>[NL]*1 (see below)
 Returns the waveform data as binary data.
 The head of the binary data is prefixed by "#0" (23h, 30h), and the data is terminated by (0Ah) + (EOF) to signify [NL].

Note Waveform names are case sensitive.

Error (Execution error)
 If the specified waveform does not exist.

:MEMory:WAVE:ADATa

Syntax :MEMory:WAVE:ADATa
 "<name>",<range>,<freq>,<amp>,<offset>,<no.>,<wave1>,<wave2>...<waveN>
 "<name>" Waveform name
 <range> Character string
 =R10V (10 V range)
 =R1V (1 V range)
 =R0_1V (0.1 V range)
 <freq> Clock frequency is specified in NRf data format
 =10e+6 to 0 (Units: Hz)
 <amp> Amplitude value is specified in NRf data format (Units: V)
 <offset> Offset value is specified in NRf data format (Units: V)
 The sum of the offset and the amplitude must not exceed the voltage range.
 <no.> The number of data is specified in NRf data format.
 = up to 128000
 <wave1> to <waveN>
 Waveform data is specified in NRf data format (Units: V)
 Output voltage = (waveform data x amplitude/range)+offset
 When amplitude = range (10/1/0.1) and offset =0, output voltage = waveform data
 The amplitude and offset values must not exceed specified range.

Example

Transmission :MEM:WAVE:ADATA
 'WAVE1',R10V,10e6,10,0,5,0,10,10,-10,-10
 Writes the data of the waveform named WAVE1. The range is 10 V, clock frequency is 10 MHz, amplitude is 10 V, offset is 0 V and there are five data points: 0 V, 10 V, 10 V, -10 V and -10 V.

Function A set of arbitrary waveform data items is input.

- Notes**
- Lower-case characters are converted to upper case.
 - If a waveform with the same name already exists, its data is overwritten.
 - The file name must be surrounded by single (' ') or double (" ") quotes.
 - A maximum of 8 waveforms can be input.
 - The waveform name may consist of capital letters and ! # % \$ - ^ and _ characters. The name must conform to the "8.3" MS-DOS file naming format. Lower-case letters are converted to capitals.
 - DBCS characters cannot be used.

Example

WAVE1, 123WAVE,WAVE-01

- Errors** (Execution error)
- When 8 waveforms are already present
When frequency, amplitude, offset or data values are out of range
 - When RUN is active.
- (Command error)
- When the range is specified by an improper string

:MEMory:WAVE:SEND (GP-IB only)

■ Input arbitrary waveform data

Syntax :MEMory:WAVE:SEND "<name>",
 <range>, <freq>, <amp>, <offset>,
 <no.>,#0<binary1u><binary1l>
 <binary2u><binary2l>...<binaryNu>
 <binaryNl>[NL]
 "<name>" Waveform name
 <range> Character string
 = R10V (10 V range)
 = R1V (1 V range)
 = R0_1V (0.1 V range)
 <freq> Clock frequency is specified in
 NRf data format
 = 10e+6 to 0 (Units: Hz)
 <amp> Amplitude value is specified in
 NRf data format (Units: V)
 <offset> Offset value is specified in
 NRf data format (Units: V)
 The sum of the offset and the
 amplitude must not exceed the
 voltage range.
 <no.> The number of data is specified
 in NRf data format.
 = up to 128000
 #0<binary>[NL]*1
 Sets the waveform data as binary
 data.
 The head of the binary data is
 prefixed by "#0" (23h, 30h), and the
 data is terminated by (0Ah) + (EOF)
 to signify [NL].

Example

Transmission

```
:MEMORY:WAVE:SEND 'WAVE1',
R10V,10e6,10,0,5,#000007D007D0083
008300[NL]
```

Writes the data of the waveform
 named WAVE1. The range is 10 V,
 clock frequency is 10 MHz, amplitude
 is 10 V, offset is 0 V and there are
 five data points: 0 V, 10 V, 10 V,
 -10 V and -10 V.

Reference

0 V = 0000_D = 0000_H
 10 V = 32000_D = 7D00_H
 -10 V = -32000_D = 8300_H

*1:

<binary> format
 <binary1u><binary1l><binary2u><binary2l>...<binaryNu><binaryNl>
 <binary1u> The upper byte of the first waveform data word
 <binary1l> The lower byte of the first waveform data word
 <binaryNu> The upper byte of the Nth waveform data word
 <binaryNl> The lower byte of the Nth waveform data word
 Each data word consists of two bytes. The maximum amplitude is
 indicated by 32000 to -32000. (10 V to -10V). See Appendix 1.

Function A set of arbitrary waveform data items
 is input using the specified formats.

- Notes**
- Lower-case characters are converted to upper case.
 - If a waveform with the same name already exists, its data is overwritten.
 - A maximum of 8 waveforms can be input.
 - The file name must be surrounded by single (' ') or double (" ") quotes.
 - The waveform name may consist of capital letters and ! # % \$ - ^ and _ characters. The name must conform to the "8.3" MS-DOS file naming format. Lower-case letters are converted to capitals.
 - DBCS characters cannot be used.

Example

WAVE1, 123WAVE,WAVE-01

- Upon normal finish, EOWL in Event Status Register 0 is set.
- Several seconds will be required if there is a large amount of waveform data to be written.

Errors (Execution error)

- When 8 waveforms are already present
- When frequency, amplitude, offset or data values are out of range
- When the sweep data is not converted such as RUN active.

(Command error)

- When the range is specified by an improper string

:MEMory:SWEep:RECeive? (GP-IB only)

■ Outputs the sweep data.

Syntax :MEMory:SWEep:RECeive? <ch>
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)

Response syntax (Header ON)
 :MEMORY:SWEEP:RECEIVE
 #0<binary>[NL]
 (Header OFF)
 #0<binary>[NL]

Function Returns the sweep data in binary format through the GP-IB to be stored on the PC.
 #0<binary>[NL]
 Returns the sweep data in binary format.
 The head of the binary data is prefixed by "#0" (23h, 30h), and the data is terminated by (0Ah) + (EOF) to signify [NL].

- Notes**
- This sweep data is in a special format for storage on the PC. The contents of the data cannot be determined in this format.
 - To restore the loaded sweep data, use the :MEMORY:SWEEP:SEND command.

Error (Execution error)
 When no sweep data exists

:MEMory:SWEep:SEND (GP-IB only)

■ Input sweep data

Syntax :MEMory:SWEep:SEND
 <ch>,#0<binary>[NL]
 <ch> Channel number
 = 1 to 4 (1 to 2 for the 7075-01)
 #0<binary>[NL]
 Input loaded sweep data by the :MEMORY:SWEEP:RECEIVE? query.
 The head of the binary data is prefixed by "#0" (23h, 30h), and the data is terminated by (0Ah) + (EOF) to signify [NL].

Example
 Transmission :MEMORY:WAVE:SEND 1,#0<binary>[NL]
 Enter the sweep data to channel 1.

Function Input loaded sweep data by the :MEMORY:SWEEP:RECEIVE? query.

- Notes**
- The sweep data to be input should be the same as the contents loaded by the :MEMORY:SWEEP:RECEIVE? query. If the contents are changed, the operation cannot be guaranteed.
 - Upon normal finish, EOSL in Event Status Register 0 is set.
 - The sweep will not be output merely by inputting the sweep data with this command. Set the sweep setting on.

Error (Execution error)
 When sweep data is abnormal

8.3.6 Specific Commands for Others

:HEADer

■ Enables and disables the headers.

Syntax :HEADer <ON/OFF>

Example

Transmission :HEAD OFF
Disables the header.

Function Enables or disables the headers of the response message from the unit.

Error (Command error)
When the setting data contains characters other than ON or OFF.

:HEADer?

■ Queries the headers enablement.

Syntax :HEADer?

Response syntax (Header ON)
:HEADER <ON/OFF>
(Header OFF)
<ON/OFF>

Example

Transmission :HEAD?
Response (Header ON)
:HEADER ON
(Header OFF)
OFF

Function Returns the current setting of headers.

Note With this query, if any error occurs, no response message is produced.

:ESE0 (GP-IB only)

■ Sets the event status enable register 0.

Syntax :ESE0 <NR1>
<NR1>= 0 to 255
(NR1 numerical data)

Example

Transmission :ESE0 128
Enables ESER0 bit7.

Function

- Loads the effective format of the Event Status Register (ESR0) into the Event Status Enable Register (ESER0).
- Decimals are rounded off.

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
EOFL	EOWL	EOSL	EORO	Reserved			

Note When the power is turned on, the data is reinitialized to 0.

Errors (Execution error)
When the value is outside of the setting range
(Command error)
When <NR1> was not in NRf format.

:ESE0? (GP-IB only)

■ Queries the event status enable register 0.

Syntax :ESE0?
Response syntax (Header ON)
ESE0 <0-255>
(Header OFF)
<0-255>

Example
Transmission :ESE0?
Response (Header ON)
:ESE0 128
(Header OFF)
128

Function Returns the contents of the event status enable register 0 (ESER0) as a NR1 value (0 to 255).

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
EOFL	EOWL	EOSL	EORO	Reserved			

Notes With this query, if any error occurs, no response message is produced.

:ESR0?

■ Queries the event status register.

Syntax :ESR0?
Response syntax (Header ON)
ESR0 <0-255>
(Header OFF)
<0-255>

Example
Transmission :ESR0?
Response (Header ON)
:ESR0 128
(Header OFF)
128
Terminates the reading out of the file.

Function Returns the contents of SESR as NR1 value (0 to 255), and clears the data.

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
EOFL	EOWL	EOSL	EORO	Reserved			

Notes With this query, if any error occurs, no response message is produced.

:COM:TERMinator (RS-232C only)

■ Sets the terminator of response message.

Syntax :COM:TERMinator <0/1/2>
<0>: LF
<1>: CR+LF
<2>: CR (when powering on)

Example
Transmission :COM:TERM 1
Set the terminator of response message to CR+LF.

Function Sets the response message terminator of RS-232C interface.

:COM:TERMinator? (RS-232C only)

■ Queries the response message terminator setting.

Syntax :COM:TERMinator?

Response syntax (Header ON)
:COM:TERM <0/1/2>
(Header OFF)
<0/1/2>

Example

Transmission :COM:TERM?
Response (Header ON)
:COM:TERM 1
(Header OFF)
1

Function Returns the current setting of terminator as NR1 numerical data.

Note With this query, if any error occurs, no response message is produced.

:COM:ERRor (RS-232C only)

■ Sets the command error display.

Syntax :COM:ERRor <ON/OFF>

Example

Transmission :COM:ERROR ON
Displays the command error display.

Function Enables or disables the command error display of the RS-232C interface.

Error (Command error)
When the character data other than ON or OFF is set.

:COM:ERRor? (RS-232C only)

■ Queries the command error display setting.

Syntax :COM:ERRor?

Response syntax (Header ON)
:COM:ERROR <ON/OFF>
(Header OFF)
<ON/OFF>

Example

Transmission :COM:ERROR?
Response (Header ON)
:COM:ERROR ON
(Header OFF)
ON

Function Returns the current setting of command error display as character data (ON/OFF).

8.4 GP-IB Command Summary

8.4.1 Standard Commands

Commands	Explanation
System data queries	
*IDN?	Queries device ID.
Internal operation commands and queries	
*RST	Device initial setting.
*TST?	Queries the result of the self-test.
Synchronized drive commands and queries	
*OPC	Sets the LSB (bit0) of SESR after all action has been completed.
*OPC?	Queries whether all action has been completed. ASCII [1] is the response.
*WAI	Finishes executing all previous commands before executing subsequent commands
Status and event control commands and queries	
*CLS	Clear STATUS BYTE and related queue (flush the output queue)
*ESE	Writes SESER.
*ESE?	Reads SESER.
*ESR?	Reads and clears SESR.
*SRE	Writes SRSE.
*SRE?	Reads SRER.
*STB?	Reads the STB and MSS bits, without performing serial polling.

8.4.2 Specific Commands

Environment Settings

:SYSTem Miscellaneous settings			
Commands	Parameters <ch>=channel no.		
	Transmission	Response	Parameter explanation
:SYSTem:BEEPer	ON/OFF		Sets the beep sound.
:SYSTem:BEEPer?	ON/OFF		Query
:SYSTem:CRT	ON/OFF		Sets LCD backlight auto off
:SYSTem:CRT?	ON/OFF		Query
:SYSTem:DATE	<year>,<month>,<day>		<year>=0 to 90 (NR1) <month>=1 to 12 (NR1) <day>=1 to 31 (NR1)
:SYSTem:DATE?	<year>,<month>,<day>		Query
:SYSTem:TIME	<hour>,<min>,<sec>		<hour>= 0 to 23(NR1) <min>= 0 to 59 (NR1) <sec>= 0 to 59 (NR1)
:SYSTem:TIME?	<hour>,<min>,<sec>		Query
:SYSTem:SYNChro	OFF/MASTer/SLAVE		Selects master or slave operation
:SYSTem:SYNChro?	OFF/MASTER/SLAVE		Query
:SYSTem:LANGUage	JAPANEse/ENGLish		Sets the display language.
:SYSTem:LANGUage?	JAPANESE/ENGLISH		Query

Output settings

:OSET Switches to Output Setting Screen			
Commands	Parameters <ch>=channel no.		
	Transmission	Response	Parameter explanation
:OSET:AMPLitude	<ch>,<amp>		<amp>=output voltage value (NRf) [Unit: V]
:OSET:AMPLitude?	<ch>	<ch>,<amp>	Query
:OSET:OFFSet	<ch>,<offset>		<offset>=offset voltage value (NRf) [Unit: V]
:OSET:OFFSet?	<ch>	<ch>,<offset>	Query
:OSET:UPLow	<ch>,<up>,<low>		NRf [Unit: V]
:OSET:UPLow?	<ch>	<ch>,<up>,<low>	Query
:OSET:PHASe	<ch>,<phase>		NRf [Unit: deg]

:OSET Switches to Output Setting Screen			
Commands	Parameters <ch>=channel no.		
	Transmission	Response	Parameter explanation
:OSET:PHASe?	<ch>	<ch>,<phase>	Query
:OSET:DELay	<ch>,<delay>		NRf (number of data)
:OSET:DELay?	<ch>	<ch>,<delay>	Query
:OSET:FILTer	<ch>,<freq>		<freq>=PASS/F1MHZ/ F500KHZ/ F200KHZ/ F100KHZ/ F50KHZ/ F20KHZ/ F10KHZ/ F5KHZ/ F2KHZ/ F1KHZ/ F500HZ/ F200HZ/ F100HZ/ F50HZ
:OSET:FILTer?	<ch>	<ch>,<freq>	Query
:OSET:FREQuency	<ch>,<freq>		<freq>=NRf [Unit: Hz]
:OSET:FREQuency?	<ch>	<ch>,<freq>	Query
:OSET:PERiod	<ch>,<period>		<period>=NRf [Unit:s]
:OSET:PERiod?	<ch>	<ch>,<period>	Query
:OSET:RANGe	<ch>,<range>		<range>=R10V/R1V/ R0_1V
:OSET:RANGe?	<ch>	<ch>,<range>	Query
:OSET:DUTY	<ch>,<duty>		<duty>=NRf [Unit:%]
:OSET:DUTY?	<ch>	<ch>,<duty>	Query
:OSET:TRACking	<ch>,<item>		<ch>=OFF/CH1_2/ CH1_3/ CH1_4 <item>=WAVE/ FREQuency/ AMPLitude/ FILTer/ DUTY
:OSET:SWEep	<ch>,ON/OFF		Enables sweep
:OSET:SWEep?	<ch>	<ch>,ON/OFF	Query
:OSET:WAVE	<ch>,<wave>		<ch>=1 to 4 <wave>=SINe/SQUare/ PULSe/TRIangle/ RAMP1/RAMP2/ NOISe/DC/AWG
:OSET:WAVE?	<ch>	<ch>,<wave>	Query
:OSET:AWG	<ch>,"<wave>"		"<wave>"= waveform name
:OSET:AWG?	<ch>	<ch>,"<wave>"	Query
:OSET:AWG:SIZE?	"<wave>"	"<wave>",<size>	<size>=NR2 (number of data)
:OSET:AWG: NUMBer?	<number>		<number>=NR2 (Readable waveform number)

8.4.2 Specific Commands

:OSET Switches to Output Setting Screen				
Commands	Parameters <ch>=channel no.			Explanation
	Transmission	Response	Parameter explanation	
:OSET:AWG:LIST?		"<wave1>", "<wave2>",...	<waveN>= Readable waveform name list (character)	Query
:OSET:CLEar				Deletes all waveform.
:OUT	<ch>,ON/OFF			Sets the output.
:OUT?	<ch>	<ch>,ON/OFF		Query
:RUN				Start the output.
:RUN?		0/1	0 (during stop) 1 (during output)	Query
:STOP				Stops the output.
:TRIG				Trigger

Waveform input

:LOAD

Commands	Parameters			Explanation
	Transmission	Response	Parameter explanation	
:LOAD:LOAD	"<file>",<model>,<ch>,<word>,<atn>		"<file>"= File name <model>=0 to 11 (NRf) <word>= number of words to load (NRf) <atn>= attenuation A1/A0_1/A0_01/AUTO	Reads the waveform file. (Information of the waveform file)
:LOAD:LOAD?	"<file>"	"<file>",<model>,<ch>",<word>	"<ch>"=0(none)/1(present)	Query
:LOAD:SWEep	"<file>",<ch>			Reads the sweep file.

Disk

:FILE				
Commands	Parameters			Explanation
	Transmission	Response	Parameter explanation	
:FILE:SAVE	"<file>"			Saves the setting file.
:FILE:LOAD	"<file>"			Loads the setting file.
:FILE:DELeTe	"<file>"/"<dir>"		"<dir>"= directory name	Deletes the file or directroy.
:FILE:FORMat				Formats a disk.
:FILE:CHDir	"<dir>"			Changes the current directory.
:FILE:DIR?		"<dir>"		Queries the current directory name.
:FILE:FILE?		<no.>	<no.>=Number of files (NR1)	Queries the number of files in the current directory.
:FILE:LIST?	"<file1>","<file2>","..."			Queries the list of file name in the current directory.
:FILE:INFor?	"<file>"	"<file>","FILE/DIRECTORY"		Queries whether a file or directory

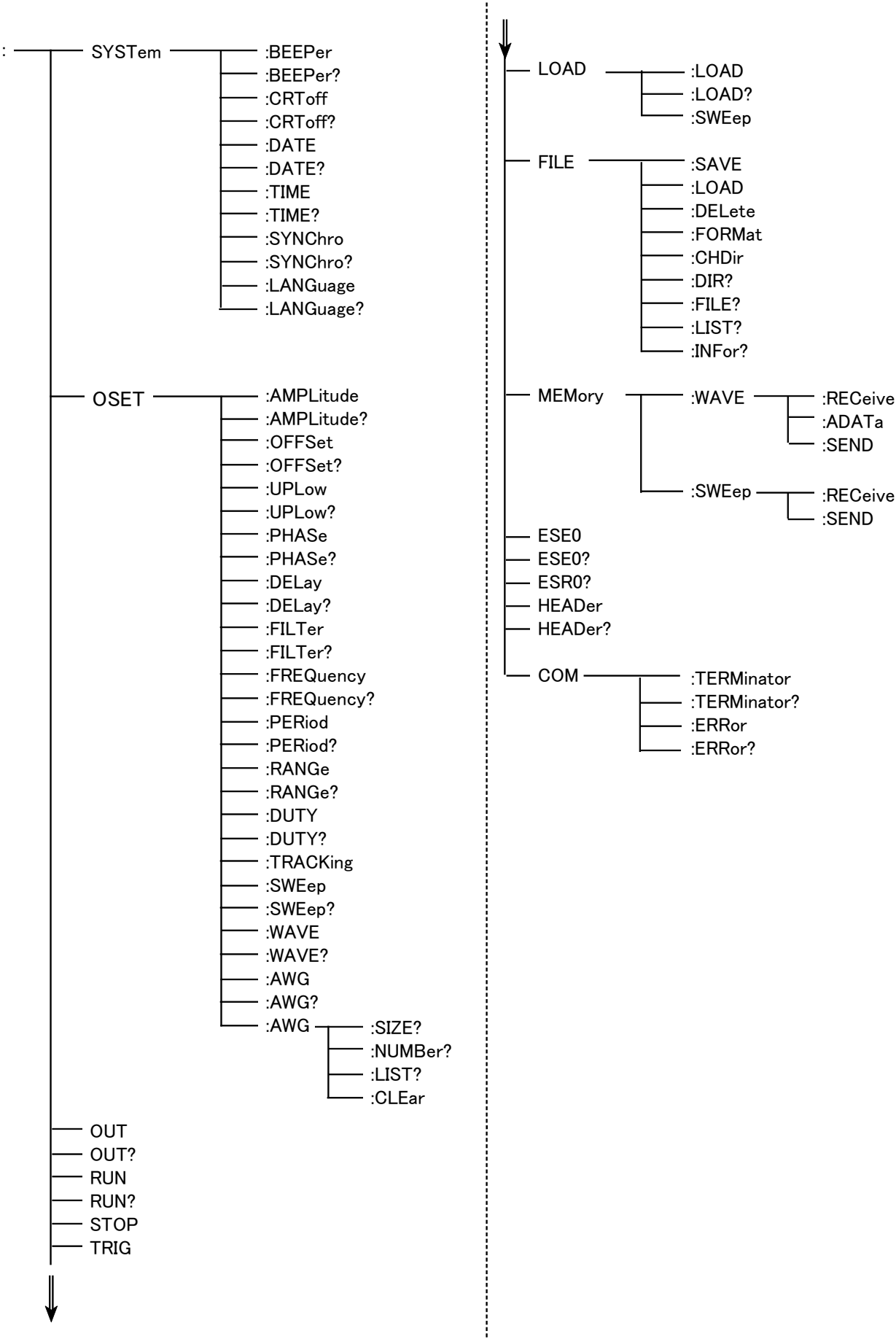
Data input

:MEMory				
Commands	Parameters			Explanation
	Transmission	Response	Parameter explanation	
:MEMory:WAVE:RECeive?	"<name>"	"<name>"<range>,<freq>,<amp>,<offset>,<no.>,<#0<binary>[NL]	"<name>"=waveform name <range>=R10V/R1V/R0_1V <freq>=clock frequency (NRf) <amp>=amplitude (NRf) Unit:V <offset>=offset (NRf) <no.>= data count NR1[words] <#0<binary>[NL]= waveform data (binary format)	Outputs the waveform data.
:MEMory:WAVE:ADATa	"<name>"<range>,<freq>,<amp>,<offset>,<no.><wave>		<wave>=waveform data	Enters the waveform data.
:MEMory:WAVE:SEND	"<name>"<range>,<freq>,<amp>,<offset>,<no.>,<#0<binary>[NL]			Enters the waveform data.
:MEMory:SWEep:RECeive?	<ch>	<ch>,<#0<binary>[NL]	<binary>=Sweep data (binary format)	Outputs the sweep data.
:MEMory:SWEep:SEND	<ch>,<#0<binary>[NL]		<binary>=Sweep data (binary format)	Enters the sweep data.

Others

Commands	Parameters		Explanation
	Transmission	Response	
:ESE0	<0 to 255>		Writes ESERO. (NRf)
:ESE0?	<0 to 255>		Queries ESERO.
:ESR0?	<0 to 255>		Queries ESRO.
:HEADer	ON/OFF		Enables and disables the headers.
:HEADer?	ON/OFF		Query
:COM:ERRor	ON/OFF		Enables and disables the command error display.
:COM:ERRor?	ON/OFF		Query
:COM:TERMinator	0/1/2		Queries the terminator setting of response message.
:COM:TERMinator?	0/1/2		Query

8.4.3 Specific Command Tree



Chapter 9

7990 WAVEFORM CREATION SOFTWARE

9.1 Notes on Use

Please note the following conditions before using the software:

- The 7990 WAVEFORM CREATION SOFTWARE is the property of HIOKI E.E. Corporation. Reproduction, copying or modifying part or all of this software is prohibited by law, except for the purpose of creating waveform data for the arbitrary waveform generator.
- The 7990 may be modified and upgraded without notice in the interest of improving operation.
- Excepts from the 7990 in publications may be allowed with our permission. However, use of the HIOKI trademark is not permitted.
- Liability for the results of customers' use of the 7990 rests solely with the customer, and is not the responsibility of HIOKI.

■ CD-R

CAUTION
--

- Always hold the disc by the edges, so as not to make fingerprints on the disc or scratch the printing.
- Never touch the recorded side of the disc. Do not place the disc directly on anything hard.
- Do not wet the disc with volatile alcohol or water, as there is a possibility of the label printing disappearing.
- To write on the disc label surface, use a spirit-based felt pen. Do not use a ball-point pen or hard-tipped pen, because there is a danger of scratching the surface and corrupting the data. Do not use adhesive labels.
- Do not expose the disc directly to the sun's rays, or keep it in conditions of high temperature or humidity, as there is a danger of warping, with consequent loss of data.
- To remove dirt, dust, or fingerprints from the disc, wipe with a dry cloth, or use a CD cleaner. Always wipe radially from the inside to the outside, and do no wipe with circular movements. Never use abrasives or solvent cleaners.
- Hioki shall not be held liable for any problems with a computer system that arises from the use of this CD-R, or for any problem related to the purchase of a Hioki product.

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■ Overview

The 7990 WAVEFORM CREATION SOFTWARE is an application program to create arbitrary waveforms for the 7075 on a PC.

9.2 Specifications

9.2.1 General Specifications

Media: One CD-R

Compatible Equipment: HIOKI Arbitrary Waveform Generator

(1) Operating Environment

Computer	A PC with at least an i486DX4 CPU and Windows98 /Me/NT4.0/2000/XP installed You need Internet Explorer 4.01 and Service Pack 1.
Memory	16 MB or more
Display	800 X 600 dot resolution with at least 256 colors
Hard Disk	At least 4 MB empty space

(2) Recommended Operating Environment

Computer	A PC with at least a pentium 133MHz CPU and Windows98/Me/NT4.0/2000/XP installed You need Internet Explorer 4.01 and Service Pack 1.
Memory	32 MB or more
Display	800 X 600 dot resolution with at least 65536 colors
Hard Disk	At least 4 MB empty space

9.2.2 Function Specifications

Input waveforms	• Waveform entry by function input (14 function types, 7 control word types) • Basic waveform inputs (Sine, square, triangle, ramp, sin(x)/x, exp, noise and DC waveforms) • Waveform entry by unlimited curves and straight lines
Editing entered waveforms	Cut, copy, paste, clear
Modifying entered waveforms	Time, amplitude, offset, cycle waveform, phase
Calculations with entered waveforms	Add, subtract, multiply, normalize, scale, absolute value, reverse and mirror
Modifying entered waveforms	Magnification, compression, scroll, TIME/DIV display, point display (time axis) V/DIV display, point display, % display (time axis)
Save and load created waveforms	7075 and 7990 format/ 7070 format/ text format (saving only)
Print created waveforms	
Data transfer (RS-232C)	Communications parameters Baud rate: select from 4800/ 9600/ 19200bps Parity: non Data bit: 8bit Stop bit: select 1 or 2 bit Xon/Xoff: unused Hardware flow control: select ON or OFF

Refer to "5.3.2 Setting the RS-232C Interface" for details of connections between the PC and the unit.

9.3 Installation

⚠ CAUTION

If the power to the computer or the computer power switch is turned off while setup.exe is running, hard disk contents may be destroyed.

1. Confirm that the operating environment conditions of "11.2.1 General Specifications" are satisfied, then insert 7990 CD-R into the CD drive.
2. Double click \English\setup.exe on the disk to run it.
3. Follow the on-screen instructions to install the 7990 WAVEFORM CREATION SOFTWARE.
4. Confirm that the software installed correctly.

9.4 Loading the Program

If installed in the Start menu, click the Start button, select Hioki, and then Waveform Software.

If not installed in the Start menu, execute wavesoft.exe in the folder where the 7990 WAVEFORM CREATION SOFTWARE is installed.

9.5 Operation

Refer to the on-line help for operating procedures with the program running.

If problems occur with data transfer

Check the following items if problems occur with data transfer:

- Confirm that the settings in the File - Interface Settings menu of the 7990 WAVEFORM CREATION SOFTWARE match the RS-232C settings in the 7075 ("5.3.2 Setting the RS-232C Interface").
- Confirm that the connections with the PC are correct.
- Confirm that the same waveform name is not already present on the 7075. If it is, the waveform data cannot be sent. Change the name of the waveform in the File - Properties menu.

NOTE

Data cannot be sent when the 7075 is in the following states:

- When a waveform with the same name already exists on the 7075.
- When there are already 8 waveforms stored in the 7075.
- When using Save As, if the arbitrary waveform is given the same name as a waveform already specified for arbitrary waveform output on the 7075.
- When using Save As, if the arbitrary waveform is given the same name as a waveform already specified for sweep arbitrary waveform output on the 7075.

Chapter 10

Specifications

10.1 General Specifications

Number of channels	4 channels (7075) 2 channels (7075-01)
Output function	Function generator and arbitrary waveform generator (settable for each channel)
Display	5.7-inch LCD (with touch panel)
Languages	English/ Japanese
External data storage device	3.5-inch floppy disk drive
Capacity	1.44 MB, 1.2 MB, 720 KB formats supported (1.2 MB format not supported)
Data	MS-DOS format (MS-DOS is a registered trademark of Microsoft Corporation.)
Recordable data	Output status, sweep data
Interfaces	GP-IB: IEEE 488.1 compliance, IEEE 488.2 reference RS-232C: Dsub9-pin connector, Transfer speed 19200, 9600, 4800 bps
Temperature and humidity ranges for operation	10 to 40°C (50°F to 104°F) , 85%RH or less (with no condensation)
Temperature and humidity ranges for storage	-10 to 50°C (14°F to 122°F) , 85%RH or less (with no condensation)
Operating temperature and humidity for guaranteed accuracy	23°C±5°C (73°F±41°F) , 85%RH or less (with no condensation) *30 minutes after power-on.
Period of guaranteed accuracy	1 year
Location for use	Indoors, altitude up to 2000 m (6562 feet)
Dielectric strength	1.5 kV AC/min (Threshold level 25 mA) Power (1 pulse) on cabinet
Power	100/120/200/230 V AC (Voltage fluctuations of ±10% from the rated supply voltage are taken into account.), 50/60 Hz
Maximum rated power	120 VA
Backup battery and lifetime	3 years approx.
Dimensions	345 W X 130 H X 286 D mm (13.59" X 5.12" X 11.26") approx. (excluding protrusion)

Mass	7.8 kg (275.1 oz.) approx. (7075) 7.5 kg (264.6 oz.) approx. (7075-01)	
Accessories	7990 WAVEFORM CREATION SOFTWARE Power cord: 1 Instruction manual: 1	
Options	9165 CONNECTION CORD (BNC-BNC) 9166 CONNECTION CORD (BNC-clip) 9151-02 GP-IB CONNECTOR CABLE (2 m) 9151-04 GP-IB CONNECTOR CABLE (4 m)	
Standards Applying	EMC	EN61326 EN61000-3-2 EN61000-3-3
	Safety	EN61010 Pollution Degree 2

10.2 Function Specifications

■ Analog Output (common to both function generator and arbitrary waveform outputs)

Maximum output voltage	Maximum ± 10 V ($RL = \infty$)	
Amplitude setting range	10 V range	0 to 10 V, open-circuited (resolution 1 mV)
	1 V range	0 to 1 V, open-circuited (resolution 0.1 mV)
	0.1 V range	0 to 0.1 V, open-circuited (resolution 0.01 mV)
DC offset setting range	10 V range	-10 to 10 V, open-circuited (resolution 1 mV)
	1 V range	-1 to 1 V, open-circuited (resolution 0.1 mV)
	0.1 V range	-0.1 to 0.1 V, open-circuited (resolution 0.01 mV)
Minimum load impedance	40 Ω	
Output impedance	50 $\Omega \pm 2\%$ (DC)	
Square wave rise and fall times	Within 45 ns (10 to 90% of maximum amplitude, when the setting of LPF "pass", $RL = 50 \Omega$)	
Square wave overshoot	Less than $\pm 5\%$ of set amplitude (P-P value, with LPF bypassed, $RL = 50 \Omega$)	
Inter-Channel Skew	Within 25 ns (measured with the same waveform selected) <u>Except during sweeping the frequency.</u>	
Output range accuracy	1 V range	Add 0.2% of the range to the accuracy of the 10 V range
	0.1 V range	Add 0.4% of the range to the accuracy of the 10 V range
	For specification of 10 V, see ■ FG Function, and ■ Arbitrary waveform generator function.	

■ FG Function (Accuracy measured in the 10 V range)

Type of waveform	Sine, square (constant duty), triangle, ramp-up, ramp-down and pulse waveforms, noise and DC
Frequency range	Sine, square: 0 to 10 MHz (resolution 10 mHz) Triangle, ramp, pulse: 0 to 200 kHz (resolution 10 mHz)
Frequency accuracy	Within $\pm(50 \text{ ppm of setting value} + 50 \mu\text{Hz})$
DC offset accuracy	Within $\pm(0.5\% \text{ of setting value} + 25 \text{ mV})$
DC offset stability	Within $\pm(\text{DC offset accuracy} \times 0.1)/^\circ\text{C}$
Amplitude accuracy	Within $\pm(2\% \text{ of setting value} + 20 \text{ mVrms})$ at 1 kHz, sine wave
Amplitude stability	$\pm(\text{amplitude accuracy} \times 0.1)/^\circ\text{C}$
Phase difference	-360.00 to 360.00 deg (resolution 0.01 deg)
Jitter (triangle, ramp and pulse waveforms)	Within 100 ns p-p
Square wave duty cycle	40 to 60% fixed
Pulse wave duty cycle adjustable range	1 to 99% (setting resolution: the larger of 0.1% or 100 ns) valid for pulse widths greater than 100 ns

■ Arbitrary waveform generator function (Accuracy measured in the 10 V range)

Amplitude resolution	16-bit equivalent (64000 count)
Waveform memory capacity	128000 words/channel
Filter	Second-order LPF, 50 Hz to 1 MHz (14 steps with 1-, 2- and 5-multiple system series)
Waveform input method	Loadable from floppy disk, GP-IB or RS-232C (can be downloaded directly from Memory HiCorder)
DC output accuracy	Within $\pm$ (2% of setting value + 25 mVrms)
DC output stability	Within $\pm$ (DC output accuracy X 0.1)/°C
Amplitude accuracy	Within $\pm$ (2% of setting value + 20 mVrms) at size 10000, sine wave of 10 MHz clock
Delay	Settable within $\pm$ 128000 range in 1-clock units
Clock for arbitrary waveform	Number of channels: 4 channels max. (same as the number of waveform output channels) Frequency range: 0 to 10 MHz (resolution 10 mHz) Frequency accuracy: Within $\pm$ (50 ppm of setting value + 50 μ Hz) Jitter: Within the larger of 800 ps-rms or 0.05% of set period
Number of loops	1 to 65535 or ∞

■ Sweep Function

Sweep waveform	Function generator, arbitrary waveform
Sweep form	Linear (inside of element)
Sweep object	Function generator: Frequency, amplitude, offset, duty (pulse wave only) (frequency, amplitude and offset can be swept simultaneously) Arbitrary waveform: Frequency, amplitude, offset
Sequence function Sequence length	Outputs the sweep elements combined. 128 elements max Loop: outputs the element or group the specified number of times Hold: continually outputs the last data element
Loop repetitions	1024 times max or ∞
Trigger	Cancel infinite loop and hold to move to the next element
Total number of loops	Maximum 65535 times or ∞
Monitor function Monitor display Monitor channel Display update interval	The number of loops to repeat sweep Only the channel displayed can be monitored. The display channel can be switched during output. Approx. 200 ms
Marker function Line number marker Output value marker	Output for specified element number. Settings: Specify sequence element number Number of elements that can be set: Setting is possible for all elements (multiple element setting is possible). Output when sweep output data lies between two values set. Settings: Element number, number of element loops, output values (x2) Number of output values that can be set: Only one pair per sequence.

■ Input/Output Controls

TRIG IN TRIG OUT MARKER OUT	Logic level 0 to 5 V (channels 1 to 4 independently controllable)
-----------------------------------	---

RUN/STOP IN RUN/STOP OUT SYNC.CLK IN SYNC.CLK OUT MASTER CLK IN MASTER CLK OUT	Logic level 0 to 5 V
---	----------------------

■ Others

Changing the setting format	Frequency - Period Amplitude - Upper limit value Offset - Lower limit value
Selecting units	Hz - r/min V _{peak} - V _{rms}
Save output conditions	Waveform conditions and waveform at power off are retained by memory backup
Synchronized operation	4 units max (16 channels)
Waveforms stored in internal memory	8

Chapter 11

Maintenance and Service

11.1 Maintenance and Inspection

To ensure the safe operation of this unit, perform maintenance regularly.

- If damage is suspected, check the "Troubleshooting" section before contacting your dealer or Hioki representative.
- If the unit has been subject to moisture, or if oil and dust have accumulated in the unit interior, the danger of electrical shock or fires resulting from the deterioration of insulation increases greatly. If the unit is ever subject to excessive moisture, oil, or dust, cease use immediately, and return the unit to us for maintenance.
- Periodic calibration is necessary to verify and maintain accuracy. If calibration becomes necessary, return the unit to us for maintenance.
- This product uses a lithium battery to back up its memory. As the battery power is consumed, it's ability to store measurement conditions diminishes. In the event that measurement conditions can no longer be stored, please contact the manufacturer for repair service.

Cleaning the Unit

- To clean the product, wipe it gently with a soft cloth moistened with water or mild detergent. Never use solvents such as benzene, alcohol, acetone, ether, ketones, thinners or gasoline, as they can deform and discolor the case.
- Wipe the LCD display gently with a dry, soft cloth.

11.2 Shipment

⚠ CAUTION

Do not use excessive force on the touch panel, and do not use sharp objects that could damage the touch screen.

If reshipping the unit, preferably use the original packing.

Always remove the floppy disk before shipping.

If the original packing materials are not available, package the unit as follows:

1. Wrap the unit with plastic film.
2. Wrap the unit with at least 100 mm of cushioning material, and place it in a cardboard box that is at least 7 mm thick.
3. Place the accessories in the box and fill remaining space with cushioning material. Then close and tape the box, and if necessary, tie with package strapping.

11.3 Troubleshooting

If the unit is not functioning properly, check the list below. If a problem is found, contact your dealer or HIOKI representative.

When sending the unit for repair, to prevent damage in transit pack well.

Insert cushioning material so that the 7075 cannot move within the package.

Be sure to include details of the problem. HIOKI cannot bear any responsibility for damage that occurs during shipment.

Problem	Check	Countermeasure
The screen remains blank when power is switched on	Is the power cord connected?	Connect the power cord properly.
	Is the LCD Contrast set too light?	Adjust the Contrast
The keys are dead and do not respond.	Has the unit been put into the key lock condition?	Press the LOCK key for more than 2 seconds to clear the key lock condition.
	Is the unit being remotely controlled, if the GP-IB interface is being used?	Set the GP-IB to Local

If none of the above conditions apply, and the cause of the problem is not understood, try performing a system reset. All settings will revert to the factory settings.

System reset

1. Press the SYSTEM tab to enter the SYSTEM screen.
2. Press the Initialize button, and the window opens.
3. Press the OK button.

NOTE

It takes about 10 seconds to complete initializing.

11.4 Disposing of the Unit

⚠ WARNING

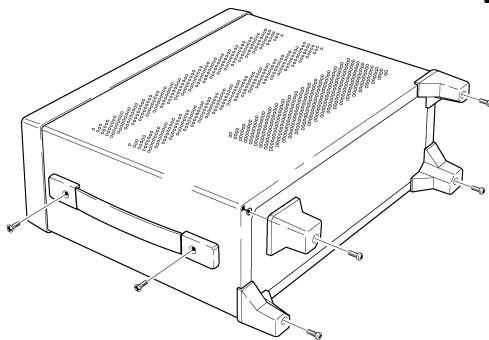
- To avoid electrocution, turn off the power switch and disconnect the power cord and measurement cables before removing the lithium battery.
- Handle and dispose of batteries in accordance with local regulations.

The unit uses a lithium battery to store output conditions and waveform data. When disposing of the unit, disassemble it as follows to remove the lithium battery for disposal by the appropriate method.

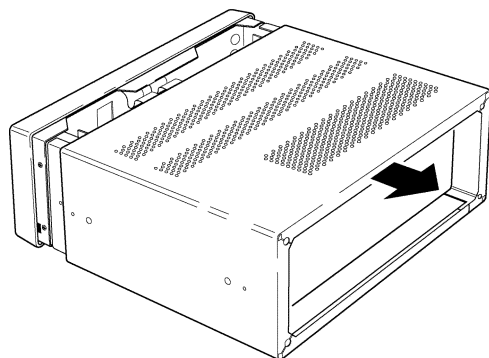
Tools required for disassembly

One Phillips screwdriver
One pair of wire cutters

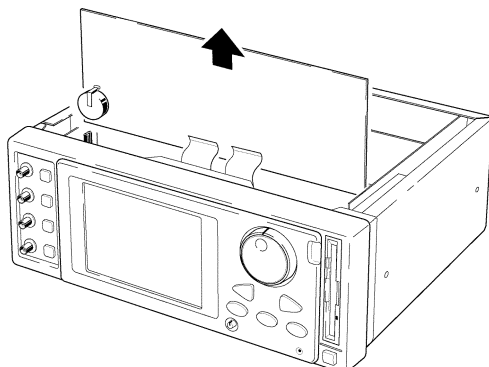
Disassembly



1. Remove the screws in the four support feet on the rear of the unit.
2. Remove the two screws in the handle on the side of the unit.



3. Pull the case toward the back to remove it.

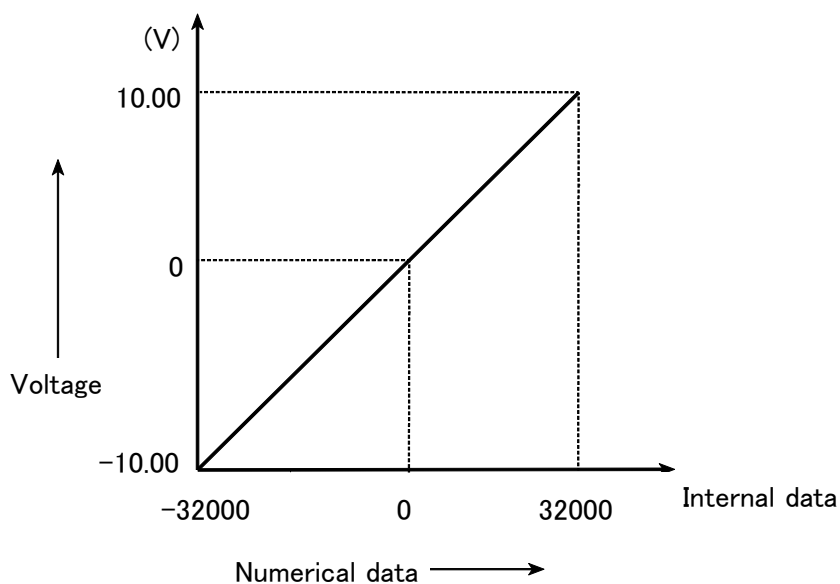


4. Remove the front-most board (MPU board), on which the lithium battery is installed.
5. Pull up on the battery, and cut the (+) terminal off with wire cutters.
6. Pull the battery up further.
7. Cut the (-) terminal that is hidden under the battery with wire cutters.

Appendix

Appendix 1 Relationship Between Internal Data and Voltage Level

The correspondence between internal data values and output voltage levels is shown in the following figure.
Voltage resolution is 16 bits.



Appendix 2 Error Message List

Error No.	Message	Description
Output Setting Errors		
201	Cannot change RANGE while running.	Press STOP, then change range.
202	Cannot change WAVE while running.	Press STOP, then change waveform.
203	Cannot set frequency of another channel.	Cancel simultaneous setting of frequency, or cancel simultaneous setting.
Sweep Related Errors		
301	Value out of range.	The time setting value is out of range.
302	Value out of range.	The number of loop time is out of range.
303	Value out of range.	The frequency is out of range.
304	Value out of range.	The duty is out of range.
305	Value out of range.	The amplitude value is out of range.
306	Value out of range.	The offset value is out of range.
307	No data.	Create data and try the operation again.
308	Not a data file.	The file does not contain (sweep) data.
309	Cannot read data.	(Sweep) data cannot be read correctly.
310	Cannot convert.	(Sweep) data cannot be converted.
311	Cannot convert while running.	Data cannot be converted during RUN operation.
312	Cannot change while running.	The data cannot be executed during RUN operation.
313	No ARB wave.	There is no waveform (arbitrary waveform specified in the file).
Output Status File Errors		
351	Value out of range.	The time setting value is out of range.
352	Value out of range.	The number of loop time is out of range.
353	Value out of range.	The frequency is out of range.
354	Value out of range.	The duty is out of range.
355	Value out of range.	The amplitude value is out of range.
356	Value out of range.	The offset value is out of range.
357	No data.	Create data and try the operation again.
358	Not a data file.	The file does not contain (output settings) data.
359	Cannot read data.	(output settings) data cannot be read correctly.
360	Cannot load while running.	The data cannot be loaded during RUN operation.

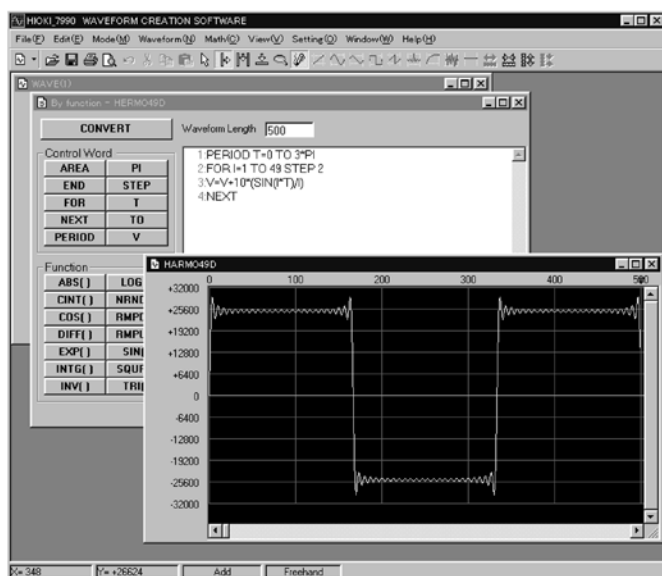
Error No.	Message	Description
Waveform Loading Errors		
401	Model not specified.	The (loading) model is not specified.
402	Not a data file.	The file does not contain data.
403	Incorrect channel number.	Check the channel number setting.
404	Different file.	The model is different from that selected. Check the model settings.
405	Wrong length.	The (specified) data count is incorrect.
406	FD has been changed.	The media was changed while setting.
410	Wave space is full.	There is no more waveform space. Delete unneeded waveforms.
411	Duplicate name.	An existing waveform has the same name. Use a different name.
420 to 434	Wave used for CHx. Cannot delete or change.	Cannot delete or change a name specified for a arbitrary waveform. Cancel the arbitrary waveform setting and repeat the operation. This is the same when specifying a arbitrary waveform for the sweep settings.
435	Waveforms are currently input.	Waveforms are being read by other means. Waveform input is not possible.
436	Alteration is impossible during RUN.	Waveforms currently being output cannot be input.
Floppy Disk Errors		
501 to 510	Hardware error.	The unit is in need of repair.
511	Drive not ready.	Confirm that the disk is inserted correctly.
512	Write protected.	Disable the write protection on the disk and repeat the operation.
513	Unknown error.	An unspecified error occurred.
514	Directory not empty.	The directory to be deleted is not empty.
515	Unreadable media. Please insert FD again.	The format of the media is not recognized, or the floppy disk may not be inserted correctly. Reinsert the disk and try again.
516	FD has been changed.	The disk was pulled out. Undo the operation.
517	Media full.	Delete files or insert another disk.
520	Directory name already exists.	Use a different name.
580	There is no VERSIONUP file.	No version update file is present.
581	Version update failed.	No version update occurred.
Download-Related		
601	Syntax error. Please check settings.	Download data is corrupt.
602	Command error. Please check settings.	Download data is corrupt.
603	Invalid channel.	The specified channel is invalid.
604	The machine is not ready.	The machine is not ready.

Error No.	Message	Description
GP-IB Related		
701	The address must be up to 30.	Specify an address between 0 and 30.
SYSTEM Related		
750	Invalid date.	The date is incorrect.

Appendix 3 Sample Program List

The following examples show function input with the 7990 WAVEFORM CREATION SOFTWARE.

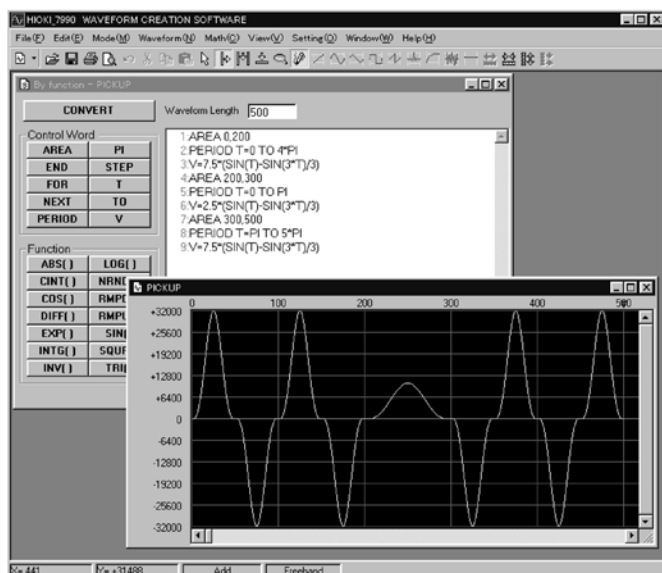
HARMO49D (49th harmonic waveform)



Waveform size: 500

- 1:PERIOD T=0 TO 3*PI ↓
- 2:FOR I=1 TO 49 STEP 2 ↓
- 3:V=V+10*(SIN(I*T)/I) ↓
- 4:NEXT ↓

PICKUP (Electromagnetic pickup waveform)



Waveform size: 500

- 1:AREA 0,200 ↓
- 2:PERIOD T=0 TO 4*PI ↓
- 3:V=7.5*(SIN(T)-SIN(3*T)/3) ↓
- 4:AREA 200,300 ↓
- 5:PERIOD T=0 TO PI ↓
- 6:V=2.5*(SIN(T)-SIN(3*T)/3) ↓
- 7:AREA 300,500 ↓
- 8:PERIOD T=PI TO 5*PI ↓
- 9:V=7.5*(SIN(T)-SIN(3*T)/3) ↓

DECLARATION OF CONFORMITY

Manufacturer's Name: HIOKI E.E. CORPORATION
Manufacturer's Address: 81 Koizumi, Ueda, Nagano 386-1192, Japan

Product Name: WAVEFORM GENERATOR
Model Number: 7075, 7075-01
Product Options: 9165 CONNECTION CORD
9166 CONNECTION CORD

Separately Available Accessories:
9151-02 GP-IB CONNECTOR CABLE
9151-04 GP-IB CONNECTOR CABLE

The above mentioned products conform to the following product specifications:

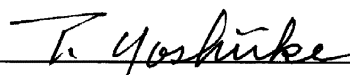
Safety: EN61010-1:2001
EMC: EN61326:1997+A1:1998+A2:2001+A3:2003
Class A equipment
Minimum immunity test requirement
EN61000-3-2:2000
EN61000-3-3:1995+A1:2001

Supplementary Information:

The products herewith comply with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

HIOKI E.E. CORPORATION

15 September 2006


Tatsuyoshi Yoshiike
President

7075A999-02

HIOKI 7075, 7075-01 WAVEFORM GENERATOR
Instruction Manual

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