HIOKI

Communication Instruction Manual

IM3570

IMPEDANCE ANALYZER

HIOKI E. E. CORPORATION

August 2010 Edition 1 IM3570A983-00 10-08H

600329700

Contents

Contents

Introduction

This instruction manual provides details on the communication interfaces of the IM3750 impedance analyzer.

Safety Information

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

Safety Symbols

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

⚠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.

Notation

Symbols in this manual

	Indicates the prohibited action.
(**p.**)	Indicates the location of reference information.
*	Indicates that descriptive information is provided below.
[ ]	Menus, commands, dialogs, buttons in a dialog, and other names on the screen and the keys are indicated in brackets.
CURSOR (**Bold character**)	Bold characters within the text indicate operating key labels.
Windows	Unless otherwise specified, “Windows” represents Windows 95, 98, Me, Widows NT4.0, Windows 2000, Windows XP, Windows Vista, or Windows 7.
Dialogue	Dialogue box represents a Windows dialog box.

Mouse Operation

Click:	Press and quickly release the left button of the mouse.
Right-click:	Press and quickly release the right button of the mouse.
Double click:	Quickly click the left button of the mouse twice.
Drag:	While holding down the left button of the mouse, move the mouse and then release the left button to deposit the chosen item in the desired position.
Activate:	Click on a window on the screen to activate that window.

2

Specifications Chapter 1

1.1 RS-232C Specifications

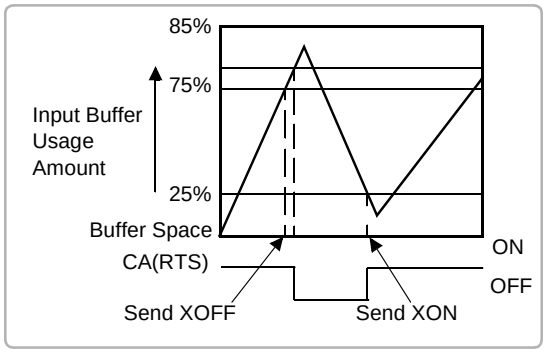
Transmission Method		Communication method: Full duplex Synchronous method: Start-stop synchronization
Transmission Speed		9600 bps, 19200 bps, 38400 bps, 57600 bps
Data Bits		8 bits
Parity		None
Stop bit		1 bits
Message terminator (delimiter)		CR+LF, CR
Flow control		Hardware (RTS/CTS control), software (XON/XOFF control) "Handshake (About Buffer Flow Control)" (p. 1)
Electrical Specifications	Input voltage level	5 to 15 V ..... ON -15 to -5 V ..... OFF
	Output voltage level	5 to 9 V ..... ON -9 to -5 V ..... OFF

Handshake (About Buffer Flow Control)

Control during Receiving

When using hardware (RTS/CTS control):

- When the data in the receive buffer exceeds 85% of the buffer, CA(RTS) is set to OFF and the controller is notified that there is not much space remaining in the buffer.
- Processing of the data in the buffer continues, and then CA(RTS) is set to ON and the controller is notified that there is sufficient remaining space in the buffer when the amount of data becomes less than 25%.



When using software (XON/XOFF control):

- When the data in the receive buffer exceeds 75% of the buffer, XOFF(13H) is sent and the controller is notified that there is not much space remaining in the buffer.
- Processing of the data in the buffer continues, and then XON(11H) is sent and the controller is notified that there is sufficient remaining space in the buffer when the amount of data becomes less than 25%.

Control during Sending

When using hardware (RTS/CTS control):

- When CB(CTS) is confirmed to be OFF, the sending of data is halted. When it is confirmed to be ON, the sending of data is resumed.

When using software (XON/XOFF control):

- When XOFF is received, the sending of data is halted. When XON is received, the sending of data is resumed.

1.2 GP-IB Specifications

SH1	Supports all source handshake functions.
AH1	Supports all acceptor handshake functions.
T6	Supports standard talker functions. Supports serial poll functions. Talk only mode is not supported. Supports the talker cancel function by MLA (My Listen Address).
L4	Supports standard listener functions. Listener only mode is not supported. Supports the listener cancel function by MTA (My Talk Address).
SR1	Supports all service request functions.
RL1	Supports all remote/local functions.
PP0	Parallel poll functions are not supported.
DC1	Supports all device clear functions.
DT1	Supports all device trigger functions.
C0	Controller functions are not supported.

Code used: ASCII code

1.3 USB Specifications

Connector	Series B receptacle
Compliance standard	USB2.0 (Full Speed/High Speed)
No. of ports	1
Class	Communication class
Supported OS	Windows 2000, XP, Vista, 7

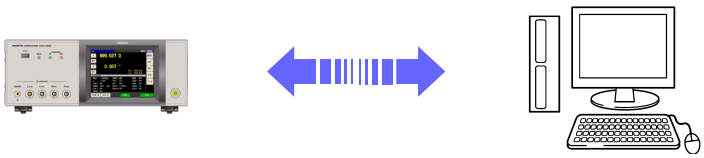
1.4 LAN Specifications

Connector	RJ-45 connector × 1
Compliance standard	IEEE 802.3-compliant Ethernet
Transfer system	10BASE-T/ 100BASE-TX Auto detected
Protocol	TCP/IP
Function	Command control

Connection and Setting Procedure Chapter 2

2.1 Overview of Communication

You can control the instrument with communication commands from a computer via the GP-IB, RS-232C, USB, and LAN interfaces.
There are the following four communication methods. To enable communication, the communication conditions need to be set on the instrument.



RS-232C communication (p. 5)

An optional 9670 Printer can be connected to enable printing measurement values and screens. (p. 34)

GP-IB communication (p. 7)

- Commands common to IEEE-488-2 1987 (requirement) can be used.
- The instrument complies with the following standard. (Compliance standard: IEEE-488.1 1987)
- The instrument has been designed with reference to the following standard. (Reference standard: IEEE-488.2 1987)

USB communication (p. 9)

The instrument is communication class compatible.

LAN communication (p. 28)

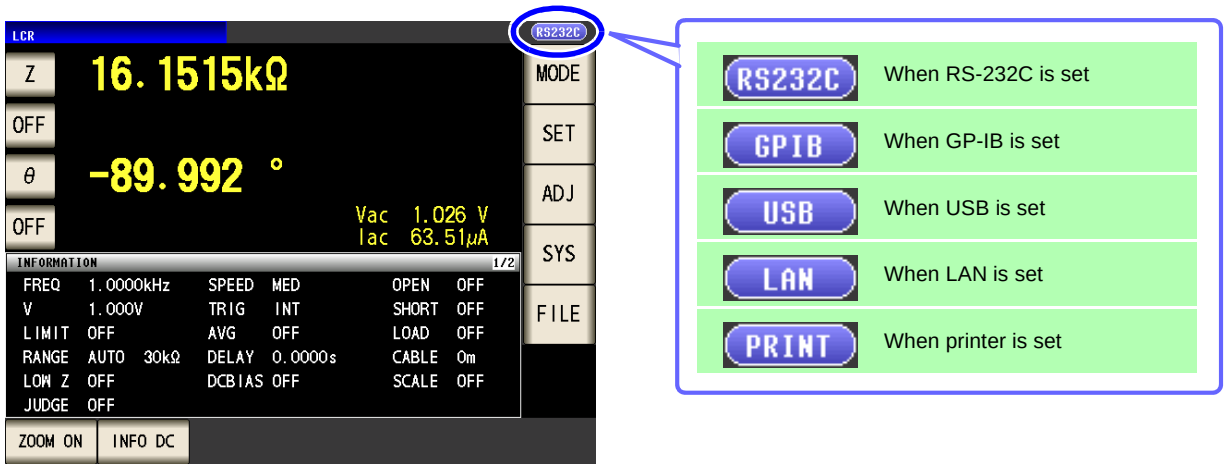
Command control using the TCP/IP protocol is possible.

⚠WARNING

- **Always turn both devices OFF when connecting and disconnecting an interface connector. Otherwise, an electric shock accident may occur.**
- **To avoid damage to the instrument, do not short-circuit the terminal and do not input voltage to the terminal.**
- **Failure to fasten the connectors properly may result is sub-specification performance or damage to the equipment.**

Screen Displayed while Setting Interfaces

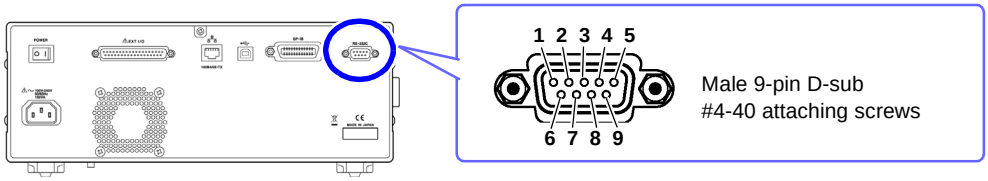
When you set an interface, the icon for the set interface is displayed on the right side of the screen.



2.2 RS-232C Connection and Settings

Connecting the RS-232C Cable

Connect the RS-232C cable to the RS-232C connector.
(Recommended cable: 9637 RS-232C cable)

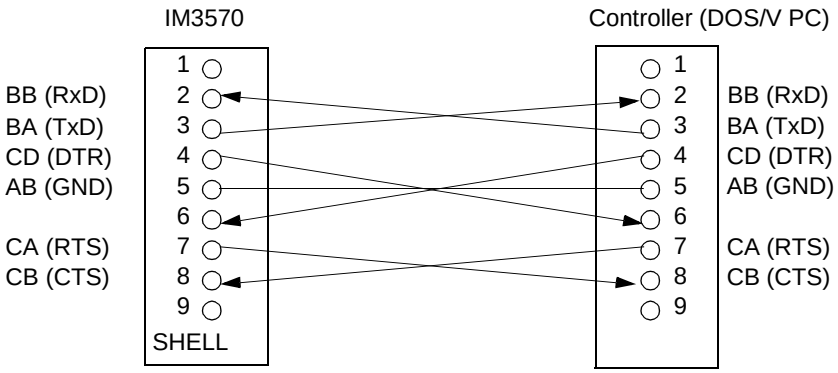


To connect the instrument to a controller (DTE), use a **crossover cable** compatible with the connectors on both the instrument and the controller. The I/O connector is a DTE (Data Terminal Equipment) configuration.

Connector (D-sub) Pin No.	Interchange Circuit Name	CCITT Circuit No.	EIA Abbreviation	JIS Abbreviation	Common Abbreviation
1	Unused				
2	Received Data	104	BB	RD	RxD
3	Transmitted Data	103	BA	SD	TxD
4	Data Terminal Ready	108/2	CD	ER	DTR
5	Signal Ground	102	AB	SG	GND
6	Unused				
7	Request to Send	105	CA	RS	RTS
8	Clear to Send	106	CB	CS	CTS
9	Unused				

Example: Connecting to a DOS/V PC

Specification: D-sub 9-pin female and female connector, reverse connection



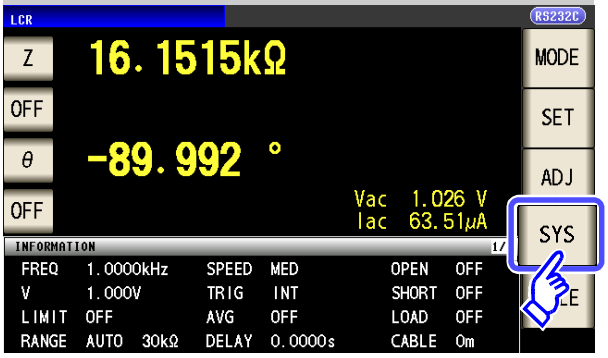
NOTE Hardware control will not work properly if you use a cable that has CA(RTS) and CB(CTS) short-circuited.

Setting RS-232C

Procedure

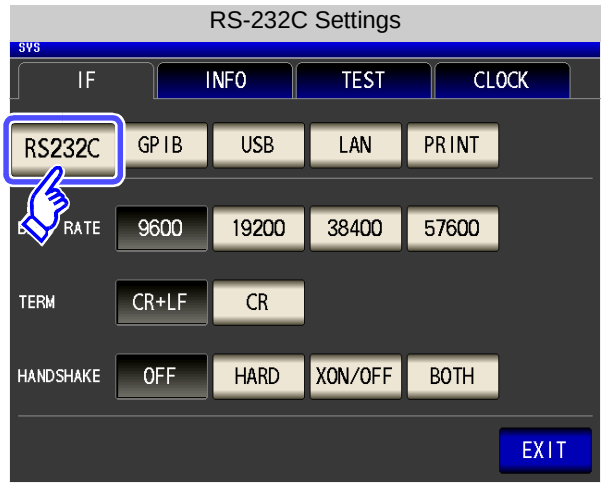
You can configure the setting from any of [LCR] mode, [ANALYZER] mode.

1 LCR Initial Screen



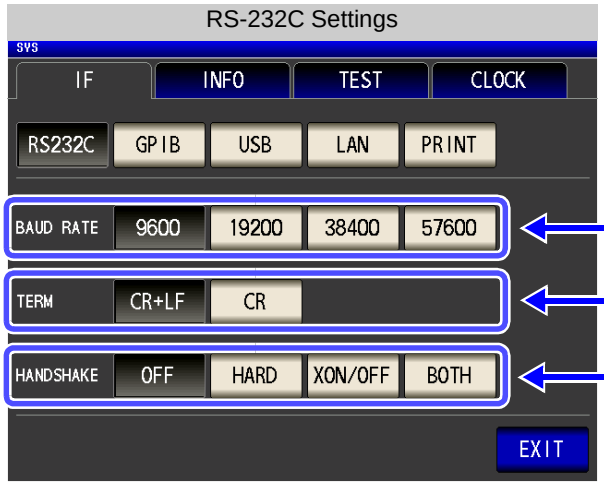
Interface Settings

2 RS-232C Settings



Press [RS232C].

3 RS-232C Settings



Select the baud rate setting.

Select the terminator setting.

CR+LF	CR+LF
CR	CR

Select the handshake setting.

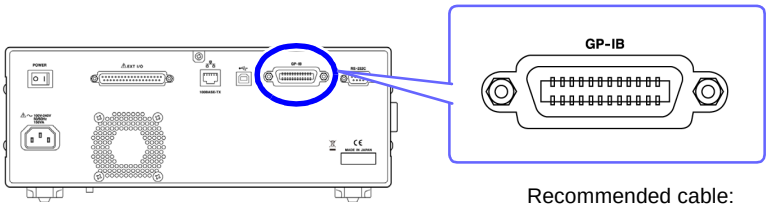
OFF	No flow control
HARD	Hardware (RTS/CTS control)
XON/OFF	Software (XON/XOFF control)
BOTH	Hardware + software

4 **Press** [EXIT] **to confirm the setting.**

2.3 GP-IB Connection and Settings

Connecting the GP-IB Cable

Connect the GP-IB cable to the GP-IB connector.



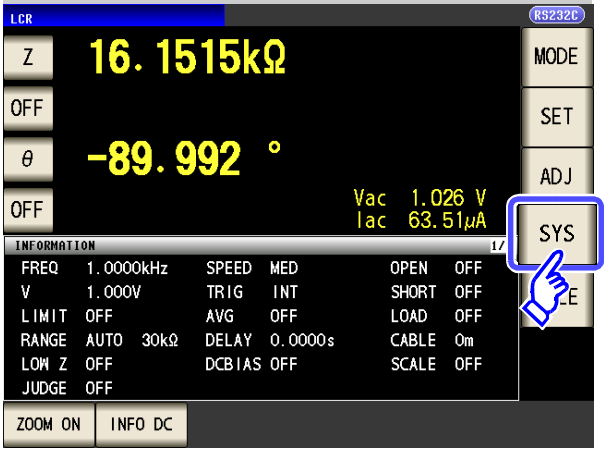
Recommended cable:
9150-02 GP-IB connection cable (2 m)
9151-04 GP-IB connection cable (4 m)

Setting GP-IB

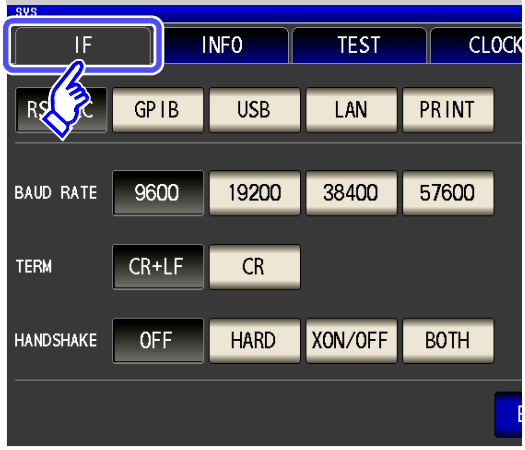
Procedure

You can configure the setting from any of LCR mode, ANALYZER mode.

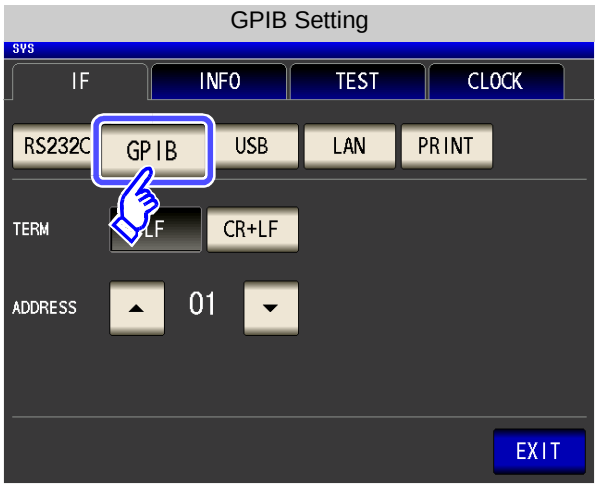
1 LCR Initial Screen



Interface Settings

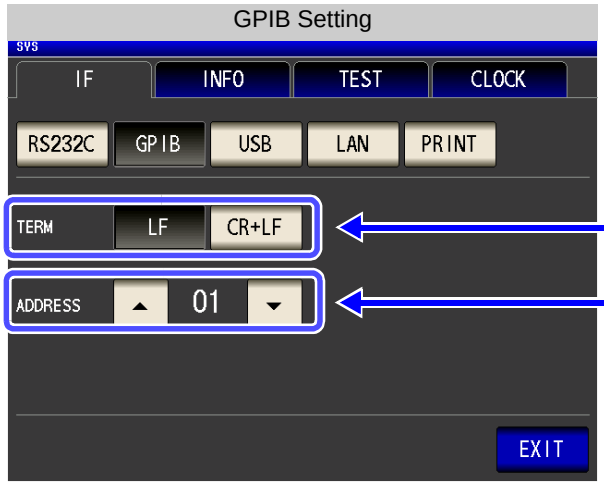


2



Press GPIB **.**

3



Select the terminator setting.

LF	LF with EOI
CR+LF	LF with CR+EOI

Use ▲ **or** ▼ **to set the GP-IB address.**

4 **Press** EXIT **to confirm the setting.**

2.4 USB Settings and Connection

NOTE To connect the instrument to a computer the first time, a dedicated USB driver must be installed. After setting USB in the interface settings of the instrument, install the USB driver. (p. 11)
The USB driver is compatible with the Windows 2000, Windows XP (32-bit version), Windows Vista (32-bit version), and Windows 7 (32-bit version) operating systems.

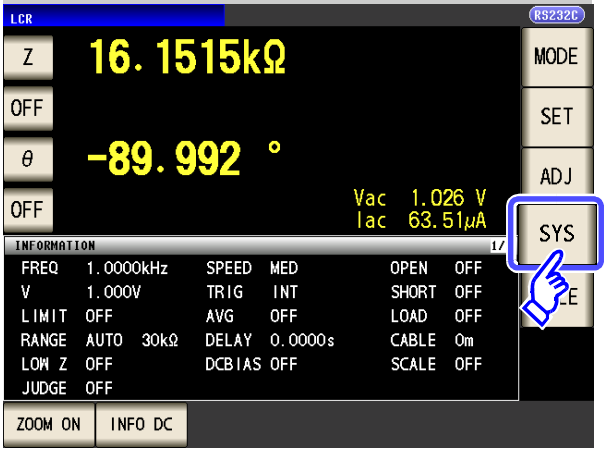
Setting USB

Procedure

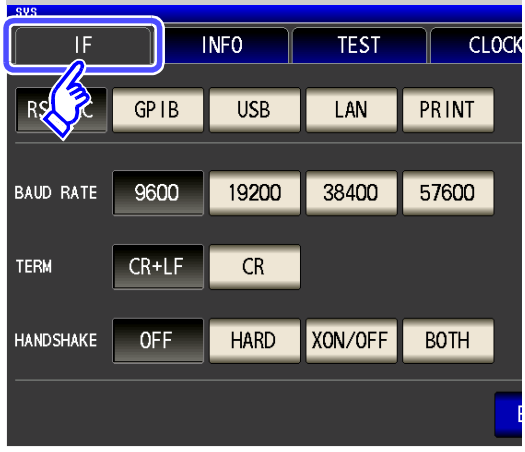
You can configure the setting from any of [LCR] mode, [ANALYZER] mode.

1

LCR Initial Screen

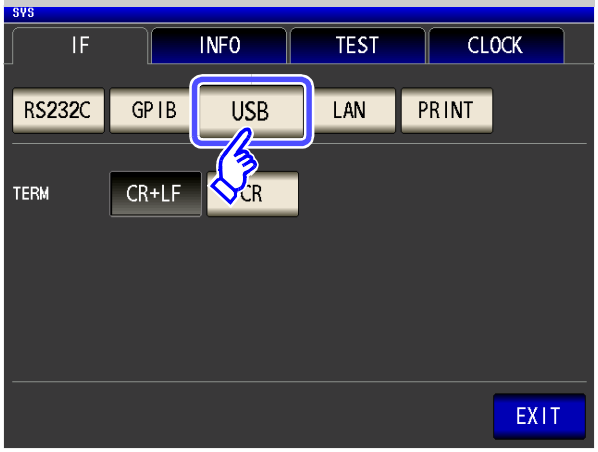


Interface Settings



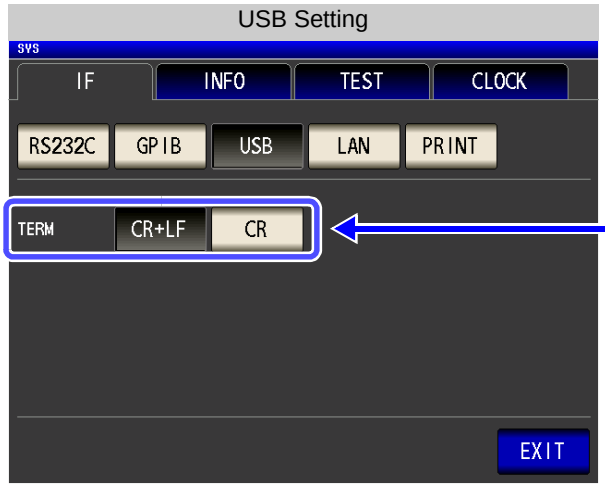
2

USB Setting



Press [USB].

3



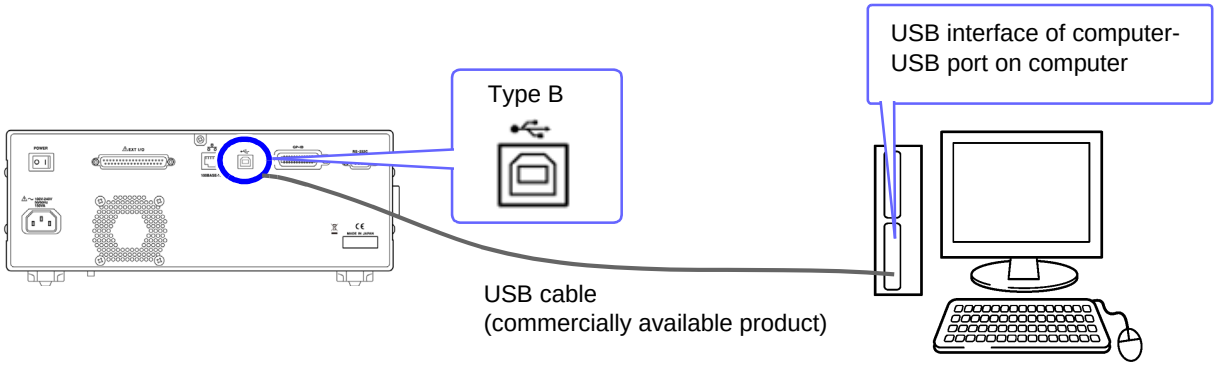
Select the terminator setting.

CR+LF	CR+LF
CR	CR

4 **Press** EXIT **to confirm the setting.**

Connecting the USB Cable

Connect a USB cable (commercially available USB cable) to the USB port of the instrument.



CAUTION

- **To avoid faults, do not disconnect or reconnect the USB cable during instrument operation.**
- **Connect the instrument and the computer to a common earth ground. Using different grounds could result in potential difference between the instrument and the computer. Potential difference on the USB cable can result in malfunctions and faults.**

Installing the USB Driver

Install the USB driver before you use the instrument with a USB connection.
Log into the computer from an account with administrator privileges when installing the USB driver.
The USB driver can be downloaded from the bundled CD, or our web site.(http://www.hioki.com)

CAUTION **To avoid faults, do not disconnect or reconnect the USB cable during instrument operation.**

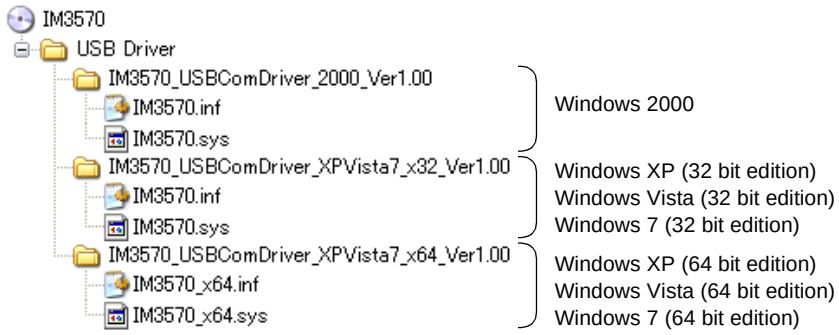
For Windows 2000 (p. 11)

For Windows XP (p. 15)

For Windows Vista (p. 18)

For Windows 7 (p. 22)

Use the USB driver that is compatible with your operating system.



NOTE When using a driver on the supplied CD, copy the driver that is compatible with your operating system to the hard disk beforehand.
Example: In the case of Windows 7 (32-bit version), copy the whole IM3570_USBComDriver_XPVista7_x32_Ver1.00 folder.

For Windows 2000

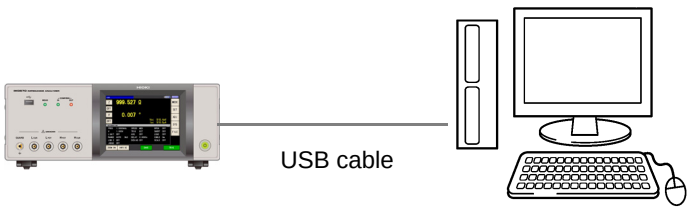
1 **Connect the power cord to the instrument and turn the power on.**

2 **Change the interface communication condition of the IM3570 to USB.**

See: "Setting USB" (p. 9)

3 **Using the USB cable, connect the instrument to the PC to which the driver will be installed.**

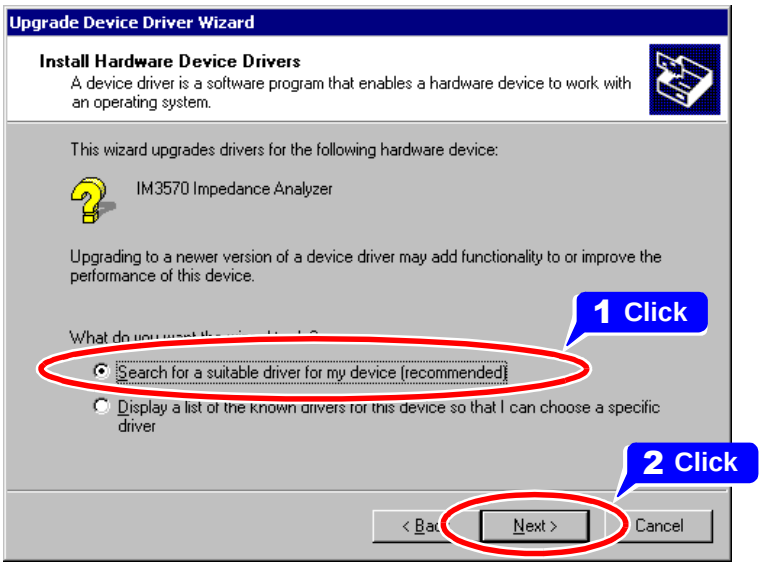
The **[Found New Hardware Wizard]** dialog box will appear.



4 Install the driver as instructed in the [Upgrade Device Driver Wizard] dialog box.

Click **[Next]**.

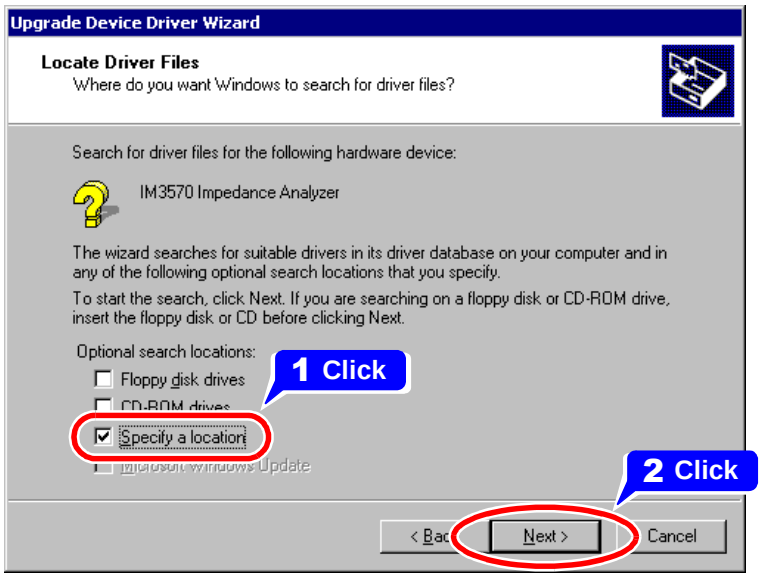
5



1 Click **[Search for a suitable driver for my device]**.

2 Click **[Next]**.

6



1 Click **[Specify a location]**.

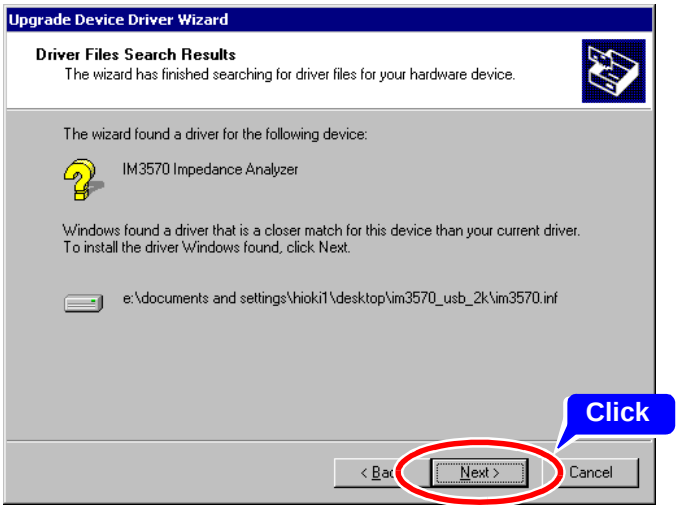
2 Click **[Next]**.

7

1 Click **[Browse]** and select the folder containing the driver.

2 Click **[OK]**.

8



Click **[Next]**.

9

Click **[Finish]**.

For Windows XP

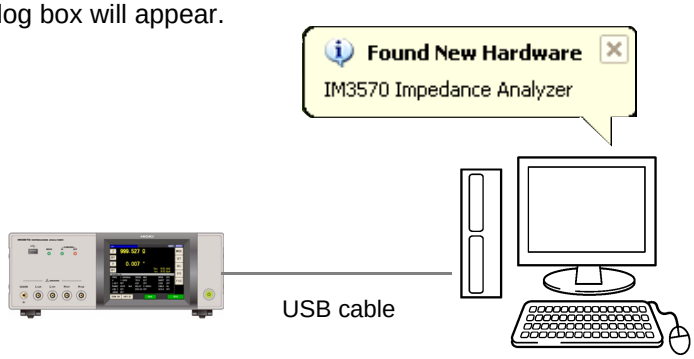
1 **Connect the power cord to the instrument and turn the power on.**

2 **Change the interface communication condition of the IM3570 to USB.**

See: "Setting USB" (p. 9)

3 **Using the USB cable, connect the instrument to the PC to which the driver will be installed.**

After the "Found New Hardware" window appears, the **[Found New Hardware Wizard]** dialog box will appear.



4 **Install the driver as instructed in the [Found New Hardware Wizard] dialog box.**

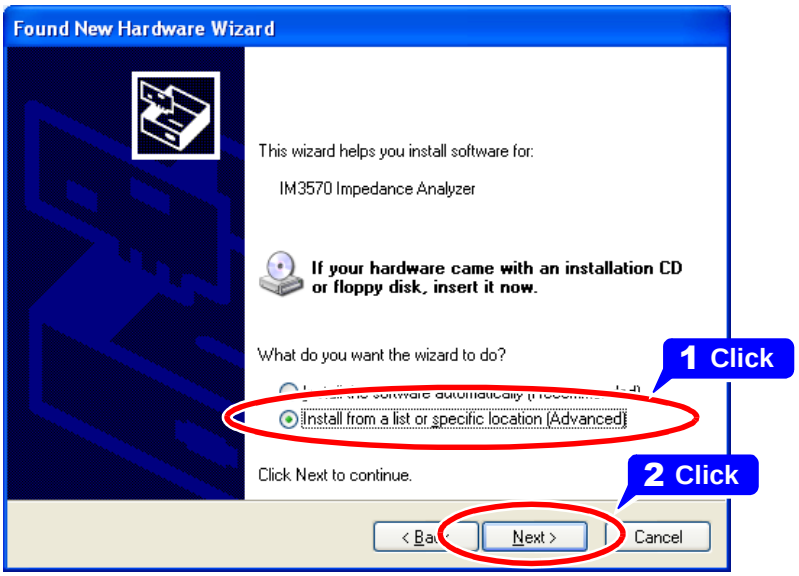
1 Click **[No, not this time]**.

2 Click **[Next]**.

If after installing the driver you connect the instrument to the personal PC using a different USB port, the "Found New Hardware" window will appear again and the Found New Hardware Wizard will start up. Use this wizard to install the driver again for this port.
When the driver is installed, the COM port number may change.

See: "Appendix 3 Checking the USB Virtual COM Port" (p. A9)

5

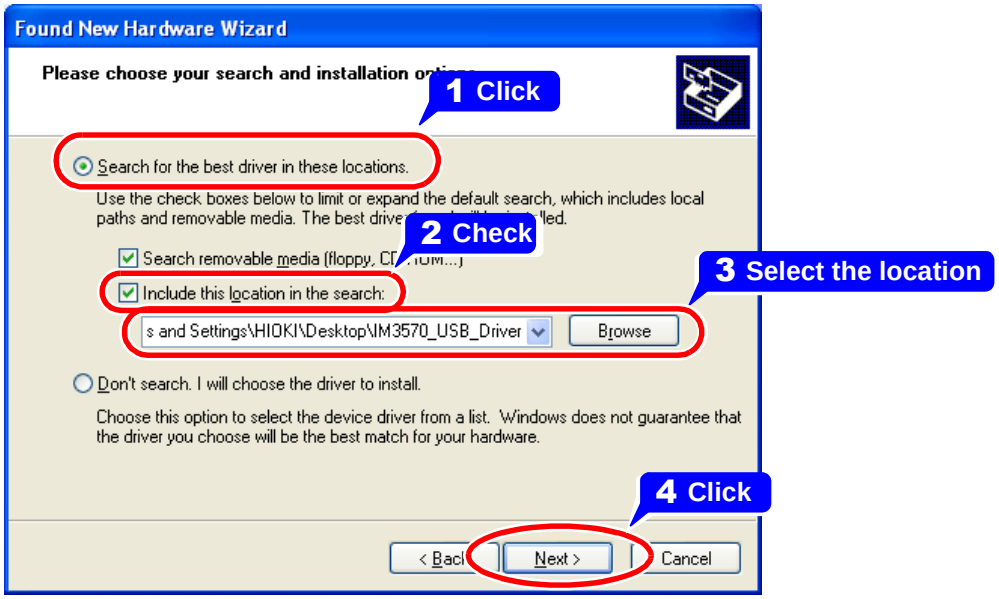


1 Click **[Install from a list or specific location]**.

2 Click **[Next]**.

Depending on the version of Windows XP used, instead of displaying this dialog box the PC might go directly to the dialog box in Step “7” instead.

6



1 Click **[Search for the best driver in these locations]**.

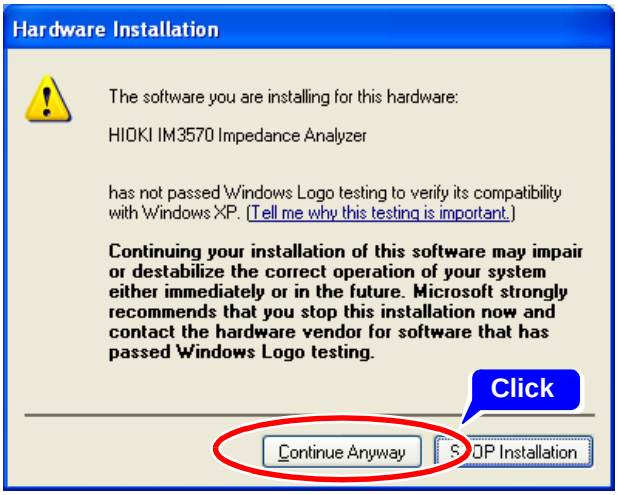
2 Place a checkmark by **[Include this location in the search]** (if there are checkmarks next to any other items, uncheck them).

3 Click **[Browse]** and select the folder containing the driver.

4 Click **[Next]**.

The **[Hardware Installation]** dialog box appears.

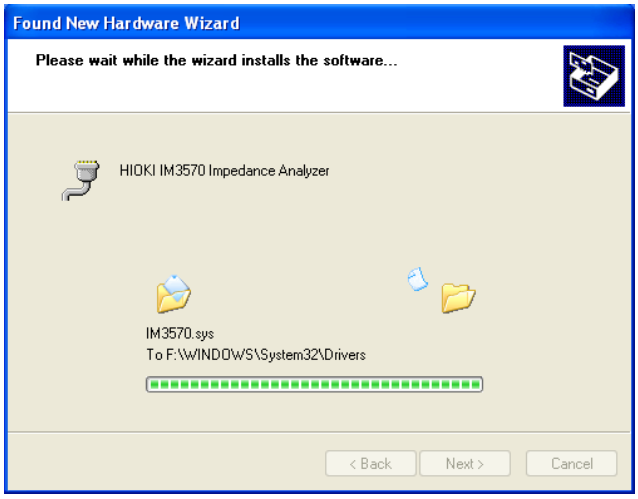
7



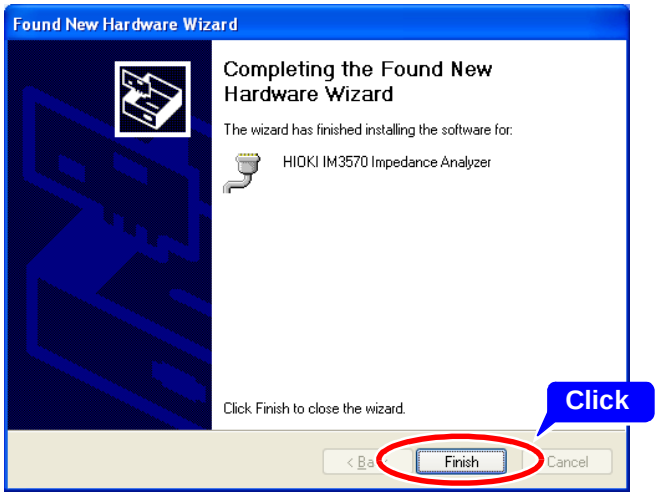
Click **[Continue Anyway]**.

After Windows XP checks the software, it will display a warning stating that the software has not been certified by Microsoft. Click **[Continue Anyway]**.

Windows will begin copying the driver files.



When installation is complete, the **[Completing the Found New Hardware wizard]** will appear.



Click **[Finish]**.

For Windows Vista

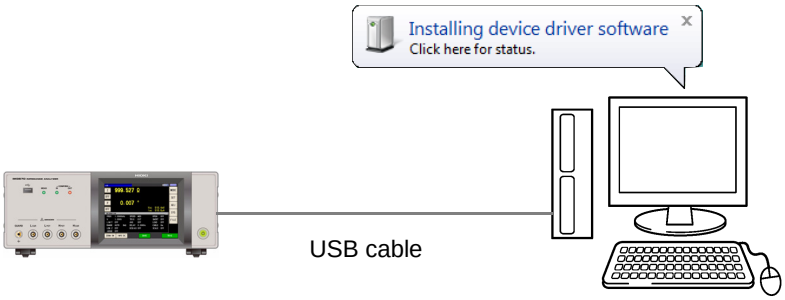
1 **Connect the power cord to the instrument and turn the power on.**

2 **Change the interface communication condition of the IM3570 to USB.**

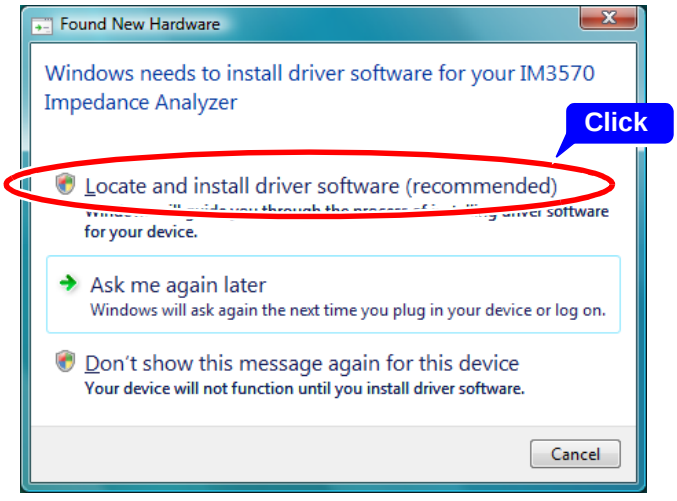
See: "Setting USB" (p. 9)

3 **Using the USB cable, connect the instrument to the personal computer to which the driver will be installed.**

After the "Installing device driver software." window appears, the **[Found New Hardware]** dialog box will appear.

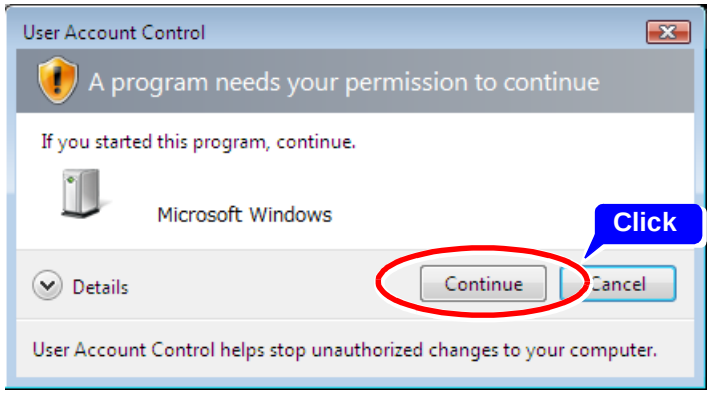


4 **Set the installation setting on the computer.**



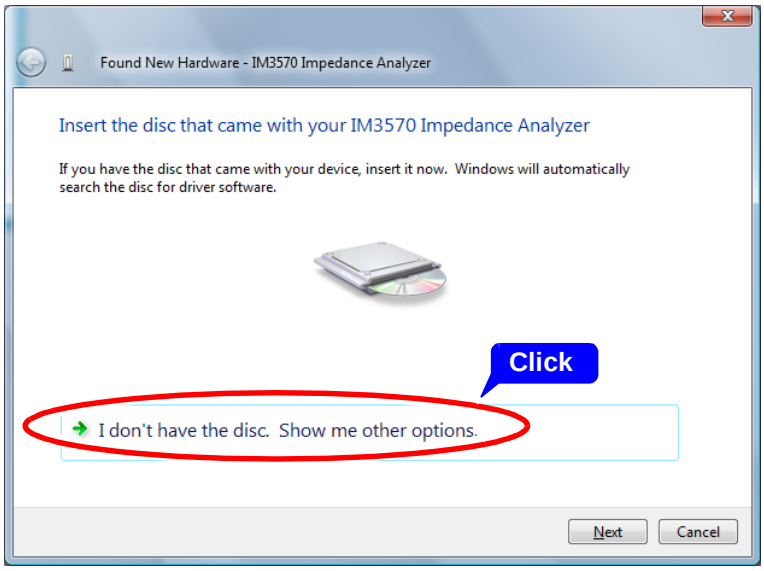
Click **[Locate and install driver software(recommended)]**.

The dialog which asks for installation permission of a driver will appear.



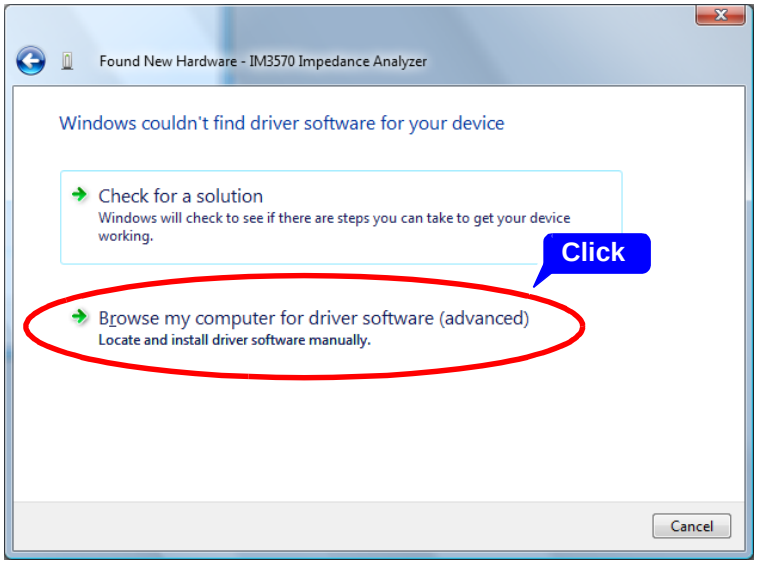
Click **[Continue]**.

5



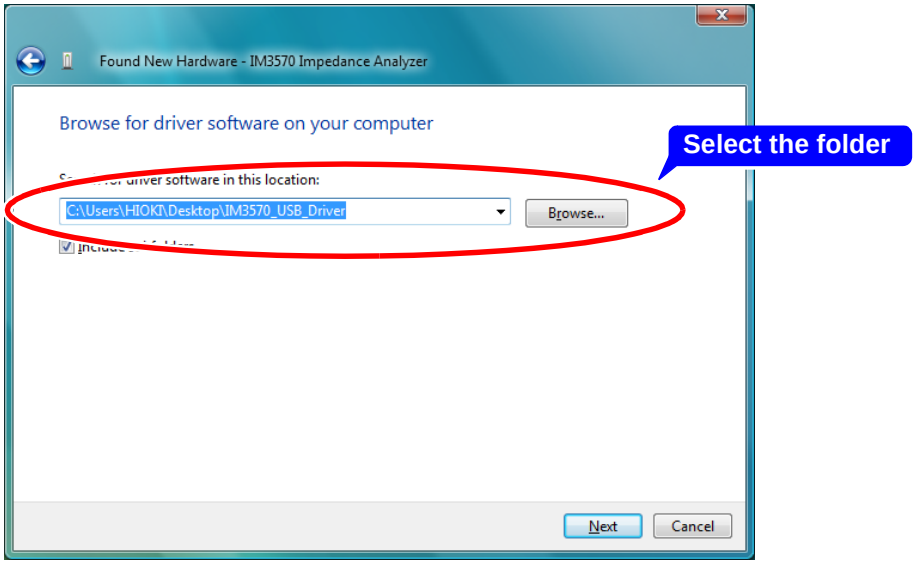
Click **[I don't have the disc. Show me other options]**.

6



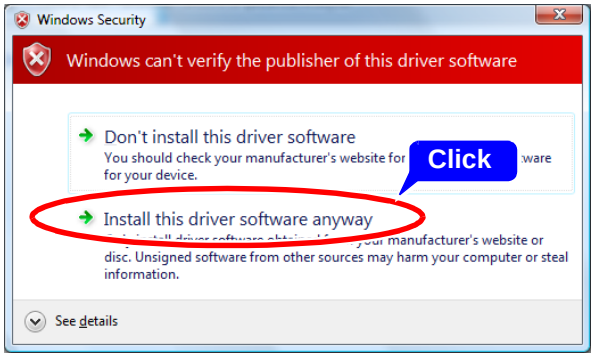
Click **[Browse my computer for driver software (advanced)]**.

7



Click **[Browse]** and select the folder containing the driver.

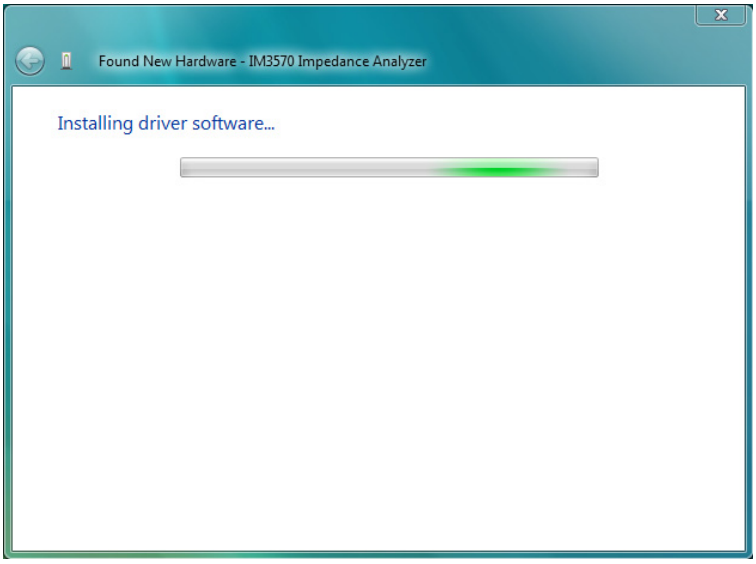
8



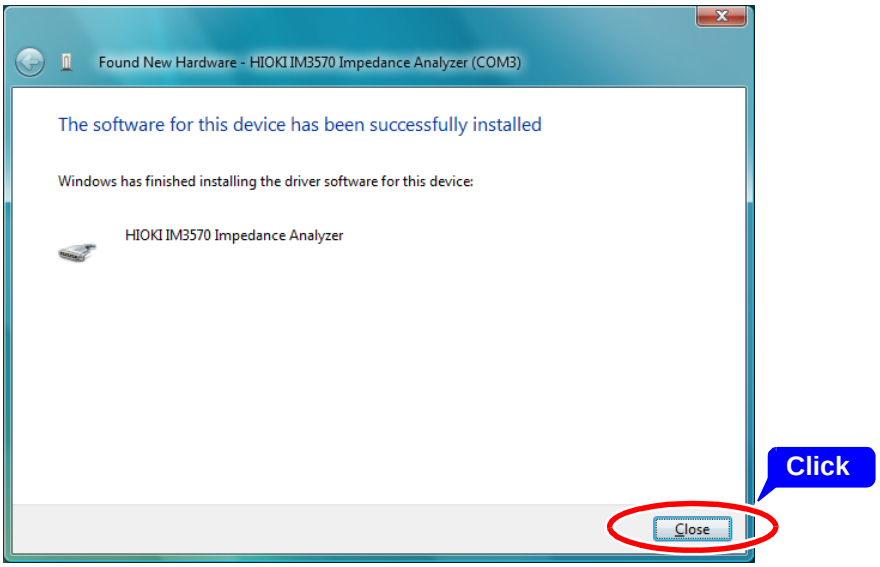
When the **[Windows can't verify the publisher of this driver software]** message appears, click **[Install this driver software anyway]** to continue the installation.

9

Copying of the files begins.



10 When the installation is finished, the following dialog box appears.



Click **[Close]**.

For Windows 7

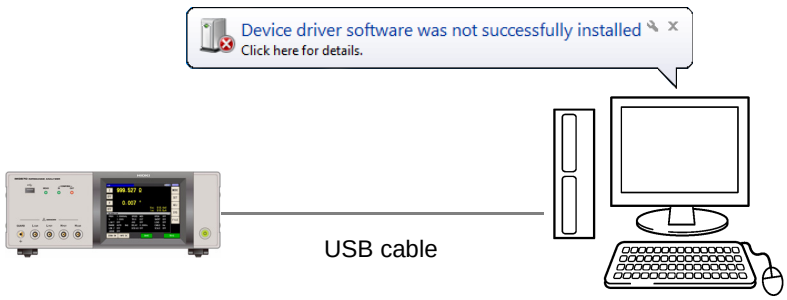
1 **Connect the power cord to the instrument and turn the power on.**

2 **Change the interface communication condition of the IM3570 to USB.**

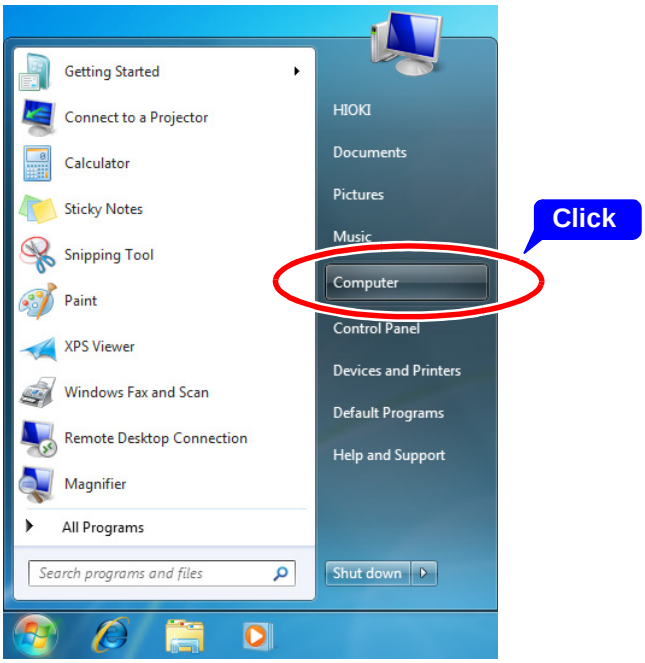
See: "Setting USB" (p. 9)

3 **Using the USB cable, connect the instrument to the personal computer to which the driver will be installed.**

The **[Device driver software was not successfully installed]** pop-up message appears.

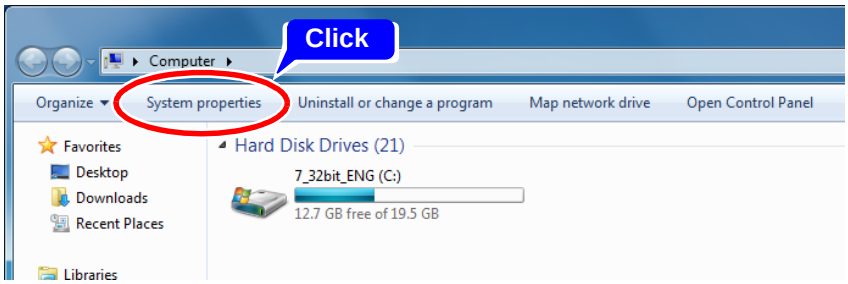


4 **Open [Computer].**



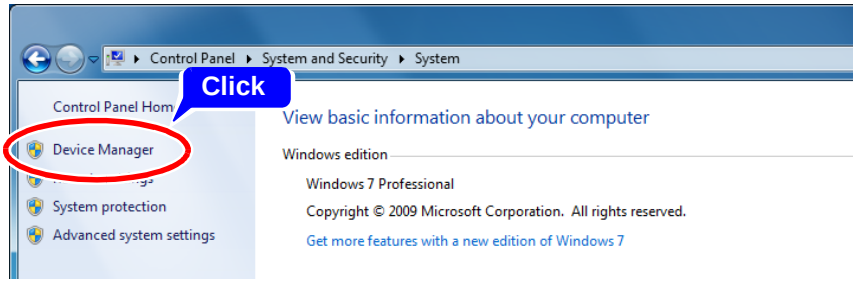
Click **[Start Menu]** and then **[Computer]**.

5 Open [System].



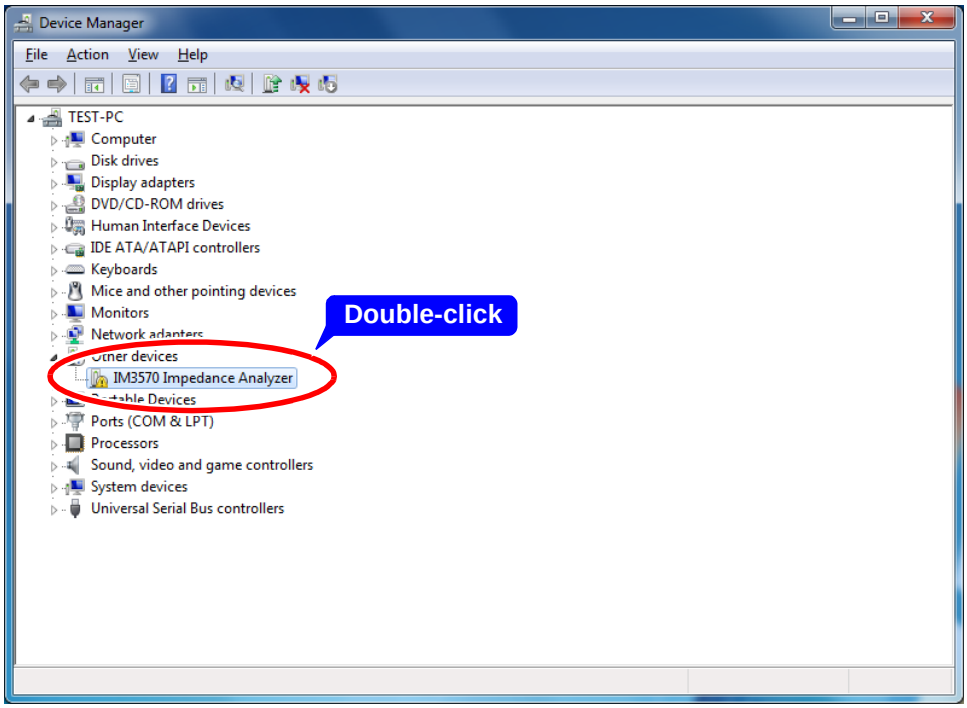
Click **[System properties]**.

6 Open [Device Manager].



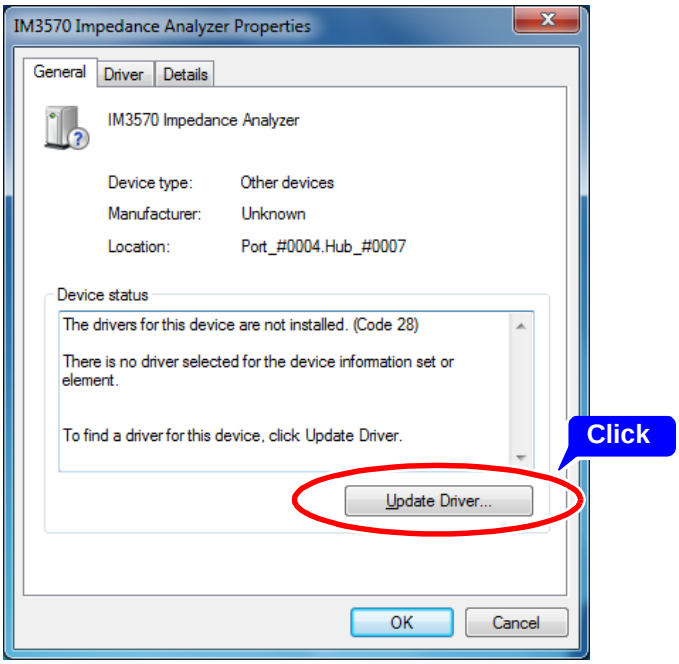
Click **[Device Manager]**.

7 Open the properties of the driver.



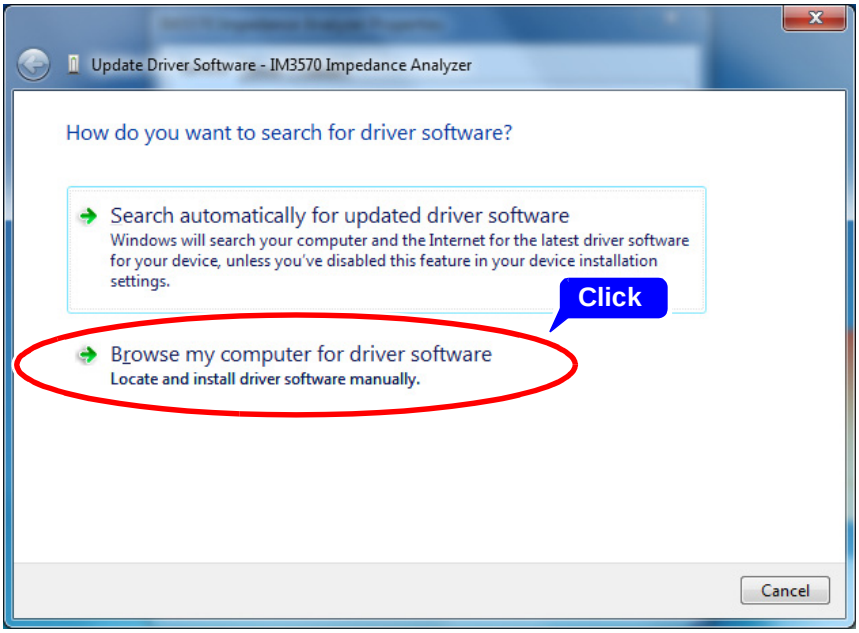
Double-click **[IM3570 Impedance Analyzer]**.

8 Update the driver software.



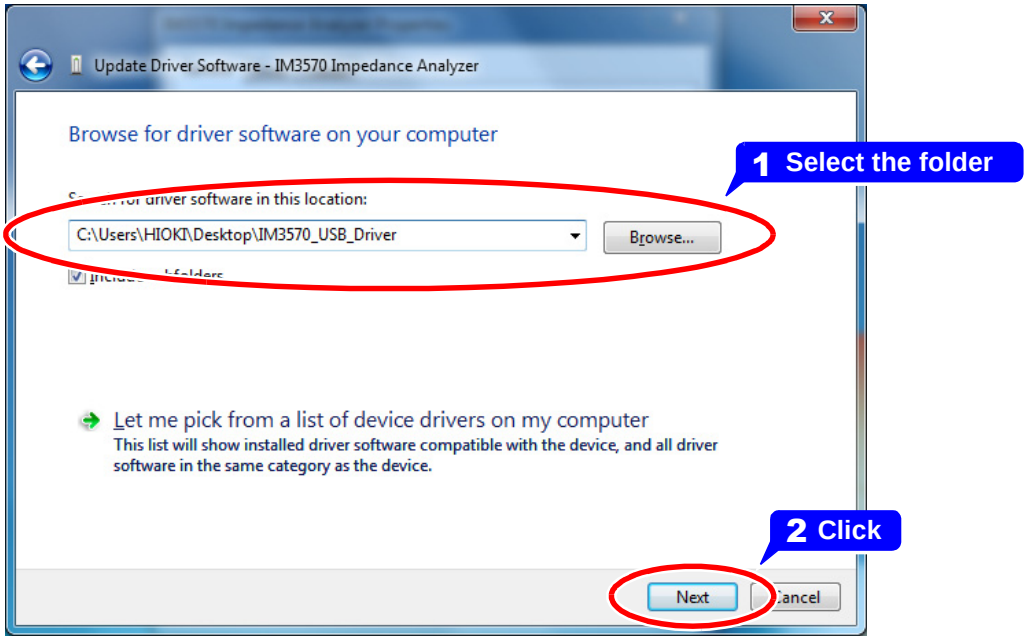
Click **[Update Driver]**.

9



Click **[Browse my computer for driver software]**.

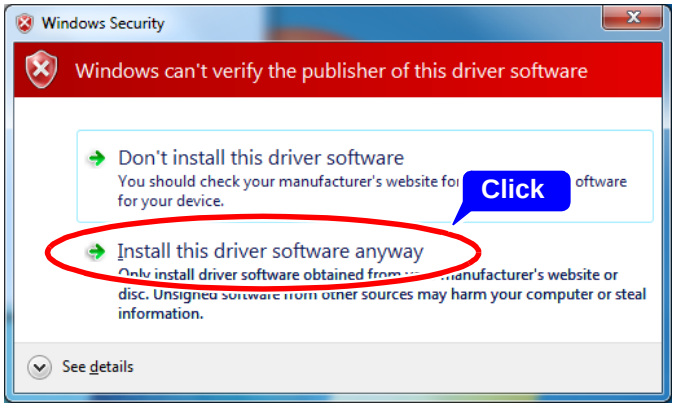
10



1 Click **[Browse]** and select the folder containing the driver.

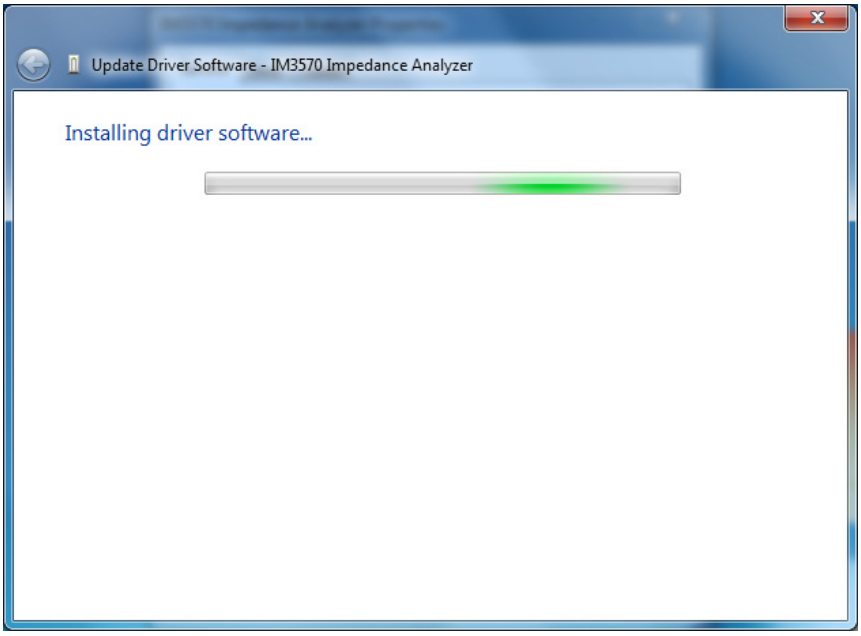
2 Click **[Next]**.

11

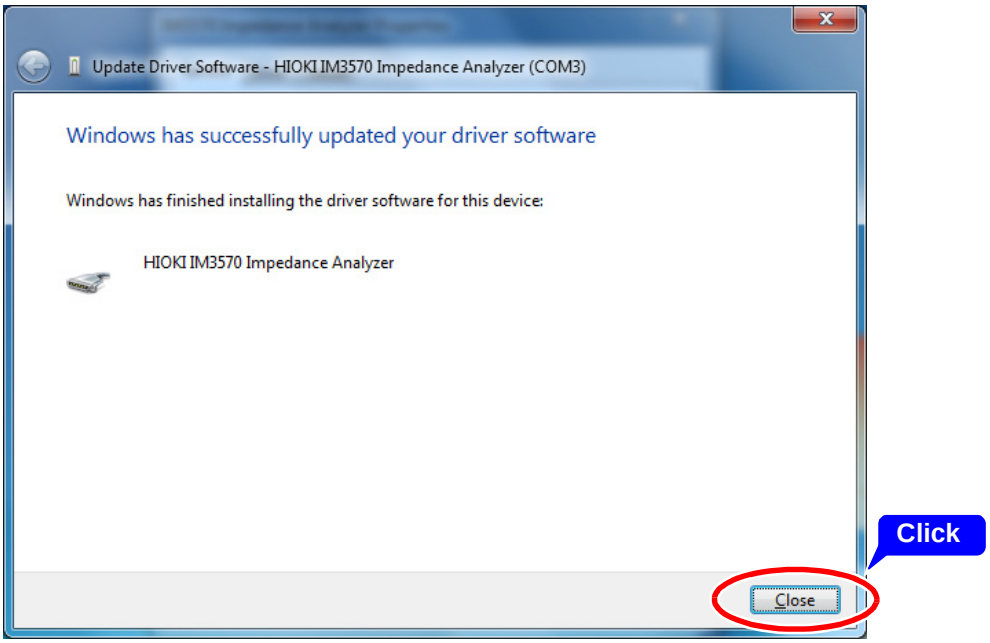


When the **[Windows can't verify the publisher of this driver software]** message appears, click **[Install this driver software anyway]** to continue the installation.

12 Copying of the files begins.

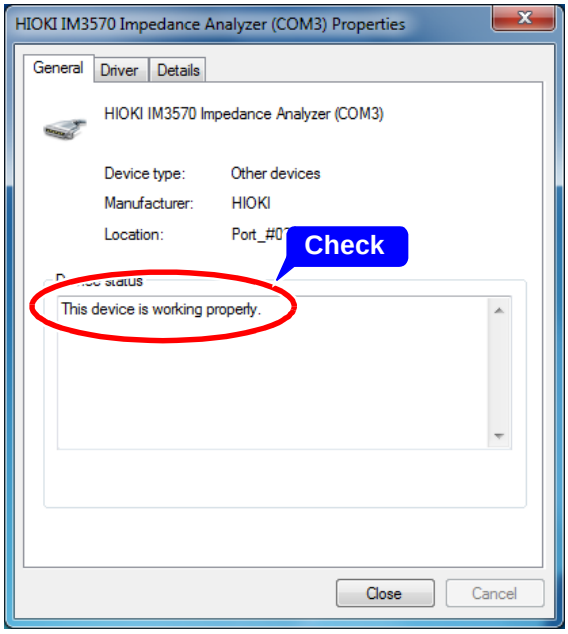


13 When the installation is finished, the following dialog box appears.



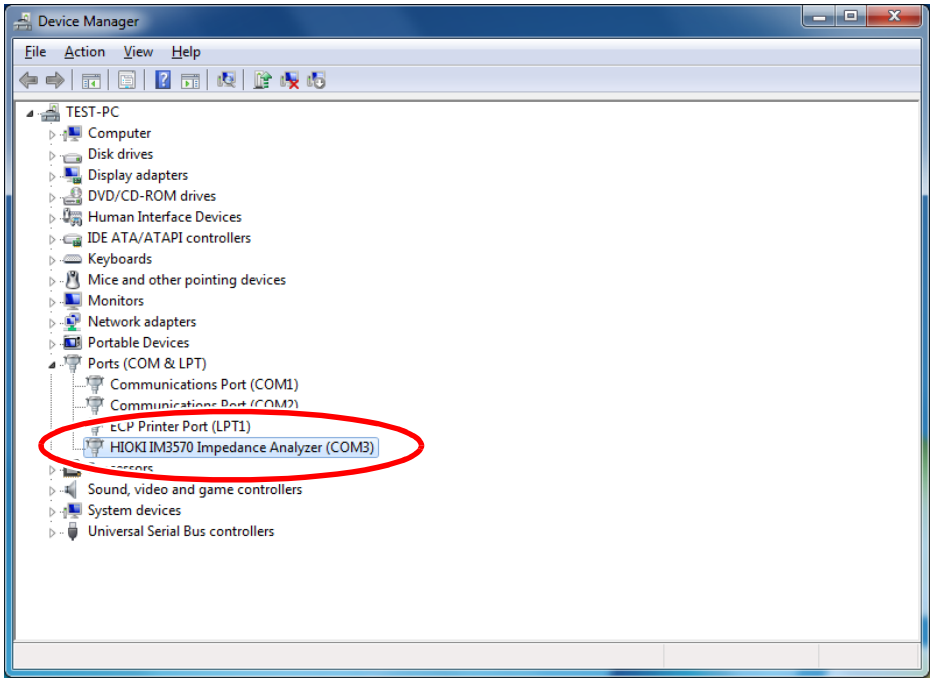
Click **[Close]**.

14 When the installation is finished, the following dialog box appears.



Confirm that the device status is "This device is working properly."

NOTE In Device Manager, you can confirm the COM port assigned to IM3750.



2.5 LAN Settings and Connection

LAN Settings

You can perform command control using the TCP/IP protocol.
Set the instrument to match your network environment in advance.

NOTE
- Make these settings before connecting to a network. Changing settings while connected can duplicate IP addresses of other network devices, and incorrect address information may otherwise be presented to the network.
- The instrument does not support DHCP (automatic IP address assignment) on a network.

Setting Items

IP address	Identifies each device connected on a network. Each network device must be set to a unique address. The instrument supports IP version 4, with IP addresses indicated as four decimal octets, e.g., "192.168.0.1".
Subnet mask	This setting is for separating the IP address into the network address that indicates the network and the host address that indicates the instrument. On this instrument, the subnet mask is represented as four decimal numbers separated by ". " such as "255.255.255.0."
Default Gateway	When the computer and instrument are on different but overlapping networks (subnets), this IP address specifies the device to serve as the gateway between the networks. If the computer and instrument are connected one-to-one, no gateway is used, and the instrument's default setting "0.0.0.0" can be kept as is.

Network Environment Configuration

Example 1. Connecting the instrument to an existing network

When connecting the instrument to an existing network, the network settings need to be confirmed in advance.
An IP address which is not the same as that of another network device needs to be assigned.
Confirm the following items with the network administrator, and write them down.

IP Address _____.____.____.____
Subnet Mask _____.____.____.____
Default Gateway _____.____.____.____

Example 2. Connecting multiple instruments to a single computer using a hub

When building a local network with no outside connection, the following private IP addresses are recommended.
Example of private IP address:
IP Address .....Computer: 192.168.0.100
Model IM3570: 192.168.0.1, 192.168.0.2, 192.168.0.3...
(Set an IP address that differs from that of other network devices.)
Subnet Mask.....255.255.255.0
Default Gateway .....OFF(0.0.0.0)

Example 3. Connecting one instrument to a single computer using the 9642 LAN Cable

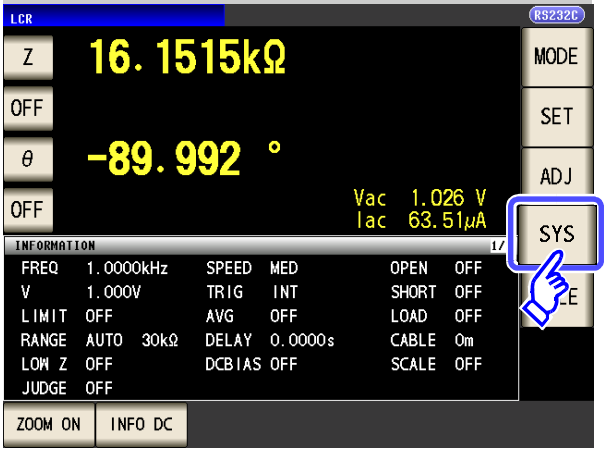
The 9642 LAN Cable can be used with its supplied connection adapter to connect one instrument to one computer, in which case the IP address is freely settable. Use the recommended private IP addresses.
IP Address .....Computer: 192.168.0.100
Model IM3570:192.168.0.1 (Set to a different IP address than the computer.)
Subnet Mask.....255.255.255.0
Default Gateway .....OFF(0.0.0.0)

Procedure

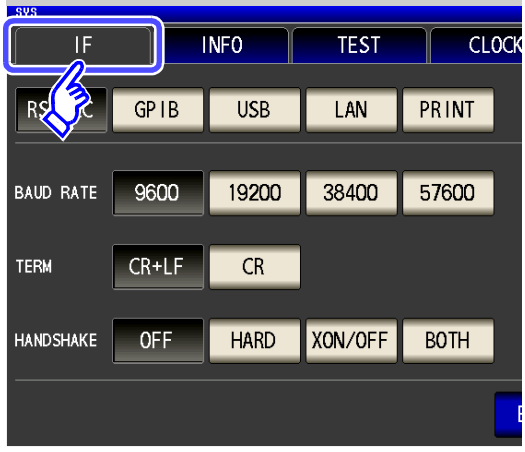
You can configure the setting from any of [LCR] mode, [ANALYZER] mode.

1

LCR Initial Screen

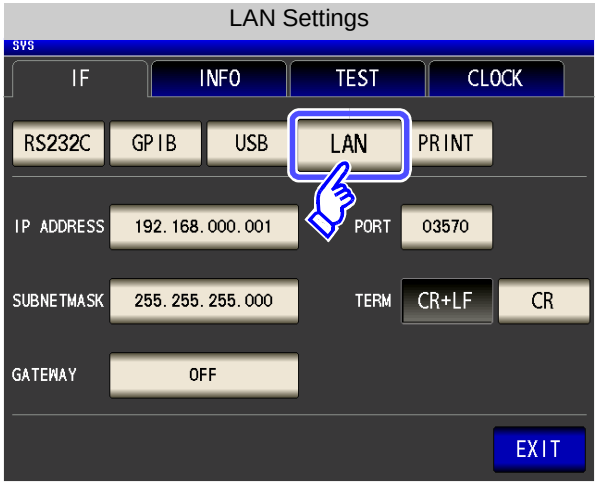


Interface Settings



2

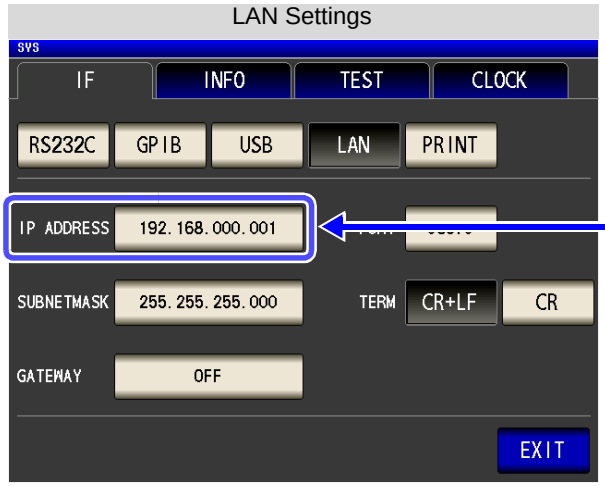
LAN Settings



Press [LAN].

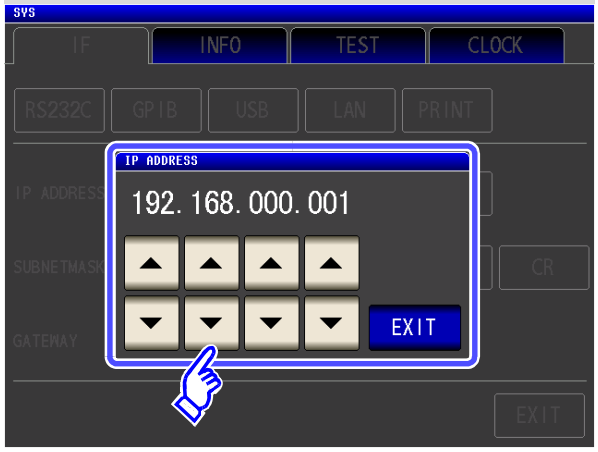
3

LAN Settings



Select the IP address.

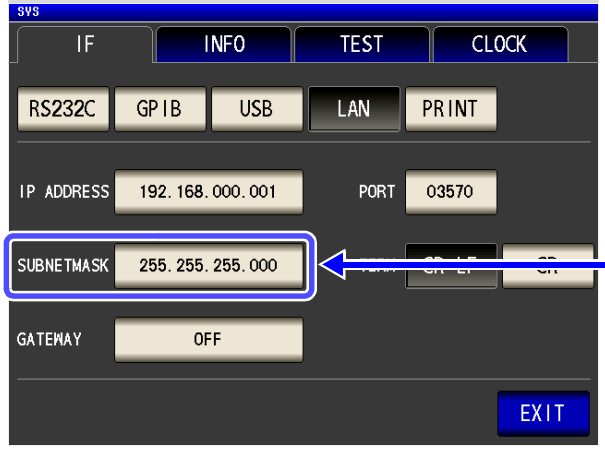
4 IP address Settings



Use ▲ or ▼ to set the IP address.

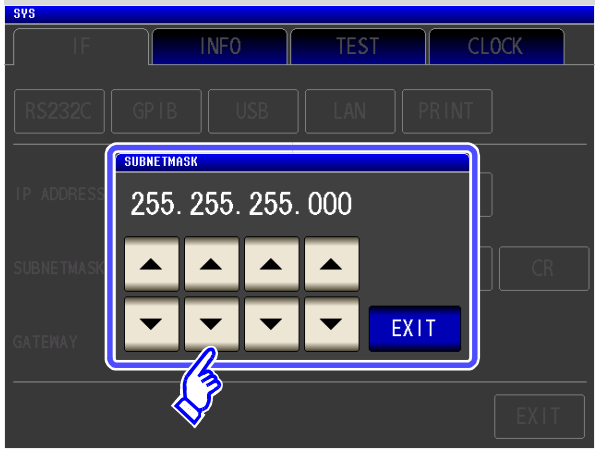
Press EXIT to confirm the setting.

5 LAN Settings



Select the subnet mask.

6 Subnet mask Settings

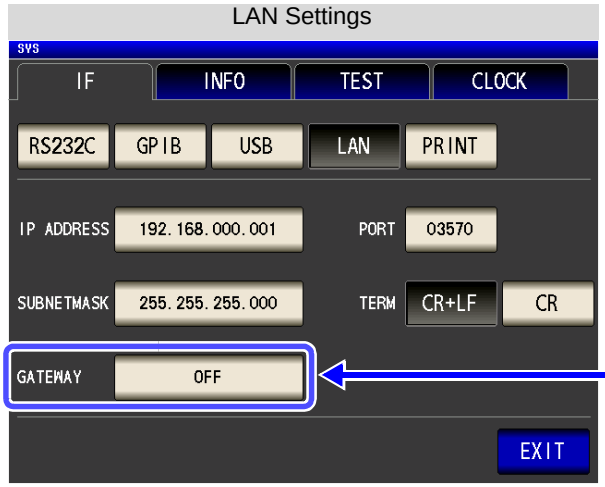


Use ▲ or ▼ to set the subnet mask, and press EXIT to confirm the setting.

NOTE Any of the following 30 subnet masks can be set for the instrument.

128.000.000.000	255.128.000.000	255.255.128.000	255.255.255.128
192.000.000.000	255.192.000.000	255.255.192.000	255.255.255.192
224.000.000.000	255.224.000.000	255.255.224.000	255.255.255.224
240.000.000.000	255.240.000.000	255.255.240.000	255.255.255.240
248.000.000.000	255.248.000.000	255.255.248.000	255.255.255.248
252.000.000.000	255.252.000.000	255.255.252.000	255.255.255.252
254.000.000.000	255.254.000.000	255.255.254.000	
255.000.000.000	255.255.000.000	255.255.255.000 (Initial setting)	

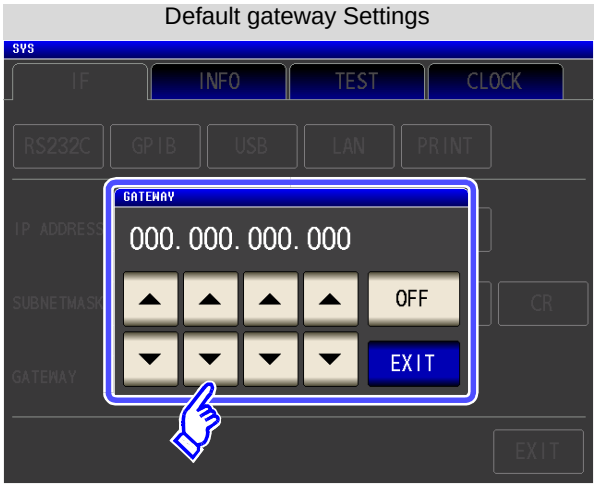
7



Select the default gateway.

If the default gateway does not need to be set, for example, when connecting the instrument and computer on a one-to-one basis using a cross cable, leave this set to OFF.

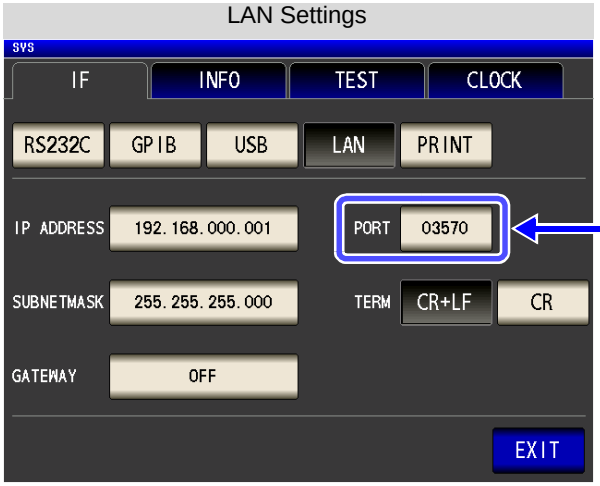
8



Use ▲ or ▼ to set the default gateway.

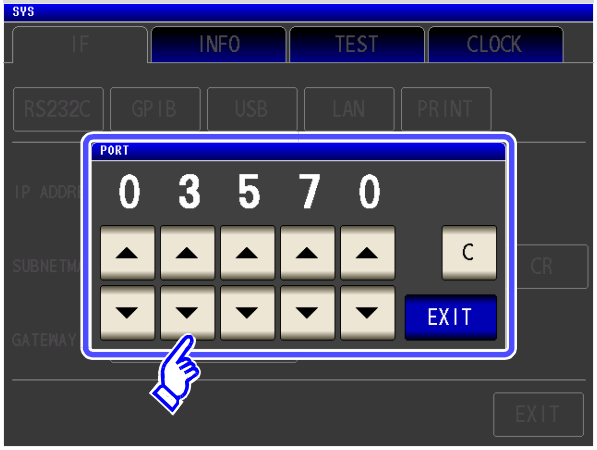
Press EXIT to confirm the setting.

9



Select the port number.

10 Port number Settings

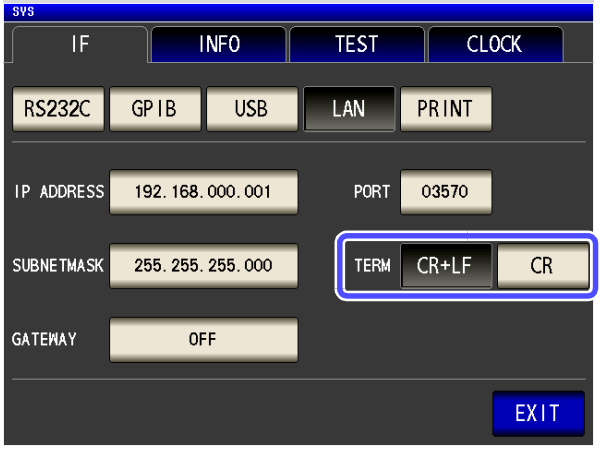


Use ▲ or ▼ to set the port number to use for communication commands.

Settable range : 1024 to 65535

Press EXIT to confirm the setting.

11 LAN Settings



Select the terminator setting.

CR+LF	CR+LF
CR	CR

12 **Press EXIT to confirm the setting.**

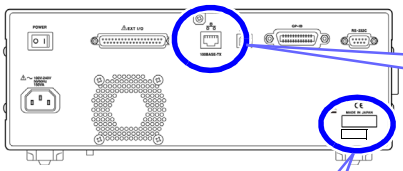
Connecting a LAN Cable

Use a LAN cable to connect the instrument and computer.

Required items:

When connecting the instrument to an existing network (prepare any of the following):
- Straight-through Cat 5, 100BASE-TX-compliant Ethernet cable (up to 100 m, commercially available). For 10BASE communication, a 10BASE-T-compliant cable may also be used.
- Hioki 9642 LAN Cable (option)
  (A cross adapter cannot be used.)

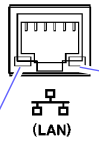
When connecting one instrument to a single computer (prepare one of the following):
- 100BASE-TX-compliant cross-over cable (up to 100 m)
- 100BASE-TX-compliant straight-through cable with cross-over adapter (up to 100 m)
- Hioki 9642 LAN Cable (option)



The MAC address of the LAN is displayed below the serial number.

You can also check it on the instrument screen.

See: "Checking the Version of the Instrument" in the instruction manual.

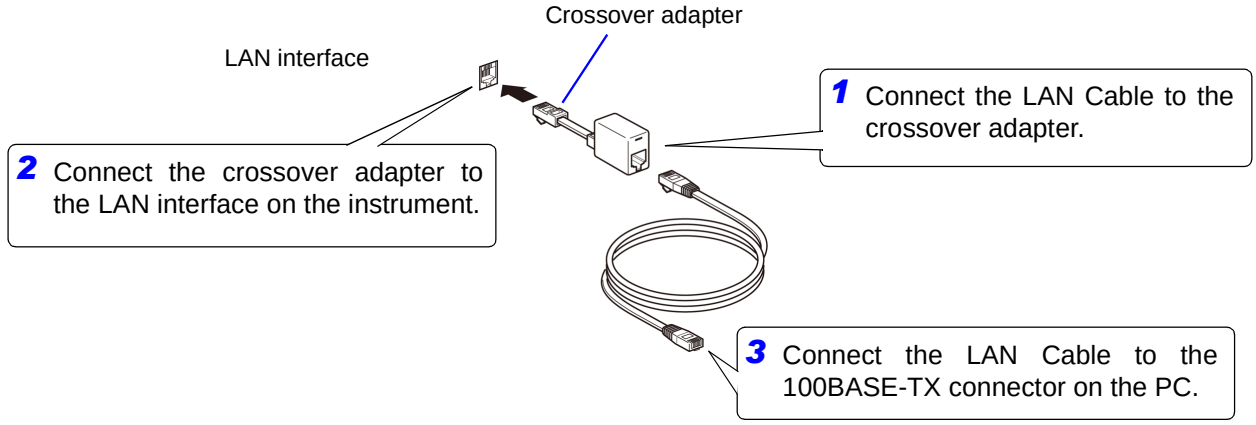


SPEED LED
On:Performing communication with 100BASE.
Off:Performing communication with 10BASE.

RX/TX LED
Flashes when data is being exchanged.

When connecting the instrument to a single computer (connect the instrument to the computer)

Connecting with the 9642 LAN Cable and crossover adapter (supplied with the 9642)



2.6 Printer (Option) Settings

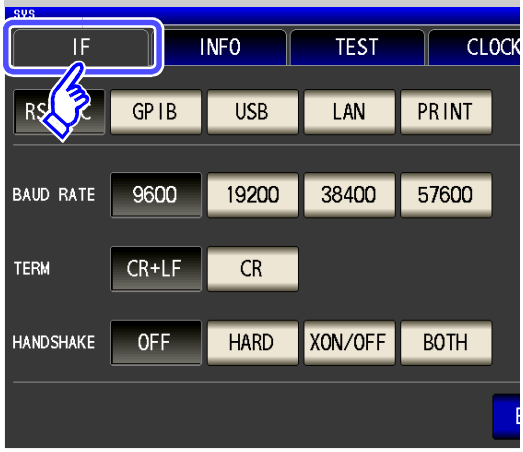
For the procedure to connect the instrument and printer (option), refer to “Chapter 12 Printing” in the Instruction Manual.

Procedure

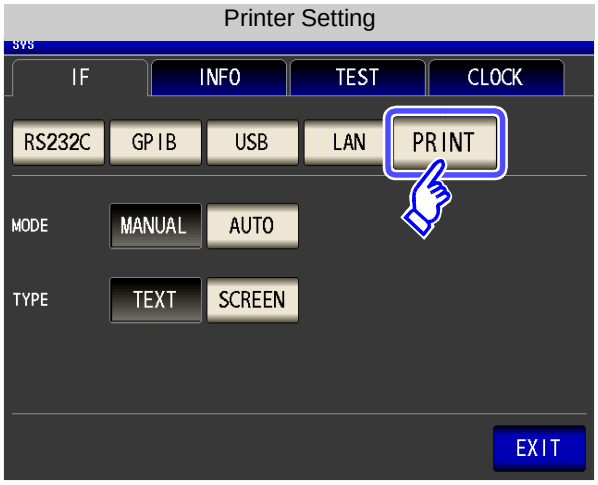
You can configure the setting from any of [LCR] mode, [ANALYZER] mode.

1 LCR Initial Screen

Interface Settings

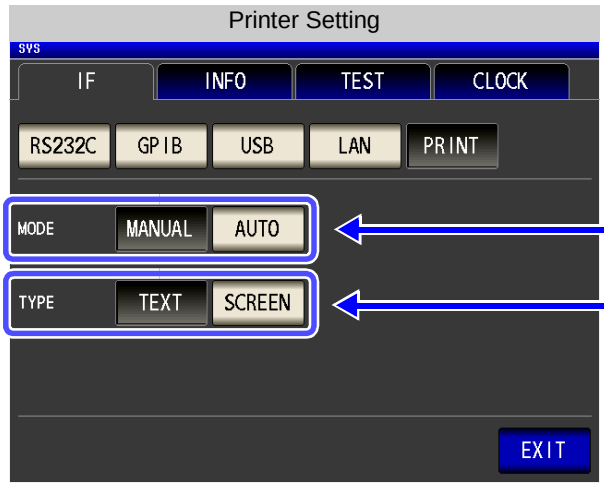


2 Printer Setting



Press [PRINT].

3 Printer Setting



Select the timing for printing.

[MANUAL]	Prints when [PRINT] displayed in the initial screen is pressed.
[AUTO]	Prints automatically after measurement finishes.

Select the print type.

[TEXT]	Prints the measurement values.
[SCREEN]	Prints the measurement screen.

NOTE

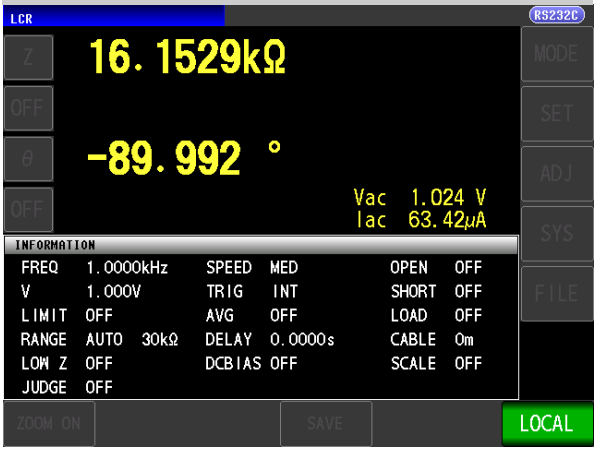
- **[TYPE]** can only be set in LCR mode.
- It is automatically set to [SCREEN] in analyzer mode.
- It cannot be set during continuous measurement.
  ([TEXT] or [SCREEN] is automatically selected depending on the print content.)

4 **Press** [EXIT] **to confirm the setting.**

2.7 Remote Mode

When you connect a device to an interface and start communication, the mode becomes remote mode (remote operation state) and the keys on the LCD are disabled.

Remote Mode State

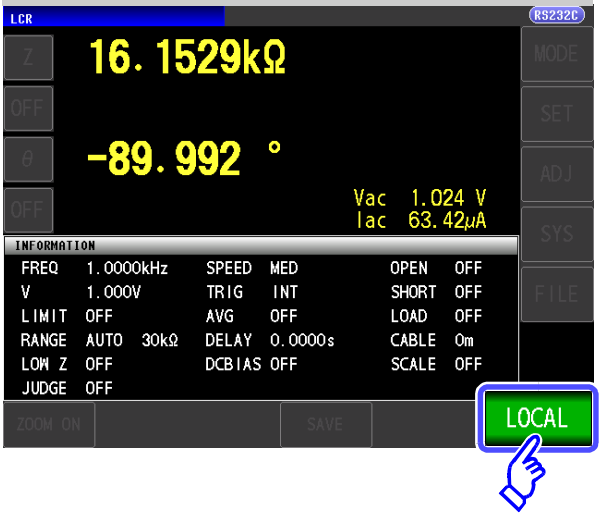


All of the keys except LOCAL **are disabled.**

Canceling Remote Mode

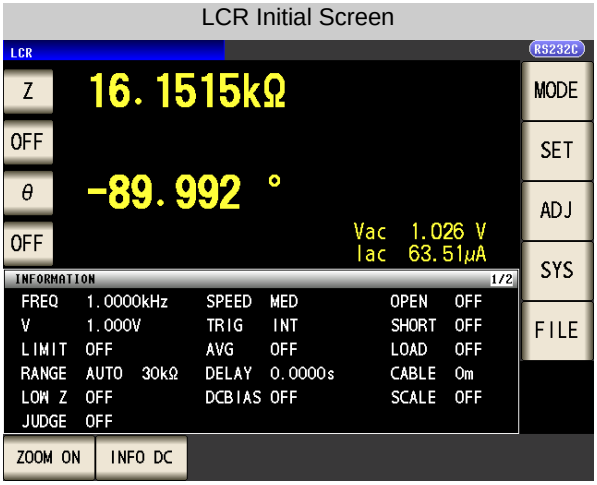
Procedure

1 Local State



Press LOCAL **to return to the normal state (local state).**

2 LCR Initial Screen

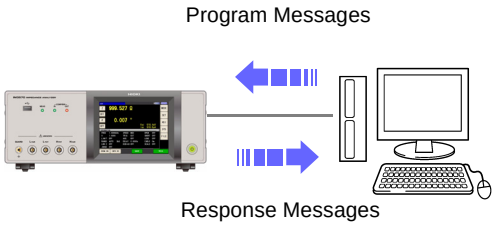


The initial screen is redisplayed.

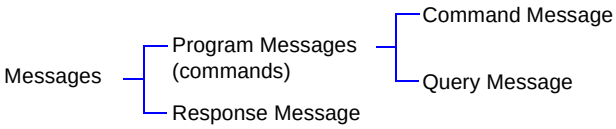
About Communication Chapter 3

3.1 Communication Methods

You can control the instrument by sending messages to the instrument from a computer via each of the interfaces.
Messages include program messages (p. 38) that are sent from the computer to the instrument and response message (p. 38) that are sent from the instrument to the computer.



Message types are further categorized as follows



When issuing commands that contain data, make certain that the data is provided in the specified format.

NOTE In the following explanations, "program messages " are referred to as "commands "

About Marks

Each of the following marks indicates that the explanation is unique to the corresponding interface.

GP-IB	Only for GP-IB
RS-232C	Only for RS-232C
USB	Only for USB
LAN	Only for LAN
LCR	Only for LCR mode
ANALYZER	Only for ANALYZER mode

3.2 About Message Formats

Program Messages

Program messages can be divided into command messages and query messages.

Command Message

A command for controlling the unit such as an instruction to configure a setting or reset the settings of the device.

Example `:FREQUENCY 1000` (instruction for setting the frequency)

Header: `:FREQUENCY` — Separator: ` ` — Data Section: `1000`

Query Message

A command for finding out the results of operations, results of measurements, or the current configuration state of the device.

Example `:FREQUENCY ?` (instruction for setting the frequency)

Header: `:FREQUENCY` — Question Mark: `?`

See Header(p. 39), Separator(p. 40), Data Section(p. 41)

Response Message

A response message is created after the syntax of a received query message has been checked. The "HEADer" command can be used to select whether there is a header.

Header ON `:FREQUENCY 1000`
Header OFF `1000`
(The current frequency is 1 kHz.)

- The header is set to OFF when the power is turned on.
- If some sort of error was generated when a query message was received, a response message is not created for the query message.

See About errors:(p. 57)

Command Syntax

Command names are selected for functions to be executed in a language that is as easy as possible to understand, and command names can also be shortened.
The unshortened form of a command name is known as the "long form" and the shortened form of a command name is know as the "short form." In this manual,
uppercase characters are used for the short form part and lowercase characters are used for the remaining part. However, either uppercase or lowercase characters
are acceptable.

FREQuency	OK (long form)
FREQ	OK (long form)
FREQu	Error
FRE	Error

For response messages returned from the unit, uppercase characters and the long form are used.

Header

The header indicates what is to be controlled. Program messages must have a header.

Command Program Headers

There are three types of headers: simple command, compound command, and common command.

- **Simple Command Header**
  Simple command headers contain a single word beginning with an alphabetic character.
  :HEADer
- **Compound Command Header**
  Compound command headers contain multiple simple command headers separated by colons (:).
  :BEEPer:KEY
- **Common Command Header**
  Common command headers begin with an asterisk (*) to indicate the commands are common commands.
  (As specified in IEEE488.2)
  ***RST**

Query Program Header

This is used for finding out the results of operations performed in response to device commands, the results of measurements, or the current configuration state of the device.

A program header is identified as a query if a question mark (?) is added at the end as shown in the example below.

:FREQuency?

Message Terminator

A message terminator indicates the end of a command.
The unit accepts the following as message terminators.

GP-IB	• LF • CR+LF • EOI • LF with EOI
RS-232C USB LAN	• CR • CR+LF

NOTE The Model IM3570 unit analyzes a message after it has confirmed the message terminator.

Depending on the interface setting, the following can be selected as terminators of response messages.

GP-IB	• LF with EOI (initial state) • CR and EOI with LF
RS-232C USB LAN	• CR • CR and LF (initial state)

Separator

Message Unit Separator (Semicolon)

Semicolons are used as separators when executing compound messages. Linking multiple messages by semicolons (;) enables a single line to be used to describe a compound command.

```
:RANGe:AUTO ON;:BEEPer:KEY ON;*IDN?
```

If a command error occurs when messages are described in succession, the messages from the error to the terminator are not executed.

Example) If `:RAN:AUTO ON;:BEEPer:KEY ON;*IDN?` is executed and `:RAN:AUTO` is a command error, `:BEEPer:KEY ON;*IDN?` following the error will also not be executed

Command processing is continued for an execution error or a query error.
See About errors:"3.6 About Event Registers" (p. 50),
and 4.1"Message List"; Explanation of Errors (Page 57 to 206)

Message Unit Separator (Space)

A space is used as a separator to differentiate the header and data section. Add a space ( ) between the header and data section.

```
:LEVel 0.5
```

Message Unit Separator (Comma)

In a message containing multiple data items, commas are required to separate the data items from one another.

```
:COMParator:FLIMit:ABSOlute 112345,123456
```

Data Section

A data section indicates the content of a command.
In the unit, character data and decimal numeric data are used for data sections, and use differs depending on the command.

Character Data

Character data begins with an alphanumeric character and consists of alphabetic characters and numbers. Both uppercase and lowercase characters are acceptable, but uppercase characters are always used for response messages from the unit.

```
:TRIGger INTernal
```

Decimal Numeric Data

There are three numeric data formats: NR1, NR2, and NR3. Both signed numeric and unsigned numeric values are acceptable for each of these formats.

Unsigned numeric values are treated as positive numeric values.

Furthermore, if the accuracy of numeric values exceeds that capable of being handled by the unit, the numeric values are rounded off.

NR1	Integer data (Example: +12, -23, 34)
NR2	Fixed-point data (Example:+1.23, -23.45, 3.456)
NR3	Floating-point representation exponent data (Example:+1.0E-2, -2.3E+4)

The format that includes all three of the above types is referred to as the NRf format.

The NRf format is accepted by the unit.

For response data, the format is specified separately for each command and the data is sent in that format.

```
:RANGe 6
:LEVel:VOLTage 0.5
```

NOTE For commands with data, make every effort to enter the data in the specified format.

Omitting Compound Command Headers

When compound commands contain common initial parts (example: **:BEEPer:KEY**, **:BEEPer:JUDGment**), the common initial part (example: **:BEEPer:**) can be omitted just for subsequent commands.
The common initial part is known as the "current path," and until cleared, the current paths of subsequent commands are determined to have been omitted when analysis is performed.
The following shows an example of the procedure for using current paths.

- **Normal expression**

:BEEPer:KEY ON;:BEEPer:JUDGment NG

- **Expression with current path omitted**

:BEEPer:KEY ON;JUDGment NG

This becomes the current path and can be omitted from subsequent commands.

The current path is cleared when the power is turned on, the interface type is changed, the device is cleared* (only for GP-IB), or upon detection of a colon (:) at the beginning of a command or a message terminator.
Common command messages can be executed regardless of the current path.
Furthermore, the current path is not affected.
A colon does not need to be added to the beginning of simple and compound command headers. However, Hioki recommends adding a colon to the beginning of these headers to prevent them from being mixed up with headers that have omissions and to prevent an incorrect operation from being performed.
* Device Initialization

3.3 About Data Transmission Formats

With IM3750, two types of data transmission format are supported: ASCII and binary.
There is also long format mode which allows 10 digits for the number of effective digits of measurement values.
The data transmission speed differs depending on the data transfer format or long format setting.

Measurement Value, Measurement Signal, and Monitor Value Formats

Measurement Parameter		Number of Effective Digits (Long Format ON/OFF)		Exponent (Long Format ON/OFF)	
		OFF	ON	OFF	ON
Measurement values	θ	Up to third decimal place	Up to seventh decimal place	None	
	D	Up to sixth decimal place	Up to ninth decimal place	None	
	Q	Up to third decimal place	Up to fifth decimal place	None	
	other	7 effective digits	Up to ninth decimal place	2 digit number to the power of 3 separation (E+03, E+06, E-12)	2 digit number to the power of 1 separation (E+01, E+02, E-12)
Measurement signals	FREQ	5 effective digits		2 digit number to the power of 3 separation (E+03,E+06,E-12)	
	V	Up to third decimal place		None	
	CV	Up to third decimal place		None	
	CC	Up to second decimal place		Fixed to E-03	
Monitor values	V	Up to sixth decimal place	Up to ninth decimal place	2 digit number to the power of 1 separation (E+01, E+02, E-12)	
	I	Up to sixth decimal place	Up to ninth decimal place	2 digit number to the power of 1 separation (E+01, E+02, E-12)	

COMP Format

Mode		Number of Effective Digits	Exponent Portion
ABS	Upper limit value	7 effective digits	2 digit number to the power of 3 separation (E+03, E+06, E-12)
	Lower limit value		
%	Reference value	7 effective digits	2 digit number to the power of 3 separation (E+03, E+06, E-12)
	Upper limit value	7 effective digits	None
	Lower limit value		
Δ%	Reference value	7 effective digits	2 digit number to the power of 3 separation (E+03, E+06, E-12)
	Upper limit value	7 effective digits	None
	Lower limit value		

BIN format

Mode		Number of Effective Digits	Exponent Portion
ABS	Upper limit value	7 effective digits	2 digit number to the power of 3 separation (E+03, E+06, E-12)
	Lower limit value		
%	Reference value	7 effective digits	2 digit number to the power of 3 separation (E+03, E+06, E-12)
	Upper limit value	7 effective digits	None
	Lower limit value		
Δ%	Reference value	7 effective digits	2 digit number to the power of 3 separation (E+03, E+06, E-12)
	Upper limit value	7 effective digits	None
	Lower limit value		

About signs

When a value is negative, a minus (-) sign is added before the measurement value.
When a value is positive, a space (" ") sign is added before the measurement value.
However, a space is not added in the following cases.

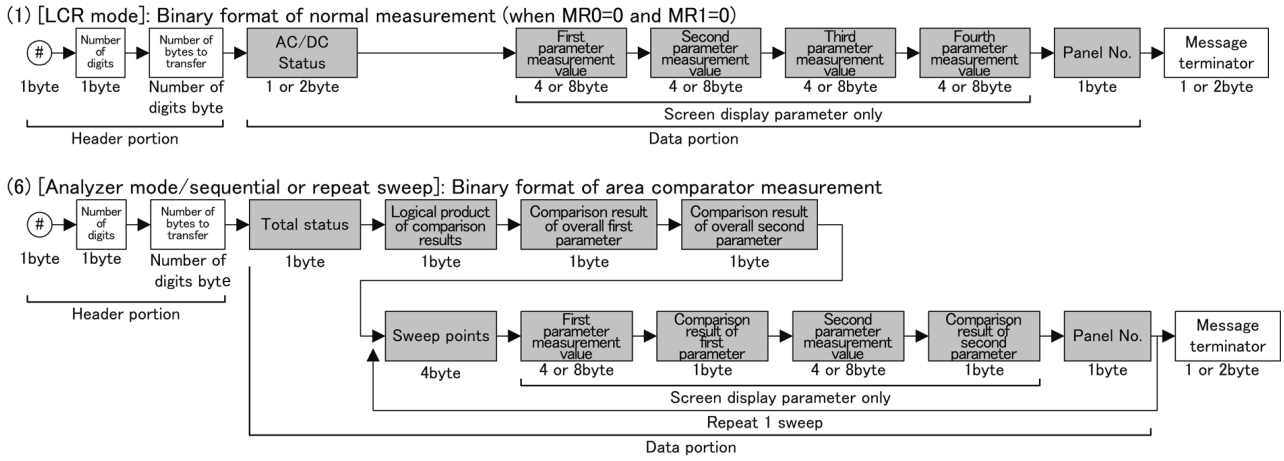
- Value when long format is on
- V/ CV/ CC value
- Monitor value

Binary Format

If a **:FORMat:DATA REAL** command is executed, the IM3750 transmits the data in binary format.
The data portion of the commands/queries shown below is returned in binary format.

- **:MEASure?** query response
  See:**:MEASure?** query message reference (p. 146)
- Measurement value data in automatic output mode
  See:**:MEASure?** query message reference (p. 146)
- **:MEMory?** query response
  See:**:MEMory?** query message reference (p. 146)
- **:MEASure:COMParator:PEAK:LMAX?** query response
  See:**:MEASure:COMParator:PEAK:LMAX?** query message reference (p. 194)
- **:MEASure:COMParator:PEAK:LMIN?** query response
  See:**:MEASure:COMParator:PEAK:LMIN?** query message reference (p. 195)
- **:MEASure:CURSor?** query response
  See:**:MEASure:CURSor?** query message reference (p. 196)
- **:MEASure:POINt?** query response
  See:**:MEASure:POINt?** query message reference (p. 196)

Example of response data format



The response data consist of the header portion, data portion, and terminator.
The following describes the format of each portion.
For details on the response data format. (p. 146)

Header portion

• The header portion consists of the three parameters shown below.

"#"(1byte) : Sign used for data output format

Number of digits for <Number of bytes to transfer> (1 byte)
: Number of digits for number of bytes of data portion

Number of bytes to transfer (number of digits byte)
: Number of bytes of data portion

When the data portion is 13 bytes, it is as shown below.

"#213"

• The number of bytes of the data portion for the response data of the :MEASure? query in ANALYZER mode or the response data of the :MEMory? query is the total for **n** sweep points or for n measurement values.
The number of digits for <Number of bytes to transfer> is fixed as shown below.

:MEASure? query in SWEEP measurement: "5" digits

:MEMory? query: "7" digits

Therefore, if the measurement value of one 14-byte measurement value data is 200 sweep points and if 200 items are stored to memory, the number of bytes to transfer is 2,800 bytes, and the header portion is as shown below.

:MEASure? query in ANALYZER mode : "#502800"

:MEMory? query: "#70002800"

Data portion

• The data portion returns the data of the parameters set in the **:MEASure:VALid** and **:MEASure:ITEM** commands in the same way as with ACSII format.
See **:MEASure?** query message reference (p. 146),
:MEMory? query message reference (p. 158)
• For details on the number of bytes of each parameter (p. 146).

Message Terminator

A message terminator is added in accordance with the instrument settings.

3.4 About the Output Queue and Input Buffer

Output Queue

The output queue is the area in the unit where response messages are stored.
Stored response messages are cleared once they are read by the controller of the PC. The output queue is also cleared at the following times.

GP-IB	• The power is turned on • The device is cleared* • There is a query error
RS-232C USB LAN	• The power is turned on

* The device is initialized

The output queue of the unit is 10KB. If a response message exceeds this size, a query error is generated and the output buffer is cleared.
For GP-IB, the output queue is cleared and a query error is generated if a new message is received when there is data in the output queue.

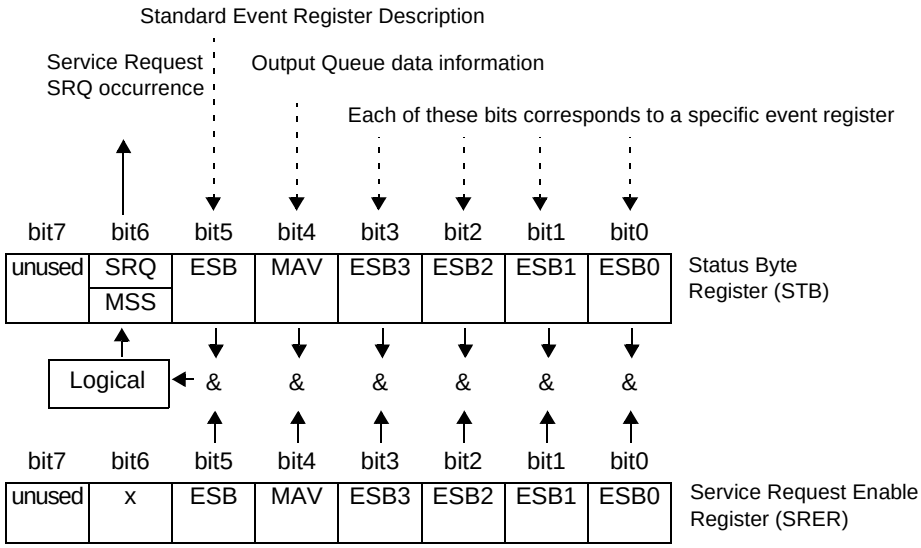
Input Buffer

The input buffer is the area in the unit where received data is stored. The input buffer is 10KB. If data exceeding 10KB was sent and the input buffer becomes full, the GP-IB interface bus enters a wait state until free space becomes available.
RS-232C, USB and LAN cannot receive data that exceeds 10KB.

NOTE Keep the length of one command under 10KB.

3.5 About the Status Byte Register

GP-IB	The unit adopts the IEEE488.2 defined status model for parts related to the serial polling performed by the service request function. A trigger for generating a service request is called an event.
RS-232C USB LAN	Reading these enables you to know the status of the instrument.



Overview of Service Request Occurrence

The Status Byte Register contains information about the event registers and the output queue. Required items are selected from this information by masking with the Service Request Enable Register. When any bit selected by the mask is set, bit 6 (MSS; the Master Summary Status) of the Status Byte Register is also set, which generates an SRQ (Service Request) message and dispatches a service request.

NOTE For RS-232C, USB and LAN bit 4 (MAV message available) of the status byte register is not set.

Status Byte Register (STB)

A status byte register is an 8-bit register output from the unit to the controller during serial polling.
If even one of the status byte register bits enabled by the service request enable register changes from "0" to "1," the MSS bit becomes 1. At the same time, the SRQ bit also becomes "1" and a service request is generated.

The SRQ bit is always synchronized with the service request and only read and simultaneously cleared upon being serial polled. The MSS bit is only read by an "***STB?**" query and is not cleared until the event is cleared by a command such as a "***CLS**" command.

STB		
Bit 7		Unused
Bit 6	SRQ	This becomes 1 when a service request is sent.
	MSS	This indicates logical OR of other bits of the status byte register.
Bit 5	ESB	Standard event summary (logical OR) bit This indicates the logical OR of a standard event status register.
Bit 4	MAV	Message available This indicates there is a message in the output queue.
Bit 3	ESB3	Event summary (logical OR) bit 3 This indicates the logical OR of event status register 3.
Bit 2	ESB2	Event summary (logical OR) bit 2 This indicates the logical OR of event status register 2.
Bit 1	ESB1	Event summary (logical OR) bit 1 This indicates the logical OR of event status register 1.
Bit 0	ESB0	Event summary (logical OR) bit 01 This indicates the logical OR of event status register 0.

Service Request Enable Register (SRER)

When the service request enable register is used to set each of the bits to "1," the corresponding bits are enabled in the status byte register.

3.6 About Event Registers

Standard Event Status Register (SESR)

A standard event status register is an 8-bit register.
If even one of the standard status byte register bits enabled by the standard event status enable register becomes "1", bit 5 (ESB) of the status byte register becomes 1.
See (p. 51)

The content of the standard event register is cleared at the following times.

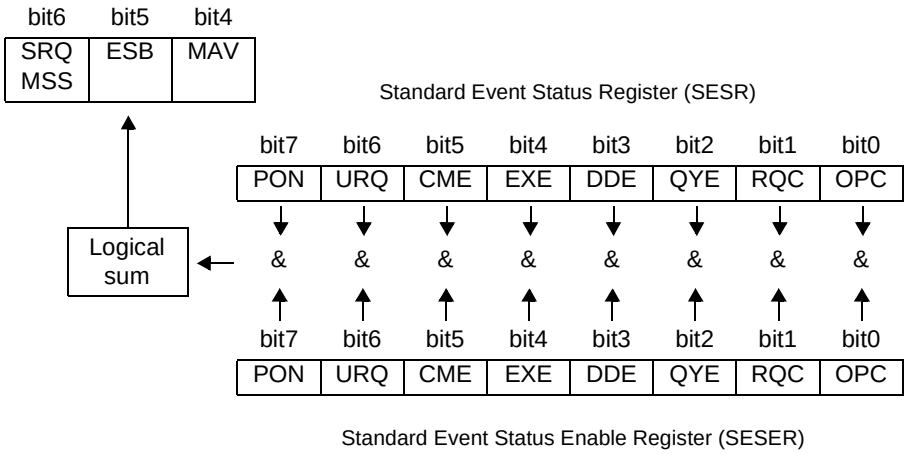
- The "***CLS**" command is executed.
- An event register query is executed (***ESR?**)
- The power is turned on again.

SESR		
Bit 7	PON	Power on flag This becomes "1" when the power is turned on or the unit recovers from a power failure.
Bit 6	URQ	User request Unused
Bit 5	CME	Command error (Commands up until the message terminator are ignored.) This becomes "1" when there is an error with the syntax or meaning of a received command. • When there is an error in the program header • When the number of data items differs from that specified • When the data format differs from that specified • When a command not in the unit is received
Bit 4	EXE	Execution error This becomes "1" when a received command cannot be executed for some reason. • When the specified data is outside the setting range • When the specified data cannot be set • When the command cannot be executed because another function is being used
Bit 3	DDE	Device dependent error This becomes "1" when a command cannot be executed for a reason other than a command error, query error, or execution error. • When the command cannot be executed because there is an internal anomaly • When data valid for open circuit, short circuit, or load compensation cannot be incorporated
Bit 2	QYE	Query error (Clears the output queue.) This becomes "1" when a query error is detected by the controller of the output queue. • When an attempt was made to read the output queue while it was empty (only for GP-IB) • When there is an output queue overflow • When data in the output queue is lost
Bit 1	RQC	Request control Unused
Bit 0	OPC	End of operations This becomes "1" when the operation complete "***OPC**" command is executed. • When operations for all messages up until the "***OPC**" command have ended

Standard Event Status Enable Register (SESER)

When the standard event status enable register is used to set each of the bits to "1," the corresponding bits are enabled in the standard event status register.

Standard Event Status Register (SESR) and Standard Event Status Enable Register (SESER)



Unique Event Status Registers (ESR0, ESR1, ESR2, ESR3)

Four event status registers have been provided for managing events in the unit.
An event status register is an 8-bit register.

If even one of the event status register bits enabled by the event status enable register becomes "1," the corresponding bit becomes as follows.

- When event status register 0: Bit 0 (ESB0) of the status byte register becomes "1"
- When event status register 1: bit 1 (ESB1) becomes "1"
- When event status register 2: bit 2 (ESB2) becomes "1"
- When event status register 3: bit 3 (ESB3) becomes "1"

The content of event status register 0, 1, 2, and 3 is cleared at the following times.

- The "**`*CLS`**" command is executed.
- An event status register query is executed (**`:ESR0?,:ESR1?,:ESR2?,:ESR3?`**)
- The power is turned on again.

3.6 About Event Registers

ESR0		
Bit		**LCR mode/ ANALYZER mode/ CONTINUOUS mode**
Bit 7	REF	Non-guaranteed accuracy bit
Bit 6	COF	Constant current and constant voltage overflow*
Bit 5	LOF	Limit overflow
Bit 4	MOF	Impedance overflow
Bit 3	MUF	Impedance underflow
Bit 2	IDX	Data incorporation end bit
Bit 1	EOM	End of measurement bit
Bit 0	CEM	End of compensation data measurement bit

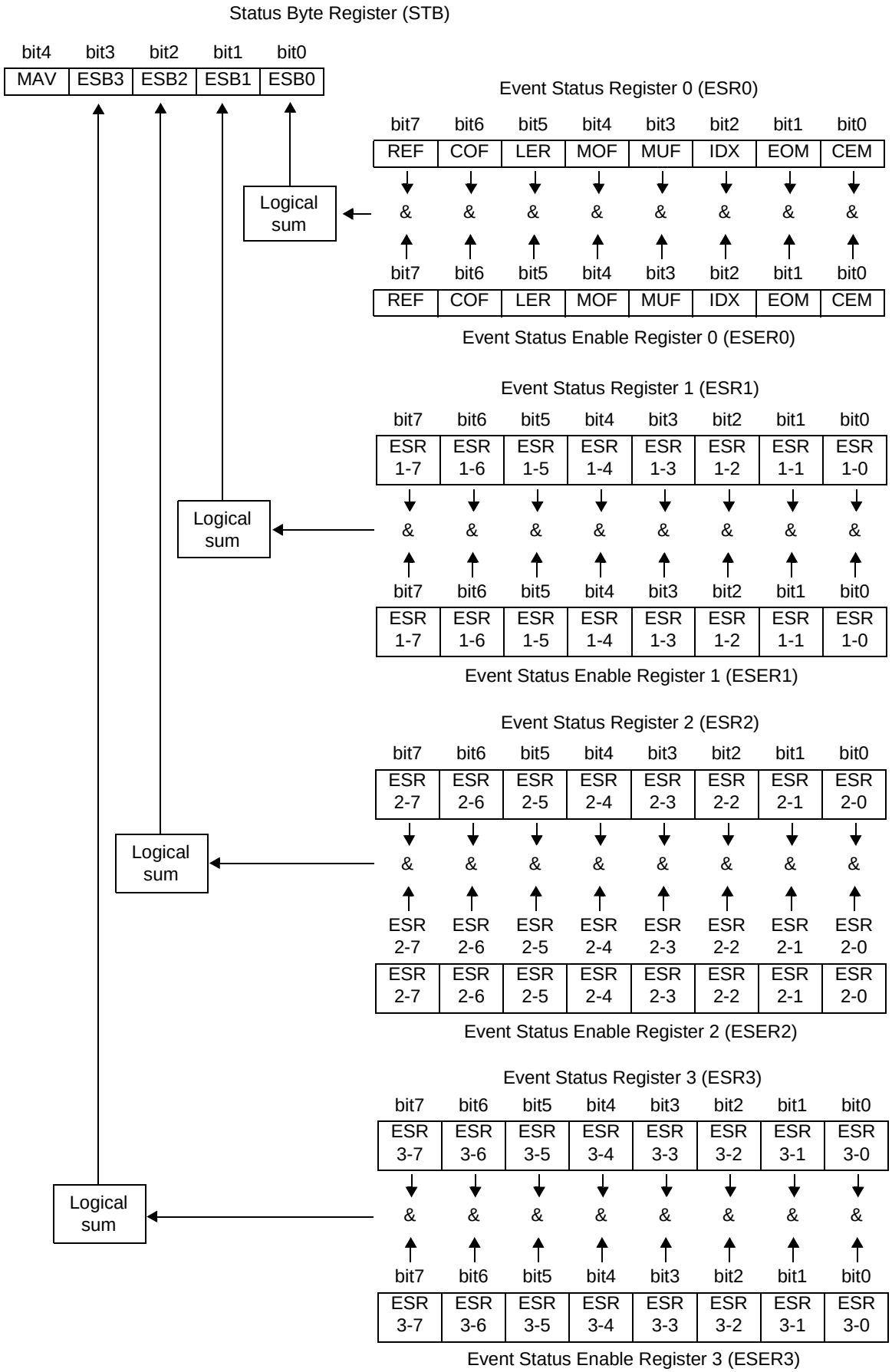
* When RANGE HOLD: Out of AD range
When RANGE AUTO: Out of AD range or out of ranging range

ESR1				
Bit		**LCR mode**	**ANALYZER mode**	**CONTINUOUS mode**
Bit 7	ESR1-7	-	-	-
Bit 6	ESR1-6	Comparison result logical AND (AND of bit 1 and bit 4)	Comparison result logical AND (AND of bit 1 and bit 4)	Logical AND of all measurement results
Bit 5	ESR1-5	Below lower limit value of third parameter	Below lower limit value of second parameter	-
Bit 4	ESR1-4	Within range of third parameter	Within range of second parameter	-
Bit 3	ESR1-3	Above upper limit of third parameter	Above upper limit of second parameter	-
Bit 2	ESR1-2	Below lower limit value of first parameter	Below lower limit value of first parameter	-
Bit 1	ESR1-1	Within range of first parameter	Within range of first parameter	-
Bit 0	ESR1-0	Above upper limit of first parameter	Above upper limit of first parameter	-

ESR2				
Bit		**LCR mode**	**ANALYZER mode**	**CONTINUOUS mode**
Bit 7	ESR2-7	Within range of BIN 8	-	-
Bit 6	ESR2-6	Within range of BIN 7	-	-
Bit 5	ESR2-5	Within range of BIN 6	Local minimum value of first parameter: Out of X axis range	-
Bit 4	ESR2-4	Within range of BIN 5	Local minimum value of first parameter: Within XY-axis range	-
Bit 3	ESR2-3	Within range of BIN 4	Local minimum value of first parameter: Out of Y axis range	-
Bit 2	ESR2-2	Within range of BIN 3	Local maximum value of first parameter: Out of range for X axis	-
Bit 1	ESR2-1	Within range of BIN 2	Local maximum value of first parameter: Within XY-axis range	-
Bit 0	ESR2-0	Within range of BIN 1	Local maximum value of first parameter: Out of range for Y axis	-

ESR3				
Bit		LCR mode	ANALYZER mode	CONTINUOUS mode
Bit 7	ESR3-7	-	-	-
Bit 6	ESR3-6	Outside range of BIN	-	-
Bit 5	ESR3-5	-	Local minimum value of second parameter: Out of X axis range	-
Bit 4	ESR3-4	-	Local minimum value of second parameter: Within XY-axis range	-
Bit 3	ESR3-3	-	Local minimum value of second parameter: Out of Y axis range	-
Bit 2	ESR3-2	-	Local maximum value of second parameter: Out of range for X axis	-
Bit 1	ESR3-1	Within range of BIN 10	Local maximum value of second parameter: Within XY-axis range	-
Bit 0	ESR3-0	Within range of BIN 9	Local maximum value of second parameter: Out of range for Y axis	-

Event Status Register 0 (ESR0), 1 (ESR1), 2 (ESR2), and 3 (ESR3) and Event Status Enable Register 0 (ESER0), 1 (ESER1), 2 (ESER2), and 3 (ESER3)



Reading and Writing of Each Register

Register	Read	Write
Status Byte Register	*STB?	-
Service Request Enable Register	*SRE?	*SRE
Standard Event Status Register	*ESR?	-
Standard Event Status Enable Register	*ESE?	*ESE
Event Status Register 0	:ESR0?	-
Event Status Enable Register 0	:ESE0?	:ESE0
Event Status Register 1	:ESR1?	-
Event Status Enable Register 1	:ESE1?	:ESE1
Event Status Register 2	:ESR2?	-
Event Status Enable Register 2	:ESE2?	:ESE2
Event Status Register 3	:ESR3?	-
Event Status Enable Register 3	:ESE3?	:ESE3

GP-IB Command

The following commands can be used by interface functions.

Command	Description	
GTL	Go To Local	Cancels the remote state and switches to the local state.
LLO	Local Lock Out	Disables all keys including.
DCL	Device CLear	Clears the input buffer and output SDC Selected queue.
SDC	Selected Device Clear	Clears the input buffer and output SDC Selected queue.
GET	Group Execute Trigger	When there is an external trigger, performs the sampling process once.

3.7 Initialization Items

Some items are initialized when, for example, the power is turned on. Refer to the table below.

GP-IB

Item \ Initialization Method	At Power-on	∗RST Command	Device Clear*4	∗CLS Command
GP-IB Address	–	–	–	–
Device-specific functions (Range, etc.)	–	●	–	–
Output Queue	●	–	●	–
Input buffer	●	–	●	–
Status Byte Register	●	–	–*1	●*2
Event registers	●*3	–	–	●
Enable register	●	–	–	–
Current path	●	–	●	–
Headers on/ off	●	●	–	–

RS-232C USB LAN

Item \ Initialization Method	At Power-on	∗RST Command	∗CLS Command
Device-specific functions (Range, etc.)	–	●	–
Output Queue	●	–	–
Input buffer	●	–	–
Status Byte Register	●	–	●*2
Event registers	●*3	–	●
Enable register	●	–	–
Current path	●	–	–
Headers on/ off	●	●	–

*1 Only the MAV bit (bit 4) is cleared.
*2 All bits except the MAV bit are cleared.
*3 Excluding the PON bit (bit 7).
*4 This means to initialize the unit.

Chapter 4 Communication Message

4.1 Message List

4.1.1 Common Commands

Command	Data Formats	Description	Ref page
*CLS		Clearing the status byte register and related queues (except the output queue)	73
*ESE	<Mask value>	Reading and writing the standard event status enable register (SESER)	73
*ESE?			
*ESR?		Reading and clearing the standard event status register (SESR)	74
*IDN?		Querying instrument ID (Identification code)	70
*OPC		Setting OPC of SESR after all of the actions being executed are finished	71
*OPC?		Sending response of ASCII 1 after all of the actions being executed are finished	72
*RST		Initializing the instrument.	70
*SRE	<Mask value>	Writing and reading the service request enable register (SRER)	74
*SRE?			
*STB?		Reading the status byte register	75
*TRG		Requesting a sample	75
*TST?		Executing self tests and querying results	71
*WAI		Executing following command after command processing is finished	72

NOTE

- If an error occurred, the instrument emits a bleep error sound. Also, the error bit of the standard event status register (SESR) becomes 1.
- A query error occurs if a response message exceeds 10 KB.
- A message syntax error results in a command error.
- An execution error occurs if other than the specified numerical data is set.
- An execution error occurs if a command is executed during the execution of open, short, or load compensation. However, the following commands can be executed.
  *ESR?
  *OPC
  *OPC?
  *WAI
- For details on command errors, see the notes in the message reference.

4.1.2 Unique Commands

Commands for LCR and Analyzer Modes

Command	Data Formats	Description	Ref page
Average Function			
:AVERaging	<OFF/ number of averaging times>	Setting and querying measurement averaging	76
:AVERaging?			
Beep Tone			
:BEEPer:JUDGment	<OFF/ IN/ NG>	Setting and querying beep sound for the judgment results of measurement values	77
:BEEPer:JUDGment?			
:BEEPer:KEY	<ON/ OFF>	Setting and querying beep sound for key input	77
:BEEPer:KEY?			
BIN Function			
:BIN	<OFF/ ON>	Setting and querying ON/ OFF of BIN function	78
:BIN?			
:BIN:FLIMit:ABSolute	<BIN number>,<OFF/ Lower limit values>, <OFF/ Upper limit values>	Setting and querying the upper and lower limit values of the first parameter of the BIN function (absolute value mode)	79
:BIN:FLIMit:ABSolute?	<BIN number>		
:BIN:FLIMit:DEViation	<BIN number>,<OFF/ Lower limit values>, <OFF/ Upper limit values>	Setting and querying the upper and lower limit values of the first parameter of the BIN function (deviation percentage (Δ%) mode)	80
:BIN:FLIMit:DEViation?	<BIN number>		
:BIN:FLIMit:MODE	<ABSolute/ PERcent/ DEViation>	Selecting and querying the mode of the first parameter of the BIN function	81
:BIN:FLIMit:MODE?			
:BIN:FLIMit:PERcent	<BIN number>,<OFF/ Lower limit values>, <OFF/ Upper limit values>	Setting and querying the upper and lower limit values of the first parameterof the BIN function (percentage (%) mode)	82
:BIN:FLIMit:PERcent?	<BIN number>		
:BIN:FLIMit:REFerence	<Reference value>	Setting and querying the reference value of the first parameter of the BIN function (percentage (%) mode and deviation percentage (Δ%) mode)	83
:BIN:FLIMit:REFerence?			
:BIN:SLIMit:ABSolute	<BIN number>,<OFF/ Lower limit values>, <OFF/ Upper limit values>	Setting and querying the upper and lower limit values of the third parameter of the BIN function (absolute value mode)	84
:BIN:SLIMit:ABSolute?	<BIN number>		
:BIN:SLIMit:DEViation	<BIN number>,<OFF/ Lower limit values>, <OFF/ Upper limit values>	Setting and querying the upper and lower limit values of the third parameter of the BIN function (deviation percentage (Δ%) mode)	85
:BIN:SLIMit:DEViation?	<BIN number>		
:BIN:SLIMit:MODE	<ABSolute/ PERcent/ DEViation>	Selecting and querying the mode of the third parameter of the BIN function	86
:BIN:SLIMit:MODE?			
:BIN:SLIMit:PERcent	<BIN number>,<OFF/ Lower limit values>, <OFF/ Upper limit values>	Setting and querying the upper and lower limit values of the third parameter of the BIN function (percentage (%) mode)	87
:BIN:SLIMit:PERcent?	<BIN number>		
:BIN:SLIMit:REFerence	<Reference value>	Setting and querying the reference value of the third parameter of the BIN function (percentage (%) mode and deviation percentage (Δ%) mode)	88
:BIN:SLIMit:REFerence?			
Comparator Function			
:COMParator	<OFF/ ON>	Setting and querying ON/ OFF of comparator function	88
:COMParator?			

Command	Data Formats	Description	Ref page
:COMParator:FLIMit :ABSolute	<OFF/ Lower limit values>, <OFF/ Upper limit values>	Setting and querying the upper and lower limit values of the first parameter of the comparator function (absolute value mode)	89
:COMParator:FLIMit :ABSolute?			
:COMParator:FLIMit :DEViation	<Reference value>, <OFF/ Lower limit values>, <OFF/ Upper limit values>	Setting and querying the reference value and the upper and lower limit values of the first parameter of the comparator function (deviationpercentage (Δ%) mode)	90
:COMParator:FLIMit :DEViation?			
:COMParator:FLIMit:MODE	<ABSolute/ PERcent/ DEViation>	Setting and querying the judgment mode of the first parameter of the comparator function	91
:COMParator:FLIMit:MODE?			
:COMParator:FLIMit :PERcent	<Reference value>, <OFF/ Lower limit values>, <OFF/ Upper limit values>	Setting and querying the reference value and the upper and lower limit values of the first parameter of the comparator function (percentage (%) mode)	92
:COMParator:FLIMit :PERcent?			
:COMParator:SLIMit :ABSolute	<OFF/ Lower limit values>, <OFF/ Upper limit values>	Setting and querying the upper and lower limit values of the third parameter of the comparator function (absolute value mode)	93
:COMParator:SLIMit :ABSolute?			
:COMParator:SLIMit :DEViation	<Reference value>, <OFF/ Lower limit values>, <OFF/ Upper limit values>	Setting and querying the reference value and the upper and lower limit values of the third parameter of the comparator function (deviation percentage (Δ%) mode)	94
:COMParator:SLIMit :DEViation?			
:COMParator:SLIMit:MODE	<ABSolute/ PERcent/ DEViation>	Setting and querying the judgment mode of the third parameter of the comparator function	95
:COMParator:SLIMit:MODE?			
:COMParator:SLIMit :PERcent	<Reference value>, <OFF/ Lower limit values>, <OFF/ Upper limit values>	Setting and querying the reference value and the upper and lower limit values of the third parameter of the comparator function (percentage mode)	96
:COMParator:SLIMit :PERcent?			
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:CORRection:CABLe	<Cable length>	Setting and querying the cable length compensation function	97
:CORRection:CABLe?			
Load Compensation Function			
:CORRection:LOAD	<OFF/ ON>	Executing and querying the load compensation function	97
:CORRection:LOAD?			
:CORRection:LOAD:CONDition	<Compensation No.>,<Frequency>, <Range No.>,<LOW Z>,<V/ CV /CC>, <Level value>,<DC bias>, <DC bias value>	Setting and querying the load compensation conditions	98
:CORRection:LOAD:CONDition?	<Compensation No.>		
:CORRection:LOAD :DCResistance:CONDition	<Compensation No.>,<Range No.>, <LOW Z>,<V/ CV/ CC>,<Level value>	Setting and querying the load compensation conditions for when DC resistance measurement	100
:CORRection:LOAD :DCResistance:CONDition?	<Compensation No.>		
:CORRection:LOAD :DCResistance:REFerence	<Compensation No.>, <Reference value>	Setting and querying the reference value of load compensation for when DC resistance measurement	102
:CORRection:LOAD :DCResistance:REFerence?	<Compensation No.>		
:CORRection:LOAD:ERRor?		Querying load compensation failure flag	102

Command	Data Formats	Description	Ref page
:CORRection:LOAD :REFerence	<Compensation No.>,<Mode No.>, <Reference value1>,<Reference value2>	Setting and querying the reference values of load compensation	103
:CORRection:LOAD :REFerence?	<Compensation No.>		
:CORRection:LOAD:RESet	<Compensation No.>	Resetting the load compensation conditions	104
:CORRection:LOAD:RETurn	<OFF/ ON>	Setting and querying the load compensation function	104
:CORRection:LOAD:RETurn?			
Open-circuit Compensation Function			
:CORRection:OPEN	<OFF/ ALL/ SPOT>	Executing and querying the open compensation function	105
:CORRection:OPEN?			
:CORRection:OPEN:ERRor?		Querying open compensation failure flag	106
:CORRection:OPEN:FREQuency	<Compensation No.>, <OFF/ DC/Frequency>	Setting and querying frequency for acquiring open compensation value	107
:CORRection:OPEN:FREQuency?	<Compensation No.>		
:CORRection:OPEN:RETurn	<OFF/ ALL/ SPOT>	Setting and querying the open compensation function	108
:CORRection:OPEN:RETurn?			
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:CORRection:SCALe	<OFF/ ON>	Setting and querying the scaling compensation function	109
:CORRection:SCALe?			
:CORRection:SCALe:DATA	<Scaling No.>,<Compensation value A>, <Compensation value B>	Setting and querying the scaling compensation value	110
:CORRection:SCALe:DATA?	<Scaling No.>		
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:CORRection:SHORt	<OFF/ ALL/ SPOT>	Executing and querying the short compensation function	111
:CORRection:SHORt?			
:CORRection:SHORt:ERRor?		Querying short compensation failure flag	112
:CORRection:SHORt :FREQuency	<Compensation No.>, <OFF/ DC/ Frequency>	Setting and querying frequency for acquiring short compensation value	113
:CORRection:SHORt :FREQuency?	<Compensation No.>		
:CORRection:SHORt:RETurn	<OFF/ ALL/ SPOT>	Setting and querying the short compensation function	114
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:DCBias	<ON/ OFF>	Setting and querying ON/ OFF of DC bias function	114
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:DCBias:LEVel	<DC bias level>	Setting and querying the DC bias level	115
:DCBias:LEVel?			
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:DCResistance:ADJust	<ON/ OFF>	Setting and querying the DC offset for when DC resistance measurement	115
:DCResistance:ADJust?			
:DCResistance:ADJust :DEMand		Acquiring DC offset for when DC resistance measurement	116
:DCResistance:AVERaging	<OFF/ number of averaging times>	Setting and querying averaging for when DC resistance measurement	116
:DCResistance:AVERaging?			
:DCResistance:DELay	<Delay time>	Setting and querying the transition delay time for when DC resistance measurement	117
:DCResistance:DELay?			

Command	Data Formats	Description	Ref page
:DCResistance:LEVel	<V/ CV/ CC>	Setting and querying the measurement signal level for when DC resistance measurement	117
:DCResistance:LEVel?			
:DCResistance:LEVel :CCURRent	<Constant current level>	Setting and querying the constant current level value for when DC resistance measurement	118
:DCResistance:LEVel :CCURRent?			
:DCResistance:LEVel :CVOLTage	<Constant voltage level>	Setting and querying the constant voltage level value for when DC resistance measurement	118
:DCResistance:LEVel :CVOLTage?			
:DCResistance:LEVel :VOLTage	<Open-circuit voltage level>	Setting and querying the open-circuit voltage level value for when DC resistance measurement	119
:DCResistance:LEVel :VOLTage?			
:DCResistance:LIMiter	<ON/ OFF>	Setting and querying ON/ OFF of limit for when DC resistance measurement	119
:DCResistance:LIMiter?			
:DCResistance:LIMiter :CURRent	<Current limit value>	Setting and querying the current limit value for when DC resistance measurement	120
:DCResistance:LIMiter :CURRent?			
:DCResistance:LIMiter :VOLTage	<Voltage limit value>	Setting and querying the voltage limit value for when DC resistance measurement	120
:DCResistance:LIMiter :VOLTage?			
:DCResistance:RANGe	<Measurement range>	Setting and querying the measurement range for when DC resistance measurement	121
:DCResistance:RANGe?			
:DCResistance:RANGe:AUTO	<ON/ OFF>	Automatically setting and querying the measurement range for when DC resistance measurement	122
:DCResistance:RANGe:AUTO?			
:DCResistance:RANGe:LOWZ	<ON/ OFF>	Setting and querying low Z high accuracy mode for when DC resistance measurement	122
:DCResistance:RANGe:LOWZ?			
:DCResistance:SPEEd	<FAST/ MEDium/ SLOW/ SLOW2>	Setting and querying the measurement speed for when DC resistance measurement	123
:DCResistance:SPEEd?			
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:DISPlay	<ON/ OFF>	Setting and querying LCD display	123
:DISPlay?			
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:ESE0	<Mask value>	Writing and reading event status enable register 0	124
:ESE0?			
:ESE1	<Mask value>	Writing and reading event status enable register 1	125
:ESE1?			
:ESE2	<Mask value>	Writing and reading event status enable register 2	126
:ESE2?			
:ESE3	<Mask value>	Writing and reading event status enable register 3	127
:ESE3?			
:ESR0?		Reading event status register 0	127
:ESR1?		Reading event status register 1	128
:ESR2?		Reading event status register 2	128

Command	Data Formats	Description	Ref page
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:FILE:DATE	<ON/ OFF>	Setting and querying the date and time for when saving text	129
:FILE:DATE?			
:FILE:DELIMiter	<COMma/ TAB/ SEMIcolon/ SPACE>	Setting and querying the delimiter for when saving text	130
:FILE:DELIMiter?			
:FILE:FOLDer	<Folder name>	Setting and querying the save folder	130
:FILE:FOLDer?			
:FILE:INFOrmation?		Querying USB flash drive information	131
:FILE:MODE	<AUTO/ MANUAL>	Setting and querying the mode of the save folder	131
:FILE:MODE?			
:FILE:PARAmeter	<ON/ OFF>	Setting and querying the measurement parameter setting for when saving text	132
:FILE:PARAmeter?			
:FILE:QUOTe	<OFF/ DOUBle/ SINGle>	Setting and querying the quotation mark setting for when saving text	132
:FILE:QUOTe?			
:FILE:SAVE		Executing file saving	133
:FILE:SET	<ON/ OFF>	Setting and querying the measurement condition setting for when saving text	133
:FILE:SET?			
:FILE:TYPE	<OFF/ TEXT/ BMP>	Setting and querying the save type	134
:FILE:TYPE?			
Data transfer format			
:FORMat:DATA	<ASCii/ REAL>	Setting and querying the data transfer format	134
:FORMat:DATA?			
:FORMat:LONG	<ON/ OFF>	Setting and querying long format for when data transfer	135
:FORMat:LONG?			
Measurement Frequency			
:FREQuency	<Frequency>	Setting and querying the measurement frequency.	135
:FREQuency?			
RS-232C Communication Handshake			
:HANDshake	<OFF/ HARDware/ X/ BOTH>	Setting and querying the RS-232C communication handshake.	136
:HANDshake?			
Header			
:HEADer	<ON/ OFF>	Setting and querying existence of header in response message	136
:HEADer?			
HIGH- Z reject function			
:HIZ	<ON/ OFF>	Setting and querying the HIGH-Z reject function	137
:HIZ?			
:HIZ:LIMit	<Limit value>	Setting and querying the limit value of the HIGH-Z reject function	137
:HIZ:LIMit?			
EXT I/O Output			
:IO:OUTPut:DELay	<I/O delay time>	Setting and querying the delay time between judgment result output and $\overline{\text{EOM}}$ output	138
:IO:OUTPut:DELay?			
:IO:RESult:RESet	<ON/ OFF>	Setting and querying output of the judgment result signal line	139
:IO:RESult:RESet?			

Command	Data Formats	Description	Ref page
:IO:TRIGger:EDGe	<DOWN/ UP>	Setting and querying the trigger edge	140
:IO:TRIGger:EDGe?			
:IO:TRIGger:ENABle	<ON/ OFF>	Setting and querying permit/prohibit of trigger input during measurement	140
:IO:TRIGger:ENABle?			
Key Lock			
:KEYLock		Executing and querying the key lock	141
:KEYLock?			
:KEYLock:PASScode	<Passcode/ none>	Setting the key lock passcode	141
:KEYLock:UNLock	<Passcode/ none>	Disabling the key lock	142
Measurement Signal Level			
:LEVel	<V/ CV/ CC>	Setting and querying the measurement signal level	142
:LEVel?			
Constant current level			
:LEVel:CCURRent	<Constant current level>	Setting and querying the constant current level value	143
:LEVel:CCURRent?			
Constant voltage level			
:LEVel:CVOLTage	<Constant voltage level>	Setting and querying the constant voltage level	143
:LEVel:CVOLTage?			
Open-circuit voltage level			
:LEVel:VOLTage	<Open-circuit voltage level>	Setting and querying the open-circuit voltage level	144
:LEVel:VOLTage?			
Limit Function of Measurement Signal Level			
:LIMiter	<ON/ OFF>	Setting and querying ON/ OFF of the limit function	144
:LIMiter?			
:LIMiter:CURRent	<Current limit value>	Setting and querying the current limit value	145
:LIMiter:CURRent?			
:LIMiter:VOLTage	<Voltage limit value>	Setting and querying the voltage limit value	145
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Panel Load Function			
:LOAD	<Panel No.>	Executing panel load	145
:LOAD?			
Measurement Value Output			
:MEASure?		Querying measurement data	146
:MEASure:ITEM	<MR0>,<MR1>	Setting and querying measurement parameters	155
:MEASure:ITEM?			
:MEASure:OUTPut:AUTO	<ON/ OFF>	Setting and querying the measurement value automatic output function	156
:MEASure:OUTPut:AUTO?			
:MEASure:VALid	<Setting value>	Setting and querying the response data of the measurement acquisition query	157
:MEASure:VALid?			
Measurement Value Memory Function			
:MEMory?	<No data/ ALL>	Querying the measurement values saved to memory by the measurement value memory function.	158
:MEMory:CLEar		Clearing memory of measurement value memory function	160

Command	Data Formats	Description	Ref page
:MEMory:CONTrol	<ON/ IN/ OFF>	Setting and querying the measurement value memory function	160
:MEMory:CONTrol?			
:MEMory:COUNt?		Querying the number of measurement values saved to memory with the memory function	161
:MEMory:POINts	<Memory size>	Setting and querying the measurement value memory size	161
:MEMory:POINts?			
Measurement Mode			
:MODE	<LCR/ ANALYzer/ CONTinuous>	Setting and querying measurement mode	162
:MODE?			
Monitor Function			
:MONItor?		Querying the voltage/current monitor value	162
Parameter Settings (# is a numerical value from 1 to 4)			
:PARameter#	<Z/ Y/ PHASE(phase angle)/ CS/ CP/ D/ LS/ LP/Q/ RS/ G/ RP/ X/ B/ RDC/ OFF>	Setting and querying the display parameters	163
:PARameter#?			
:PARameter#:DIGit	<Number of display digits>	Setting and querying number of display digits	163
:PARameter#:DIGit?			
Initialize Device			
:PRESet		Initializing the instrument	164
Measurement Range			
:RANGe	<Range No.>	Setting and querying the measurement range	164
:RANGe?			
:RANGe:AUTO	<ON/ OFF>	Automatically setting and querying the measurement range	165
:RANGe:AUTO?			
:RANGe:LOWZ	<ON/ OFF>	Setting and querying low impedance high accuracy mode mode	165
:RANGe:LOWZ?			
Panel Save Function			
:SAVE	<Panel No.>,<Panel name>	Executing and querying the panel save function	166
:SAVE?	<Panel No.>		
:SAVE:CLEar	<ALL/ Panel No.>	Clearing data saved for a panel	166
:SAVE:NAME?	<Panel No.>	Querying a panel name	167
:SAVE:REName	<Panel No.>,<Panel name>	Changing a panel name	167
:SAVE:TYPE	<ALL/ HARDware/ ADJust>	Setting and querying the save type	168
:SAVE:TYPE?			
Measurement Speed			
:SPEEd	<FAST/ MEDium/ SLOW/ SLOW2>	Setting and querying the measurement speed.	168
:SPEEd?			
Trigger Synchronous Output Function			
:SSOurce	<ON/ OFF>	Setting and querying the trigger synchronous output function.	169
:SSOurce?			
:SSOurce:WAIT	<Wait time>	Setting and querying the wait time of trigger synchronous output	169
:SSOurce:WAIT?			

Command	Data Formats	Description	Ref page
System Settings			
:SYSTem:DATE	<Year>,<Month>,<Day>	Setting and querying the date	170
:SYSTem:DATE?			
:SYSTem:MACAddress?		Querying the MAC address	170
:SYSTem:SERIAlno?		Querying the serial number	171
:SYSTem:TIME	<Hour>,<Minute>,<Second>	Setting and querying the time	171
:SYSTem:TIME?			
:SYSTem:USBId?		Querying the USB ID	171
Message Terminator			
:TRANsmit:TERMinator	<Terminator number>	Setting and querying the terminator of the response message	172
:TRANsmit:TERMinator?			
Trigger			
:TRIGger	<INTernal/ EXTernal>	Setting and querying the trigger mode.	173
:TRIGger?			
:TRIGger:DELAy	<Trigger delay time>	Setting and querying the trigger delay time.	173
:TRIGger:DELAy?			

NOTE

- If an error occurred, the instrument emits a bleep error sound. Also, the error bit of the standard event status register (SESR) becomes 1.
- A query error occurs if a response message exceeds 10 KB.
- A message syntax error results in a command error.
- An execution error occurs if a command is executed in a mode that does not support the corresponding command.
- An execution error occurs if other than the specified character data or numerical data is set.
- An execution error occurs if a command is executed during the execution of open, short, or load compensation. However, the following commands can be executed.
  :ESR0?
  :ESR1?
  :ESR2?
  :ESR3?
- For details on command errors, see the notes in the message reference.

Commands for Analyzer Mode

Command	Data Formats	Description	Ref page
Comparator Function			
:COMParator:ANALyzer	<OFF/ AREA/ PEAK>	Setting and querying comparator judgment mode	174
:COMParator:ANALyzer?			
:COMParator:AREA	<OFF/ 1/ 2>	Setting and querying drawing of judgment area	174
:COMParator:AREA?			
:COMParator:AREA:FIX	<Segment No.>,<1/ 2>, <PERcent/ VALue>,<Reference value>, <Lower limit values>,<Upper limit values>	Setting and querying area judgment (reference value manual setting)	175
:COMParator:AREA:FIX?	<Segment No.>,<1/ 2>		
:COMParator:AREA:LIMit	<Sweep point No.>,<1/2>, <Lower limit values>,<Upper limit values>	Setting and querying the upper and lower limit values for area judgment	176
:COMParator:AREA:LIMit?	<Sweep point No.>, <1/2>		
:COMParator:AREA:MEAS	<Segment No.>,<1/ 2>, <PERcent/ VALue>,<Lower limit values>, <Upper limit values>	Setting and querying area judgment (reference value automatic setting)	177
:COMParator:AREA:MEAS?	<Segment No.>,<1/ 2>		
:COMParator:PARAmeter	<1/ 2/ ALL>	Setting and querying judgment parameter	178
:COMParator:PARAmeter?			
:COMParator:PEAK	<Segment No.>,<1/ 2>,<MAX/ MIN>, <Left limit value>,<Right limit value>, <Lower limit values>,<Upper limit values>	Setting and querying peak judgment	179
:COMParator:PEAK?	<Segment No.>,<1/ 2>,<MAX/ MIN>		
:COMParator:PEAK:FILTer	<ON/ OFF>	Setting and querying the filter value	180
:COMParator:PEAK:FILTer?			
:COMParator:PEAK:NO	<Local minimum No.>, <Local maximum No.>	Setting and querying the local maximum number and local minimum number	180
:COMParator:PEAK:NO?			
Display Cursor			
:CURSor	<OFF/ A/ AB>	Setting and querying the display cursor setting	181
:CURSor?			
:CURSor:MOVe	<A/ B>	Setting and querying the cursor to move or perform searches	181
:CURSor:MOVe?			
:CURSor:SEARch	<MAX/ MIN/ TARGet/ LMAX/ LMIN>	Setting and querying the cursor to move or perform searches	182
:CURSor:SEARch?			
:CURSor:SEARch:TARGet	<TARGET value>	Setting and querying the target value	182
:CURSor:SEARch:TARGet?			
Graph Display			
:GRAPh:AUTOscale		Executing auto scaling	183
:GRAPh:COLor	<1/ 2>,<Segment No.>,<Color No./ OFF>	Setting and querying the graph display color	183
:GRAPh:COLor?	<1/ 2>,<Segment No.>		
:GRAPh:COLor:RESet	<1/ 2>	Executing reset of the graph display colors of all segments	184
:GRAPh:COLor:SEG1	<1/ 2>	Reflecting the display color of segment 1 to all segments	184
:GRAPh:OVERwrite	<ON/ OFF>	Setting and querying the overwrite function	184
:GRAPh:OVERwrite?			

Command	Data Formats	Description	Ref page
:GRAPh:SCALe	<LINear/ LOG>	Setting and querying the horizontal axis display scale	185
:GRAPh:SCALe?			
:GRAPh:SPAN	<SINGle/ SEGMent>	Setting and querying the horizontal axis span format	185
:GRAPh:SPAN?			
:GRAPh:VERTical:CENTerdiv	<1/ 2>,<Reference value>, <One graduation width>	Setting and querying the reference value and graduation width of the vertical axis display scale	186
:GRAPh:VERTical:CENTerdiv?	<1/ 2>		
:GRAPh:VERTical:GRID	<1/ 2>	Setting and querying the parameters to display grid	186
:GRAPh:VERTical:GRID?			
:GRAPh:VERTical:METHod	<1/ 2>,<UPPer/ CENTer>	Setting and querying the setting method for the vertical axis display scale	187
:GRAPh:VERTical:METHod?	<1/ 2>		
:GRAPh:VERTical:MODE	<1/ 2>,<AUTO/ MANual>	Setting and querying the vertical axis display scale method	187
:GRAPh:VERTical:MODE?	<1/ 2>		
:GRAPh:VERTical:SCALe	<1/ 2>,<LINear/ LOG>	Setting and querying the vertical axis display scale	188
:GRAPh:VERTical:SCALe?	<1/ 2>		
:GRAPh:VERTical:UPPerlower	<1/ 2>,<Lower limit values>, <Upper limit values>	Setting and querying the upper and lower limit values of the vertical axis display scale	188
:GRAPh:VERTical:UPPerlower?	<1/ 2>		
Sweep Point List Settings			
:LIST:CENTerspan	<CENTER value>,<SPAN value>, <Number of sweep points>	Simultaneously setting and querying sweep point settings of the CENTER-SPAN method	189
:LIST:CENTerspan?			
:LIST:INTerval	<POINT value>,<INTERVAL value>, <Number of sweep points>	Setting and querying the sweep point settings of INTERVAL mode	190
:LIST:INTerval?			
:LIST:STARt:STEP	<START value>,<STEP value>, <Number of sweep points>	Setting and querying the sweep point settings of START-STEP mode	191
:LIST:STARt:STEP?			
:LIST:STARt:STOP	<START value>,<STOP value>, <Number of sweep points>, <LINear/ LOG>	Setting and querying the sweep point settings of START-STOP mode	192
:LIST:STARt:STOP?			
Measurement Value Output			
:MEASure?		Querying measurement data	146
:MEASure:COMParator:PEAK?		Querying the overall judgment result when peak comparator measurement	193
:MEASure:COMParator :PEAK:LMAX?		Querying the judgment result of the local maximum value when peak comparator measurement	194
:MEASure:COMParator :PEAK:LMIN?	<Segment No.>,<1/ 2>	Querying the judgment result of the local minimum value when peak comparator measurement	195
:MEASure:CURSor?	<A/ B>	Querying the measurement data of the cursor position	196
:MEASure:POINt?	<Sweep point>	Querying the measurement data of the specified sweep point	196
Sweep Point Settings			
:POINt	<Sweep point No.>,<Setting value>	Setting and querying the sweep point	197
:POINt?	<Sweep point No.>		
Search Function			
:SEARch		Executing the search function	197

Command	Data Formats	Description	Ref page
Segment Function			
:SEGMent	<ON/ OFF>	Setting and querying the segment sweep function	198
:SEGMent?			
:SEGMent:ADD	<Segment No./ no data>	Adding a segment	198
:SEGMent:AVERaging	<Segment No.>, <OFF/ number of averaging times>	Setting and querying measurement averaging of the specified segment	199
:SEGMent:AVERaging?	<Segment No.>		
:SEGMent:DELete	<Segment No.>	Deleting the specified segment	199
:SEGMent:NUM?		Querying the number of segments	200
:SEGMent:PDELay	<Segment No.>,<Delay time>	Setting and querying the point delay time of the specified segment	200
:SEGMent:PDELay?	<Segment No.>		
:SEGMent:RANGe	<Segment No.>, <Measurement range/ AUTO>	Setting and querying the measurement range of the specified segment	201
:SEGMent:RANGe?	<Segment No.>		
:SEGMent:SPEEd	<Segment No.>, <FAST /MEDium/SLOW/ SLOW2>	Setting and querying the measurement speed of the specified segment	201
:SEGMent:SPEEd?	<Segment No.>		
:SEGMent:STARt:STOP	<Segment No.>,<START value>, <STOP value>,<Number of sweep points>, <LINear/ LOG>	Simultaneously setting and querying sweep point settings of START-STOP method of specified segment	202
:SEGMent:STARt:STOP?	<Segment No.>		
:SEGMent:SUB:SOURce	<V/ CV/ CC>	Setting and querying measurement signal for when segment sweep	203
:SEGMent:SUB:SOURce?			
:SEGMent:SUB:SOURce:VALue	<Segment No.>,<Signal source value>	Setting and querying the measurement signal level of the specified segment	204
:SEGMent:SUB:SOURce:VALue?	<Segment No.>		
Sweep Method Settings			
:SWEep:DISPlay	<GRAPh/ NUMEric/ COMParator>	Setting and querying display for when analyzer mode	204
:SWEep:DISPlay?			
:SWEep:DRAW	<REAL/ AFTer>	Setting and querying the screen display timing	205
:SWEep:DRAW?			
:SWEep:MAIN:SOURce	<FREQ/ V/ CV/ CC>	Setting and querying main sweep measurement signal mode	205
:SWEep:MAIN:SOURce?			
:SWEep:PDELay	<Point delay time>	Setting and querying point delay	206
:SWEep:PDELay?			
:SWEep:TRIGger	<SEQuential/ REPeat/ STEP>	Setting and querying trigger mode	206
:SWEep:TRIGger?			

NOTE

- If an error occurred, the instrument emits a bleep error sound. Also, the error bit of the standard event status register (SESR) becomes 1.
- A query error occurs if a response message exceeds 10 KB.
- A message syntax error results in a command error.
- An execution error occurs if a command is executed in a mode that does not support the corresponding command.
- An execution error occurs if other than the specified character data or numerical data is set.
- An execution error occurs if a command is executed during the execution of open, short, or load compensation.
- For details on command errors, see the notes in the message reference.

4.2 Message Reference

Refer to the following on how to read this section.

This indicates whether the command message format has a numeric value or character parameter.

<Numeric value> Numeric value parameter

(NR1) Integer
(NR2) Fixed Point
(NR3) Floating point
(NRf) Format including all of NR1, NR2, and NR3

<Character> Character parameter

<Content to input>

Indicates the content of the command.

Setting and querying the current limit value

Describes the syntax of the message.
Provides an explanation of the command data section or response data.

Syntax

Command: `:LIMiter:CURRent` <Current limit value>
Query: `:LIMiter:CURRent?`
Response: <Current limit value>
Parameter: <Current limit value> = 0.01 m to 100.00 mA (NR3)

Provides an explanation of the message.

Explanation

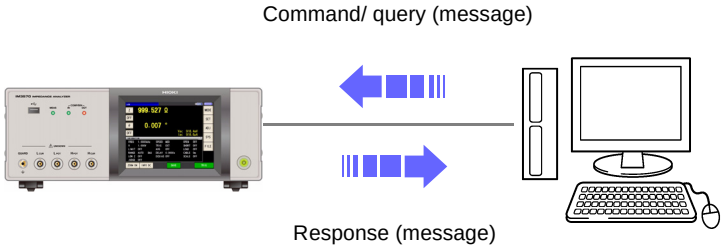
Command: Sets the current limit value.
Query: Returns the current limit value.

Shows an actual example of using the command.
This explanation is normally for when HEADER ON. (Except for HEADER command.)

Example

Command: `:LIMiter:CURRent 50.00E-03`
Sets the current limit value to 50 mA.

Query: `:LIMiter:CURRent?`
`:LIMITER:CURRENT 50.00E-03` (when HEADER ON)
`50.00E-03` (when HEADER OFF)
The current limit value is set to 50 mA.



4.2.1 Common Commands

(1) System Data Commands

Querying the instrument ID (Identification Code)

Syntax Query `*IDN?`

Response <Maker Name>,0,< Model Name>,<Software Version>

Explanation Query Returns the ID of the instrument.
A header is not added to the response message.

Example Query `*IDN?`

Response `HIOKI,IM3570,0,V1.00`

(2) Internal Operation Commands

Initializing the instrument

Syntax Command `*RST`

Explanation Command Initializes the instrument. This is the same as a system reset.
However, the settings of interface are not initialized.
See "Appendix 2 Initial Settings Table" (p. A4)

Example Command `*RST`
Executes initialization of the instrument.

Note When the instrument is initialized, the current setting information is deleted and the instrument is restored to the initial state.

Executing self tests and querying results

Syntax

Query `*TST?`

Response <Result>

Parameter <Result> = 0 to 15 (NR1)

Explanation

Query

Executes the following self tests and returns the result.

1. ROM test
2. SDRAM test
3. SRAM test
4. BUS test

When the tests start, all functions including measurement are stopped and commands also become unable to be received.

The tests take approximately 1 minute.

Do not send commands or turn off the power of the instrument during the tests.

A header is not added to the response message.

Example

Query `*TST?`

Response `5`

The ROM test and SRAM test failed (NG).

Note

If the result is other than 0, the instrument may have malfunctioned.

Contact your dealer or Hioki representative.

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	unused	unused	unused	BUS error	SRAM error	SDRAM error	ROM error

(3) Synchronization Commands

Setting OPC of SESR after all of the actions being executed are finished

Syntax

Command `*OPC`

Explanation

Command

Sets the OPC (bit 0) of the SESR (standard event status register) at the point in time that command processing finishes for the sent commands which are before the command. Sets OPC bit 0 of the Standard Event Status Register (SESR) when all prior commands have finished processing.

Example

Command `A;B;*OPC;C`

Sets the OPC of SESR after the A and B commands are finished.

Sending response of ASCII 1 after all of the actions being executed are finished

Syntax Query `*OPC?`

Explanation Query Sends the response of ASCII 1 at the point in time that command processing finishes for the sent commands which are before the `*OPC` command. A header is not added to the response message.

Example Query `*OPC?`
Response `1`

Executing following command after command processing is finished

Syntax Command `*WAI`

Explanation Command Executes the command following `*WAI` after command processing is finished.

Example Command `A;B;*WAI;C`

Executes `*WAI` and then the C command after processing ends for commands A and B.

Current Frequency:1 kHz when in internal trigger state

- When the `*WAI` command was not used
  (Send)
  `:FREQuency 120;:MEASure?`
  In this case, it is not certain which frequency measurement value will be sent in response to the `:MEASure?` query.
- When the `*WAI` command was used
  (Send)
  `:FREQuency 120;*WAI;:MEASure?`
  In this case, the 120 Hz frequency measurement value is sent in response to the `:MEASure?` query.

Note Unique commands other than the "`:MEASure?`" query use sequential commands. Therefore, the `*WAI` command is only effective for the "`:MEASure?`" query.

(4) Status and Event Control Commands

Clearing the status byte register and related queues (except the output queue)

Syntax Command ***CLS**

Explanation Command Clears the content of the event registers (SESR, ESR0, ESR1, ESR2, ESR3).

Example Command ***CLS**
Clears the content of the event registers (SESR, ESR0, ESR1, ESR2, ESR3).

Note

GP-IB	The output queue is unaffected.
RS-232C USB LAN	This has no effect upon the output queue, various enable registers, and MAV (bit 4) of the status byte register.

Reading and writing the standard event status enable register (SESER)

Syntax Command ***ESE** <Mask value>

Query ***ESE?**

Response <Mask value>

Parameter <Mask value> = 0 to 255 (NR1)

Explanation Command Sets the mask pattern of SESER.
The initial value (at power-on) is 0.

Query Returns the mask pattern of SESER.

Example Command ***ESE 36**
Sets bits 5 and 2 of SESER.

Query ***ESE?**

Response ***ESE 36** (when HEADER ON)
36 (when HEADER OFF)
Bit 5 and 2 of SESER are 1.

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

Reading and clearing the standard event status register (SESR)

Syntax

Query ***ESR?**

Response <Register value>

Parameter <Register value> = 0 to 255 (NR1)

Explanation

Query Returns the register value of SESR, and clears the register.
The response message has no header.

Example

Query ***ESR?**

Response **32**

Bit 5 of the SESR was set to 1.

Note

Bit 6 and 1 are not used in the instrument.

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

Writing and reading the service request enable register (SRER)

Syntax

Command ***SRE** <Mask value>

Query ***SRE?**

Response <Mask value>

Parameter <Mask value> = 0 to 255 (NR1)

Explanation

Command Sets the mask pattern of SRER. The initial value (when power is turned on) is 0.
Bit 6 and unused bit 7 are ignored.

Query Returns the mask pattern of SRER.
The values of bit 6 and the unused bit (bit 7) are always 0.

Example

Command ***SRE 34**
Set SRER bits 5 and 1 to 0.

Query ***SRE?**

Response ***SRE 34** (when HEADER ON)
34 (when HEADER OFF)
SRER bits 5 and 1 have been set to 1.

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	X	ESB	MAV	ESB3	ESB2	ESB1	ESB0

Reading the Status Byte Register

Syntax

Query `*STB?`

Response <Register value>

Parameter <Register value> = 0 to 255 (NR1)

Explanation

Query Returns the register value of STB.
The response message has no header.

Example

Query `*STB?`

Response `8`

STB bit 3 has been set to 1.

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	ESB3	ESB2	ESB1	ESB0

Requesting a Sample

Syntax

Command `*TRG`

Explanation

Command Performs sampling once when there is an external trigger.

Example

```
:TRIGger EXTernal;*TRG;:MEASure?
```

This is set for the external trigger and acquires the measurement value after sampling is performed once.

Note

An execution error occurs if this command is executed when there is an internal trigger.

4.2.2 Unique Commands

Commands for LCR and Analyzer Modes

Setting and querying measurement averaging

Syntax

Command **:AVERaging** <OFF/ number of averaging times>

Query **:AVERaging?**

Response <OFF/ number of averaging times>

Parameter <number of averaging times> = 1 to 256 (NR1)

Explanation

Command Sets the number of averaging times.
OFF: Disables the averaging function.

Query Returns the number of measurement averaging times.

Example

Command **:AVERaging 32**
Sets the number of averaging times to 32.

Query **:AVERaging?**
Response **:AVERAGING 32** (when HEADER ON)
32 (when HEADER OFF)
The number of averaging times is set to 32.

Note

Setting the number of averaging times to 1 automatically sets the averaging function to OFF.
Setting the number of averaging times from 2 to 256 automatically sets the averaging function to ON.

Setting and querying beep sound for the judgment results of measurement values

Syntax

Command `:BEEPer:JUDGment` <OFF/ IN/ NG>

Query `:BEEPer:JUDGment?`

Response <OFF/ IN/ NG>

Explanation

Command Sets the beep sound for the judgment results of measurement values.
- OFF: No beep sound
- IN: Sets a beep sound to be emitted when a result is within the range.
- NG: Sets a beep sound to be emitted when a result is outside the range.

Query Returns the setting of the beep sound for the judgment results of measurement values.

Example

Command `:BEEPer:JUDGment NG`

Sets a beep sound to be emitted when a result is outside the range.

Query `:BEEPer:JUDGment?`

Response `:BEEPER:JUDGMENT NG` (when HEADER ON)

`NG` (when HEADER OFF)

A beep sound is set to be emitted when a result is outside the range.

Setting and querying beep sound for key input

Syntax

Command `:BEEPer:KEY` <ON/ OFF>

Query `:BEEPer:KEY?`

Response <ON/ OFF>

Explanation

Command Sets the beep sound for key operation.
- ON: A beep sound is emitted.
- OFF: A beep sound is not emitted.

Query Returns the setting of the beep sound for key operation.

Example

Command `:BEEPer:KEY ON`

Sets a beep sound to be emitted.

Query `:BEEPer:KEY?`

Response `:BEEPER:KEY ON` (when HEADER ON)

`ON` (when HEADER OFF)

A beep sound is set to be emitted.

Setting and querying ON/ OFF of BIN function

Syntax

Command **:BIN** <OFF/ ON>

Query **:BIN?**

Response <OFF/ ON>

Explanation

Command Sets the BIN measurement function.
OFF: Disables the BIN function.
ON: Enables the BIN function.

Query Returns ON or OFF for the BIN measurement function.

Example

Command **:BIN ON**
Sets the BIN measurement function to ON.

Query **:BIN?**
Response **:BIN ON** (when HEADER ON)
ON (when HEADER OFF)
The BIN measurement function is set to ON.

Note

Sending the **:BIN ON** command during comparator measurement automatically ends comparator measurement and starts BIN measurement.

Setting and querying the upper and lower limit values of the first parameter of the BIN function (absolute value mode)

Syntax

Command `:BIN:FLIMit:ABSolute` <BIN number>,<OFF/ lower value>, <OFF/ upper value>

Query `:BIN:FLIMit:ABSolute?` <BIN number>

Response <OFF/ lower value>, <OFF/ upper value>

Parameter <BIN number> = 1 to 10
<Lower limit values> = -9.999999E+09 to +9.999999E+09 (NR3)
<Upper limit values> = -9.999999E+09 to +9.999999E+09 (NR3)

Explanation

Command: Sets the upper and lower limit values of the first parameter in absolute value mode of the specified BIN number.

Query: Returns the setting of the upper and lower limit values of the first parameter in absolute value mode of the specified BIN number.

Example

Command `:BIN:FLIMit:ABSolute 1,0.234567E-03,1.234567`

Sets the lower and upper limit values of the first parameter in absolute value mode of BIN1 to 0.234567E-03 and 1.234567, respectively.

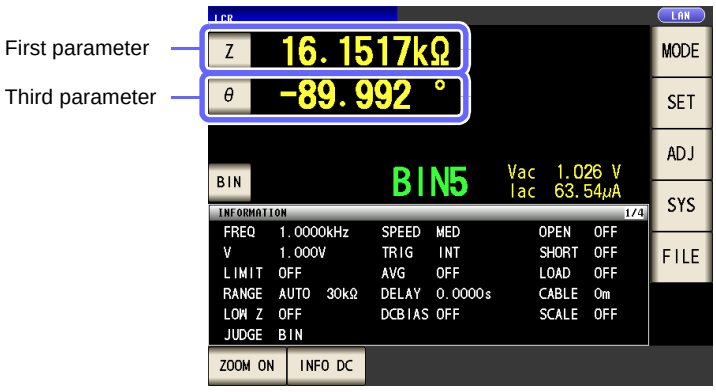
Query `:BIN:FLIMit:ABSolute? 1`
Response `:BIN:FLIMIT:ABSOLUTE 0.234567E-03, 1.234567` (when HEADER ON)
`0.234567E-03, 1.234567` (when HEADER OFF)

The lower and upper limit values of the first parameter in absolute value mode of BIN1 are set to 0.234567E-03 and 1.234567, respectively.

Note

The instrument stores the upper and lower limit values for absolute mode and those for percentage (%) mode separately.

The reference value and upper and lower limit values are common to percentage (%) mode and deviation percentage (Δ%) mode.



Setting and querying the upper and lower limit values of the first parameter of the BIN function (deviation percentage (Δ%) mode)

Syntax

Command `:BIN:FLIMit:DEViation` <BIN number>,<OFF/ lower value>, <OFF/ upper value>

Query `:BIN:FLIMit:DEViation?` <BIN number>

Response <OFF/ lower value>, <OFF/ upper value>

Parameter <BIN number> = 1 to 10
<Lower limit values> = -999.9999% to +999.9999% (NR2)
<Upper limit values> = -999.9999% to +999.9999% (NR2)

Explanation

Command: Sets the upper and lower limit values of the first parameter in deviation percentage (Δ%) mode of the specified BIN number.

Query: Returns the setting of the upper and lower limit values of the first parameter in deviation percentage (Δ%) mode of the specified BIN number.

Example

Command
```
:BIN:FLIMit:DEViation 1,-10.0,10.0
```
Sets the lower and upper limit values of the first parameter in deviation percentage (Δ%) mode of BIN1 to -10% and 10%, respectively.

Query
```
:BIN:FLIMit:DEViation? 1
```
Response
```
:BIN:FLIMIT:DEVIATION -10.0,10.0
```
(when HEADER ON)
```
-10.0,10.0
```
(when HEADER OFF)

The lower and upper limit values of the first parameter in deviation percentage (Δ%) mode of BIN1 are set to -10% and 10%, respectively.

Note

The instrument stores the upper and lower limit values for absolute mode and those for deviation percentage (Δ%) mode separately.

The reference value and upper and lower limit values are common to percentage (%) mode and deviation percentage (Δ%) mode.

Selecting and querying the mode of the first parameter of the BIN function

Syntax

Command **:BIN:FLIMit:MODE** <ABSolute/ PERcent/ DEViation>

Query **:BIN:FLIMit:MODE?**

Response <ABSOLUTE/ PERCENT/ DEVIATION>

Explanation

Command Sets the mode of the first parameter.
- ABSolute: Sets the mode to absolute (ABS) mode.
- PERcent: Sets the mode to percentage (%) mode.
- DEViation: Sets the mode to deviation percentage (Δ%) mode.

Query Returns the mode of the first parameter.

Example

Command **:BIN:FLIMit:MODE PERcent**
Selects percentage (%) mode.

Query **:BIN:FLIMit:MODE?**
Response **:BIN:FLIMIT:MODE PERCENT** (when HEADER ON)
PERCENT (when HEADER OFF)
The mode is set to percentage (%) mode.

Setting and querying the upper and lower limit values of the first parameter of the BIN function (percentage (%) mode)

Syntax

Command `:BIN:FLIMit:PERcent` <BIN number>,<OFF/ lower value>, <OFF/ upper value>

Query `:BIN:FLIMit:PERcent?` <BIN number>

Response <OFF/ lower value>, <OFF/ upper value>

Parameter <BIN number> = 1 to 10
<Lower limit values> = -999.9999% to +999.9999% (NR2)
<Upper limit values> = -999.9999% to +999.9999% (NR2)

Explanation

Command: Sets the upper and lower limit values of the first parameter in percentage (%) mode of the specified BIN number.

Query: Returns the upper and lower limit values of the first parameter in percentage (%) mode of the specified BIN number.

Example

Command `:BIN:FLIMit:PERcent 1,-10.0,10.0`

Sets the lower and upper limit values of the first parameter in percentage (%) mode of BIN1 to -10% and 10%, respectively.

Query `:BIN:FLIMit:PERcent? 1`

Response `:BIN:FLIMIT:PERCENT -10.0,10.0` (when HEADER ON)
`-10.0,10.0` (when HEADER OFF)

The lower and upper limit values of the first parameter in percentage (%) mode of BIN1 are set to -10% and 10%, respectively.

Note

The instrument stores the upper and lower limit values for absolute mode and those for percentage (%) mode separately.

The reference value and upper and lower limit values are common to percentage (%) mode and deviation percentage (Δ%) mode.

Setting and querying the reference value of the first parameter of the BIN function (percentage (%) mode and deviation percentage (Δ%) mode)

Syntax

Command `:BIN:FLIMit:REFerence` <Reference value>

Query `:BIN:FLIMit:REFerence?`

Response <Reference value>

Parameter <Reference value> = -9.999999E+09 to +9.999999E+09 (NR3)

Explanation

Command: Sets the reference value of the first parameter in percentage (%) mode or deviation percentage (Δ%) mode.

Query: Returns the reference value of the first parameter in percentage (%) mode or deviation percentage (Δ%) mode.

Example

Command `:BIN:FLIMit:REFerence 1.234567E-6`

Sets the reference value of the first parameter in percentage (%) mode or deviation percentage (Δ%) mode to 1.234567E-6.

Query `:BIN:FLIMit:REFerence?`

Response `:BIN:FLIMIT:REFERENCE 1.234567E-06` (when HEADER ON)

`1.234567E-06` (when HEADER OFF)

The reference value of the first parameter in percentage (%) mode or deviation percentage (Δ%) mode is set to 1.234567E-6.

Note

The reference value is common to percentage (%) mode and deviation percentage (Δ%) mode.

Setting and querying the upper and lower limit values of the third parameter of the BIN function (absolute value mode)

Syntax

Command `:BIN:SLIMit:ABSolute` <BIN number>,<OFF/ lower value>, <OFF/ upper value>

Query `:BIN:SLIMit:ABSolute?` <BIN number>

Response <OFF/ lower value>, <OFF/ upper value>

Parameter <BIN number> = 1 to 10
<Lower limit values> = -9.999999E+09 to +9.999999E+09 (NR3)
<Upper limit values> = -9.999999E+09 to +9.999999E+09 (NR3)

Explanation

Command: Sets the upper and lower limit values of the third parameter in absolute value mode of the specified BIN number.

Query: Returns the setting of the upper and lower limit values of the third parameter in absolute value mode of the specified BIN number.

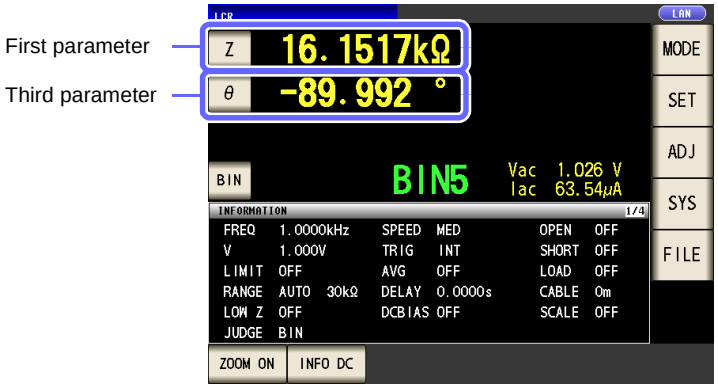
Example

Command
`:BIN:SLIMit:ABSolute 1,0.234567E-03,1.234567`
Sets the lower and upper limit values of the third parameter in absolute value mode (Δ%) of BIN1 to 0.234567E-03 and 1.234567, respectively.

Query
`:BIN:SLIMit:ABSolute? 1`
Response
`:BIN:SLIMIT:ABSOLUTE 0.234567E-03, 1.234567` (when HEADER ON)
`0.234567E-03, 1.234567` (when HEADER OFF)
The lower and upper limit values of the third parameter in absolute value mode of BIN1 are set to 0.234567E-03 and 1.234567, respectively.

Note

The instrument stores the upper and lower limit values for absolute mode and those for percentage (%) mode separately.
The reference value and upper and lower limit values are common to percentage (%) mode and deviation percentage (Δ%) mode.



Setting and querying the upper and lower limit values of the third parameter of the BIN function (deviation percentage (Δ%) mode)

Syntax

Command `:BIN:SLIMit:DEViation` <BIN number>,<OFF/ lower value>, <OFF/ upper value>

Query `:BIN:SLIMit:DEViation?` <BIN number>

Response <OFF/ lower value>,<OFF/ upper value>

Parameter <BIN number> = 1 to 10
<Lower limit values> = -999.9999% to +999.9999% (NR2)
<Upper limit values> = -999.9999% to +999.9999% (NR2)

Explanation

Command: Sets the upper and lower limit values of the third parameter in deviation percentage (Δ%) mode of the specified BIN number.

Query: Returns the setting of the upper and lower limit values of the third parameter in deviation percentage (Δ%) mode of the specified BIN number.

Example

Command
```
:BIN:SLIMit:DEViation 1,-10.0,10.0
```
Sets the lower and upper limit values of the third parameter in deviation percentage (Δ%) mode of BIN1 to -10% and 10%, respectively.

Query
```
:BIN:SLIMit:DEViation? 1
```
Response
```
:BIN:SLIMIT:DEVIATION -10.0,10.0
```
(when HEADER ON)
```
-10.0,10.0
```
(when HEADER OFF)

The lower and upper limit values of the third parameter in deviation percentage (Δ%) mode of BIN1 are set to -10% and 10%, respectively.

Note

The instrument stores the upper and lower limit values for absolute mode and those for deviation percentage (Δ%) mode separately.

The reference value and upper and lower limit values are common to percentage (%) mode and deviation percentage (Δ%) mode.

Selecting and querying the mode of the third parameter of the BIN function

Syntax

Command **:BIN:SLIMit:MODE** <ABSolute/ PERcent/ DEViation>

Query **:BIN:SLIMit:MODE?**

Response <ABSOLUTE/ PERCENT/ DEVIATION>

Explanation

Command Sets the mode of the third parameter.

ABSolute: Sets the mode to absolute (ABS) mode.
PERcent: Sets the mode to percentage (%) mode.
DEViation: Sets the mode to deviation percentage (Δ%) mode.

Query Returns the mode of the third parameter.

Example

Command **:BIN:SLIMit:MODE PERcent**
Selects percentage (%) mode.

Query **:BIN:SLIMit:MODE?**
Response **:BIN:SLIMIT:MODE PERCENT** (when HEADER ON)
PERCENT (when HEADER OFF)
The mode is set to percentage (%) mode.

Setting and querying the upper and lower limit values of the third parameter of the BIN function (percentage (%) mode)

Syntax

Command `:BIN:SLIMit:PERcent` <BIN number>,<OFF/ lower value>,<OFF/ upper value>

Query `:BIN:SLIMit:PERcent?` <BIN number>

Response <OFF/ lower value>,<OFF/ upper value>

Parameter <BIN number> = 1 to 10
<Lower limit values> = -999.9999% to +999.9999% (NR2)
<Upper limit values> = -999.9999% to +999.9999% (NR2)

Explanation

Command: Sets the upper and lower limit values of the third parameter in percentage (%) mode of the specified BIN number.

Query: Returns the upper and lower limit values of the third parameter in percentage (%) mode of the specified BIN number.

Example

Command
```
:BIN:SLIMit:PERcent 1,-10.0,10.0
```
Sets the lower and upper limit values of the third parameter in percentage (%) mode of BIN1 to -10% and 10%, respectively.

Query
```
:BIN:SLIMit:PERcent? 1
```
Response
```
:BIN:SLIMIT:PERCENT -10.0,10.0
```
(when HEADER ON)
```
-10.0,10.0
```
(when HEADER OFF)

The lower and upper limit values of the third parameter in percentage (%) mode of BIN1 are set to -10% and 10%, respectively.

Note

The instrument stores the upper and lower limit values for absolute mode and those for percentage (%) mode separately.

The reference value and upper and lower limit values are common to percentage (%) mode and deviation percentage (Δ%) mode.

Setting and querying the reference value of the third parameter of the BIN function (percentage (%) mode and deviation percentage (Δ%) mode)

Syntax

Command `:BIN:SLIMit:REFerence` <Reference value>

Query `:BIN:SLIMit:REFerence?`

Response <Reference value>

Parameter <Reference value> = -9.999999E+09 to +9.999999E+09 (NR3)

Explanation

Command Sets the reference value of the third parameter in percentage (%) mode or deviation percentage (Δ%) mode.

Query Returns the reference value of the third parameter in percentage (%) mode or deviation percentage (Δ%) mode.

Example

Command `:BIN:SLIMit:REFerence 1.234567E-6`

Sets the reference value of the third parameter in percentage (%) mode or deviation percentage (Δ%) mode to 1.234567E-6.

Query `:BIN:SLIMit:REFerence?`

Response `:BIN:SLIMIT:REFERENCE 1.234567E-06` (when HEADER ON)

`1.234567E-06` (when HEADER OFF)

The reference value of the third parameter in percentage (%) mode or deviation percentage (Δ%) mode is set to 1.234567E-6.

Note

The reference value is common to percentage (%) mode and deviation percentage (Δ%) mode.

Setting and querying ON/ OFF of comparator function

Syntax

Command `:COMParator` <OFF/ ON>

Query `:COMParator?`

Response <OFF/ ON>

Explanation

Command Sets the comparator measurement function.

OFF: Disables the comparator function.

ON: Enables the comparator function.

Query Returns the setting of the comparator measurement function.

Example

Command `:COMParator ON`

Sets the comparator measurement function to ON.

Query `:COMParator?`

Response `:COMPARATOR ON` (when HEADER ON)

`ON` (when HEADER OFF)

The comparator measurement function is set to ON.

Note

Sending the `:COMParator ON` command during BIN measurement automatically ends BIN measurement and starts comparator measurement.

Setting and querying the upper and lower limit values of the first parameter of the comparator function (absolute value mode)

Syntax

Command `:COMParator:FLIMit:ABSolute` <OFF/ lower value>, <OFF/ upper value>

Query `:COMParator:FLIMit:ABSolute?`

Response <OFF/ lower value>,<OFF/ upper value>

Parameter <Lower limit values> = -9.999999E+09 to +9.999999E+09 (NR3)
<Upper limit values> = -9.999999E+09 to +9.999999E+09 (NR3)

Explanation

Command Sets the upper and lower limit values of the first parameter in absolute mode.

Query Returns the upper and lower limit values of the first parameter in absolute mode.

Example

Command `:COMParator:FLIMit:ABSolute 0.234567E-03,1.234567`

Sets the lower and upper limit values of the first parameter in absolute value mode to 0.234567E-03 and 1.234567, respectively.

Query `:COMParator:FLIMit:ABSolute?`

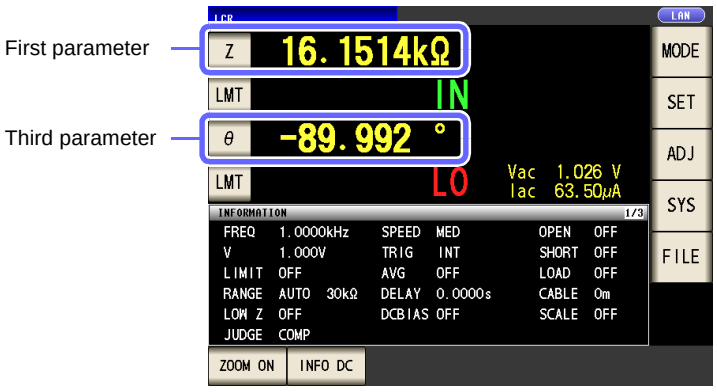
Response `:COMPARATOR:FLIMIT:ABSOLUTE 0.234567E-03, 1.234567` (when HEADER ON)
`0.234567E-03, 1.234567` (when HEADER OFF)

The lower and upper limit values of the first parameter in absolute value mode are set to 0.234567E-03 and 1.234567, respectively.

Note

The instrument stores the upper and lower limit values for absolute mode and those for percentage (%) mode separately.

The reference value and upper and lower limit values are common to percentage (%) mode and deviation percentage (Δ%) mode.



Setting and querying the reference value and the upper and lower limit values of the first parameter of the comparator function (deviation percentage (Δ%) mode)

Syntax

Command `:COMParator:FLIMit:DEViation` <Reference value>, <OFF/ Lower limit values>, <OFF/ Upper limit values>

Query `:COMParator:FLIMit:DEViation?`

Response <Reference value>,<OFF/ lower value>,<OFF/ upper value>

Parameter <Reference value> = -9.999999E+09 to +9.999999E+09 (NR3)
<Lower limit values> = -999.9999% to +999.9999% (NR2)
<Upper limit values> = -999.9999% to +999.9999% (NR2)

Explanation

Command Sets the reference value and upper and lower limit values of the first parameter in deviation percentage (Δ%) mode.

Query Returns the reference value and upper and lower limit values of the first parameter in deviation percentage (Δ%) mode.

Example

Command `:COMParator:FLIMit:DEViation 1.234567E-6,-10.0,10.0`

Sets the reference value and the lower and upper limit values of the first parameter in deviation percentage (Δ%) mode to 1.234567E-6, -10%, and 10%, respectively.

Query `:COMParator:FLIMit:DEViation?`
Response `:COMPARATOR:FLIMIT:DEVIATION 1.234567E-6,-10.0,10.0` (when HEADER ON)
`1.234567E-6,-10.0,10.0` (when HEADER OFF)

The reference value and the lower and upper limit values of the first parameter in deviation percentage (Δ%) mode are set to 1.234567E-6, -10%, and 10%, respectively.

Note

The instrument stores the upper and lower limit values for absolute mode and those for deviation percentage (Δ%) mode separately.

The reference value and upper and lower limit values are common to percentage (%) mode and deviation percentage (Δ%) mode.

Setting and querying the judgment mode of the first parameter of the comparator function

Syntax

Command **:COMParator:FLIMit:MODE** <ABSolute/ PERcent/ DEViation>

Query **:COMParator:FLIMit:MODE?**

Response <ABSOLUTE/ PERCENT/ DEVIATION>

Explanation

Command Sets the mode of the first parameter.
- ABSolute: Sets the mode to absolute (ABS) mode.
- PERcent: Sets the mode to percentage (%) mode.
- DEViation: Sets the mode to deviation percentage (Δ%) mode.

Query Returns the mode of the first parameter.

Example

Command **:COMParator:FLIMit:MODE PERcent**

Selects percentage (%) mode.

Query **:COMParator:FLIMit:MODE?**

Response **:COMPARATOR:FLIMIT:MODE PERCENT** (when HEADER ON)

PERCENT (when HEADER OFF)

The mode is set to percentage (%) mode.

Setting and querying the reference value and the upper and lower limit values of the first parameter of the comparator function (percentage (%) mode)

Syntax

Command `:COMParator:FLIMit:PERcent` <Reference value>, <OFF/ lower limit values>, <OFF/ upper limit values>

Query `:COMParator:FLIMit:PERcent?`

Response <Reference value>,<OFF/ lower value>,<OFF/ upper value>

Parameter <Reference value> = -9.999999E+09 to +9.999999E+09 (NR3)
<Lower limit values> = -999.9999% to +999.9999% (NR2)
<Upper limit values> = -999.9999% to +999.9999% (NR2)

Explanation

Command Sets the reference value and upper and lower limit values of the first parameter in percentage (%) mode.

Query Returns the reference value and upper and lower limit values of the first parameter in percentage (%) mode.

Example

Command `:COMParator:FLIMit:PERcent 1.234567E-6,-10.0,10.0`

Sets the reference value and the lower and upper limit values of the first parameter in percentage (%) mode to 1.234567E-06, -10%, and 10%, respectively.

Query `:COMParator:FLIMit:PERcent?`

Response `:COMPARATOR:FLIMIT:PERCENT 1.234567E-06,-10.0,10.0` (when HEADER ON)
`1.234567E-06,-10.0,10.0` (when HEADER OFF)

The reference value and the lower and upper limit values of the first parameter in percentage (%) mode are set to 1.234567E-06, -10%, and 10%, respectively.

Note

The instrument stores the upper and lower limit values for absolute mode and those for percentage (%) mode separately.

The reference value and upper and lower limit values are common to percentage (%) mode and deviation percentage (Δ%) mode.

Setting and querying the upper and lower limit values of the third parameter of the comparator function (absolute value mode)

Syntax

Command `:COMParator:SLIMit:ABSolute` <OFF/ lower limit values>, <OFF/ upper limit values>

Query `:COMParator:SLIMit:ABSolute?`

Response <OFF/ lower limit values>,<OFF/ upper limit values>

Parameter <Lower limit values> = -9.999999E+09 to +9.999999E+09 (NR3)
<Upper limit values> = -9.999999E+09 to +9.999999E+09 (NR3)

Explanation

Command Sets the upper and lower limit values of the third parameter in absolute mode.

Query Returns the upper and lower limit values of the third parameter in absolute mode.

Example

Command `:COMParator:SLIMit:ABSolute 0.234567E-03,1.234567`

Sets the lower and upper limit values of the third parameter in absolute value mode to 0.234567E-03 and 1.234567, respectively.

Query `:COMParator:SLIMit:ABSolute?`

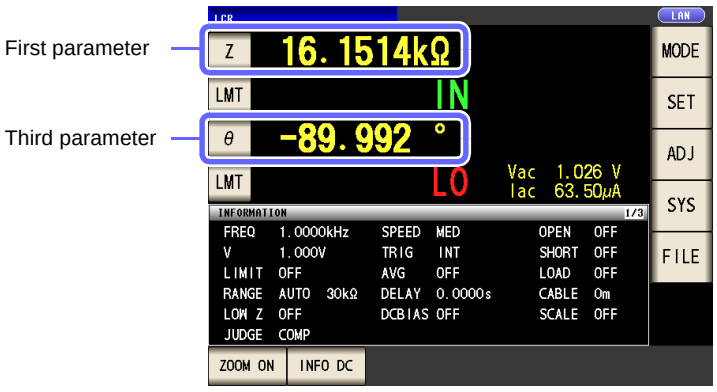
Response `:COMPARATOR:SLIMIT:ABSOLUTE 0.234567E-03, 1.234567` (when HEADER ON)
`0.234567E-03, 1.234567` (when HEADER OFF)

The lower and upper limit values of the third parameter in absolute value mode are set to 0.234567E-03 and 1.234567, respectively.

Note

The instrument stores the upper and lower limit values for absolute mode and those for percentage (%) mode separately.

The reference value and upper and lower limit values are common to percentage (%) mode and deviation percentage Δ%) mode.



Setting and querying the reference value and the upper and lower limit values of the third parameter of the comparator function (deviation percentage (Δ%) mode)

Syntax

Command `:COMParator:SLIMit:DEViation` <Reference value>, <OFF/ lower limit values>, <OFF/ upper limit values>

Query `:COMParator:SLIMit:DEViation?`

Response <Reference value>,<OFF/ lower value>,<OFF/ upper value>

Parameter <Reference value> = -9.999999E+09 to +9.999999E+09 (NR3)
<Lower limit values> = -999.9999% to +999.9999% (NR2)
<Upper limit values> = -999.9999% to +999.9999% (NR2)

Explanation

Command Sets the reference value and upper and lower limit values of the third parameter in deviation percentage (Δ%) mode.

Query Returns the reference value and upper and lower limit values of the third parameter in deviation percentage (Δ%) mode.

Example

Command `:COMParator:SLIMit:DEViation 1.234567E-6,-10.0,10.0`
Sets the reference value and the lower and upper limit values of the third parameter in deviation percentage (Δ%) mode to 1.234567E-6, -10%, and 10%, respectively.

Query `:COMParator:SLIMit:DEViation?`
Response `:COMPARATOR:SLIMIT:DEVIATION 1.234567E-06,-10.0,10.0` (when HEADER ON)
`1.234567E-06,-10.0,10.0` (when HEADER OFF)
The reference value and the lower and upper limit values of the first parameter in deviation percentage (Δ%) mode are set to 1.234567E-6, -10%, and 10%, respectively.

Note

The instrument stores the upper and lower limit values for absolute mode and those for deviation percentage (Δ%) mode separately.
The reference value and upper and lower limit values are common to percentage (%) mode and deviation percentage (Δ%) mode.

Setting and querying the judgment mode of the third parameter of the comparator function

Syntax

Command **:COMParator:SLIMit:MODE** <ABSolute/ PERcent/ DEViation>

Query **:COMParator:SLIMit:MODE?**

Response <ABSOLUTE/ PERCENT/ DEVIATION>

Explanation

Command Sets the mode of the third parameter.

ABSolute: Sets the mode to absolute (ABS) mode.
PERcent: Sets the mode to percentage (%) mode.
DEViation: Sets the mode to deviation percentage (Δ%) mode.

Query Returns the mode of the third parameter.

Example

Command **:COMParator:SLIMit:MODE PERcent**

Selects percentage (%) mode.

Query **:COMParator:SLIMit:MODE?**

Response **:COMPARATOR:SLIMIT:MODE PERCENT** (when HEADER ON)
PERCENT (when HEADER OFF)
The mode is set to percentage (%) mode.

Setting and querying the reference value and the upper and lower limit values of the third parameter of the comparator function (percentage mode)

Syntax

Command `:COMParator:SLIMit:PERcent` <Reference value>, <OFF/ lower limit values>, <OFF/ upper limit values>

Query `:COMParator:SLIMit:PERcent?`

Response <Reference value>,<OFF/ lower value>,<OFF/ upper value>

Parameter <Reference value> = -9.999999E+09 to +9.999999E+09 (NR3)
<Lower limit values> = -999.9999% to +999.9999% (NR2)
<Upper limit values> = -999.9999% to +999.9999% (NR2)

Explanation

Command Sets the reference value and upper and lower limit values of the third parameter in percentage (%) mode.

Query Returns the reference value and upper and lower limit values of the third parameter in percentage (%) mode.

Example

Command `:COMParator:SLIMit:PERcent 1.234567E-6,-10.0,10.0`
Sets the reference value and the lower and upper limit values of the third parameter in percentage (%) mode to 1.234567E-6, -10%, and 10%, respectively.

Query `:COMParator:SLIMit:PERcent?`
Response `:COMPARATOR:SLIMIT:PERCENT 1.234567E-06,-10.0,10.0` (when HEADER ON)
`1.234567E-06,-10.0,10.0` (when HEADER OFF)
The reference value and the lower and upper limit values of the third parameter in percentage (%) mode are set to 1.234567E-6, -10%, and 10%, respectively.

Note

The instrument stores the upper and lower limit values for absolute mode and those for percentage (%) mode separately.
The reference value and upper and lower limit values are common to percentage (%) mode and deviation percentage (Δ%) mode.

Setting and querying the cable length compensation function

Syntax

Command `:CORRection:CABLe` <Cable length>

Query `:CORRection:CABLe?`

Response <Cable length>

Parameter <Cable length> = 0/ 1 (NR1)

Explanation

Command: Sets the cable length compensation function.
This command is only valid when in LCR mode and analyzer mode.

Query: Returns the setting of the cable length compensation function.
0: The cable length compensation function is set to 0 m.
1: The cable length compensation function is set to 1 m.

Example

Command `:CORRection:CABLe 1`
Sets the cable length compensation function to 1 m.

Query `:CORRection:CABLe?`
Response `:CORRECTION:CABLE 1` (when HEADER ON)
`1` (when HEADER OFF)
The cable length compensation function is set to 1 m.

Executing and querying the load compensation function

Syntax

Command `:CORRection:LOAD` <OFF/ ON>

Query `:CORRection:LOAD?`

Response <OFF/ ON>

Explanation

Command: Sets the load compensation function and acquires the compensation value.
This command is only valid when in LCR mode.
OFF : Disables the load compensation function.
ON : Acquires the load compensation value and enables the load compensation function.

Query: Returns the setting of the load compensation function.

Example

Command `:CORRection:LOAD ON`
Acquires the load compensation value and enables the load compensation function.

Query `:CORRection:LOAD?`
Response `:CORRECTION:LOAD ON` (when HEADER ON)
`ON` (when HEADER OFF)
The load compensation function is enabled.

Note

Set the load compensation conditions before acquiring the load compensation value.
A command error occurs if there is not even one valid load compensation condition.
In the following cases, the load compensation value cannot be acquired and an execution error occurs.
- When performing measurement with an internal trigger in LCR mode
- When performing measurement with an external trigger in LCR mode

Setting and querying the load compensation conditions

Syntax

Command `:CORRection:LOAD:CONDition` <Compensation No.>,<Frequency>,<Range No.>,<LOW Z>,<V/ CV /CC>,<Level value>,<DC bias>,<DC bias value>

Query `:CORRection:LOAD:CONDition?` <Compensation No.>

Response <Frequency>,<Range No.>,<LOW Z>,<V/ CV /CC>,<Level value>,<DC bias>,<DC bias value>

Parameter
<Compensation No.> = 1/ 2/ 3/ 4/ 5
<Frequency> = 4.00 to 5,0000E+06 (NR3)
<Range No.> = 1 to 12 (NR1)
<LOW Z> = OFF/ ON
<Level Value> = The settable range varies depending on the conditions. (NR3)
<DC bias> = OFF/ON
<DC bias value> = The settable range varies depending on the conditions. (NR3)

Explanation

Command Sets the load compensation conditions.
This command is only valid when in LCR mode.

Query Returns the load compensation conditions.

Example

Command `:CORRection:LOAD:CONDition 3,5.0000E+03,3,ON,CV,0.300,ON,2.00`
Sets the following load compensation conditions for load compensation No. 3.
Frequency: 5.0000 kHz
Range: 3 (10 Ω range)
LOW Z : ON
Level mode: CV
Level value: 0.300 V
DC bias: ON
DC bias value: 2.00 V

Query `:CORRection:LOAD:CONDition? 3`
Response `:CORRECTION:LOAD:CONDITION 5.0000E+03,3,ON,CV,0.300,ON,2.00` (when HEADER ON)
`5.0000E+03,3,ON,CV,0.300,ON,2.00` (when HEADER OFF)
The following load conditions are set for load compensation No. 3.
Frequency: 5.0000 kHz
Range: 3 (10 Ω range)
LOW Z : ON
Level mode: CV
Level value: 0.300 V
DC bias: ON
DC bias value: 2.00 V

Note

If this command is executed when the setting last time was the DC setting, the parameter to be used for the reference value is changed to Z-θ, and the reference value is cleared.

An execution error occurs in the following cases.

- When a value that cannot be set as a load compensation condition is specified
- When a compensation number for which the load compensation conditions have not been set is queried
- When a compensation number which is set to DC is queried

Setting and querying the load compensation conditions

Range No.	Range	
12	100 MΩ	This can be set when the frequency is 100 kHz or less.
11	10 MΩ	This can be set when the frequency is 1 MHz or less.
10	1 MΩ	
9	100 kΩ	
8	30 kΩ	
7	10 kΩ	
6	3 kΩ	
5	1 kΩ	
4	300 Ω	
3	10 Ω	
2	1 Ω	
1	100 mΩ	

Setting and querying the load compensation conditions for when DC resistance measurement

Syntax

Command `:CORRection:LOAD:DCResistance:CONDition` <Compensation No.>,<Range No.>,<LOW Z>,<V/ CV/ CC>,<Level Value>

Query `:CORRection:LOAD:DCResistance:CONDition?` <Compensation No.>

Response <Range No.>,<LOW Z>,<V/ CV/ CC>,<Level Value>

Parameter <Compensation No.> = 1/ 2/ 3/ 4/ 5
<Range No.> = 1 to 12 (NR1)
<LOW Z> = OFF/ ON
<Level Value> = The settable range varies depending on the conditions. (NR3)

Explanation

Command: Sets the load compensation conditions for when DC resistance measurement.
This command is only valid when in LCR mode.

Query: Returns the load compensation conditions for when DC resistance measurement.

Example

Command
```
:CORRection:LOAD:DCResistance:CONDition
5,6,OFF,CC,5.23
```
Sets the following load compensation conditions for when DC resistance measurement to load compensation No. 5.
Range: 6 (3 kΩ range)
LOW Z : OFF
Level mode: CC
Level value: 5.23 mA

Query
```
:CORRection:LOAD:DCResistance:CONDition? 5
```
Response
```
:CORRECTION:LOAD:DCRESISTANCE:CONDITION 6,OFF,CC,
5.23
```
(when HEADER ON)
```
6,OFF,CC,5.23
```
(when HEADER OFF)
The following load compensation conditions for when DC resistance measurement are set to load compensation No. 5.
Range: 6 (3 kΩ range)
LOW Z : OFF
Level mode: CC
Level value: 5.23 mA

Note

If this command is executed and the setting last time was not the DC setting, the parameter to use for the reference value is changed to Rdc, and the reference value is cleared.
An execution error occurs in the following cases.
- When a value that cannot be set as a load compensation condition for DC resistance measurement is specified
- When a compensation number for which the load compensation conditions for when DC resistance measurement have not been set is queried
- When a compensation number which is not set to DC is queried

Setting and querying the load compensation conditions for when DC resistance measurement

Range No.	Range
12	100 MΩ
11	10 MΩ
10	1 MΩ
9	100 kΩ
8	30 kΩ
7	10 kΩ
6	3 kΩ
5	1 kΩ
4	300 Ω
3	10 Ω
2	1 Ω
1	100 mΩ

Setting and querying the reference value of load compensation for when DC resistance measurement

Syntax

Command `:CORRection:LOAD:DCResistance:REFerence` <Compensation No.>,<Reference value>

Query `:CORRection:LOAD:DCResistance:REFerence?` <Compensation No.>

Response <Reference value>

Parameter <Compensation No.> = 1/ 2/ 3/ 4/ 5
<Reference value> = The settable range varies depending on the conditions. (NR3)

Explanation

Command: Sets the reference value to use for load compensation for when DC resistance measurement. This command is only valid when in LCR mode.

Query: Returns the reference value to use for load compensation for when DC resistance measurement.

Example

Command
```
:CORRection:LOAD:DCResistance:REFerence 1,20
```
Sets the reference value of compensation No. 1 to 20 Ω.

Query
```
:CORRection:LOAD:DCResistance:REFerence? 1
```
Response
```
:CORRECTION:LOAD:DCRESISTANCE:REFERENCE 20.00000E+00
```
(when HEADER ON)
```
20.00000E+00
```
(when HEADER OFF)

The reference value of compensation No. 1 is set to 20 Ω.

Note

An execution error occurs in the following cases.
- When the specified compensation number is not set to DC
- When a valid reference value is not set

Querying load compensation failure flag

Syntax

Query `:CORRection:LOAD:ERRor?`

Response <Result>

Parameter <Result> = 0/ 1 (NR1)

Explanation

Query: Returns the result of executing load compensation.
0 : Load compensation ended normally.
1 : Load compensation ended abnormally.

Example

Query
```
:CORRection:LOAD:ERRor?
```
Response
```
:CORRECTION:LOAD:ERROR 0
```
(when HEADER ON)
```
0
```
(when HEADER OFF)

Load compensation ended normally.

Setting and querying the reference values of load compensation

Syntax

Command `:CORRection:LOAD:REFerence` <Compensation No.>,<Mode No.>, <Reference value1>, <Reference value2>

Query `:CORRection:LOAD:REFerence?` <Compensation No.>

Response <Mode No.>,<Reference value1>,<Reference value2>

Parameter <Compensation No.> = 1/ 2/ 3/ 4/ 5
<Mode No.> = 1 to 10 (NR1)
<Reference value1> = The settable range varies depending on the reference value mode. (NR3)
<Reference value2> = The settable range varies depending on the reference value mode. (NR3)

Explanation

Command: Sets the parameter and reference values to use for the reference values for load compensation.
This command is only valid when in LCR mode.

Query: Returns the parameter and reference values to use for the reference value for load compensation.

Example

Command
```
:CORRection:LOAD:REFerence 1,2,10e-9,0.00014
```
Sets parameter, reference value 1 (Cs), and reference value 2 (D) of compensation No. 1 to Cs-D, 10 nF, and 0.00014, respectively.

Query
```
:CORRection:LOAD:REFerence? 1
```
Response
```
:CORRECTION:LOAD:REFERENCE 2,10.00000E-09,140.0000E-06
```
(when HEADER ON)
```
2,10.00000E-09,140.0000E-06
```
(when HEADER OFF)
The parameter, reference value 1 (Cs), and reference value 2 (D) of compensation No. 1 are set to Cs-D, 10 nF, and 0.00014, respectively.

Note

An execution error occurs in the following cases.
- When the specified compensation number is set to DCR
- When a valid reference value is not set

Mode No.	Parameter
1	Z-θ
2	Cs-D
3	Cs-Rs
4	Cp-D
5	Cp-Rp
6	Ls-Q
7	Ls-Rs
8	Lp-Q
9	Lp-Rp
10	Rs-X

Resetting the load compensation conditions

Syntax

Command `:CORRection:LOAD:RESet` <Compensation No.>

Parameter <Compensation No.> = 1/ 2/ 3/ 4/ 5

Explanation

Command Clears the load compensation conditions of the specified compensation number.
Clearing the compensation conditions disables (turns OFF) load compensation.
This command is only valid when in LCR mode.

Example

Command `:CORRection:LOAD:RESet 1`
Clears the load compensation conditions of compensation No. 1.

Note

The load compensation conditions cannot be restored once they are cleared.
Set them again.

Setting and querying the load compensation function

Syntax

Command `:CORRection:LOAD:RETurn` <OFF/ ON>

Query `:CORRection:LOAD:RETurn?`

Response <OFF/ ON>

Explanation

Command Sets the load compensation function. The compensation values are not acquired.
This command is only valid when in LCR mode.
OFF : Disables the load compensation function.
ON : Enables the load compensation function.

Query Returns the setting of the load compensation function.

Example

Command `:CORRection:LOAD:RETurn ON`
Enables the load compensation function.

Query `:CORRection:LOAD:RETurn?`
Response `:CORRECTION:LOAD:RETURN ON` (when HEADER ON)
`ON` (when HEADER OFF)
The load compensation function is enabled.

Executing and querying the open compensation function

Syntax

Command **:CORRection:OPEN** <OFF/ ALL/ SPOT>

Query **:CORRection:OPEN?**

Response <OFF/ ALL/ SPOT>

Explanation

Command

Sets the open compensation function and acquires the compensation value.

This command is only valid when in LCR mode and analyzer mode.

OFF: Disables the open compensation function.

ALL: Acquires the open compensation value and sets the open compensation function to ALL compensation.

SPOT: Acquires the open compensation value at the set SPOT compensation frequency, and sets the open compensation function to SPOT compensation.

Query

Returns the setting of the open compensation function.

OFF: The open compensation function is disabled.

ALL: The open compensation function is set to ALL compensation.

SPOT: The open compensation function is set to SPOT compensation.

Example

Command **:CORRection:OPEN ALL**

Acquires the open compensation value and sets the open compensation function to ALL compensation.

Query **:CORRection:OPEN?**

Response **:CORRECTION:OPEN ALL** (when HEADER ON)

ALL (when HEADER OFF)

The open compensation function is set to ALL compensation.

Note

Compensation cannot be executed during measurement as doing so will result in an execution error. Change to an external trigger in the case of LCR mode, and sequence sweep or step sweep in the case of analyzer mode, and then execute the command.

An execution error occurs if a command to change the environment settings is executed during compensation. Also, try your hardest to avoid executing commands other than ones for checking each status register (***ESR?**, **:ESR0?** ,etc.).

In the following cases, the load compensation value cannot be acquired and an execution error occurs.

- When performing measurement with an internal trigger in LCR mode
- When performing measurement with an external trigger in LCR mode
- When performing measurement sequentially in analyzer mode

Querying open compensation failure flag

Syntax

Query `:CORRection:OPEN:ERRor?`

Response <Result>

Parameter <Result> = 0/ 1/ 2 (NR1)

Explanation

Query

Returns the result of executing open compensation.

0: Open compensation ended normally.
1: Open compensation ended abnormally.
2 : Open compensation ended in a state in which the range has not been determined.

Example

Query `:CORRection:OPEN:ERRor?`

Response `:CORRECTION:OPEN:ERROR 0` (when HEADER ON)

`0` (when HEADER OFF)

Open compensation ended normally.

Note

If [2] is returned for this command, the compensation value is being acquired in the state in which auto ranging has not determined the range. In particular, symptoms such as this may occur if compensation is executed in an environment subject to a lot of noise. For the countermeasures against noise, see “Appendix External Interference” in the instruction manual.

Also, use guarding when testing high impedance elements.

See “Appendix Measurement of High Impedance Components” in the instruction manual.

Setting and querying frequency for acquiring open compensation value

Syntax

Command `:CORRection:OPEN:FREQuency` <Compensation No.>, <OFF/ DC/ Frequency>

Query `:CORRection:OPEN:FREQuency?` <Compensation No.>

Response <OFF/ DC/ Frequency>

Parameter <Compensation No.> = 1/ 2/ 3/ 4/ 5
<Frequency> = 4.00 to 5,0000E+06 (NR3)

Explanation

Command: Sets the frequency for performing SPOT compensation with the open compensation function. This command is only valid when in LCR mode and analyzer mode.

- OFF: Disables SPOT compensation of the specified compensation number.
- DC: Sets the specified compensation number to DC SPOT compensation.
- Frequency: Sets the SPOT compensation frequency of the specified compensation number.

Query: Returns the SPOT compensation frequency of the open compensation function.

- OFF: The SPOT compensation frequency of the specified compensation number is not set.
- DC: The specified compensation number is set to DC SPOT compensation.
- Frequency: Returns the SPOT compensation frequency of the specified compensation number.

Example

Command
```
:CORRection:OPEN:FREQuency 1,120E+3
```
Sets the SPOT compensation frequency of compensation No. 1 to 120 kHz.

Query
```
:CORRection:OPEN:FREQuency? 1
```
Response
```
:CORRECTION:OPEN:FREQUENCY 120.00E+03
```
(when HEADER ON)
```
120.00E+03
```
(when HEADER OFF)

The SPOT compensation frequency of compensation No. 1 is set to 120 kHz.

Setting and querying the open compensation function

Syntax

Command **:CORRection:OPEN:RETurn** <OFF/ ALL/ SPOT>

Query **:CORRection:OPEN:RETurn?**

Response <OFF/ ALL/ SPOT>

Explanation

Command

Sets the open compensation function. The compensation values are not acquired.
This command is only valid when in LCR mode and analyzer mode.

- OFF: Disables the open compensation function.
- ALL: Sets the open compensation function to ALL compensation.
- SPOT: Sets the open compensation function to SPOT compensation.

Query

Returns the open compensation setting.

- OFF: The open compensation function is disabled.
- ALL: The open compensation function is set to ALL compensation.
- SPOT: The open compensation function is set to SPOT compensation.

Example

Command **:CORRection:OPEN:RETurn SPOT**

Sets the open compensation function to SPOT compensation.

Query **:CORRection:OPEN:RETurn?**

Response **:CORRECTION:OPEN:RETURN SPOT** (when HEADER ON)
SPOT (when HEADER OFF)

The open compensation function is set to SPOT compensation.

Setting and querying the scaling compensation function

Syntax

Command `:CORRection:SCALe` <OFF/ ON>

Query `:CORRection:SCALe?`

Response <OFF/ ON>

Explanation

Command: Sets the scaling compensation function.
This command is only valid when in LCR mode and analyzer mode.

Query: Returns the setting of the scaling compensation function.

Example

Command `:CORRection:SCALe ON`
Enables the scaling compensation function.

Query `:CORRection:SCALe?`
Response `:CORRECTION:SCALE ON` (when HEADER ON)
`ON` (when HEADER OFF)
The scaling compensation function is enabled.

Note

In analyzer mode, only scaling No. 1 and scaling No. 3 are enabled.

No.	LCR Mode	ANALYZEYR mode
SCALE1	First parameter	First parameter
SCALE2	Second parameter	Disabled
SCALE3	Third parameter	Second parameter
SCALE4	Fourth parameter	Disabled

Setting and querying the scaling compensation value

Syntax

Command `:CORRection:SCALe:DATA` <Scaling No.>,<Compensation value A>, <Compensation value B>

Query `:CORRection:SCALe:DATA?` <Scaling No.>

Response <Compensation value A>,<Compensation value B>

Parameter <Scaling No.> = 1/ 2/ 3/ 4
<Compensation value A> = -999.9999 to 999.9999 (NR2)
<Compensation value B> = -9.999999E+09 to 9.999999E+09 (NR3)

Explanation

Command Sets the values of the scaling compensation function.
This command is only valid when in LCR mode and analyzer mode.

Query Returns the values of the scaling compensation function.

Example

Command `:CORRection:SCALe:DATA 1,1.23,4.56`
Sets compensation value A and compensation value B of scaling No. 1 to 1.23 and 4.56, respectively.

Query `:CORRection:SCALe:DATA? 1`
Response `:CORRECTION:SCALE:DATA 1.23,4.560000E+00` (when HEADER ON)
`1.2300,4.560000E+00` (when HEADER OFF)
The compensation value A and compensation value B of scaling No. 1 are set to 1.23 and 4.56, respectively.

Executing and querying the short compensation function

Syntax

Command `:CORRection:SHORt` <OFF/ ALL/ SPOT>

Query `:CORRection:SHORt?`

Response <OFF/ ALL/ SPOT>

Explanation

Command

Sets the short compensation function and acquires the compensation value.

This command is only valid when in LCR mode and analyzer mode.

- OFF: Disables the short compensation function.
- ALL: Acquires the short compensation value and sets the short compensation function to ALL compensation.
- SPOT: Acquires the short compensation value at the set SPOT compensation frequency, and sets the short compensation function to SPOT compensation.

Query

Returns the setting of the short compensation function.

- OFF: The short compensation function is disabled.
- ALL: The short compensation function is set to ALL compensation.
- SPOT: The short compensation function is set to SPOT compensation.

Example

Command `:CORRection:SHORt ALL`

Acquires the short compensation value and sets the short compensation function to ALL compensation.

Query `:CORRection:SHORt?`

Response `:CORRECTION:SHORT ALL` (when HEADER ON)

`ALL` (when HEADER OFF)

The short compensation function is set to ALL compensation.

Note

Compensation cannot be executed during measurement as doing so will result in an execution error. Change to an external trigger in the case of LCR mode, and sequence sweep or step sweep in the case of analyzer mode, and then execute the command.

An execution error occurs if a command to change the environment settings is executed during compensation. Also, try your hardest to avoid executing commands other than ones for checking each status register (`*ESR?`, `:ESR0?` ,etc.).

In the following cases, the load compensation value cannot be acquired and an execution error occurs.

- When performing measurement with an internal trigger in LCR mode
- When performing measurement with an external trigger in LCR mode
- When performing measurement sequentially in analyzer mode

Querying short compensation failure flag

Syntax

Query `:CORRection:SHORt:ERRor?`

Response <Result>

Parameter <Result> = 0/ 1/ 2 (NR1)

Explanation

Query

Returns the result of executing short compensation.

0: Short compensation ended normally.
1: Short compensation ended abnormally.
2: Short compensation ended in a state in which the range has not been determined.

Example

Query `:CORRection:SHORt:ERRor?`

Response `:CORRECTION:SHORT:ERROR 0` (when HEADER ON)

`0` (when HEADER OFF)

Short compensation ended normally.

Note

If [2] is returned for this command, the compensation value is being acquired in the state in which auto ranging has not determined the range. In particular, symptoms such as this may occur if compensation is executed in an environment subject to a lot of noise. For the countermeasures against noise, see “Appendix External Interference” in the instruction manual.

Setting and querying frequency for acquiring short compensation value

Syntax

Command `:CORRection:SHORt:FREQuency` <Compensation No.>, <OFF/ DC/ Frequency>

Query `:CORRection:SHORt:FREQuency?` <Compensation No.>

Response <OFF/ DC/ Frequency>

Parameter <Compensation No.> = 1/ 2/ 3/ 4/ 5
<Frequency> = 4.00 to 5,0000E+06 (NR3)

Explanation

Command Sets the frequency for performing SPOT compensation with the short compensation function.
This command is only valid when in LCR mode and analyzer mode.
- OFF: Disables SPOT compensation of the specified compensation number.
- DC: Sets the specified compensation number to DC SPOT compensation.
- Frequency: Sets the SPOT compensation frequency of the specified compensation number.

Query Returns the SPOT compensation frequency of the short compensation function.
- OFF: The SPOT compensation frequency of the specified compensation number is not set.
- DC: The specified compensation number is set to DC SPOT compensation.
- Frequency: Returns the SPOT compensation frequency of the specified compensation number.

Example

Command
```
:CORRection:SHORt:FREQuency 1,120E+3
```
Sets the SPOT compensation frequency of compensation No. 1 to 120 kHz.

Query
```
:CORRection:SHORt:FREQuency? 1
```
Response
```
:CORRECTION:SHORT:FREQUENCY 120.00E+03
```
(when HEADER ON)
```
120.00E+03
```
(when HEADER OFF)

The SPOT compensation frequency of compensation No. 1 is set to 120 kHz.

Setting and querying the short compensation function

Syntax

Command **:CORRection:SHORt:RETurn** <OFF/ ALL/ SPOT>

Query **:CORRection:SHORt:RETurn?**

Response <OFF/ ALL/ SPOT>

Explanation

Command Sets the short compensation function. The compensation values are not acquired.
This command is only valid when in LCR mode and analyzer mode.
OFF: Disables the short compensation function.
ALL: Sets the short compensation function to ALL compensation.
SPOT: Sets the short compensation function to SPOT compensation.

Query Returns the setting of the short compensation function.
OFF: The short compensation function is disabled.
ALL: The short compensation function is set to ALL compensation.
SPOT: The short compensation function is set to SPOT compensation.

Example

Command **:CORRection:SHORt:RETurn SPOT**
Sets the short compensation function to SPOT compensation.

Query **:CORRection:SHORt:RETurn?**
Response **:CORRECTION:SHORT:RETURN SPOT** (when HEADER ON)
SPOT (when HEADER OFF)
The short compensation function is set to SPOT compensation.

Setting and querying ON/ OFF of DC bias function

Syntax

Command **:DCBias** <ON/ OFF>

Query **:DCBias?**

Response <ON/ OFF>

Explanation

Command Sets the DC bias function.

Query Returns the setting of the DC bias function.

Example

Command **:DCBias ON**
Enables the DC bias function.

Query **:DCBias?**
Response **:DCBIAS ON** (when HEADER ON)
ON (when HEADER OFF)
The DC bias function is enabled.

Setting and querying the DC bias level

Syntax

Command `:DCBias:LEVel` <DC bias level>

Query `:DCBias:LEVel?`

Response <DC bias level>

Parameter <DC bias level> = 0.00 to 2.50 V (NR2)

Explanation

Command Sets the DC bias level.

Query Returns the DC bias level.

Example

Command `:DCBias:LEVel 1.50`
Sets the DC bias level to 1.5 V.

Query `:DCBias:LEVel?`
Response `:DCBIAS:LEVEL 1.50` (when HEADER ON)
`1.50` (when HEADER OFF)
The DC bias level is set to 1.5 V.

Setting and querying the DC offset for when DC resistance measurement

Syntax

Command `:DCResistance:ADJust` <ON/ OFF>

Query `:DCResistance:ADJust?`

Response <ON/ OFF>

Explanation

Command Sets the DC offset for when DC resistance measurement.

Query Returns the setting of the DC offset for when DC resistance measurement.

Example

Command `:DCResistance:ADJust ON`
Enables the DC offset for when DC resistance measurement.

Query `:DCResistance:ADJust?`
Response `:DCRESISTANCE:ADJUST ON` (when HEADER ON)
`ON` (when HEADER OFF)
The DC offset for when DC resistance measurement is enabled.

Acquiring DC offset for when DC resistance measurement

Syntax

Command `:DCResistance:ADJust:DEMand`

Explanation

Command Acquires the DC offset value for when DC resistance measurement.
Use this command when the DC adjustment function is OFF and the DC offset value needs to be acquired. This command is valid when the DC adjustment function is ON but the offset value is acquired for each measurement.

Example

Command `:DCResistance:ADJust:DEMand`
Acquires the DC offset value for when DC resistance measurement.

Setting and querying averaging for when DC resistance measurement

Syntax

Command `:DCResistance:AVERaging` <OFF/ number of averaging times>

Query `:DCResistance:AVERaging?`

Response <OFF/ number of averaging times>

Parameter <number of averaging times> = 1 to 256 (NR1)

Explanation

Command Sets the number of averaging times for when DC resistance measurement.
OFF : Disables the averaging function.

Query Returns the number of averaging times for when DC resistance measurement.

Example

Command `:DCResistance:AVERaging 32`
Sets the number of averaging times for when DC resistance measurement to 32.

Query `:DCResistance:AVERaging?`
Response `:DCRESISTANCE:AVERAGING 32` (when HEADER ON)
`32` (when HEADER OFF)
The number of averaging times for when DC resistance measurement is set to 32.

Note

Setting the number of averaging times to 1 automatically sets the averaging function to OFF.
Setting the number of averaging times from 2 to 256 automatically sets the averaging function to ON.

Setting and querying the transition delay time for when DC resistance measurement

Syntax

Command `:DCResistance:DELay` <Delay time>

Query `:DCResistance:DELay?`

Response <Delay time>

Parameter <Delay time> = 0.0003 to 9.9999 (NR2)

Explanation

Command Sets the delay time for when switching between AC measurement and DC measurement.

Query Returns the delay time for when switching between AC measurement and DC measurement.

Example

Command `:DCResistance:DELay 0.05`

Sets the delay time for when switching between AC measurement and DC measurement to 0.0500 s.

Query `:DCResistance:DELay?`

Response `:DCRESISTANCE:DELAY 0.0500` (when HEADER ON)

`0.0500` (when HEADER OFF)

The delay time for when switching between AC measurement and DC measurement is set to 0.0500 s.

Setting and querying the measurement signal level for when DC resistance measurement

Syntax

Command `:DCResistance:LEVel` <V/ CV/ CC>

Query `:DCResistance:LEVel?`

Response <V/ CV/ CC>

Explanation

Command Sets the measurement signal type for when DC resistance measurement to any one of open-circuit voltage, constant voltage, and constant current.

V : Sets open-circuit voltage.
CV : Sets constant voltage.
CC : Sets constant current.

Query Returns the measurement signal type for when DC resistance measurement.

Example

Command `:DCResistance:LEVel V`

Sets the measurement signal type for when DC resistance measurement to V (open-circuit voltage).

Query `:DCResistance:LEVel?`

Response `:DCRESISTANCE:LEVEL V` (when HEADER ON)

`V` (when HEADER OFF)

The measurement signal type for when DC resistance measurement is set to V (open-circuit voltage).

Setting and querying the constant current level value for when DC resistance measurement

Syntax

Command `:DCResistance:LEVel:CCURRent` <Constant current level>

Query `:DCResistance:LEVel:CCURRent?`

Response <Constant current level>

Parameter <Constant current level> = The settable range varies depending on the conditions. (NR3)
Refer to "Chapter 4 Setting the Measurement Signal Level" in the instruction manual.

Explanation

Command Sets the constant current level for when DC resistance measurement.

Query Returns the setting of the constant current level for when DC resistance measurement.

Example

Command `:DCResistance:LEVel:CCURRent 10E-3`
Sets the constant current level for when DC resistance measurement to 10 mA.

Query `:DCResistance:LEVel:CCURRent?`
Response `:DCRESISTANCE:LEVEL:CCURRENT 10.00E-3` (when HEADER ON)
`10.00E-3` (when HEADER OFF)
The constant current level for when DC resistance measurement is set to 10 mA.

Setting and querying the constant voltage level value for when DC resistance measurement

Syntax

Command `:DCResistance:LEVel:CVOLTage` <Constant voltage level>

Query `:DCResistance:LEVel:CVOLTage?`

Response <Constant voltage level>

Parameter <Constant voltage level> = The settable range varies depending on the conditions. (NR3)
Refer to “Chapter 4 Setting the Measurement Signal Level” in the instruction manual.

Explanation

Command Sets the constant voltage level for when DC resistance measurement.

Query Returns the setting of the constant voltage level for when DC resistance measurement.

Example

Command `:DCResistance:LEVel:CVOLTage 1.000`
Sets the constant voltage level for when DC resistance measurement to 1 V.

Query `:DCResistance:LEVel:CVOLTage?`
Response `:DCRESISTANCE:LEVEL:CVOLTAGE 1.000` (when HEADER ON)
`1.000` (when HEADER OFF)
The constant voltage level for when DC resistance measurement is set to 1 V.

Setting and querying the open-circuit voltage level value for when DC resistance measurement

Syntax

Command `:DCResistance:LEVel:VOLTage` <Open-circuit voltage level>

Query `:DCResistance:LEVel:VOLTage?`

Response <Open-circuit voltage level>

Parameter <Open-circuit voltage level> = The settable range varies depending on the conditions. (NR3)
Refer to “Chapter 4 Setting the Measurement Signal Level” in the instruction manual.

Explanation

Command Sets the open-circuit voltage level for when DC resistance measurement.

Query Returns the setting of the open-circuit voltage level for when DC resistance measurement.

Example

Command `:DCResistance:LEVel:VOLTage 1.000`
Sets the open-circuit voltage level for when DC resistance measurement to 1 V.

Query `:DCResistance:LEVel:VOLTage?`
Response `:DCRESISTANCE:LEVEL:VOLTAGE 1.000` (when HEADER ON)
`1.000` (when HEADER OFF)
The open-circuit voltage level for when DC resistance measurement is set to 1 V.

Setting and querying ON/ OFF of limit for when DC resistance measurement

Syntax

Command `:DCResistance:LIMiter` <ON/ OFF>

Query `:DCResistance:LIMiter?`

Response <ON/ OFF>

Explanation

Command Sets the limit function for when DC resistance measurement.

Query Returns the setting of the limit function for when DC resistance measurement.

Example

Command `:DCResistance:LIMiter ON`
Sets the limit function for when DC resistance measurement to ON.

Query `:DCResistance:LIMiter?`
Response `:DCRESISTANCE:LIMITER ON` (when HEADER ON)
`ON` (when HEADER OFF)
The limit function for when DC resistance measurement is set to ON.

Setting and querying the current limit value for when DC resistance measurement

Syntax

Command `:DCResistance:LIMiter:CURRent` <Current limit value>

Query `:DCResistance:LIMiter:CURRent?`

Response <Current limit value>

Parameter <Current limit value> = 0.01 m to 100.00 mA (NR3)

Explanation

Command Sets the current limit value for when DC resistance measurement.

Query Returns the current limit value for when DC resistance measurement.

Example

Command `:DCResistance:LIMiter:CURRent 50.00E-03`
Sets the current limit value for when DC resistance measurement to 50 mA.

Query `:DCResistance:LIMiter:CURRent?`
Response `:DCRESISTANCE:LIMITER:CURRENT 50.00E-03` (when HEADER ON)
`50.00E-03` (when HEADER OFF)
The current limit value for when DC resistance measurement is set to 50 mA.

Setting and querying the voltage limit value for when DC resistance measurement

Syntax

Command `:DCResistance:LIMiter:VOLTage` <Voltage limit value>

Query `:DCResistance:LIMiter:VOLTage?`

Response <Voltage limit value>

Parameter <Voltage limit value> = 0.10 to 2.50 V (NR3)

Explanation

Command Sets the voltage limit value for when DC resistance measurement.

Query Returns the voltage limit value for when DC resistance measurement.

Example

Command `:DCResistance:LIMiter:VOLTage 2.5`
Sets the voltage limit value for when DC resistance measurement to 2.5 V.

Query `:DCResistance:LIMiter:VOLTage?`
Response `:DCRESISTANCE:LIMITER:VOLTAGE 2.500` (when HEADER ON)
`2.500` (when HEADER OFF)
The voltage limit value for when DC resistance measurement is set to 2.5 V.

Setting and querying the measurement range for when DC resistance measurement

Syntax

Command `:DCResistance:RANGe` <Range No.>

Query `:DCResistance:RANGe?`

Response <Range No.>

Parameter <Measurement range No.> = 1 to 12 (NR1)

Explanation

Command: Sets the measurement range for when DC resistance measurement.
If this command is executed, the range setting is automatically changed from auto to hold.

Query: Returns the measurement range for when DC resistance measurement.

Example

Command
`:DCResistance:RANGe 4`
Sets the measurement range for when DC resistance measurement to 4 (300 Ω).

Query
`:DCResistance:RANGe?`
Response
`:DCRESISTANCE:RANGE 4` (when HEADER ON)
`4` (when HEADER OFF)
The measurement range for when DC resistance measurement is set to 4 (300 Ω).

Note

Range No.	Range
12	100 MΩ
11	10 MΩ
10	1 MΩ
9	100 kΩ
8	30 kΩ
7	10 kΩ
6	3 kΩ
5	1 kΩ
4	300 Ω
3	10 Ω
2	1 Ω
1	100 mΩ

Automatically setting and querying the measurement range for when DC resistance measurement

Syntax

Command `:DCResistance:RANGe:AUTO` <ON/ OFF>

Query `:DCResistance:RANGe:AUTO?`

Response <ON/ OFF>

Explanation

Command Sets the measurement range for when DC resistance measurement to be changed automatically.

ON : The range is changed automatically by the auto ranging function.

OFF : The range is fixed and is not changed automatically.

Query Returns the automatic setting of the measurement range for when DC resistance measurement.

Example

Command `:DCResistance:RANGe:AUTO ON`

Sets the measurement range for when DC resistance measurement to be changed automatically.

Query `:DCResistance:RANGe:AUTO?`

Response `:DCRESISTANCE:RANGE:AUTO ON` (when HEADER ON)

`ON` (when HEADER OFF)

The measurement range for when DC resistance measurement is set to be changed automatically.

Setting and querying low Z high accuracy mode for when DC resistance measurement

Syntax

Command `:DCResistance:RANGe:LOWZ` <ON/ OFF>

Query `:DCResistance:RANGe:LOWZ?`

Response <ON/ OFF>

Explanation

Command Sets low Z high accuracy mode for when DC resistance measurement.

Query Returns the setting of low Z high accuracy mode for when DC resistance measurement.

Example

Command `:DCResistance:RANGe:LOWZ ON`

Enables low Z high accuracy mode for when DC resistance measurement.

Query `:DCResistance:RANGe:LOWZ?`

Response `:DCRESISTANCE:RANGE:LOWZ ON` (when HEADER ON)

`ON` (when HEADER OFF)

Low Z high accuracy mode for when DC resistance measurement is enabled.

Setting and querying the measurement speed for when DC resistance measurement

Syntax

Command **:DCResistance:SPEEd** <FAST/ MEDium/ SLOW/ SLOW2>

Query **:DCResistance:SPEEd?**

Parameter <FAST/ MEDIUM/ SLOW/ SLOW2>

Explanation

Command Sets the measurement speed for when DC resistance measurement.

Query Returns the setting of the measurement speed for when DC resistance measurement.

Example

Command **:DCResistance:SPEEd MEDium**

Sets the measurement speed for when DC resistance measurement to medium.

Query **:DCResistance:SPEEd?**

Response **:DCRESISTANCE:SPEED MEDIUM** (when HEADER ON)

NORMAL (when HEADER OFF)

The measurement speed for when DC resistance measurement is set to medium.

Setting and querying LCD display

Syntax

Command **:DISPlay** <ON/ OFF>

Query **:DISPlay?**

Response <ON/ OFF>

Explanation

Command Sets LCD display.

ON : Sets the LCD to always on.

OFF : The LCD turns off after approximately 10 seconds elapse since the touch panel was last touched. Touching the touch panel again turns the LCD on again.

Query Returns the setting of LCD display.

Example

Command **:DISPlay OFF**

Sets the LCD to turn off.

Query **:DISPlay?**

Response **:DISPLAY OFF** (when HEADER ON)

OFF (when HEADER OFF)

The LCD is set to turn off.

Writing and reading event status enable register 0

Syntax

Command `:ESE0` <Mask value>

Query `:ESE0?`

Response <Mask value>

Parameter <Mask value> = 0 to 255 (NR1)

Explanation

Command Sets the mask pattern of ESER0.
The initial value (when power is turned on) is 0.

Query Returns the mask pattern of ESER0.

Example

Command `:ESE0 20`
Sets bit 4 and bit 2 of ESER0.

Query `:ESE0?`

Response `:ESE0 20` (when HEADER ON)
`20` (when HEADER 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
REF	COF	LOF	MOF	MUF	IDX	EOM	CEM

Writing and reading event status enable register 1

Syntax

Command `:ESE1` <Mask value>

Query `:ESE1?`

Response <Mask value>

Parameter <Mask value> = 0 to 255 (NR1)

Explanation

Command: Sets the mask pattern of ESER1.
The initial value (when power is turned on) is 0.

Query: Returns the mask pattern of ESER1.

Example

Command `:ESE1 64`
Sets bit 6 of ESER1.

Query `:ESE1?`
Response `:ESE1 64` (when HEADER ON)
`64` (when HEADER 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
ESR1-7 (Unused)	ESR1-6	ESR1-5	ESR1-4	ESR1-3	ESR1-2	ESR1-1	ESR1-0

Note

For details on each of the bits, refer to "3.6 About Event Registers" (p. 50).

Writing and reading event status enable register 2

Syntax

Command `:ESE2` <Mask value>

Query `:ESE2?`

Response <Mask value>

Parameter <Mask value> = 0 to 255 (NR1)

Explanation

Command: Sets the mask pattern of ESER2.
The initial value (when power is turned on) is 0.

Query: Returns the mask pattern of ESER2.

Example

Command `:ESE2 1`
Sets bit 0 of ESER2.

Query `:ESE2?`
Response `:ESE2 1` (when HEADER ON)
`1` (when HEADER 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
ESR2-7	ESR2-6	ESR2-5	ESR2-4	ESR2-3	ESR2-2	ESR2-1	ESR2-0

Note

For details on each of the bits, refer to "3.6 About Event Registers" (p. 50).

Writing and reading event status enable register 3

Syntax

Command `:ESE3` <Mask value>

Query `:ESE3?`

Response <Mask value>

Parameter <Mask value> = 0 to 255 (NR1)

Explanation

Command: Sets the mask pattern of ESER3.
The initial value (when power is turned on) is 0.

Query: Returns the mask pattern of ESER3.

Example

Command `:ESE3 3`
Sets bit 1 and bit 0 of ESER3.

Query `:ESE3?`
Response `:ESE3 3` (when HEADER ON)
`3` (when HEADER OFF)
Bit 1 and bit 0 of ESER3 are set to 1.

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
ESR3-7	ESR3-6	ESR3-5	ESR3-4	ESR3-3	ESR3-2	ESR3-1	ESR3-0

Note

For details on each of the bits, refer to "3.6 About Event Registers" (p. 50).

Reading event status register 0

Syntax

Query `:ESR0?`

Response <Register value>

Parameter <Register value> = 0 to 255 (NR1)

Explanation

Query: Returns the register value of event status register 0 (ESR0), and clears the register.
A header is not added to the response message.

Example

Query `:ESR0?`
Response `4`

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
REF	COF	LOF	MOF	MUF	IDX	EOM	CEM

Note

For details on each of the bits, refer to "3.6 About Event Registers" (p. 50).

Reading event status register 1

Syntax

Query `:ESR1?`

Response <Register value>

Parameter <Register value> = 0 to 255 (NR1)

Explanation

Query Returns the register value of event status register 1 (ESR1), and clears the register.
A header is not added to the response message.

Example

Query `:ESR1?`
Response `82`

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
ESR1-7 (Unused)	ESR1-6	ESR1-5	ESR1-4	ESR1-3	ESR1-2	ESR1-1	ESR1-0

Note

When comparator measurement is performed in LCR mode, the bits are set after one measurement finishes.
When area judgment is performed in analyzer mode, the bits are set after one sweep point measurement finishes.
In the case of continuous measurement, the AND bit is set after continuous measurement finishes.
For details on each of the bits, refer to "3.6 About Event Registers" (p. 50).

Reading event status register 2

Syntax

Query `:ESR2?`

Response <Register value>

Parameter <Register value> = 0 to 255 (NR1)

Explanation

Query Returns the register value of event status register 2 (ESR2), and clears the register.
A header is not added to the response message.

Example

Query `:ESR2?`
Response `1`

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
ESR2-7	ESR2-6	ESR2-5	ESR2-4	ESR2-3	ESR2-2	ESR2-1	ESR2-0

Note

When BIN measurement is performed in LCR mode, the bits are set after one measurement finishes.
When peak judgment is performed in analyzer mode, the bits are set after one sweep measurement finishes.
In continuous measurement mode, the bits are not set.
For details on each of the bits, refer to "3.6 About Event Registers" (p. 50).

Reading event status register 3

Syntax

Query `:ESR3?`

Response <Register value>

Parameter <Register value> = 0 to 255 (NR1)

Explanation

Query Returns the register value of event status register 3 (ESR3), and clears the register.
A header is not added to the response message.

Example

Query `:ESR3?`
Response `64`

128	64	32	16	8	4	2	1
bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
ESR3-7	ESR3-6	ESR3-5	ESR3-4	ESR3-3	ESR3-2	ESR3-1	ESR3-0

Note

When BIN measurement is performed in LCR mode, the bits are set after one measurement finishes.
When peak judgment is performed in analyzer mode, the bits are set after one sweep measurement finishes.
In continuous measurement mode, the bits are not set.
For details on each of the bits, refer to "3.6 About Event Registers" (p. 50).

Setting and querying the date and time for when saving text

Syntax

Command `:FILE:DATE` <ON/ OFF>

Query `:FILE:DATE?`

Response <ON/ OFF>

Explanation

Command Sets whether to save the date and time when saving text.

Query Returns the date and time setting for when saving text.

Example

Command `:FILE:DATE ON`
Saves the date and time when saving text.

Query `:FILE:DATE?`
Response `:FILE:DATE ON` (when HEADER ON)
`ON` (when HEADER OFF)
The date and time are saved when saving text.

Setting and querying the delimiter for when saving text

Syntax

Command **:FILE:DELIMiter** <COMma/ TAB/ SEMIcolon/ SPACE>

Query **:FILE:DELIMiter?**

Response <COMMA/ TAB/ SEMICOLON/ SPACE>

Explanation

Command Sets the delimiter for when saving text.

COMma: Comma (,)
TAB : Tab
SEMIcolon : Semicolon (;)
SPACE : Space

Query Returns the delimiter for when saving text.

Example

Command **:FILE:DELIMiter SEMIcolon**
Sets the delimiter for when saving text to a semicolon.

Query **:FILE:DELIMiter?**
Response **:FILE:DELIMITER SEMICOLON** (when HEADER ON)
SEMICOLON (when HEADER OFF)
The delimiter for when saving text is set to a semicolon.

Setting and querying the save folder

Syntax

Command **:FILE:FOLDer** <Folder name>

Query **:FILE:FOLDer?**

Response <Folder name>

Parameter <Folder name> = 0 to 9, A to Z, + ,–, _ (Up to 12 characters)

Explanation

Command Sets the folder name of the save folder.
The characters that can be used for the file name are alphanumeric characters and the “+,” “-,” and “_” symbols.
Lowercase alphabetical characters are converted to uppercase.

Query Returns the folder name of the save folder.

Example

Command **:FILE:FOLDer SaveData0523**
Sets the folder name of the save folder to [SAVEDATA0523].

Query **:FILE:FOLDer?**
Response **:FILE:FOLDER SAVEDATA0523** (when HEADER ON)
SAVEDATA0523 (when HEADER OFF)
The folder name of the save folder is set to [SAVEDATA0523].

Querying USB flash drive information

Syntax

Query `:FILE:INFOrmation?`

Response <Format type>,<Total size>,<Space used>,<Space free>,<Usage rate>

Parameter <Format type> = FAT12/ FAT16/ FAT32

Explanation

Query Returns the information of the USB flash drive.
An execution error occurs if the USB flash drive is not connected.

Example

Query `:FILE:INFOrmation?`
Response `:FILE:INFORMATION FAT32,1.9GB,960MB,949MB,50.3%`
(when HEADER ON)
`FAT32,1.9GB,960MB,949MB,50.3%` (when HEADER OFF)
The format type of the connected USB flash drive is FAT32, the total size 1.9 GB, space used 960 MB, space free 949 MB, and usage rate 50.3%.

Setting and querying the mode of the save folder

Syntax

Command `:FILE:MODE` <AUTO/ MANUAL>

Query `:FILE:MODE?`

Response <AUTO/ MANUAL>

Explanation

Command Sets the mode of the save folder.
AUTO: The save folder is set automatically from the date and time.
MANUAL:Any folder can be set. Set the folder name with the **FILE:FOLDer** command.

Query Returns the mode of the save folder.

Example

Command `:FILE:MODE MANUAL`
Sets the mode of the save folder to manual.

Query `:FILE:MODE?`
Response `:FILE:MODE MANUAL` (when HEADER ON)
`MANUAL` (when HEADER OFF)
The mode of the save folder is set to manual.

Setting and querying the measurement parameter setting for when saving text

Syntax

Command **:FILE:PARAmeter** <ON/ OFF>

Query **:FILE:PARAmeter?**

Response <ON/ OFF>

Explanation

Command Sets whether to save the measurement parameters when saving text.

Query Returns the setting of the measurement parameters for when saving text.

Example

Command **:FILE:PARAmeter ON**

Saves the measurement parameters when saving text.

Query **:FILE:PARAmeter?**

Response **:FILE:PARAMETER ON** (when HEADER ON)

ON (when HEADER OFF)

The measurement parameters are saved when saving text.

Setting and querying the quotation mark setting for when saving text

Syntax

Command **:FILE:QUOTe** <OFF/ DOUBle/ SINGle>

Query **:FILE:QUOTe?**

Response <OFF/ DOUBLE/ SINGLE>

Explanation

Command Sets the quotation mark for when saving text.

OFF: Quotation marks are not added.
DOUBle: Double quotation mark (“)
SINGle: Single quotation mark (‘)

Query Returns the quotation mark for when saving text.

Example

Command **:FILE:QUOTe DOUBle**

Sets the quotation mark for when saving text to the double quotation mark.

Query **:FILE:QUOTe?**

Response **:FILE:QUOTE DOUBLE** (when HEADER ON)

DOUBLE (when HEADER OFF)

The quotation mark for when saving text is set to the double quotation mark.

Executing file saving

Syntax

Command `:FILE:SAVE`

Explanation

Command Executes file saving.
An execution error occurs if the save type is set to “OFF” or a USB flash drive is not connect.

Example

Command `:FILE:SAVE`
Executes file saving.

Setting and querying the measurement condition setting for when saving text

Syntax

Command `:FILE:SET` <ON/ OFF>

Query `:FILE:SET?`

Response <ON/ OFF>

Explanation

Command Sets whether to save the measurement conditions when saving text.

Query Returns the measurement condition setting for when saving text.

Example

Command `:FILE:SET ON`
Saves the measurement conditions when saving text.

Query `:FILE:SET?`
Response `:FILE:SET ON` (when HEADER ON)
`ON` (when HEADER OFF)
The measurement conditions are saved when saving text.

Setting and querying the save type

Syntax

Command **:FILE:TYPE** <OFF/ TEXT/ BMP>

Query **:FILE:TYPE?**

Response <OFF/ TEXT/ BMP>

Explanation

Command Sets the save type.
- OFF: Disables the file save function.
- TEXT: Saves the measurement values as text.
- BMP: Saves images as BMP images.

Query Returns the save type.

Example

Command **:FILE:TYPE BMP**
Sets the save type to BMP.

Query **:FILE:TYPE?**
Response **:FILE:TYPE BMP** (when HEADER ON)
BMP (when HEADER OFF)
The save type is set to BMP.

Setting and querying the data transfer format

Syntax

Command **:FORMat:DATA** <ASCii/ REAL>

Query **:FORMat:DATA?**

Response <ASCII/ REAL>

Explanation

Command Sets the data transfer format.
- ASCii : Transfers data in ASCII format.
- REAL : Transfers data in binary format.

Query Returns the data transfer format.

Example

Command **:FORMat:DATA REAL**
Sets the data transfer format to binary.

Query **:FORMat:DATA?**
Response **:FORMAT REAL** (when HEADER ON)(when HEADER ON)
REAL (when HEADER OFF)(when HEADER OFF)
The data transfer format is set to binary.

Setting and querying long format for when data transfer

Syntax

Command `:FORMat:LONG` <ON/ OFF>

Query `:FORMat:LONG?`

Response <ON/ OFF>

Explanation

Command Sets long format for when data transfer.

Query Returns ON or OFF for the setting of long format for when data transfer.

Example

Command `:FORMat:LONG ON`

Returns the data in long format when data transfer

Query `:FORMat:LONG?`

Response `:FORMAT:LONG ON` (when HEADER ON)

`ON` (when HEADER OFF)

The data is set to be returned in long format when data transfer.

Setting and querying the Measurement Frequency

Syntax

Command `:FREQuency` <Frequency>

Query `:FREQuency?`

Response <Frequency>

Parameter <Frequency> = 4.00 to 5.0000 MHz (NR3)

Explanation

Command Sets the measurement frequency.

Query Returns the setting of the measurement frequency.

Example

Command `:FREQuency 1000`

Sets the measurement frequency to 1 kHz.

Query `:FREQuency?`

Response `:FREQUENCY 1.0000E+03` (when HEADER ON)

`1.0000E+03` (when HEADER OFF)

The measurement frequency is set to 1 kHz.

Setting and querying the RS-232C Communication Handshake

Syntax

Command **:HANDshake** <OFF/ HARDware/ X/ BOTH>

Query **:HANDshake?**

Response <OFF/ HARDWARE/ X/ BOTH>

Explanation

Command Sets the RS-232C communication handshake.

OFF :	No handshake
HARDware :	Hardware handshake
X :	Software handshake
BOTH :	Both hardware handshake and software handshake

Query Returns the RS-232C communication handshake.

Example

Command **:HANDshake X**

Sets software handshake.

Query **:HANDshake?**

Response **:HANDSHAKE X** (when HEADER ON)

X (when HEADER OFF)

The setting is set to the software handshake.

Note

An execution error occurs if the interface is set to other than RS-232C.

Setting and querying existence of header in response message

Syntax

Command **:HEADer** <ON/ OFF>

Query **:HEADer?**

Explanation

Command Sets whether or not there is a header in the response message.
This is initialized to OFF when the power is turned on.

Query Returns the header setting of the response message.

Example

Command **:HEADer ON**

Adds a header to the response message.

Query **:HEADer?**

Response **:HEADER ON** (when HEADER ON)

OFF (when HEADER OFF)

A header is set to be added to the response message.

Setting and querying the Hi Z reject function

Syntax

Command `:HIZ` <ON/ OFF>

Query `:HIZ?`

Response <ON/ OFF>

Explanation

Command Enables or disables the Hi Z reject function.
OFF : Does not detect abnormal measurement values.
ON : Detects abnormally high measurement values as errors.

Query Returns whether the Hi Z reject function is enabled or disabled.

Example

Command `:HIZ ON`
Enables the Hi Z reject function.

Query `:HIZ?`
Response `:HIZ ON` (when HEADER ON)
`ON` (when HEADER OFF)
The Hi Z reject function is enabled.

Setting and querying the limit value of the Hi Z reject function

Syntax

Command `:HIZ:LIMit` <Limit value>

Query `:HIZ:LIMit?`

Response <Limit value>

Parameter <Limit value> = 0 to 30000% (NR1)

Explanation

Command Sets the limit value of the Hi Z reject function.

Query Returns the limit value of the Hi Z reject function.

Example

Command `:HIZ:LIMit 500`
Sets the limit value of the Hi Z reject function to 500%.

Query `:HIZ:LIMit?`
Response `:HIZ:LIMIT 500` (when HEADER ON)
`500` (when HEADER OFF)
The limit value of the Hi Z reject function is set to 500%.

Setting and querying the delay time between judgment result output and EOM output

Syntax

Command `:IO:OUTPut:DELay` <I/O delay time>

Query `:IO:OUTPut:DELay?`

Response <I/O delay time>

Parameter <I/O delay time> = 0 to 0.9999 s (NR2)

Explanation

Command Sets the delay time for the period between the output of comparator and BIN judgment results and the output of the EOM from the EXT I/O.

Query Returns the delay time for the period between the output of comparator and BIN judgment results and the output of the EOM from the EXT I/O.

Example

Command `:IO:OUTPUT:DELAY 0.1234`

Sets the delay time for the period between the output of comparator and BIN judgment results and the output of the EOM from the EXT I/O to 0.1234 s.

Query `:IO:OUTPUT:DELAY?`

Response `:IO:OUTPUT:DELAY 0.1234` (when HEADER ON)

`0.1234` (when HEADER OFF)

The delay time for the period between the output of comparator and BIN judgment results and the output of the EOM from the EXT I/O is set to 0.1234 s.

Note

The delay time for the period between the comparator and BIN judgment results and the EOM has an error of approximately 160 ms with regards to the setting value.

Furthermore, the delay time may vary widely if a trigger is input from the EXT I/O or communication is performed via an interface during measurement, so make every effort not to perform control from an external device during measurement.

Setting and querying output of the judgment result signal line

Syntax

Command `:IO:RESult:RESet` <ON/ OFF>

Query `:IO:RESult:RESet?`

Response <ON/ OFF>

Explanation

Command: Sets whether the judgment result signal line of the EXT I/O is reset.

- ON : Resets the judgment results simultaneously with the input of a measurement start signal (trigger signal).
- OFF : Updates the judgment results at the point in time when measurement ends.

Query: Returns whether the judgment result signal line of the EXT I/O is reset.

Example

Command `:IO:RESult:RESet ON`

Sets the judgment results to be reset simultaneously with the input of a measurement start signal (trigger signal).

Query `:IO:RESult:RESet?`

Response `:IO:RESULT:RESET ON` (when HEADER ON)

`ON` (when HEADER OFF)

The judgment results are set to be reset simultaneously with the input of a measurement start signal (trigger signal).

Note

For details on the judgment result signal line, refer to “Chapter 12 External Control” in the instruction manual.

Setting and querying the trigger edge

Syntax

Command **:IO:TRIGger:EDGe** <DOWN/ UP>

Query **:IO:TRIGger:EDGe?**

Response <DOWN/ UP>

Explanation

Command Sets the trigger edge of the EXT I/O.
DOWN : Applies a trigger to the rising edge.
ON : Applies a trigger to the falling edge.

Query Returns the setting of the trigger edge of the EXT I/O.

Example

Command **:IO:TRIGger:EDGe UP**
Sets a trigger to be applied to the rising edge.

Query **:IO:TRIGger:EDGe?**
Response **:IO:TRIGGER:EDGE UP** (when HEADER ON)
UP (when HEADER OFF)
A trigger is set to be applied to the rising edge.

Setting and querying permit/prohibit of trigger input during measurement

Syntax

Command **:IO:TRIGger:ENABle** <ON/ OFF>

Query **:IO:TRIGger:ENABle?**

Response <ON/ OFF>

Explanation

Command Enables or disables trigger input from the EXT I/O during measurement.
ON : Accepts trigger input from the EXT I/O during measurement.
OFF : Does not accept trigger input from the EXT I/O during measurement.

Query Returns whether trigger input from the EXT I/O during measurement is enabled or disabled.

Example

Command **:IO:TRIGger:ENABle ON**
Sets trigger input from the EXT I/O during measurement to be accepted.

Query **:IO:TRIGger:ENABle?**
Response **:IO:TRIGGER:ENABLE ON** (when HEADER ON)
ON (when HEADER OFF)
Trigger input from the EXT I/O during measurement is set to be accepted.

Executing and querying the key lock

Syntax

Command `:KEYLock`

Query `:KEYLock?`

Response <ON/ OFF>

Explanation

Command
Enables the key lock.
When you want to set a passcode, set it before using this command.
The factory default setting for the passcode is "3570".

Query
Returns the state of the key lock.
OFF : The key lock is not enabled.
ON : The key lock is enabled.

Example

Command
`:KEYLock`
Enables the key lock.

Query
`:KEYLock?`
Response
`:KEYLOCK ON` (when HEADER ON)
`ON` (when HEADER OFF)
An execution error occurs if this command is sent while the key lock is enabled.

Setting the key lock passcode

Syntax

Command `:KEYLock:PASScode` <Passcode/ none>

Parameter <Passcode> = 0 to 9 (up to 4 digits)

Explanation

Command
Sets the passcode of the key lock.
If the passcode is omitted, the key lock will be set without a passcode.
The factory default setting for the passcode is "3570."

Example

Command
`:KEYLock:PASScode 0523`
Sets the passcode of the key lock to "0523."

Note

An execution error occurs in the following cases.
- When the key lock is enabled.
- When the passcode contains an invalid character (alphabetical character, space, slash, etc.).
- When the passcode exceeds 4 digits.

Disabling the key lock

Syntax

Command `:KEYLock:UNLock` <Passcode/ none>

Parameter <Passcode> = 0 to 9 (up to 4 digits)

Explanation

Command Disables the key lock.
If a passcode is set, specify the passcode in the query data.

Example

Command `:KEYLock:UNLock 0523`
Specifies "523" for the passcode and disables the key lock.

Note

An execution error occurs in the following cases.

- When the key lock is not enabled.
- When the passcode contains an invalid character (alphabetical character, space, slash, etc.).
- When the passcode exceeds 4 digits.
- When the passcode is incorrect.

If you forget the passcode, perform a full reset to restore the instrument to the factory default settings. (Refer to "Full Reset Procedure" in "Chapter 15 Maintenance and Service" of the instruction manual.)

Setting and querying the measurement signal level

Syntax

Command `:LEVel` <V/ CV/ CC>

Query `:LEVel?`

Response <V/ CV/ CC>

Explanation

Command Sets the measurement signal type to any one of open-circuit voltage, constant voltage, and constant current.

V : Sets open-circuit voltage.
CV : Sets constant voltage.
CC : Sets constant current.

Query Returns the measurement signal type.

Example

Command `:LEVel V`
Sets the measurement signal type to V (open-circuit voltage).

Query `:LEVel?`
Response `:LEVEL V` (when HEADER ON)
`V` (when HEADER OFF)
The measurement signal type is set to V (open-circuit voltage).

Setting and querying the constant current level value

Syntax

Command `:LEVel:CCURRent` <Constant current level>

Query `:LEVel:CCURRent?`

Response <Constant current level>

Parameter <Constant current level> = The settable range varies depending on the conditions. (NR3)
Refer to "Chapter 4 Setting the Measurement Signal Level" in the instruction manual

Explanation

Command Sets the constant current level.

Query Returns the currently set constant current level.

Example

Command `:LEVel:CCURRent 10E-3`
Sets the constant current level to 10 mA.

Query `:LEVel:CCURRent?`
Response `:LEVEL:CCURRENT 10.00E-3` (when HEADER ON)
`10.00E-3` (when HEADER OFF)
The constant current level is set to 10 mA.

Setting and querying the constant voltage level

Syntax

Command `:LEVel:CVOLTage` <Constant voltage level>

Query `:LEVel:CVOLTage?`

Response <Constant voltage level>

Parameter <Constant voltage level> = The settable range varies depending on the conditions.(NR3)
Refer to "Chapter 4 Setting the Measurement Signal Level" in the instruction manual.

Explanation

Command Sets the constant voltage level.

Query Returns the currently set constant voltage level.

Example

Command `:LEVel:CVOLTage 1.000`
Sets the constant voltage level to 1 V.

Query `:LEVel:CVOLTage?`
Response `:LEVEL:CVOLTAGE 1.000` (when HEADER ON)
`1.000` (when HEADER OFF)
The constant voltage level is set to 1 V.

Setting and querying the open-circuit voltage level

Syntax

Command `:LEVel:VOLTage` <Open-circuit voltage level>

Query `:LEVel:VOLTage?`

Response <Open-circuit voltage level>

Parameter <Open-circuit voltage level> = The settable range varies depending on the conditions. (NR3)
Refer to "Chapter 4 Setting the Measurement Signal Level" in the instruction manual.

Explanation

Command Sets the open-circuit voltage level.

Query Returns the currently set open-circuit voltage level.

Example

Command `:LEVel:VOLTage 1.000`
Sets the open-circuit voltage level to 1 V.

Query `:LEVel:VOLTage?`
Response `:LEVEL:VOLTAGE 1.000` (when HEADER ON)
`1.000` (when HEADER OFF)
The open-circuit voltage level is set to 1 V.

Setting and querying the limit function

Syntax

Command `:LIMiter` <ON/ OFF>

Query `:LIMiter?`

Response <ON/ OFF>

Explanation

Command Sets the limit function.

Query Returns the setting of the limit function.

Example

Command `:LIMiter ON`
Sets the limit function to ON.

Query `:LIMiter?`
Response `:LIMITER ON` (when HEADER ON)
`ON` (when HEADER OFF)
The limit function is set to ON.

Setting and querying the current limit value

Syntax

Command `:LIMiter:CURRent` <Current limit value>

Query `:LIMiter:CURRent?`

Response <Current limit value>

Parameter <Current limit value> = 0.01 m to 100.00 mA (NR3)

Explanation

Command Sets the current limit value.

Query Returns the current limit value.

Example

Command `:LIMiter:CURRent 50.00E-03`
Sets the current limit value to 50 mA.

Query `:LIMiter:CURRent?`
Response `:LIMITER:CURRENT 50.00E-03` (when HEADER ON)
`50.00E-03` (when HEADER OFF)
The current limit value is set to 50 mA.

Setting and querying the voltage limit value

Syntax

Command `:LIMiter:VOLTage` <Voltage limit value>

Query `:LIMiter:VOLTage?`

Response <Voltage limit value>

Parameter <Voltage limit value> = 0.005 to 5.000 V (NR3)

Explanation

Command Sets the voltage limit value.

Query Returns the voltage limit value.

Example

Command `:LIMiter:VOLTage 5.000`
Sets the voltage limit value to 5 V.

Query `:LIMiter:VOLTage?`
Response `:LIMITER:VOLTAGE 5.000` (when HEADER ON)
`5.000` (when HEADER OFF)
The voltage limit value is set to 5 V.

Executing panel load

Syntax

Command `:LOAD` <Panel No.>

Parameter <Panel No.> = 1 to 128

Explanation

Command Loads the specified panel number.

Example

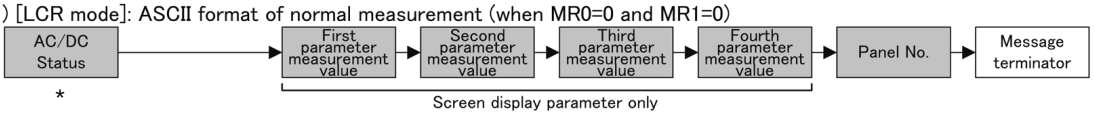
Command `:LOAD 2`
Loads panel number 2.

Querying measurement data

Syntax Query `:MEASure?`

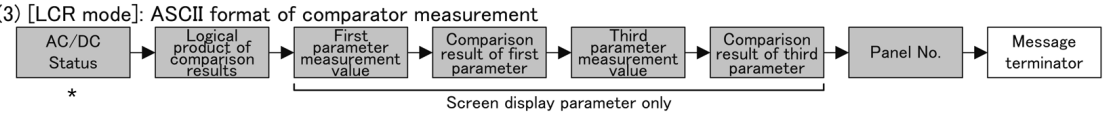
Response The response format varies depending on the mode.

(1) [LCR mode]: ASCII format of normal measurement (when MR0=0 and MR1=0)

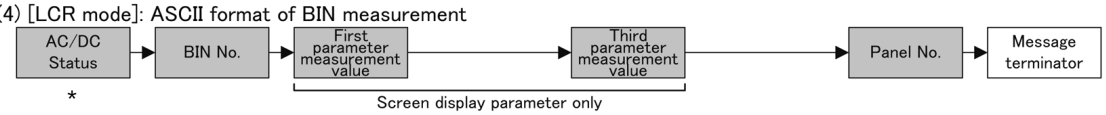


(2) [LCR mode]: ASCII format of normal measurement (when MR0≠0 and MR1≠0)

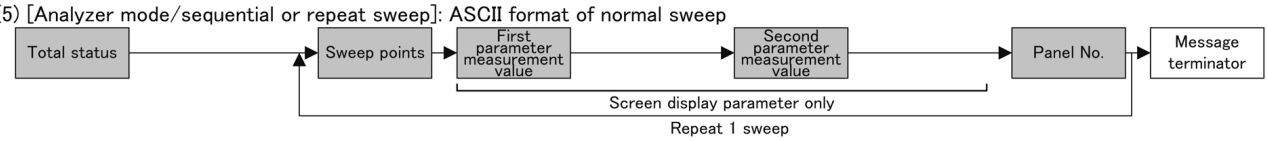
(3) [LCR mode]: ASCII format of comparator measurement



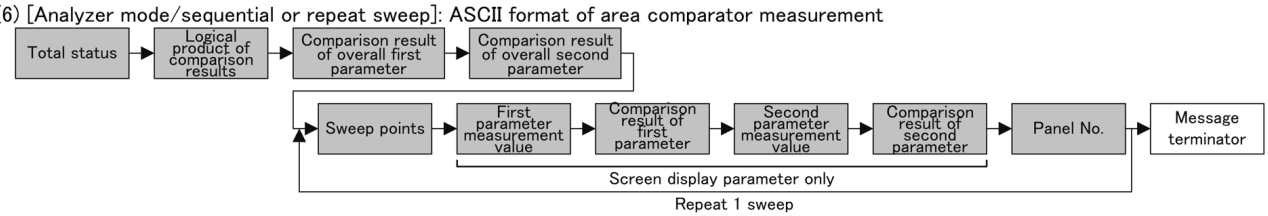
(4) [LCR mode]: ASCII format of BIN measurement



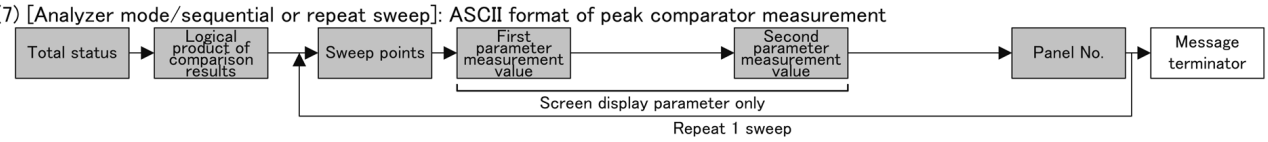
(5) [Analyzer mode/sequential or repeat sweep]: ASCII format of normal sweep



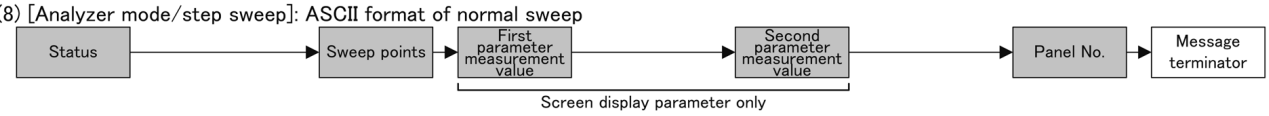
(6) [Analyzer mode/sequential or repeat sweep]: ASCII format of area comparator measurement



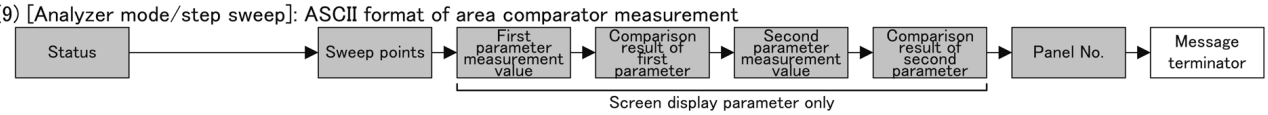
(7) [Analyzer mode/sequential or repeat sweep]: ASCII format of peak comparator measurement



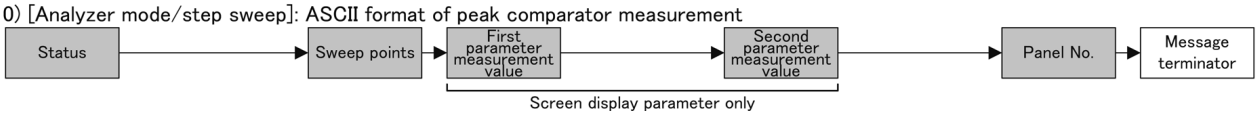
(8) [Analyzer mode/step sweep]: ASCII format of normal sweep



(9) [Analyzer mode/step sweep]: ASCII format of area comparator measurement

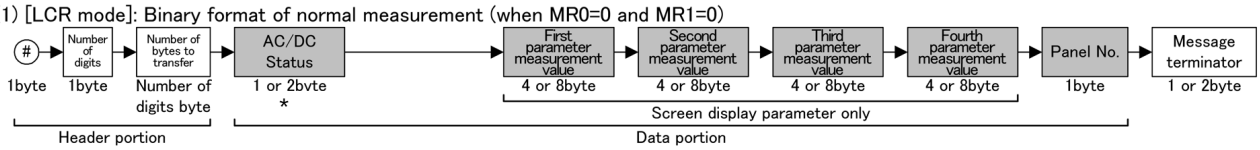


(10) [Analyzer mode/step sweep]: ASCII format of peak comparator measurement

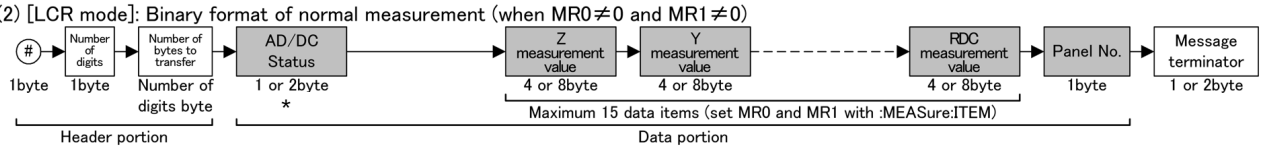


Note * The AC status is output when the response parameters include any of Z, Y, PHASE, Cs, Cp, D, Ls, Lp, Q, Rs, G, Rp, X, and B, and the DC status is output when the parameters include RDC.

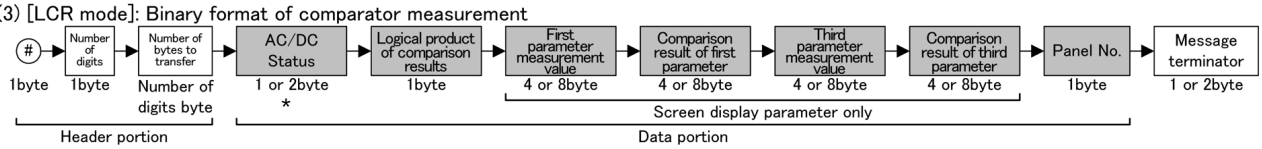
(1) [LCR mode]: Binary format of normal measurement (when MR0=0 and MR1=0)



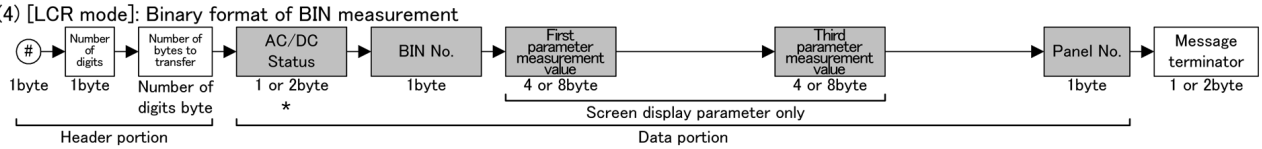
(2) [LCR mode]: Binary format of normal measurement (when MR0≠0 and MR1≠0)



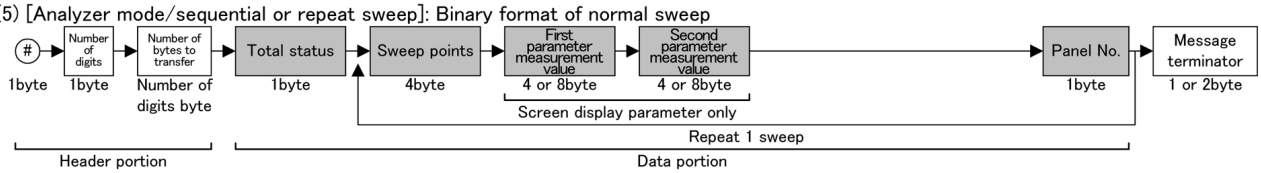
(3) [LCR mode]: Binary format of comparator measurement



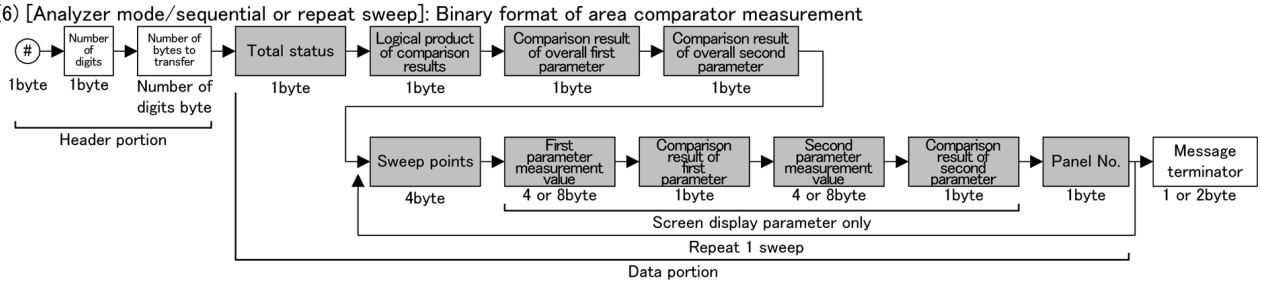
(4) [LCR mode]: Binary format of BIN measurement



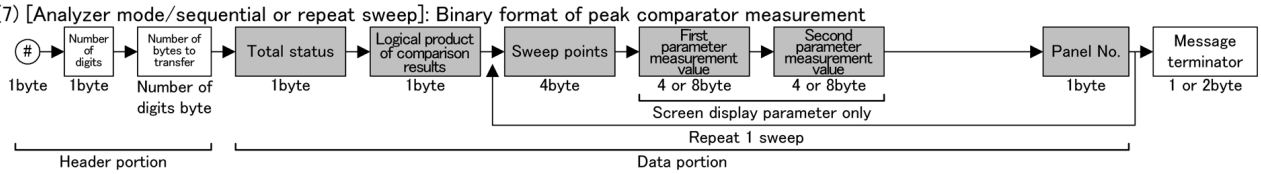
(5) [Analyzer mode/sequential or repeat sweep]: Binary format of normal sweep



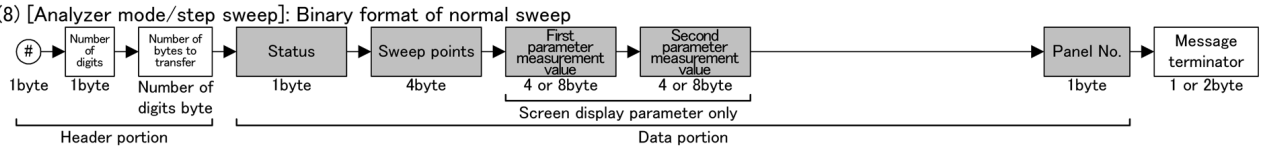
(6) [Analyzer mode/sequential or repeat sweep]: Binary format of area comparator measurement



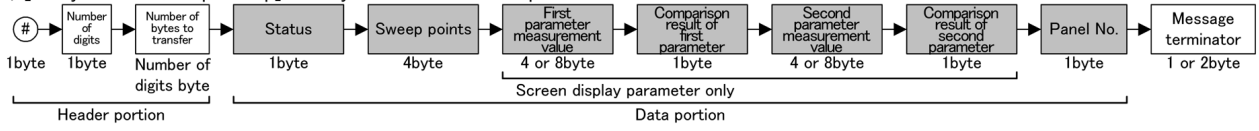
(7) [Analyzer mode/sequential or repeat sweep]: Binary format of peak comparator measurement



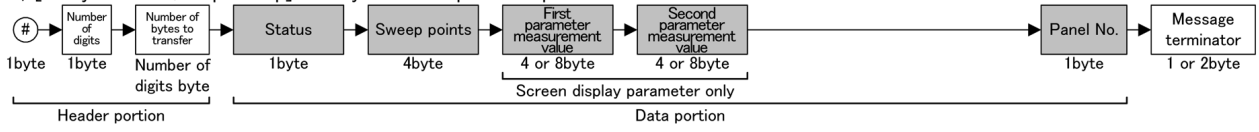
(8) [Analyzer mode/step sweep]: Binary format of normal sweep



(9) [Analyzer mode/step sweep]: Binary format of area comparator measurement



(10) [Analyzer mode/step sweep]: Binary format of peak comparator measurement



Note * The AC status is output when the response parameters include any of Z, Y, PHASE, Cs, Cp, D, Ls, Lp, Q, Rs, G, Rp, X, and B, and the DC status is output when the parameters include RDC.

<Status> = 0/ 1/ 2/ 3/ 4/ 5/ 7/ 8/ 9 (NR1)

Status	ASCII	Binary
Normal	0	0x00
No measurement after power turned on	1	0x01
Outside of display range	2	0x02
Outside of guaranteed accuracy range	3	0x03
Overflow	4	0x04
Underflow	5	0x05
H side contact error	7	0x07
L side contact error	8	0x08
Sampling error	9	0x09

<Panel No.> = 0 to 128 (NR1)

Status	ASCII	Binary
When panel loading has not been executed or a measurement condition was changed after panel loading.	0	0x00
When panel loaded	1 to 128	0x01 to 0x80

<Message terminator> = CR/ LF/ CRLF

ASCII	Binary
CR	0x0D
LF	0x0A
CRLF	0x0D0A

<Logical product of judgment results> = 0/ 1 (NR1)

When LCR mode ..... Logical product of first parameter judgment result and third parameter judgment result

When analyzer mode .. Logical product of judgment result of overall first parameter and judgment result of overall second parameter judgment result

Result	ASCII	Binary
When either of the judgment results is NG (HI/LO) or when comparator judgment is not made	0	0x00
When all of the judgment results are IN or if either one of the parameters is not judged and the judgment result of the judged parameter is IN	1	0x01

<Judgment results of overall first and second parameters> = 0/ 1 (NR1)

Result	ASCII	Binary
When the measurement value of either the first or second parameter is NG (HI/LO) or the comparator judgment is not made	0	0x00
When all of the measurement values of the first and second parameters are IN	1	0x01

<Judgment results of first, second, and third parameters> = -1/ 0/ 1/ 2 (NR1)

Result	ASCII	Binary
When LO judgment	-1	0xFF
When IN judgment	0	0x00
When HI judgment	1	0x01
When comparator judgment is not made	2	0x02

<BIN number> = -2 to 10 (NR1)

BIN No.	ASCII	Binary
When BIN judgment is not made	-2	0xFE
OUT OF BINS	-1	0xFF
BIN1	1	0x01
BIN2	2	0x02
BIN3	3	0x03
BIN4	4	0x04
BIN5	5	0x05
BIN6	6	0x06
BIN7	7	0x07
BIN8	8	0x08
BIN9	9	0x09
BIN10	10	0x0A

Explanation Query

Returns the status, judgment results, measurement values, and panel number. Set the response content with the **:MEASure:VALid** command. When performing normal measurement in LCR mode, you can select the type of parameters to return with the **:MEASure:ITEM** command. For details, refer to the **:MEASure:ITEM** command. Switching between ASCII mode and binary mode can be set with the **:FORMat:DATA** command.

Example Query **:MEASure?**

Response

(1)[LCR mode] Binary format of normal measurement (when MR=0 and MR1=0)
(2)[LCR mode] Binary format of normal measurement (when MR≠0 and MR1≠0)
[ASCII]

```
0,Z  16.15222E+03,PHASE -89.992,0
```
(when HEADER ON)

```
0, 16.15222E+03,-89.992,0
```
(when HEADER OFF)

[Binary]

```
23 32 31 30 00 46 7C 60 E4 C2 B3 FB F6 00 0D 0A
```

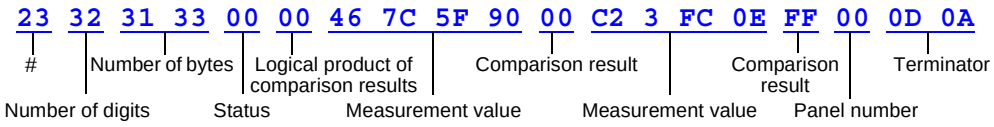
- 23: #
- 32: Number of digits
- 31 30: Number of bytes
- 00: Status
- 46 7C 60 E4: Measurement value
- C2 B3 FB F6: Measurement value
- 00: Panel number
- 0D 0A: Terminator

(3)[LCR mode] Binary format of comparator measurement

[ASCII]

```
0,0,Z  16.15189E+03,0,PHASE -89.992,-1,0 (when HEADER ON)
0,0, 16.15189E+03,0,-89.992,-1,0 (when HEADER OFF)
```

[Binary]

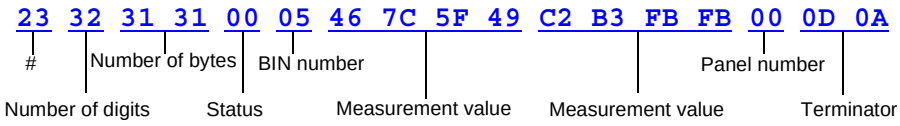


(4)[LCR mode] Binary format of BIN measurement

[ASCII]

```
0,5,Z  16.15182E+03,PHASE -89.992,0 (when HEADER ON)
0,5, 16.15182E+03,-89.992,0 (when HEADER OFF)
```

[Binary]

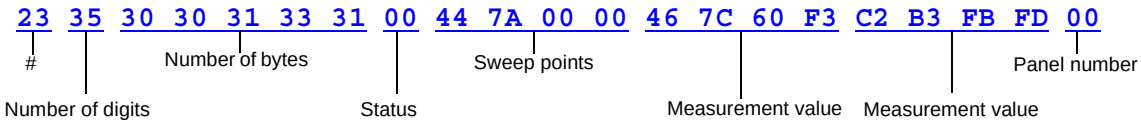


(5)[Analyzer mode/sequential or repeat sweep] Binary format of normal sweep

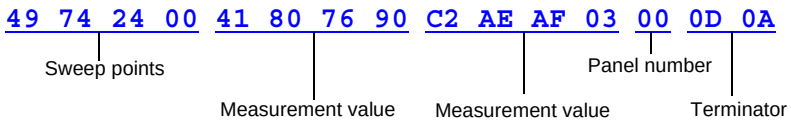
[ASCII]

```
0, 1.0000E+03,Z  16.15224E+03,PHASE -89.992,0,(Repeat 1 sweep),
1.0000E+06,Z  16.05789E+00,PHASE -87.342,0 (when HEADER ON)
 0, 1.0000E+03, 16.15224E+03,-89.992,0,(Repeat 1 sweep),
  1.0000E+06, 16.05789E+00,-87.342,0 (when HEADER OFF)
```

[Binary]



(Repeat 1 sweep)



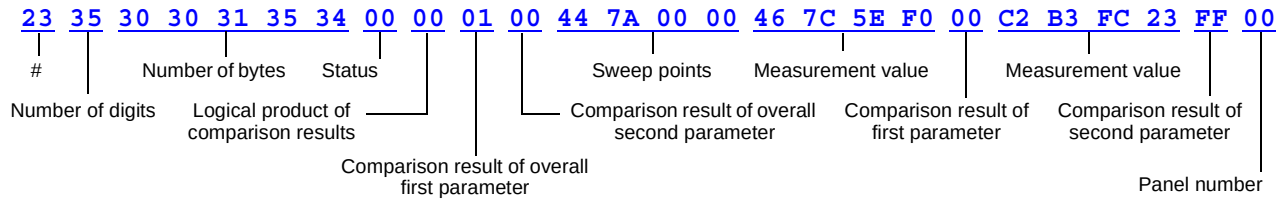
(6)[Analyzer mode/sequential or repeat sweep] Binary format of peak comparator measurement

[ASCII]

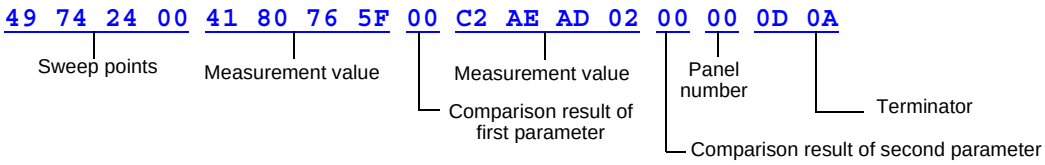
0,0,1,0, 1.0000E+03,Z 16.15174E+03,0,PHASE -89.992,-1,0,(Repeat 1 sweep), 1.0000E+06,Z 16.05780E+00,0,PHASE -87.338,0,0 (when HEADER ON)

0,0,1,0, 1.0000E+03, 16.15174E+03,0, -89.992,-1,0,(Repeat 1 sweep), 1.0000E+06, 16.05780E+00,0, -87.338,0,0 (when HEADER OFF)

[Binary]



(Repeat 1 sweep)



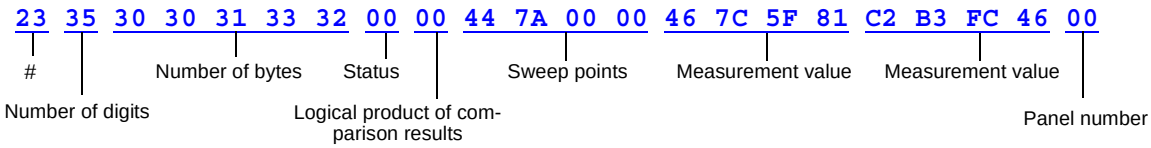
(7)[Analyzer mode/sequential or repeat sweep] Binary format of peak comparator measurement

[ASCII]

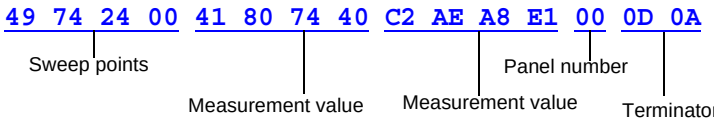
0,0, 1.0000E+03,Z 16.15188E+03,PHASE -89.993,0,(Repeat 1 sweep),1.0000E+06,Z 16.05676E+00,PHASE -87.330,0 (when HEADER ON)

0,0, 1.0000E+03, 16.15188E+03,-89.993,0,(Repeat 1 sweep), 1.0000E+06, 16.05676E+00,-87.330,0 (when HEADER OFF)

[Binary]



(Repeat 1 sweep)



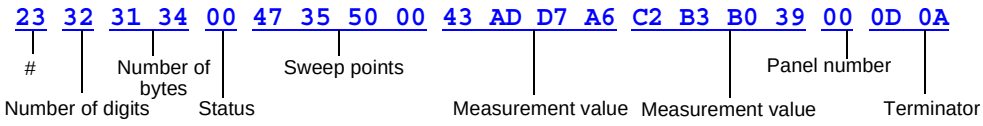
(8)[Analyzer mode/step sweep] Binary format of normal sweep

[ASCII]

0, 46.416E+03,Z 347.6848E+00,PHASE -89.844,0 (when HEADER ON)

0, 46.416E+03, 347.6848E+00,-89.844,0 (when HEADER OFF)

[Binary]



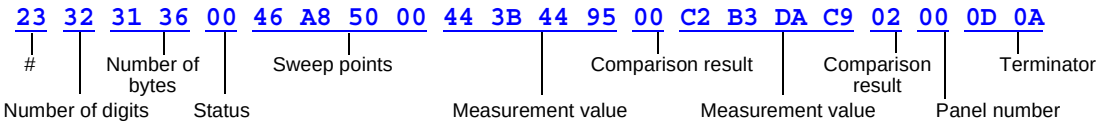
(9)[Analyzer mode/step sweep] Binary format of area comparator measurement

[ASCII]

```
0, 21.544E+03,Z  749.0716E+00,0,PHASE -89.927,2,0
```
(when HEADER ON)

```
0, 21.544E+03, 749.0716E+00,0,-89.927,2,0
```
(when HEADER OFF)

[Binary]



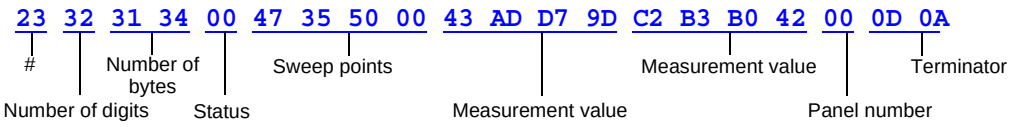
(10)[Analyzer mode/step sweep] Binary format of peak comparator measurement

[ASCII]

```
0, 46.416E+03,Z  347.6845E+00,PHASE -89.844,0
```
(when HEADER ON)

```
0, 46.416E+03, 347.6845E+00,-89.844,0
```
(when HEADER OFF)

[Binary]



Note In the query example, the following are set before sending the :MEASure? command.

```
:MEASure:ITEM 0,0
:MEASure:VALid 31
```

Priority Order	Measurement Error	Panel Indication	Measurement Status	Measurement Values (Upper Portion: When Short Format, Lower Portion: When Long Format) θ	D	Q	Other	Comparator Measurement: Logical Product	Comparator Measurement: Each Parameter Judgment Result	BIN Measurement: BIN No.
High ↑	Sampling error	SAMPLE ERR	9	444.4444	4.444444	44444.44	4444444E+28	0	1	-1
				444.4444444	4.444444444	44444.44444	4444444444E+28			
	L side contact error	L NO CNTCT	8	555.5555	5.555555	55555.55	5555555E+28	0	1	-1
				555.5555555	5.555555555	55555.55555	5555555555E+28			
	H side contact error	H NO CNTCT	7	555.5555	5.555555	55555.55	5555555E+28	0	1	-1
				555.5555555	5.555555555	55555.55555	5555555555E+28			
	Underflow	UNDERFLOW	5	-999.9999	-9.999999	-99999.99	-9999999E+28	0	-1	-1
				-999.9999999	-9.999999999	-99999.99999	-9999999999E+28			
	Overflow	OVERFLOW	4	999.9999	9.999999	99999.99	9999999E+28	0	1	-1
				999.9999999	9.999999999	99999.99999	9999999999E+28			
	Outside of guaranteed accuracy range	Reference Value	3	Up to third decimal place	Up to sixth decimal place	Up to third decimal place	7 effective digits	Normal judgment	Normal judgment	Normal judgment
				Up to seventh decimal place	Up to ninth decimal place	Up to fifth decimal place	Up to ninth decimal place			
	Outside of display range	DISP OUT	2	Up to third decimal place	Up to sixth decimal place	Up to third decimal place	7 effective digits	Normal judgment	Normal judgment	Normal judgment
				Up to seventh decimal place	Up to ninth decimal place	Up to fifth decimal place	Up to ninth decimal place			
	Normal	Measurement values	0	Up to third decimal place	Up to sixth decimal place	Up to third decimal place	7 effective digits	Normal judgment	Normal judgment	Normal judgment
				Up to seventh decimal place	Up to ninth decimal place	Up to fifth decimal place	Up to ninth decimal place			
Low	No measurement after power turned on		1	888.8888	8.888888	88888.88	8888888E+28	0	2	-2
				888.8888888	8.888888888	88888.88888	8888888888E+28			

Priority Order	Measurement Error	Panel Indication	ERR No. 10 Pin	Comparator Measurement		BIN Measurement	
				Logical Product AND No. 14 Pin	Each Parameter Judgment Result Pin Nos. 11, 12, 13, 30, 31, and 32	BIN1 to BIN10, Pin Nos. 11 to 15 and 30 to 34	OUT_OF_BINS Pin No. 19
High	Sampling error	SAMPLE ERR	LOW	HI	HI	HI	LOW
		L NO CNTCT	LOW	HI	LCR:31,11*	HI	LOW
	L side contact error	H NO CNTCT	LOW	HI	LCR:31,11	HI	LOW
		UNDERFLOW	HI	HI	LCR:32,12	HI	LOW
	H side contact error	OVERFLOW	HI	HI	LCR:31,11	HI	LOW
		Reference Value	HI	Normal judgment	Normal judgment	Normal judgment	Normal judgment
	Underflow	DISP OUT	HI	Normal judgment	Normal judgment	Normal judgment	Normal judgment
		Measurement Values	HI	Normal judgment	Normal judgment	Normal judgment	Normal judgment
Low	Overflow		HI	No output	No output	HI	HI

* Notations of output pins

Setting and querying measurement parameters

Syntax

Command **:MEASure:ITEM** <MR0>,<MR1>

Query **:MEASure:ITEM?**

Response <MR0>,<MR1>

Parameter <MR0> = 0 to 255 (NR1)
<MR1> = 0 to 255 (NR1)

Explanation

Command: Specifies the measurement parameter for response of the **:MEASure?** query during normal measurement by the sum of bits.
If this is set to MR0=0 and MR1=0, the measurement values of the measurement parameters displayed on the screen are returned.
This is set to MR0=0 and MR0=0 when the power is turned on.

Query: Returns the measurement parameters for the response of the **:MEASure?** query during normal measurement.

Example

Command **:MEASure:ITEM 53,18**
Sets measurement parameters for response to Z, θ, Cp, D, Rs, and X.

Query **:MEASure:ITEM?**
Response **:MEASURE:ITEM 53,18** (when HEADER ON)
53,18 (when HEADER OFF)
The measurement parameters for response are set to to Z, θ, Cp, D, Rs, and X.

Note

Specify the MR0 and MR1 values by the sum of bits.
For example, when setting the measurement parameters for response to Z, θ, Cp, D, Rs, and X, specify MR0=1+4+16+32=53 and MR1=2+16=18 because Z = 1, θ = 4, Cp = 16, D = 32, Rs = 2, and X = 16.
This command results in an execution error in other than LCR mode.

128 bit 7	64 bit 6	32 bit 5	16 bit 4	8 bit 3	4 bit 2	2 bit 1	1 bit 0
Lp	Ls	D	Cp	Cs	θ	Y	Z

Measurement register 0 (MR0)

128 bit 7	64 bit 6	32 bit 5	16 bit 4	8 bit 3	4 bit 2	2 bit 1	1 bit 0
unused	RDC	B	X	Rp	G	Rs	Q

Measurement register 1 (MR1)

Setting and querying the measurement value automatic output function

Syntax

Command **:MEASure:OUTPut:AUTO** <ON/ OFF>

Query **:MEASure:OUTPut:AUTO?**

Response <ON/ OFF>

Explanation

Command Sets the measurement value automatic output function.

ON : Outputs the measurement values automatically after measurement finishes.

OFF : Does not output the measurement values automatically after measurement finishes.

If this is set to ON, the measurement values are automatically output from the selected interface after measurement finishes.

The output format of measurement values is the same as that for the **:MEASure?** query.

In analyzer mode, the measurement values are input when the measurement of one sweep point finishes.

Query Returns the setting of the measurement value automatic output function.

Example

Command **:MEASure:OUTPut:AUTO ON**

Sets the measurement value automatic output function to ON.

Query **:MEASure:OUTPut:AUTO?**

Response **:MEASURE:OUTPUT:AUTO ON** (when HEADER ON)

ON (when HEADER OFF)

The measurement value automatic output function is set to ON.

Setting and querying the response data of the measurement acquisition query

Syntax

Command **:MEASure:VALid** <Setting value>

Query **:MEASure:VALid?**

Response <Setting value>

Parameter <Setting value> = 0 to 255 (NR1)

Explanation

Command Sets the content for the response of the **:MEASure?** query by the sum of bits.

Query Returns the content for the response of the **:MEASure?** query.

Example

Command **:MEASure:VALid 18**

Sets the measurement values and measurement status to be returned with the **:MEASure?** query.

Query **:MEASure:VALid?**

Response **:MEASURE:VALID 18** (when HEADER ON)

18 (when HEADER OFF)

The measurement values and measurement status are set to be returned with the **:MEASure?** query.

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	unused	unused	Measurement status	Comparator result or BIN result	Sweep point value	Measurement value	Panel load number

Querying measurement values saved to memory with the measurement value memory function

Syntax

Query `:MEMory?` <No data/ ALL>

Response Refer to the response format of the MEASure? command.

Explanation

Query

- Returns all of the measurement values saved to memory with the measurement value memory function.
- The measurement results for up to 32,000 measurements can be saved to memory.
- Executing this command will clear the contents of memory. To clear the contents of memory before acquiring the contents of memory, use the `:MEMory:CLEar` command.
- The formats of the memory contents are the same as the response data formats of `:MEASure?` query. For details on the formats, refer to the explanation for the `:MEASure?` query. (p. 146)
- A message terminator or slash (/) is inserted between memory items.

  In the case of `:MEMory?` Message terminator

  In the case of `:MEMory? ALL` Slash (/)
- The number of data items currently saved to memory can be confirmed with the `:MEMory:COUNt?` query.
- When the trigger setting is set to the internal trigger, the number of data items acquired with the `:MEMory:COUNt?` query may differ from that acquired with this command. To use the `:MEMory:COUNt?` query, set the trigger setting to the external trigger.
- When the trigger setting is set to the internal trigger, the measurement values of measurements performed while the memory values are being returned with this command may not be able to be saved. Set the external trigger when acquiring memory values and do not perform measurement until acquiring of all the memory values is complete.
- When memory becomes full, no more measurement values can be saved. To save new measurement values, use this command to read the contents of the memory or clear the contents of memory with the `:MEMory:CLEar` command.

Example

Query
```
:MEMory?
```
Response
```
Z   1.590062E+03,PHASE   -89.992
Z   1.590069E+03,PHASE   -89.993
Z   1.590057E+03,PHASE   -89.992
Z   1.590066E+03,PHASE   -89.993
Z   1.590056E+03,PHASE   -89.993
```
(when HEADER ON)

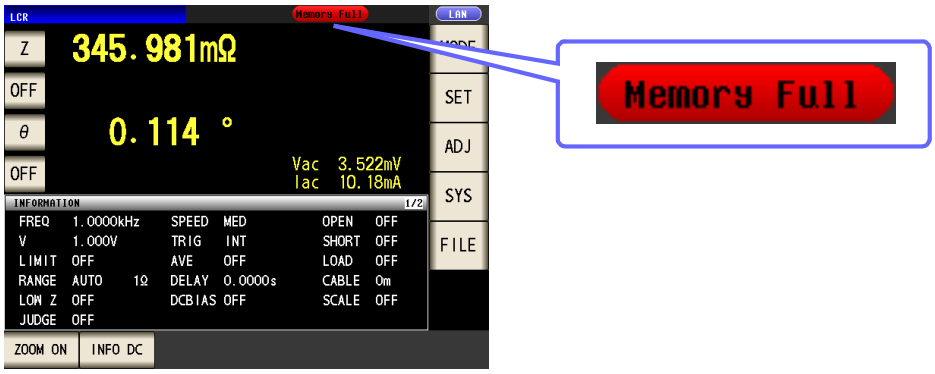
```
1.590062E+03,  -89.992
1.590069E+03,  -89.993
1.590057E+03,  -89.992
1.590066E+03,  -89.993
1.590056E+03,  -89.993
```
(when HEADER OFF)

Note

GP-IB	When `:MEMory?` is executed, only the contents of the first memory item are returned with one receive operation (trigger specification). To acquire all of the measurement values saved to memory, perform the receive operation a number of times equivalent to the number of saved data items, or perform the receive operation once after sending `:MEMory? ALL`.
RS-232C USB LAN	The only difference from `:MEMory?` and `:MEMory? ALL` is whether the delimiter of data is a message terminator or a slash (/). When `:MEMory?` is executed, the receive operation does not need to be performed a number of times equivalent to the number of saved data items to acquire all of the measurement values.

Note

If measurement values equivalent to the memory size set with the **:MEMory:POINt** command are saved to memory, measurement values from subsequent measurements will not be saved. At that time, a message like the following appears on the screen to notify you that memory is full.



Clearing memory of measurement value memory function

Syntax

Command `:MEMory:CLEar`

Explanation

Command Clears all of the measurement values saved to internal memory with the measurement value memory function.
If this command is sent, subsequent measurement results are saved from the beginning of memory.

Example

Command `:MEMory:CLEar`
Clears all of the measurement values saved to memory.

Setting and querying the measurement value memory function

Syntax

Command `:MEMory:CONTrol` <ON/ IN/ OFF>

Query `:MEMory:CONTrol?`

Response <ON/ IN/ OFF>

Explanation

Command Sets the measurement value memory function.
If the setting is changed, all of the saved measurement values are cleared.
OFF : Measurement values are not saved to internal memory.
IN : Saves the measurement values to memory only when a pass judgment is made for all of the parameters judged with the comparator and BIN functions. (The measurement values are not saved if even one of the comparator results is HI or LO, or if the BIN result is OUT-OF-BINS or D-NG.)
In analyzer mode and when the comparator and BIN functions are not used, the operation is the same as when ON.
ON : Saves the measurement values to internal memory.

Query Returns the setting of the measurement value memory function.

Example

Command `:MEMory:CONTrol ON`
Saves the measurement values to memory.

Query `:MEMory:CONTrol?`
Response `:MEMORY:CONTROL ON` (when HEADER ON)
`ON` (when HEADER OFF)
Measurement values are set to be saved to memory.

Querying the number of measurement values saved to memory with the memory function

Syntax

Query `:MEMory:COUNt?`

Response <Number of data items>

Parameter <Number of data items> = 0 to 32000 (NR1)

Explanation

Query Returns the number of data items saved to memory with the measurement value memory function.
A header is not added to the response message.

Example

Query `:MEMory:COUNt?`

Response `1000`

1,000 data items are saved to internal memory.

Setting and querying the measurement value memory size

Syntax

Command `:MEMory:POINts` <Memory size>

Query `:MEMory:POINts?`

Response <Memory size>

Parameter <Memory size> = 1 to 32000 (NR1)

Explanation

Command Sets the number of data items to save to internal memory.
This cannot be set when the memory function is set to ON or IN.
If the setting is changed, all of the saved measurement values are cleared.

Query Returns the number of data items to save to internal memory.

Example

Command `:MEMory:POINts 200`
Sets the memory size to 200.

Query `:MEMory:POINts?`
Response `:MEMORY:POINTS 200` (when HEADER ON)
`200` (when HEADER OFF)
The memory size is set to 200.

Setting and querying measurement mode

Syntax

Command **:MODE** <LCR/ ANALyzer/ CONTinuous>

Query **:MODE?**

Response <LCR/ ANALYZER/ CONTINUOUS>

Explanation

Command Sets measurement mode.

LCR : Sets measurement mode to LCR mode.
ANALYZER : Sets measurement mode to ANALYZER mode.
CONTINUOUS : Sets measurement mode to CONTINUOUS mode.

Query Returns the setting of measurement mode.

Example

Command **:MODE ANALyzer**

Sets measurement mode to analyzer.

Query **:MODE?**

Response **:MODE ANALYZER** (when HEADER ON)

ANALYZER (when HEADER OFF)

Measurement mode is set to analyzer.

Querying the voltage/current monitor value

Syntax

Query **:MONItor?**

Response <AC voltage monitor value>,<AC current monitor value>,<DC voltage monitor value>, <DC current monitor value>

Explanation

Query Returns the voltage monitor value and current monitor value.

Example

Query **:MONItor?**

Response **:MONITOR 3.500061E-03,1.015322E-02,3.361863E-03, 9.767721E-03** (when HEADER ON)

3.500061E-03,1.015322E-02,3.361863E-03,9.767721E-03 (when HEADER OFF)

The AC voltage monitor value is 3.500061 mV, the AC current monitor value is 10.15322 mA, the DC voltage monitor value is 3.361863 mV, and the DC current monitor value is 9.767721 mA.

Note

When only DC measurement is performed, the AC voltage monitor value and AC current monitor value become 0.000000E+00.

When DC measurement is not performed, the DC voltage monitor value and DC current monitor value become 0.000000E+00.

Setting and querying the display parameters (# is a numerical value from 1 to 4)

Syntax

Command `:PARameter#` <Z/ Y/ PHASE(phase angle)/ CS/ CP/ D/ LS/ LP/Q/ RS/ G/ RP/ X/ B/ RDC/ OFF>

Query `:PARameter#?`

Response <Z/ Y/ PHASE(phase angle)/ CS/ CP/ D/ LS/ LP/Q/ RS/ G/ RP/ X/ B/ RDC/ OFF>

Explanation

Command Sets the display parameters

Query Returns the settings of the display parameters.

Example

Command `:PARameter1 Z;:PARameter3 PHASe`

Sets the first parameter to impedance, and the third parameter to phase angle.

Query `:PARameter3?`

Response `:PARAMETER3 PHASE` (when HEADER ON)

`PHASE` (when HEADER OFF)

The third parameter is set to phase angle.

Setting and querying number of display digits (# is a numerical value from 1 to 4)

Syntax

Command `:PARameter#:DIGit` <Number of display digits>

Query `:PARameter#:DIGit?`

Response <Number of display digits>

Parameter <Number of display digits> = 3 to 7 (NR1)

Explanation

Command Sets the number of display digits of the first to fourth parameters.

Query Returns the number of display digits of the first to fourth parameters.

Example

Command `:PARameter1:DIGit 3`

Sets the number of display digits of the first parameter to 3.

Query `:PARameter1:DIGit?`

Response `:PARAMETER1:DIGIT 3` (when HEADER ON)

`3` (when HEADER OFF)

The number of display digits of the first parameter is set to 3.

Initializing the instrument

Syntax

Command `:PRESet`

Explanation

Command: Resets the instrument to the initial setting state.
The initial setting state differs from when a reset is performed with the `*RST` command.
See "Appendix 2 Initial Settings Table" (p. A4)

Example

Command `:PRESet`
Resets the instrument to the initial setting state.

Setting and querying the measurement range

Syntax

Command `:RANGe` <Range No.>

Query `:RANGe?`

Response <Range No.>

Parameter <Range No.> = 1 to 12 (NR1)

Explanation

Command: Sets the measurement range.
If this command is executed, the range setting is automatically changed from auto to hold.

Query: Returns the measurement range.

Example

Command `:RANGe 4`
Sets the measurement range to 4 (300 Ω).

Query `:RANGe?`
Response `:RANGE 4` (when HEADER ON)
`4` (when HEADER OFF)
The measurement range is set to 4 (300 Ω).

Note

Range No.	Range	
12	100 MΩ	This can be set when the frequency is 100 kHz or less.
11	10 MΩ	This can be set when the frequency is 1 MHz or less.
10	1 MΩ	
9	100 kΩ	
8	30 kΩ	
7	10 kΩ	
6	3 kΩ	
5	1 kΩ	
4	300 Ω	
3	10 Ω	
2	1 Ω	
1	100 mΩ	

Automatically setting and querying the measurement range

Syntax

Command `:RANGe:AUTO` <ON/ OFF>

Query `:RANGe:AUTO?`

Response <ON/ OFF>

Explanation

Command Sets the measurement range to be changed automatically.
ON : The range is changed automatically by the auto ranging function.
OFF : The range is fixed and is not changed automatically.

Query Returns the automatic setting of the measurement range.

Example

Command `:RANGe:AUTO ON`
Sets the measurement range to be changed automatically.

Query `:RANGe:AUTO?`
Response `:RANGE:AUTO ON` (when HEADER ON)
`ON` (when HEADER OFF)
The measurement range is set to be changed automatically.

Setting and querying low Z high accuracy mode

Syntax

Command `:RANGe:LOWZ` <ON/ OFF>

Query `:RANGe:LOWZ?`

Response <ON/ OFF>

Explanation

Command Sets low Z high accuracy mode.

Query Returns the setting of low Z high accuracy mode.

Example

Command `:RANGe:LOWZ ON`
Enables low Z high accuracy mode.

Query `:RANGe:LOWZ?`
Response `:RANGE:LOWZ ON` (when HEADER ON)
`ON` (when HEADER OFF)
Low Z high accuracy mode is enabled.

Executing and querying the panel save function

Syntax

Command `:SAVE` <Panel No.>,<Panel name>

Query `:SAVE?` <Panel name>

Response <0/ 1>

Parameter <Panel No.> = 1 to 128 (NR1)
<Panel name> = +, –, 0 to 9, A to Z (up to 10 characters)

Explanation

Command
Specifies the panel number and saves the panel under the specified panel name.
An LCR panel is saved when this is executed in LCR mode and an analyzer panel is saved when this is executed in analyzer mode.
Use the valid characters shown above for the panel name and specify a name that is within 10 characters.
Lowercase a to z are converted to uppercase.

Query
Returns 1 if a panel is saved to the specified panel number, and 0 if a panel is not saved.
A header is not added to the response message.

Example

Command
```
:SAVE 3,IM3570_003
```
Saves a panel under the panel name "IM3570_003" to panel number 3.

Query
```
:SAVE? 3
```
Response
```
1
```
A panel is saved to panel number 3.

Note

An execution error occurs in the following cases.
- When the panel name contains an invalid character (space, slash, etc.).
- When a panel name is not specified.
- When the number of characters of the panel name exceeds 10.

Clearing data saved for a panel

Syntax

Command `:SAVE:CLEar` <ALL/ Panel No.>

Parameter <Panel No.> = 1 to 128

Explanation

Command
Clears the data of the specified panel number.
ALL : Clears all of the panels.
A command error occurs if there is no saved data for the specified panel number.

Example

Command
```
:SAVE:CLEar 5
```
Clears the data of panel number 5.

Note

Data cannot be restored once it is cleared.

Querying a panel name

Syntax

Query `:SAVE:NAME?` <Panel No.>

Parameter <Panel No.> = 1 to 128

Explanation

Query
Returns the panel name of the specified panel number.
A command error occurs if there is no data for the specified panel number.
A header is not added to the response message.

Example

Command `:SAVE:NAME? 1`

Response `IM3570_001`
The panel name of panel number 1 is "IM3570_001."

Changing a panel name

Syntax

Command `:SAVE:REName` <Panel No.>,<Panel name>

Parameter <Panel No.> = 1 to 128
<Panel name> = +, –, 0 to 9, A to Z

Explanation

Command
Changes the panel name of the specified panel number.
Use the valid characters shown above for the panel name and specify a name that is within 10 characters.
Lowercase a to z are converted to uppercase.
A command error occurs if there is no data for the specified panel number.

Example

Command `:SAVE:REName 1,IM3570_001`
Changes the panel name of panel 1 to "IM3570_001."

Setting and querying the save type

Syntax

Command `:SAVE:TYPE` <ALL/ HARDware/ ADJust>

Query `:SAVE:TYPE?`

Response <ALL/ HARDWARE/ ADJUST>

Explanation

Command Sets the save type.
The following data indicated by "●" is saved.

	Measurement Conditions	Compensation Values
ALL	●	●
HARDware	●	-
ADJust	-	●

Query Returns the setting of the save type.

Example

Command `:SAVE:TYPE HARDware`
Sets only the measurement conditions to be saved.

Query `:SAVE:TYPE?`

Response `:SAVE:TYPE HARDWARE` (when HEADER ON)
`HARDWARE` (when HEADER OFF)
Only the measurement conditions are set to be saved.

Setting and querying the measurement speed

Syntax

Command `:SPEEd` <FAST/ MEDium/ SLOW/ SLOW2>

Query `:SPEEd?`

Response <FAST/ MEDIUM/ SLOW/ SLOW2>

Explanation

Command Sets the measurement speed.

Query Returns the setting of the measurement speed.

Example

Command `:SPEEd MEDium`
Sets the measurement speed to medium.

Query `:SPEEd?`
Response `:SPEED MEDIUM` (when HEADER ON)
`MEDIUM` (when HEADER OFF)
The measurement speed is set to medium.

Setting and querying the trigger synchronous output function

Syntax

Command `:SSOurce` <ON/ OFF>

Query `:SSOurce?`

Response <ON/ OFF>

Explanation

Command: Enables or disables the trigger synchronous output function.
- ON : Enables the trigger synchronous output function.
- OFF : Disables the trigger synchronous output function.

Query: Returns the setting of the trigger synchronous output function.

Example

Command
```
:SSOurce ON
```
Enables the trigger synchronous output function.

Query
```
:SSOurce?
```
Response
```
:SSOURCE ON
```
(when HEADER ON)
```
ON
```
(when HEADER OFF)

The trigger synchronous output function is enabled.

Setting and querying the wait time of trigger synchronous output

Syntax

Command `:SSOurce:WAIT` <Wait time>

Query `:SSOurce:WAIT?`

Response <Wait time>

Parameter <Wait time> = 0.0010 to 9.9999 s (NR2)

Explanation

Command: Sets the wait time for the period from after the measurement signal is output by applying a trigger until measurement starts.

Query: Returns the wait time of the trigger synchronous output function.

Example

Command
```
:SSOurce:WAIT 0.5000
```
Sets the wait time for the period from after the trigger is applied until measurement starts to 500 ms.

Query
```
:SSOurce:WAIT?
```
Response
```
:SSOURCE:WAIT 0.5000
```
(when HEADER ON)
```
0.5000
```
(when HEADER OFF)

The wait time for the period from after the trigger is applied until measurement starts is set to 500 ms.

Note

A short wait time may result in an increase in measurement errors.

Setting and querying the date

Syntax

Command `:SYSTem:DATE` <Year>,<Month>,<Day>

Query `:SYSTem:DATE?`

Response <Year>,<Month>,<Day>

Parameter <Year> = 0 to 99 (NR1)
<Month> = 1 to 12 (NR1)
<Day> = 1 to 31 (NR1)

Explanation

Command Sets the date.

Query Returns the set date.

Example

Command `:SYSTem:DATE 10,5,23`
Sets the date to May 23, 2010.

Query `:SYSTem:DATE?`
Response `:SYSTEM:DATE 10,05,23` (when HEADER ON)
`10,05,23` (when HEADER OFF)
The date is set to May 23, 2010.

Note

The data can be set in the range of January 1, 2000, to December 31, 2099.
Therefore, the first two digits of the year are fixed to "20," and just the last two digits can be set for "Year."
An execution error occurs if a date that does not exist is specified.

Querying the MAC address

Syntax

Query `:SYSTem:MACAddress?`

Response <MAC address>

Explanation

Query Returns the MAC address.

Example

Query `:SYSTem:MACAddress?`
Response `:SYSTEM:MACADDRESS 12-34-56-78-90-AB` (when HEADER ON)
`12-34-56-78-90-AB` (when HEADER OFF)
The MAC address is set to 12-34-56-78-90-AB.

Note

The MAC address cannot be changed.

Querying the serial number

Syntax

Query `:SYSTem:SERIAlno?`

Response <Serial No.>

Explanation

Query Returns the serial number.

Example

Query `:SYSTem:SERIAlno?`

Response `:SYSTEM:SERIALNO 123456789` (when HEADER ON)
`123456789` (when HEADER OFF)
The serial number is set to 123456789.

Note

The serial number cannot be changed.

Setting and querying the time

Syntax

Command `:SYSTem:TIME` <Hour>,<Minute>,<Second>

Query `:SYSTem:TIME?`

Response <Hour>,<Minute>,<Second>

Parameter <Hour> = 0 to 23 (NR1)
<Minute> = 0 to 59 (NR1)
<Second> = 0 to 59 (NR1)

Explanation

Command Sets the time.

Query Returns the set time.

Example

Command `:SYSTem:TIME 12,34,56`
Sets the time to 12:34:56.

Query `:SYSTem:TIME?`

Response `:SYSTEM:TIME 12,34,56` (when HEADER ON)
`12,34,56` (when HEADER OFF)
The time is set to 12:34:56.

Note

An execution error occurs if a time that does not exist is specified.

Querying the USB ID

Syntax

Query `:SYSTem:USBId?`

Response <USB ID>

Explanation

Query Returns the USB ID.

Example

Query `:SYSTem:USBId?`

Response `:SYSTEM:USBID 108F:3570` (when HEADER ON)
`108F:3570` (when HEADER OFF)
The USB ID is 108f:3570.

Setting and querying the terminator of the response message

Syntax

Command `:TRANsmit:TERMinator` <Terminator number>

Query `:TRANsmit:TERMinator?`

Response <Terminator number>

Parameter <Terminator number> = 0 to 255 (when command) / 0 to 1 (when query) (NR1)

Explanation

Command Sets the terminator of the response message.

Interface	<Terminator number>	Terminator
GP-IB	0	LF+EOI
	1 to 255	CR+LF+EOI
RS-232C USB LAN	0	CR+LF
	1 to 255	CR

Query Returns the setting of the terminator of the response message.

Interface	<Terminator number>	Terminator
GP-IB	0	LF+EOI
	1	CR+LF+EOI
RS-232C USB LAN	0	CR+LF
	1	CR

Example

Command `:TRANsmit:TERMinator 0`

Interface	Command
GP-IB	Sets the terminator to LF+EOI.
RS-232C USB LAN	Sets the terminator to CR+LF.

Query `:TRANsmit:TERMinator?`

Response `:TRANSMIT:TERMINATOR 0` (when HEADER ON)

`0` (when HEADER OFF)

Interface	Command
GP-IB	The terminator is set to LF+EOI.
RS-232C USB LAN	The terminator is set to CR+LF.

Setting and querying the trigger mode

Syntax

Command **:TRIGger** <INTernal/ EXTernal>

Query **:TRIGger?**

Response <INTERNAL/ EXTERNAL>

Explanation

Command Sets the trigger mode.
INTernal : Sets the internal trigger.
EXTernal : Sets the external trigger.

Query Returns the setting of the trigger mode.

Example

Command **:TRIGger INTernal**
Sets the trigger mode to the internal trigger.

Query **:TRIGger?**
Response **:TRIGGER INTERNAL** (when HEADER ON)
INTERNAL (when HEADER OFF)
The trigger mode is set to the internal trigger.

Setting and querying the trigger delay time

Syntax

Command **:TRIGger:DELAy** <Trigger delay time>

Query **:TRIGger:DELAy?**

Response <Trigger delay time>

Parameter <Trigger delay time> = 0 to 9.9999 s (NR2)

Explanation

Command Sets the trigger delay time.

Query Returns the setting of the trigger delay time.

Example

Command **:TRIGger:DELay 0.1**
Sets measurement to start when 100 ms elapses after trigger input.

Query **:TRIGger:DELay?**
Response **:TRIGGER:DELAY 0.1000** (when HEADER ON)
0.1000 (when HEADER OFF)
Measurement is set to start when 100 ms elapses after trigger input.

Note

To set the trigger delay function to OFF, set <Trigger delay time> to 0 s.

Commands for Analyzer Mode

Setting and querying comparator judgment mode

Syntax

Command **:COMParator:ANALyzer** <OFF/ AREA/ PEAK>

Query **:COMParator:ANALyzer?**

Response <OFF/ AREA/ PEAK>

Explanation

Command Sets the comparator judgment mode in analyzer mode.
- OFF: Sets the comparator function to OFF.
- AREA: Sets the comparator judgment mode to area judgment.
- PEAK: Sets the comparator judgment mode to peak judgment.

Query Returns the setting of the comparator judgment mode in analyzer mode.

Example

Command **:COMParator:ANALyzer AREA**

Sets the comparator judgment mode in analyzer mode to area judgment.

Query **:COMParator:ANALyzer?**

Response **:COMPARATOR:ANALYZER AREA** (when HEADER ON)

AREA (when HEADER OFF)

The comparator judgment mode in analyzer mode is set to area judgment.

Setting and querying drawing of judgment area

Syntax

Command **:COMParator:AREA** <OFF/ 1/ 2>

Query **:COMParator:AREA?**

Response <OFF/ 1/ 2>

Explanation

Command Sets the parameter for which to draw the comparator range.
- OFF : The comparator range is not drawn.
- 1 : Draws the comparator range for the first parameter.
- 2 : Draws the comparator range for the second parameter.

Query Returns the setting of the parameter for which to draw the comparator range.

Example

Command **:COMParator:AREA 1**

Sets the parameter for which to draw the comparator range to the main parameter.

Query **:COMParator:AREA?**

Response **:COMPARATOR:AREA 1** (when HEADER ON)

1 (when HEADER OFF)

The parameter for which to draw the comparator range is set to the first parameter.

Note

The parameter that can be set with this command varies depending on the setting for the parameter subject to comparator judgment.

The comparator range can only be drawn for a parameter that is set to be subject to judgment.

The comparator range cannot be drawn for both the first parameter and second parameter.

Setting and querying area judgment (reference value manual setting)

Syntax

Command `:COMParator:AREA:FIX` <Segment No.>,<1/ 2>,<PERcent/ VALue>,<Reference value>,<Lower limit values>,<Upper limit values>

Query `:COMParator:AREA:FIX?` <Segment No.>,<1/ 2>

Response <PERCENT/ VALUE>,<Reference value>,<Lower limit values>,<Upper limit values>

Parameter <Segment No.> = 1 to 20
<Reference value> = -9.999999+E09 to +9.999999+E09 (NR3)
<Upper limit values> = -999.9999% to +999.9999% (NR2)/
-9.999999+E09 to +9.999999+E09 (NR3)
<Upper limit values> = -999.9999% to +999.9999% (NR2)/
-9.999999+E09 to +9.999999+E09 (NR3)

Explanation

Command Specifies the reference value and simultaneously sets the area judgment settings.

Query Returns the area judgment settings in the order of the mode, reference value, lower limit value, and upper limit value.

Example

Command
```
:COMParator:AREA:FIX 2,1,PERcent,1.2345E-06,-20,20
```
Sets the comparator range of the first parameter of segment 2 as a percentage to the reference value of 1.2345E-06, lower limit value of -20%, and upper limit value of 20%.

Query
```
:COMParator:AREA:FIX? 2,1
```
Response
```
:COMPARATOR:AREA:FIX PERCENT,1.234500E-06,
-20.0000,20.0000
```
(when HEADER ON)
```
PERCENT,1.234500E-06,-20.0000,20.0000
```
(when HEADER OFF)

The comparator range of the first parameter of segment 2 is set as a percentage to the reference value of 1.2345E-06, lower limit value of -20%, and upper limit value of 20%.

Note

When the segment sweep setting is set to OFF, the segment number setting is disabled and fixed to segment 1.

Setting and querying the upper and lower limit values for area judgment

Syntax

Command `:COMParator:AREA:LIMit` <Sweep point No.>,<1/ 2>,
<Lower limit values>,<Upper limit values>

Query `:COMParator:AREA:LIMit?` <Sweep point No.>,<1/ 2>

Response <Lower limit values>,<Upper limit values>

Parameter <Sweep point No.> = 1 to 801 (NR1)
<Lower limit values> = OFF/-9.999999+E09 to +9.999999+E09 (NR3)
<Upper limit values> = OFF/-9.999999+E09 to +9.999999+E09 (NR3)

Explanation

Command Sets the upper and lower limit values for area judgment.

Query Returns the upper and lower limit values for area judgment.

Example

Command `:COMParator:AREA:LIMit 10,1,10E3,20E3`

Sets the lower and upper limit values for the first parameter of Sweep point No. 10 to 10 k and 20 k, respectively.

Query `:COMParator:AREA:LIMit? 10,1`
Response `:COMPARATOR:AREA:LIMIT 10.00000E+03,20.00000E+03`
(when HEADER ON)
`10.00000E+03,20.00000E+03` (when HEADER OFF)

The lower and upper limit values for the first parameter of sweep point number 10 are set to 10 k and 20 k, respectively.

Note

An execution error occurs in the following cases.

- When a value that is larger than the number of sweep points is set for the sweep point number.
- When the mode is not area judgment mode.
- When the parameter to be set is not set as a judgment parameter.

Setting and querying area judgment (reference value automatic setting)

Syntax

Command `:COMParator:AREA:MEAS` <Segment No.>,<1/ 2>,<PERcent/ VALue>,<Lower limit values>,<Upper limit values>

Query `:COMParator:AREA:MEAS?` <Segment No.>,<1/ 2>

Response <PERCENT/ VALUE>,<Lower limit values>,<Upper limit values>

Parameter <Segment No.> = 1 to 20
<Lower limit values> = -999.9999% to +999.9999% (NR2)/
-9.999999+E09 to +9.999999+E09 (NR3)
<Upper limit values> = -999.9999% to +999.9999% (NR2)/
-9.999999+E09 to +9.999999+E09 (NR3)

Explanation

Command Acquires the reference value from the current measurement value and simultaneously sets the area judgment settings.

Query Returns the area judgment settings in the order of the mode, lower limit value, and upper limit value.

Example

Command `:COMParator:AREA:MEAS 2,1,PERcent,-20,20`

Sets the comparator range of the first parameter of segment 2 as a percentage to the lower limit value of -20% and the upper limit value of 20% based on the current measurement value.

Query `:COMParator:AREA:MEAS? 2,1`
Response `:COMPARATOR:AREA:MEAS PERCENT,-20.0000,20.0000` (when HEADER ON)
`PERCENT,-20.0000,20.0000` (when HEADER OFF)

The comparator range of the first parameter of segment 2 is set as a percentage to the lower limit value of -20% and the upper limit value of 20% based on the current measurement value.

Note

When the segment sweep setting is set to OFF, the segment number setting is disabled and fixed to segment 1.

Setting and querying judgment parameter

Syntax

Command **:COMParator:PARAmeter** <1/ 2/ ALL>

Query **:COMParator:PARAmeter?**

Response <1/ 2/ ALL>

Explanation

Command Sets the parameter subject to comparator judgment.

- 1 : Sets the first parameter to be subject to comparator judgment.
- 2 : Sets the second parameter to be subject to comparator judgment.
- ALL : Sets both the first parameter and second parameter to be subject to comparator judgment.

Query Returns the setting of the parameter subject to comparator judgment.

Example

Command **:COMParator:PARAmeter 1**

Sets the parameter subject to comparator judgment to the first parameter.

Query **:COMParator:PARAmeter?**

Response **:COMPARATOR:PARAMETER 1** (when HEADER ON)

1 (when HEADER OFF)

The parameter subject to comparator judgment is set to the first parameter.

Setting and querying peak judgment

Syntax

Command `:COMParator:PEAK` <Segment No.>,<1/ 2>,<MAX/ MIN>,<Left limit value>,<Right limit value>,<Lower limit values>,<Upper limit values>

Query `:COMParator:PEAK?` <Segment No.>,<1/ 2>,<MAX/ MIN>

Response <Left limit value>,<Right limit value>,<Lower limit values>,<Upper limit values>

Parameter
<Segment No.> = 1 to 20
<Left limit value> = OFF/4.00 Hz to 5.0000 MHz (NR3)/5 mV to 5 V (NR2)/0.01 mA to 50 mA (NR3)
<Right limit value> = OFF/4.00 Hz to 5.0000 MHz (NR3)/5 mV to 5 V (NR2)/0.01 mA to 50 mA (NR3)
<Lower limit values> = OFF/-9.999999+E09 to +9.999999+E09 (NR3)
<Upper limit values> = OFF/-9.999999+E09 to +9.999999+E09 (NR3)

Explanation

Command Simultaneously sets the peak judgment settings.

The valid setting range for the left and right limit values differs depending on the type of main sweep measurement signal mode.

When frequency sweep:	4.00 to 5.0000E+06
When open-circuit voltage sweep:	5.000E-03 to 5.000
When constant voltage sweep:	5.000E-03 to 5.000
When constant current sweep:	0.01E-03 to 50.00E-03

Query Returns the area judgment settings in the order of the left limit value, right limit value, lower limit value, and upper limit value.

Example

Command
```
:COMParator:PEAK 1,1,MAX,40,1.0000E3,1.1234E+06,
1.2345E+06
```
Sets the left limit value, right limit value, lower limit value, and upper limit value of the local maximum values of the first parameter of segment 1 to 40, 1.0000E3, 1.1234E+06, and 1.2345E+06, respectively.

Query
```
:COMParator:PEAK? 1,1,MAX
```
Response
```
:COMPARATOR:PEAK 40.00000E+00,1.000000E+03,
1.123400E+06,1.234500E+06
```
(when HEADER ON)
```
40.00000E+00,1.000000E+03,1.123400E+06,1.234500E+06
```
(when HEADER OFF)

The left limit value, right limit value, lower limit value, and upper limit value of the local maximum values of the first parameter of segment 1 are set to 40, 1.0000E3, 1.1234E+06, and 1.2345E+06, respectively.

Note

When the segment sweep setting is set to OFF, the segment number setting is disabled and fixed to segment 1.

Setting and querying the filter value

Syntax

Command `:COMParator:PEAK:FILTer` <ON/ OFF>

Query `:COMParator:PEAK:FILTer?`

Response <ON/ OFF>

Explanation

Command: Sets the filter for when peak judgment.

Query: Returns the filter for when peak judgment.

Example

Command `:COMParator:PEAK:FILTer ON`

Sets the filter value for when peak judgment to ON.

Query `:COMParator:PEAK:FILTer?`

Response `:COMPARATOR:PEAK:FILTER ON` (when HEADER ON)

`ON` (when HEADER OFF)

The filter value for when peak judgment is set to ON.

Note

The filter setting is common to the filter setting of the search by cursor function.

Setting and querying the local maximum number and local minimum number

Syntax

Command `:COMParator:PEAK:NO` <Local minimum No.>, <Local maximum No.>

Query `:COMParator:PEAK:NO?`

Response <Local minimum No.>,<Local maximum No.>

Parameter <Local minimum No.> = 1 to 5(NR1)
<Local maximum No.> = 1 to 5(NR1)

Explanation

Command: Sets the local minimum number and local maximum number to be the targets when performing peak judgment.

Query: Returns the local minimum number and local maximum number to be the targets when performing peak judgment.

Example

Command `:COMParator:PEAK:NO 2,3`

Sets peak judgment to be performed with the second local minimum value and third local maximum value as the targets.

Query `:COMParator:PEAK:NO?`

Response `:COMPARATOR:PEAK:NO 2,3` (when HEADER ON)

`2,3` (when HEADER OFF)

Peak judgment is set to be performed with the second local minimum value and third local maximum value as the targets.

Setting and querying the display cursor setting

Syntax

Command **:CURSor** <OFF/ A/ AB>

Query **:CURSor?**

Response <OFF/ A/ AB>

Explanation

Command Sets the display cursor.
- OFF: Displays no cursor.
- A: Displays only cursor A.
- AB: Displays cursors A and B.

Query Returns the display cursor setting.

Example

Command **:CURSor AB**

Sets cursors A and B to be displayed.

Query **:CURSor?**

Response **:CURSOR AB** (when HEADER ON)

AB (when HEADER OFF)

Cursors A and B are set to be displayed.

Note

Cursors A and B are set to be displayed.

Setting and querying the cursor to move or perform searches.

Syntax

Command **:CURSor:MOVE** <A/ B>

Query **:CURSor:MOVE?**

Response <A/ B>

Explanation

Command Sets the cursor to move or perform searches.
- A: Cursor A can move or search.
- B: Cursor B can move or search.

Query Returns the setting of the cursor to move or perform searches.

Example

Command **:CURSor:MOVE B**

Sets the cursor to move or perform searches to cursor B.

Query **:CURSor:MOVE?**

Response **:CURSOR:MOVE B** (when HEADER ON)

B (when HEADER OFF)

The cursor to move or perform searches is set to cursor B.

Note

This command results in an execution error if display cursor is set to OFF.

Furthermore, if the display cursor is set to A, the cursor to move or perform searches is fixed to cursor A and cannot be set to cursor B.

Setting and querying the search method

Syntax

Command **:CURSor:SEARch** <MAX/ MIN/ TARGet/ LMAX/ LMIN>

Query **:CURSor:SEARch?**

Response <MAX/ MIN/ TARGET/ LMAX/ LMIN>

Explanation

Command Sets the search mode.

MAX : Sets a search for the maximum value to be performed.
MIN : Sets a search for the minimum value to be performed.
TARGet :Sets a search for any value to be performed.
LMAX : Sets a search for the local maximum value to be performed.
LMIN : Sets a search for the local minimum value to be performed.

Query Returns the search mode.

Example

Command **:CURSor:SEARch LMAX**
Sets the search mode to local maximum value search.

Query **:CURSor:SEARch?**
Response **:CURSOR:SEARCH LMAX** (when HEADER ON)
LMAX (when HEADER OFF)
The search mode is set to local maximum value search.

Note

- When the search mode is set to TARGET, the target value can be set with the **:CURSor:SEARch:TARGet** command.
- When the search mode is set to LMAX or LMIN, the filter value can be set with the **:COMParator:PEAK:FILTer** command.

Setting and querying the target value

Syntax

Command **:CURSor:SEARch:TARGet** <TARGET value>

Query **:CURSor:SEARch:TARGet?**

Response <TARGET value>

Parameter <TARGET value> = -9.999999+E09 to +9.999999+E09 (NR3)

Explanation

Command Sets the target value for when target search.

Query Returns the target value for when target search.

Example

Command **:CURSor:SEARch:TARGet 100E+03**
Sets the target value for when target search to 100 k.

Query **:CURSor:SEARch:TARGet?**
Response **:CURSOR:SEARCH:TARGET 100.0000E+03** (when HEADER ON)
100.0000E+03 (when HEADER OFF)
The target value for when target search is set to 100 k.

Note

When you want to perform a target search, set the search mode to TARGET with the **:CURSor:SEARch** command.

Executing auto scaling

Syntax

Command `:GRAPh:AUTOscale`

Explanation

Command Executes auto scaling.

Example

Command `:GRAPh:AUTOscale`

Executes auto scaling.

This can be executed when the screen is set to graph display and the scaling mode is set to AUTO for either the first parameter or second parameter.

An execution error occurs in other cases.

Setting and querying the graph display color

Syntax

Command `:GRAPh:COLor` <Segment No.>,<1/ 2>,<OFF/ Color No.>

Query `:GRAPh:COLor?` <Segment No.>,<1/ 2>

Response <OFF/ Color No.>

Parameter <Segment No.> = 1 to 20
<Color No.> = 1 to 20 (NR1)

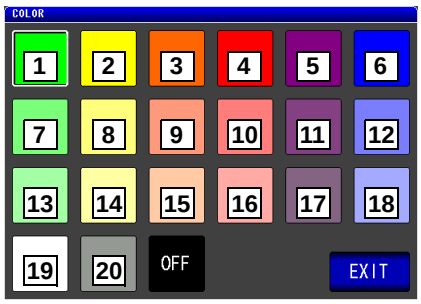
Explanation

Command Sets the graph display color.

Sets the graph display color of the first parameter and second parameter of each segment.

If the segment function is set to OFF, the segment number is fixed to 1.

For the display colors that correspond to color numbers 1 to 20, refer to the figure below.



Query Returns the graph display color.

Example

Command `:GRAPh:COLor 1,2,15`

Sets the graph display color for the second parameter of segment 1 to 15.

Query `:GRAPh:COLor? 1,2`

Response `:GRAPH:COLOR 15` (when HEADER ON)

`15` (when HEADER OFF)

The graph display color for the second parameter of segment 1 is set to 15.

Note

Only a number that has currently already been created can be specified for the segment number.

Executing reset of the graph display colors of all segments

Syntax Command `:GRAPh:COLor:RESet` <1/ 2>

Explanation Command Resets the graph display colors of all segments.
1: Resets the graph display color of the first parameter.
2: Resets the graph display color of the second parameter.

Example Command `:GRAPh:COLor:RESet 1`
Resets the graph display color of the first parameter of all segments.

Note An execution error occurs if the segment function is set to OFF.

Reflecting the display color of segment 1 to all segments

Syntax Command `:GRAPh:COLor:SEG1` <1/ 2>

Explanation Command Reflects the graph display color of segment 1 to all segments.
1: Reflects the graph display color of the first parameter of segment 1 to all segments.
2: Reflects the graph display color of the second parameter of segment 1 to all segments.

Example Command `:GRAPh:COLor:SEG1 1`
Reflects the graph display color of the first parameter of segment 1 to all segments.

Note An execution error occurs if the segment function is set to OFF.

Setting and querying the overwrite function

Syntax Command `:GRAPh:OVERwrite` <ON/ OFF>
Query `:GRAPh:OVERwrite?`
Parameter <ON/ OFF>

Explanation Command Sets the overwrite function.
Query Returns the setting of the overwrite function.

Example Command `:GRAPh:OVERwrite ON`
Enables the overwrite function so that a graph is overwritten.
Query `:GRAPh:OVERwrite?`
Response `:GRAPH:OVERWRITE ON` (when HEADER ON)
`ON` (when HEADER OFF)
The overwrite function is enabled, and a graph is set to be overwritten.

Setting and querying the horizontal axis display scale

Syntax

Command `:GRAPh:SCALe` <LINear/ LOG>

Query `:GRAPh:SCALe?`

Parameter <LINEAR/ LOG>

Explanation

Command Sets the horizontal axis display scale.

Query Returns the setting of the horizontal axis display scale.

Example

Command `:GRAPh:SCALe LINear`
Sets the horizontal display scale to linear.

Query `:GRAPh:SCALe?`
Response `:GRAPH:SCALE LINEAR` (when HEADER ON)
`LINEAR` (when HEADER OFF)
The horizontal display scale is set to linear.

Setting and querying the horizontal axis span format

Syntax

Command `:GRAPh:SPAN` <SINGle/ SEGMent>

Query `:GRAPh:SPAN?`

Response <SINGLE/ SEGMENT>

Explanation

Command Sets the horizontal axis span format.
SINGle :Sets the whole measurement range to be drawn as a single span.
SEGMent :Sets drawing to be performed for each segment.

Query Returns the setting of the horizontal axis span format.

Example

Command `:GRAPh:SPAN SEGMent`
Sets the horizontal axis span format to segment.

Query `:GRAPh:SPAN?`
Response `:GRAPH:SPAN SEGMENT` (when HEADER ON)
`SEGMENT` (when HEADER OFF)
The horizontal axis span format is set to segment.

Setting and querying the reference value and graduation width of the vertical axis display scale

Syntax

Command `:GRAPh:VERTical:CENTerdiv` <1/ 2>,<Reference value>, <One graduation width>

Query `:GRAPh:VERTical:CENTerdiv?` <1/ 2>

Response <Reference value>, <One graduation width>

Parameter <Reference value> = -9.999999+E09 to +9.999999+E09 (NR3)
<One graduation width> = -9.999999+E09 to +9.999999+E09 (NR3)

Explanation

Command Sets the range of the vertical axis of the first parameter or second parameter with a reference value and the width of one graduation.

Query Returns the range of the vertical axis of the first parameter or second parameter in the order of the reference value and the width of one graduation.

Example

Command
```
:GRAPh:VERTical:CENTerdiv 1, 100E+03, 100E+00
```
Sets range of the vertical axis of the first parameter to 100 k for the reference value and 100 for the width of one graduation.

Query
```
:GRAPh:VERTical: CENTerdiv? 1
```
Response
```
:GRAPH:VERTICAL:CENTERDIV
100.0000E+03, 100.0000E+00
```
(when HEADER ON)
```
100.0000E+03, 100.0000E+00
```
(when HEADER OFF)

The range of the vertical axis of the first parameter is set to 100 k for the reference value and 100 for the width of one graduation.

Note

- If this command is executed, the vertical display scale setting method is automatically set to the reference value and one graduation width.
- If the reference value and one graduation width are set with this command, the upper and lower limit values are automatically recalculated.

Setting and querying the parameters to display grid

Syntax

Command `:GRAPh:VERTical:GRID` <1/ 2>

Query `:GRAPh:VERTical:GRID?`

Response <1/ 2>

Explanation

Command Sets the parameters for which to display a grid.

Query Returns the parameters for which to display a grid.

Example

Command
```
:GRAPh:VERTical:GRID 2
```
Sets a grid to be displayed for the second parameter.

Query
```
:GRAPh:VERTical:GRID?
```
Response
```
:GRAPH:VERTICAL:GRID 2
```
(when HEADER ON)
```
2
```
(when HEADER OFF)

A grid is set to be displayed for the second parameter.

Setting and querying the setting method for the vertical axis display scale

Syntax

Command **:GRAPh:VERTical:METHod** <1/ 2>,<UPPer/ CENTer>

Query **:GRAPh:VERTical:METHod?** <1/ 2>

Response <UPPER/ CENTER>

Explanation

Command Sets the setting method for the display range of the vertical axis.

UPPer: Sets the display range of the vertical axis to be set with the upper and lower limit values.

ENTer: Sets the display range of the vertical axis to be set with a reference value and the width of one graduation.

Query Returns the setting method for the display range of the vertical axis.

Example

Command **:GRAPh:VERTical:METHod 1, UPPer**

Sets the display range of the vertical axis to be set with the upper and lower limit values.

Query **:GRAPh:VERTical:METHod? 1**

Response **:GRAPH:VERTICAL:METHOD UPPER** (when HEADER ON)

UPPER (when HEADER OFF)

The display range of the vertical axis is set to be set with the upper and lower limit values.

Note

Before executing this command, set MANUAL with the **:GRAPh:VERTical:MODE** command.

Setting and querying the vertical axis display scale method

Syntax

Command **:GRAPh:VERTical:MODE** <1/ 2>,<AUTO/ MANual>

Query **:GRAPh:VERTical:MODE?** <1/ 2>

Response <AUTO/ MANUAL>

Explanation

Command Sets the display range setting of the vertical axis to automatic or manual.

Query Returns the display range setting of the vertical axis.

Example

Command **:GRAPh:VERTical:MODE 1, MANual**

Sets the display range setting of the vertical axis of the first parameter to manual.

Query **:GRAPh:VERTical:MODE? 1**

Response **:GRAPH:VERTICAL:MODE MANUAL** (when HEADER ON)

MANUAL (when HEADER OFF)

The display range setting of the vertical axis of the first parameter is set to manual.

Setting and querying the vertical axis display scale

Syntax

Command `:GRAPh:VERTical:SCALe` <1/ 2>,<LINear/ LOG>

Query `:GRAPh:VERTical:SCALe?` <1/ 2>

Response <LINEAR/ LOG>

Explanation

Command Sets the vertical axis display scale.

Query Returns the vertical axis display scale.

Example

Command `:GRAPh:VERTical:SCALe 1, LOG`

Sets the vertical axis display scale of the first parameter to log.

Query `:GRAPh:VERTical:SCALe? 1`

Response `:GRAPH:VERTICAL:SCALE LOG` (when HEADER ON)

`LOG` (when HEADER OFF)

The vertical axis display scale of the first parameter is set to log.

Setting and querying the upper and lower limit values of the vertical axis display scale

Syntax

Command `:GRAPh:VERTical:UPPerlower` <1/ 2>,<Lower limit values>, <Upper limit values>

Query `:GRAPh:VERTical:UPPerlower?` <1/ 2>

Response <Lower limit values>,<Upper limit values>

Parameter <Lower limit values> = -9.9999+E09 to +9.9999+E09 (NR3)
<Upper limit values> = -9.9999+E09 to +9.9999+E09 (NR3)

Explanation

Command Sets the range of the vertical axis of the first parameter or second parameter with the lower and upper limit values.

Query Returns the range of the vertical axis of the first parameter or second parameter in the order of the lower limit value and the upper limit value.

Example

Command `:GRAPh:VERTical:UPPerlower 1, 1E+03, 100E+03`

Sets the range of the vertical axis of the first parameter to 1 k for the lower limit value and 100 k for the upper limit value.

Query `:GRAPh:VERTical:UPPerlower? 1`

Response `1.000000E+03, 100.0000E+03` (when HEADER ON)

`1.000000E+03, 100.0000E+03` (when HEADER OFF)

The range of the vertical axis of the first parameter is set to 1 k for the lower limit value and 100 k for the upper limit value.

Note

- If this command is executed, the vertical display scale setting method is automatically set to the upper and lower limit values.
- Specify a lower limit value that does not exceed the upper limit value. An execution error occurs if a lower limit value that is larger than the upper limit value is specified.
- If the upper and lower limit values are set with this command, the width of one graduation is automatically recalculated.

Simultaneously setting and querying sweep point settings of the CENTER-SPAN method

Syntax

Command `:LIST:CENTerspan` <CENTER value>,<SPAN value>,<Number of sweep points>

Query `:LIST:CENTerspan?`

Response <CENTER value>,<SPAN value>,<Number of sweep points>

Parameter <CENTER value> = The settable range varies depending on the type of sweep parameter. (NR2/NR3)
<SPAN value> = The settable range varies depending on the type of sweep parameter. (NR2/NR3)
<Number of sweep points> = 2 to 801 (NR1)

Explanation

Command Simultaneously sets the sweep point settings of the CENTER SPAN method.

Query Returns the sweep point settings of the CENTER-SPAN method.

Example

Command `:LIST:CENTerspan 1.0000E+03,200.00E+00,801`
(When the type of sweep parameter is frequency)
Sets the CENTER value, SPAN value, and number of sweep points of the sweep point settings to 1 kHz, 200 Hz, and 801 points, respectively.

Query `:LIST:CENTerspan?`
Response `:LIST:CENTERSPAN 1.0000E+03, 200.00E+00,801` (when HEADER ON)
`1.0000E+03, 200.00E+00,801` (when HEADER OFF)
The CENTER value, SPAN value, and number of sweep points of the sweep point settings of the CENTER-SPAN method are set to 1 kHz, 200 Hz, and 801 points, respectively.

Note

- The valid ranges for the CENTER value and SPAN value differ depending on the type of sweep parameter.
  For each of the ranges, refer to the setting commands of the signal levels (frequency, constant voltage level, open-circuit voltage level, and constant current level).
- The measurement speed takes priority during sweeping when the trigger setting is REPEAT, so if sweep points are changed by communication during sweeping, the first sweep result graph displayed after the change may appear in a disordered state. (In such a case, measurement is being performed without a problem.) Therefore, whenever possible change the trigger setting to SEQ or STEP when changing sweep points, and change the sweep points when sweeping is not being performed.

Setting and querying the sweep point settings of INTERVAL mode

Syntax

Command `:LIST:INTerval` <POINT value>,<INTERVAL value>,<Number of sweep points>

Query `:LIST:INTerval?`

Response <POINT value>,<INTERVAL value>,<Number of sweep points>

Parameter <POINT value> = The settable range varies depending on the type of sweep parameter. (NR2/NR3)
<INTERVAL value> = 0 to 10000 (NR2)
<Number of sweep points> = 2 to 801 (NR1)

Explanation

Command Simultaneously sets the sweep point settings of the INTERVAL method.

Query Returns the sweep point settings of INTERVAL method.

Example

Command `:LIST:INTerval 1.0000E+03,1.5000,801`
(When the type of sweep parameter is frequency)
Sets the POINT value, INTERVAL value, and number of sweep points of the sweep point settings to 1 kHz, 1.5 s, and 801 points, respectively.

Query `:LIST:INTerval?`
Response `:LIST:INTERVAL 1.0000E+03,1.5000,801` (when HEADER ON)
`1.0000E+03,1.5000,801` (when HEADER OFF)
The POINT value, INTERVAL value, and number of sweep points for the sweep point settings of the INTERVAL method are set to 1 kHz, 1.5 s, and 801 points, respectively.

Note

- The valid ranges for the POINT value differ depending on the type of sweep parameter. For each of the ranges, refer to the setting commands of the signal levels (frequency, constant voltage level, open-circuit voltage level, and constant current level).
- The measurement speed takes priority during sweeping when the trigger setting is REPEAT, so if sweep points are changed by communication during sweeping, the first sweep result graph displayed after the change may appear in a disordered state. (In such a case, measurement is being performed without a problem.) Therefore, whenever possible change the trigger setting to SEQ or STEP when changing sweep points, and change the sweep points when sweeping is not being performed.

Setting and querying the sweep point settings of START-STEP mode

Syntax

Command `:LIST:STARt:STEP` <START value>,<STEP value>,<Number of sweep points>

Query `:LIST:STARt:STEP?`

Response <START value>, <STEP value>, <Number of sweep points>

Parameter <START value> = The settable range varies depending on the type of sweep parameter. (NR2/NR3)
<STEP value> = The settable range varies depending on the type of sweep parameter. (NR2/NR3)
<Number of sweep points> = 2 to 801 (NR1)

Explanation

Command Simultaneously sets the sweep point settings of the START-STEP method.

Query Returns the sweep point settings of the START-STEP method.

Example

Command `:LIST:STARt:STEP 1.0000E+03,2.0000E+03,801`
(When the type of sweep parameter is frequency)
Sets the START value, STEP value, and number of sweep points of the sweep point settings to 1 kHz, 2 kHz, and 801 points, respectively.

Query `:LIST:STARt:STEP?`
Response `:LIST:START:STEP 1.0000E+03, 2.0000E+03,801` (when HEADER ON)
`1.0000E+03, 2.0000E+03,801` (when HEADER OFF)
The START value, STEP value, and number of sweep points of the sweep point settings of the START-STEP method are set to 1 kHz, 2 kHz, and 801 points, respectively.

Note

- The valid ranges for the START value and STEP value differ depending on the type of sweep parameter.
  For each of the ranges, refer to the setting commands of the signal levels (frequency, constant voltage level, open-circuit voltage level, and constant current level).
- The measurement speed takes priority during sweeping when the trigger setting is REPEAT, so if sweep points are changed by communication during sweeping, the first sweep result graph displayed after the change may appear in a disordered state. (In such a case, measurement is being performed without a problem.) Therefore, whenever possible change the trigger setting to SEQ or STEP when changing sweep points, and change the sweep points when sweeping is not being performed.

Setting and querying the sweep point settings of START-STOP mode

Syntax

Command **:LIST:STARt:STOP** <START value>,<STOP value>,<Number of sweep points>,<LINear/ LOG>

Query **:LIST:STARt:STOP?**

Response <START value>,<STOP value>,<Number of sweep points>,<LINEAR/ LOG>

Parameter <START value> = The settable range varies depending on the type of sweep parameter. (NR2/NR3)
<STOP value> = The settable range varies depending on the type of sweep parameter. (NR2/NR3)
<Number of sweep points> = 2 to 801 (NR1)

Explanation

Command Simultaneously sets the sweep point settings of the START-STOP method.

Query Returns the sweep point settings of the START-STOP method.

Example

Command **:LIST:STARt:STOP 1.0000E+03,1.0000E+06,801,LOG**

(When the type of sweep parameter is frequency)

Sets the START value, STOP value, number of sweep points, and setting method of sweep points of the sweep point settings to 1 kHz, 1 MHz, and 801 points, and LOG, respectively.

Query **:LIST:STARt:STOP?**

Response **:LIST:START:STOP 1.0000E+03, 1.0000E+06,801,LOG**

(when HEADER ON)

1.0000E+03, 1.0000E+06,801,LOG (when HEADER OFF)

The START value, STOP value, number of sweep points, and setting method of sweep points of the sweep point settings of the START-STOP method are set to 1 kHz, 1 MHz, and 801 points, and LOG, respectively.

Note

- The valid ranges for the START value and STOP value differ depending on the type of sweep parameter.
- For each of the ranges, refer to the setting commands of the signal levels (frequency, constant voltage level, open-circuit voltage level, and constant current level).
  If the type of sweep parameter is V/ CV/ CC, the setting method of sweep points can only be set to LINEAR. An execution error occurs if LOG is specified.
- The measurement speed takes priority during sweeping when the trigger setting is REPEAT, so if sweep points are changed by communication during sweeping, the first sweep result graph displayed after the change may appear in a disordered state. (In such a case, measurement is being performed without a problem.) Therefore, whenever possible change the trigger setting to SEQ or STEP when changing sweep points, and change the sweep points when sweeping is not being performed.

Querying the overall judgment result when peak comparator measurement

Syntax

Query `:MEASure:COMParator:PEAK?`

Response <Judgment result>

Parameter <Judgment result> = 0,1 (NR1)

Explanation

Query Returns the overall judgment result when peak comparator measurement.

Result	ASCII	Binary
When the peak judgment result of any of the segments is NG or the peak has not been judged	0	0x00
When the peak judgment results of the all of the segments are IN	1	0x01

Example

Query `:MEASURE:COMPARATOR:PEAK 1:MEASure:COMParator:PEAK?`

Response `:MEASURE:COMPARATOR:PEAK 1` (when HEADER ON)

`1` (when HEADER OFF)

Note

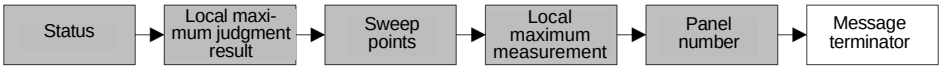
The peak overall judgment result is IN.

Querying the judgment result of the local maximum value when peak comparator measurement

Syntax

Query `:MEASure:COMParator:PEAK:LMAX?` <Segment No.>,<1/ 2>

Response



Parameter <Segment No.> = 1 to 20
<Judgment result> = 0 to 9 (NR1)

Explanation

Query

Returns the judgment result of the local maximum value and the measurement data when peak comparator measurement.

The judgment results indicate the positional relationship between the judgment area and peak.

If the peak is within the judgment area (IN), 5 is returned.

When the judgment area setting is OFF, 0 is returned for the judgment result.

For details on the judgment result values, see the following figure.

HI-LT 1	HI 2	HI-RT 3
LT 4	IN 5	RT 6
LO-RT 7	LO 8	LO-RT 9

Example

Query `:MEASure:COMParator:PEAK:LMAX? 1,1`

Response `:MEASURE:COMPARATOR:PEAK:LMAX 5, 24.831E+03,Z 4.082196E+03` (when HEADER ON)

`5, 24.831E+03, 4.082196E+03` (when HEADER OFF)

The peak comparator judgment result of the local maximum value of segment 1 and the first parameter is IN, the frequency of the sweep point is 24.831 kHz, and the measurement value is 4.082196 kΩ.

Note

When the segment sweep setting is set to OFF, the segment number setting is disabled and fixed to segment 1.

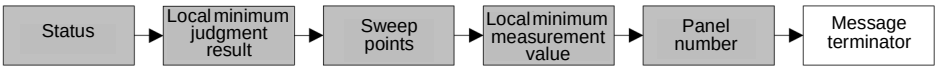
An execution error occurs when the peak could not be detected.

Querying the judgment result of the local minimum value when peak comparator measurement

Syntax

Query `:MEASure:COMParator:PEAK:LMIN?` <Segment No.>,<1/ 2>

Response



Parameter <Segment No.> = 1 to 20
<Judgment result> = 0 to 9 (NR1)

Explanation

Query

Returns the judgment result of the local minimum value and the measurement data when peak comparator measurement.

The judgment results indicate the positional relationship between the judgment area and peak.

If the peak is within the judgment area (IN), 5 is returned.

When the judgment area setting is OFF, 0 is returned for the judgment result.

For details on the judgment result values, see the following figure.

HI-LT 1	HI 2	HI-RT 3
LT 4	IN 5	RT 6
LO-RT 7	LO 8	LO-RT 9

Example

Query `:MEASure:COMParator:PEAK:LMIN? 1,1`

Response `:MEASURE:COMPARATOR:PEAK:LMIN 5, 901.57E+03,Z 11.20888E+03` (when HEADER ON)

`5, 901.57E+03, 11.20888E+03` (when HEADER OFF)

The peak comparator judgment result of the local minimum value of segment 1 and the first parameter is IN, the frequency of the sweep point is 901.57 kHz, and the measurement value is 11.20888 kΩ.

Note

When the segment sweep setting is set to OFF, the segment number setting is disabled and fixed to segment 1.

An execution error occurs when the peak could not be detected.

Querying the measurement data of the cursor position

Syntax

Query `:MEASure:CURSor?` <A/ B>

Response This is in accordance with the `:MEASure?` response format.

Explanation

Query Returns the measurement data of the specified cursor.

Example

Query `:MEASure:CURSor? A`

Response `16.406E+03,Z 96.85033E+00,PHASE -89.954` (when HEADER ON)

`16.406E+03, 96.85033E+00, -89.954` (when HEADER OFF)

The sweep frequency of the sweep point of cursor A is 16.406 kHz, the measurement value of the first parameter is 96.85033, and the measurement value of the second parameter is -89.954.

Querying the measurement data of the specified sweep point

Syntax

Query `:MEASure:POINt?` <Sweep point>

Response This is in accordance with the `:MEASure?` response format.

Parameter <Sweep point> = 1 to 801

Explanation

Query Returns the measurement data of the specified sweep point.

Example

Query `:MEASure:POINt? 100`

Response `30.549E+03,Z 52.00423E+00,PHASE -89.916` (when HEADER ON)

`30.549E+03, 52.00423E+00, -89.916` (when HEADER OFF)

The sweep frequency of the 100th sweep point is 30.549 kHz, the measurement result of the first parameter is 52.00423, and the measurement value of the second parameter is -89.916.

Note

An execution error occurs if a sweep point with no measurement data is specified.

Setting and querying the sweep point

Syntax

Query `:POINt` <Sweep point No.>,<Setting value>

Query `:POINt?` <Sweep point No.>

Response <Setting value>

Parameter <Sweep point No.> = 1 to 801 (NR1)
<Setting value> = The settable range varies depending on the conditions. (NR3)

Explanation

Command Sets the sweep value.

Query Returns the sweep value.

Example

Command `:POINt 5,23E3`

Query `:POINt? 5`
Response `:POINT 23.000E+03` (when HEADER ON)
`23.000E+03` (when HEADER OFF)
The sweep value of sweep point number 5 is set to 23 k.

Note

An execution error occurs when a value that is larger than the number of sweep points is set for the sweep point number.

Executing the search function

Syntax

Command `:SEARch`

Explanation

Command Executes the search function and moves the display cursor.

Example

Command `:SEARch`
Executes the search function.

Note

An execution error occurs if there is no applicable search result.

Setting and querying the segment sweep function

Syntax

Command **:SEGMent** <ON/ OFF>

Query **:SEGMent?**

Response <ON/ OFF>

Explanation

Command Sets the segment sweep function.
ON : Enables the segment sweep function.
OFF : Disables the segment sweep function and sets a normal sweep to be performed.

Query Returns the setting of the segment sweep function.

Example

Command **:SEGMent ON**
Enables the segment sweep function.

Query **:SEGMent?**
Response **:SEGMENT ON** (when HEADER ON)
ON (when HEADER OFF)
The segment sweep function is enabled.

Adding a segment

Syntax

Command **:SEGMent:ADD** <Segment No./ no data>

Explanation

Command Creates a new segment, and adds it to the specified segment number.
If there are already segments with the specified segment number and subsequent numbers, the segments with the specified number and subsequent numbers are each shifted up by one.
If a segment number is not specified, a new segment is added at the end of the current segments.
If a segment number that is larger than the number of current segments is specified, a new segment is added at the end of the current segments.

Example

Command **:SEGMent:ADD 3**
Creates a new segment for segment number 3.

Note

Each parameter (sweep point, measurement speed, etc.) of the newly created segment is set to the initial value. When you create a new segment, set each of the parameters.

Setting and querying measurement averaging of the specified segment

Syntax

Command `:SEGMent:AVERaging` <Segment No.>,<OFF/ Number of averaging times>

Query `:SEGMent:AVERaging?` <Segment No.>

Response <OFF/ Number of averaging times>

Parameter <Segment No.> = 1 to 20
<Number of averaging times> = 1 to 256 (NR1)

Explanation

Command Sets the number of measurement averaging times of the specified segment number.
OFF : Disables the averaging function.

Query Returns the number of measurement averaging times of the specified segment number.

Example

Command `:SEGMent:AVERaging 3, 32`
Sets the number of averaging times of segment number 3 to 32.

Query `:SEGMent:AVERaging? 3`
Response `:SEGMENT:AVERAGING 32` (when HEADER ON)
`32` (when HEADER OFF)
The number of averaging times of segment number 3 is set to 32.

Note

Setting the number of averaging times to 1 automatically sets the averaging function to OFF.
Setting the number of averaging times from 2 to 256 automatically sets the averaging function to ON.

Deleting the specified segment

Syntax

Command `:SEGMent:DELete` <Segment No.>

Parameter <Segment No.> = 1 to 20

Explanation

Command Deletes the specified segment.

Example

Command `:SEGMent:DELete 3`
Deletes the segment created for number 3.

Note

A segment cannot be restored once it is deleted.

Querying the number of segments

Syntax

Query `:SEGMent:NUM?`

Response <Segment No.>

Parameter <Segment No.> = 1 to 20 (NR1)

Explanation

Query Returns an NR1 numerical value for the number of segments currently created.

Example

Query `:SEGMent:NUM?`

Response `:SEGMENT:NUM 3` (when HEADER ON)

`3` (when HEADER OFF)

The three segments number 1 to number 3 have been created.

Setting and querying the point delay time of the specified segment

Syntax

Command `:SEGMent:PDELay` <Segment No.>,<Delay time>

Query `:SEGMent:PDELay?` <Segment No.>

Response <Delay time>

Parameter <Segment No.> = 1 to 20

<Delay time> = 0 to 10000 (NR2)

Explanation

Command Sets the point delay time of the specified segment.

Query Returns the point delay time of the specified segment.

Example

Command `:SEGMent:PDELay 3, 0.0005`

Sets the point delay time of segment number 3 to 0.5 ms.

Query `:SEGMent:PDELay? 3`

Response `:SEGMENT:PDELAY 0.0005` (when HEADER ON)

`0.0005` (when HEADER OFF)

The point delay time of segment number 3 is set to 0.5 ms.

Setting and querying the measurement range of the specified segment

Syntax

Command `:SEGMent:RANGe` <Segment No.>,<Measurement range/ AUTO>

Query `:SEGMent:RANGe?` <Segment No.>

Response <Measurement range/ AUTO>

Parameter <Segment No.> = 1 to 20
<Measurement range> = 1 to 12 (NR1)

Explanation

Command: Sets the measurement range of the specified segment.
If this command is executed, the range setting is automatically changed from auto to hold.

Query: Returns the measurement range of the specified segment.

Example

Command `:SEGMent:RANGe 3, AUTO`
Sets the measurement range of segment number 3 to auto range.

Query `:SEGMent:RANGe? 3`
Response `:SEGMENT:RANGE AUTO` (when HEADER ON)
`AUTO` (when HEADER OFF)
The measurement range of segment number 3 is set to auto range.

Note

For the range number and measurement range, refer to the measurement range setting command.

Setting and querying the measurement speed of the specified segment

Syntax

Command `:SEGMent:SPEEd` <Segment No.>,<FAST/ MEDium/ SLOW/ SLOW2>

Query `:SEGMent:SPEEd?` <Segment No.>

Response <FAST/ MEDium/ SLOW/ SLOW2>

Parameter <Segment No.> = 1 to 20

Explanation

Command: Sets the measurement speed of the specified segment.

Query: Returns the measurement speed of the specified segment.

Example

Command `:SEGMent:SPEEd 3, MEDium`
Sets the measurement speed of segment number 3 to medium.

Query `:SEGMent:SPEEd? 3`
Response `:SEGMENT:SPEED MEDIUM` (when HEADER ON)
`MEDIUM` (when HEADER OFF)
The measurement speed of segment number 3 is set to medium.

Simultaneously setting and querying sweep point settings of START-STOP method of specified segment

Syntax

Command `:SEGMent:STARt:STOP` <Segment No.>,<START value>,<STOP value>, <Number of sweep points>, <LINear/ LOG>

Query `:SEGMent:STARt:STOP?` <Segment No.>

Response <START value>,<STOP value>,<Number of sweep points>,<LINEAR/ LOG>

Parameter <START value> = The settable range varies depending on the type of sweep parameter. (NR2/NR3)
<STOP value> = The settable range varies depending on the type of sweep parameter. (NR2/NR3)
<Number of sweep points> = 2 to 801 (NR1)

Explanation

Command Simultaneously sets the sweep point settings of the START-STOP method of the specified segment.

Query Returns the sweep point settings of the START-STOP method of the specified segment.

Example

Command
```
:SEGMent:STARt:STOP 3, 1.0000E+03, 1.0000E+06, 50, LOG
```
(When the type of sweep parameter is frequency)
Sets the START value, STOP value, number of sweep points, and setting method of sweep points of the sweep point settings of segment number 3 to 1 kHz, 1 MHz, 50 points, and LOG, respectively.

Query
```
:SEGMent:STARt:STOP? 3
```
Response
```
:SEGMENT:START:STOP 1.0000E+03, 1.0000E+06,50,LOG
```
(when HEADER ON)
```
1.0000E+03, 1.0000E+06,50,LOG
```
(when HEADER OFF)
The START value, STOP value, number of sweep points, and setting method of sweep points of the sweep point settings of the START-STOP method of segment number 3 are set to 1 kHz, 1 MHz, 50 points, and LOG, respectively.

Note

- The valid ranges for the START value and STOP value differ depending on the type of main sweep measurement signal mode.
  For the valid ranges of each signal mode, refer to the setting command of each signal level (frequency, constant voltage level, open-circuit voltage level, and constant current level).
- If the main sweep measurement signal mode is V/CV/CC, the setting of the sweep point calculation method can only be set to LINear. An error occurs if LOG is selected.

Setting and querying measurement signal for when segment sweep

Syntax

Command `:SEGMent:SUB:SOURce` <V/ CV/ CC>

Query `:SEGMent:SUB:SOURce?`

Response <V/ CV/ CC>

Explanation

Command: Sets the measurement signal type for when segment sweep to any one of open-circuit voltage, constant voltage, and constant current.
This setting is common to all segments.

- V : Sets open-circuit voltage.
- CV : Sets constant voltage.
- CC : Sets constant current.

Query: Returns the measurement signal type for when segment sweep.

Example

Command `:SEGMent:SUB:SOURce CV`

Sets the measurement signal type for when segment sweep to CV (constant voltage).

Query `:SEGMent:SUB:SOURce?`

Response `:SEGMENT:SUB:SOURCE CV` (when HEADER ON)

`CV` (when HEADER OFF)

The measurement signal type for when segment sweep is set to CV (constant voltage).

Note

- The measurement signal type for when segment sweep is common to all segments. If you set the measurement signal type for any segment, the setting is applied to all segments.
- The measurement signal type for when segment sweep can only be set when the main sweep measurement signal mode is FREQ (frequency). An execution error occurs when the main sweep measurement signal mode is other than FREQ.

Setting and querying the measurement signal level of the specified segment

Syntax

Command `:SEGMent:SUB:SOURce:VALue` <Segment No.>,<Signal source value>

Query `:SEGMent:SUB:SOURce:VALue?` <Segment No.>

Response <Signal source value>

Parameter <Segment No.> = 1 to 20
<Signal source value> = The settable range varies depending on the measurement signal type for when segment sweep. (NR2/NR3)

Explanation

Command Sets the signal source value of the specified segment.
Sets the frequency when the main sweep measurement signal mode is V/ CV/ CC.

Query Returns the signal source value of the specified segment.

Example

Command `:SEGMent:SUB:SOURce:VALue 3, 0.5` (when the measurement signal type is CV)
Sets the measurement signal level of segment number 3 to 0.5 V.

Query `:SEGMent:SUB:SOURce:VALue? 3`
Response `:SEGMENT:SUB:SOURCE:VALUE 0.500` (when HEADER ON)
`0.500` (when HEADER OFF)
The measurement signal level of segment number 3 is set to 0.5 V.

Setting and querying display for when analyzer mode

Syntax

Command `:SWEep:DISPlay` <GRAPh/ NUMEric/ COMParator>

Query `:SWEep:DISPlay?`

Response <GRAPH/ NUMERIC/ COMPARATOR>

Explanation

Command Sets the screen display for when analyzer mode.

Query Returns the screen display setting for when analyzer mode.

Example

Command `:SWEep:DISPlay NUMERIC`
Sets the screen display for when analyzer mode to list display.

Query `:SWEep:DISPlay?`
Response `:SWEEP:DISPLAY NUMERIC` (when HEADER ON)
`NUMERIC` (when HEADER OFF)
The screen display for when analyzer mode is set to list display.

Setting and querying the screen display timing

Syntax

Command **:SWEep:DRAW** <REAL/ AFTer>

Query **:SWEep:DRAW?**

Response <REAL/ AFTER>

Explanation

Command Sets the display update timing of analyzer mode.
REAL: Updates display in real time after the measurement of one sweep point finishes.
AFTer: Simultaneously updates all display when one sweep ends.

Query Returns the display update timing of analyzer mode.

Example

Command **:SWEep:DRAW REAL**
Sets the display update timing to real-time drawing.

Query **:SWEep:DRAW?**
Response **:SWEEP:DRAW REAL** (when HEADER ON)
REAL (when HEADER OFF)
The display update timing is set to real-time drawing.

Setting and querying main sweep measurement signal mode

Syntax

Command **:SWEep:MAIN:SOURce** <FREQ/ V/ CV/ CC>

Query **:SWEep:MAIN:SOURce?**

Response <FREQ/ V/ CV/ CC>

Explanation

Command Sets the main sweep measurement signal type.
V: Sets open-circuit voltage level.
CV: Sets constant voltage level.
CC: Sets constant current level.

Query Returns the main sweep measurement signal type.

Example

Command **:SWEep:MAIN:SOURce V**
Sets the main sweep measurement signal type to V (open-circuit voltage).

Query **:SWEep:MAIN:SOURce?**
Response **:SWEEP:MAIN:SOURCE V** (when HEADER ON)
V (when HEADER OFF)
The main sweep measurement signal type is set to V (open-circuit voltage).

Setting and querying point delay

Syntax

Command **:SWEep:PDELay** <Point delay time>

Query **:SWEep:PDELay?**

Response <Point delay time>

Parameter 0 to 10000 (NR2)

Explanation

Command Sets the point delay time of analyzer mode.

Query Returns the point delay time of analyzer mode.

Example

Command **:SWEep:PDELay 0.0005**
Sets the point delay interval to 0.5 ms.

Query **:SWEep:PDELay?**
Response **:SWEEP:PDELAY 0.0005** (when HEADER ON)
0.0005 (when HEADER OFF)
The point delay interval is set to 0.5 ms.

Note

The point delay setting is common to the interval setting for during interval measurement.

Setting and querying trigger mode

Syntax

Command **:SWEep:TRIGger** <SEQuential/ REPeat/ STEP>

Query **:SWEep:TRIGger?**

Response <SEQUENTIAL/ REPEAT/ STEP>

Explanation

Command Sets the trigger mode of analyzer mode.
SEQuential: Measures all sweep points when one trigger is input.
REPeat: Repeats sweep measurement.
STEP: Measures one of the sweep points when one trigger is input.

Query Returns the trigger mode of analyzer mode.

Example

Command **:SWEep:TRIGger SEQuential**
Sets the trigger mode to sequential.

Query **:SWEep:TRIGger SEQuential?**
Response **:SWEEP:TRIGGER SEQUENTIAL** (when HEADER ON)
SEQUENTIAL (when HEADER OFF)
The trigger mode is set to sequential.

Creating a Program

Chapter 5

This section describes an example of how to use the Windows development language Visual Basic2010 Express Edition to operate the IM3570 unit from a PC via RS-232C, incorporate measurement values, and save measurement values to a file.
Visual Basic2010 is referred to as VB2010 hereafter.
Windows and Visual Basic2010 are registered trademarks of Microsoft Corporation.

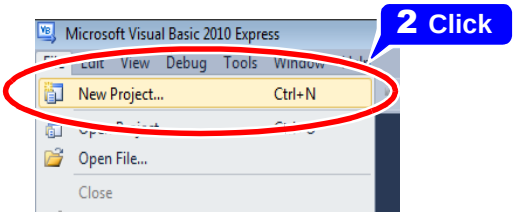
NOTE

- Depending on the environment of the PC and VB2010, the procedure may differ slightly from the one described here. For a detailed explanation on how to use VB2010, refer to the instruction manual or Help of VB2010.

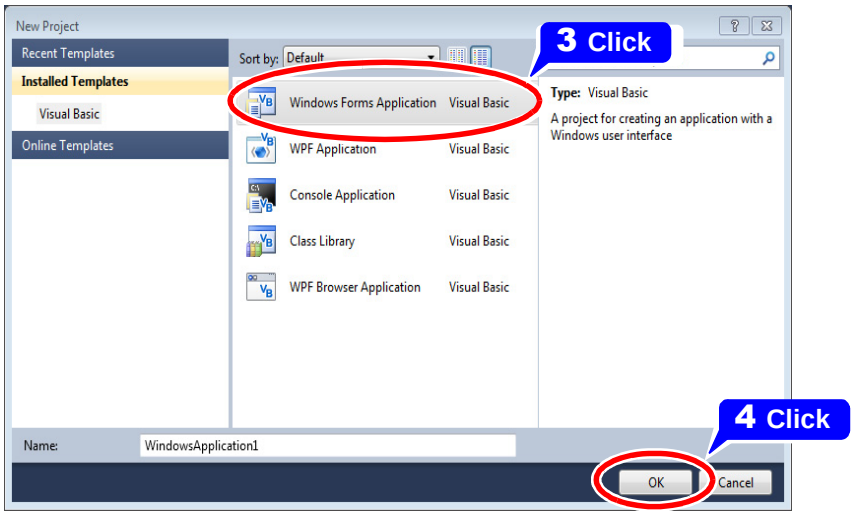
5.1 Procedure for creating a Program

1 Create a new project.

1 Startup VB2010.



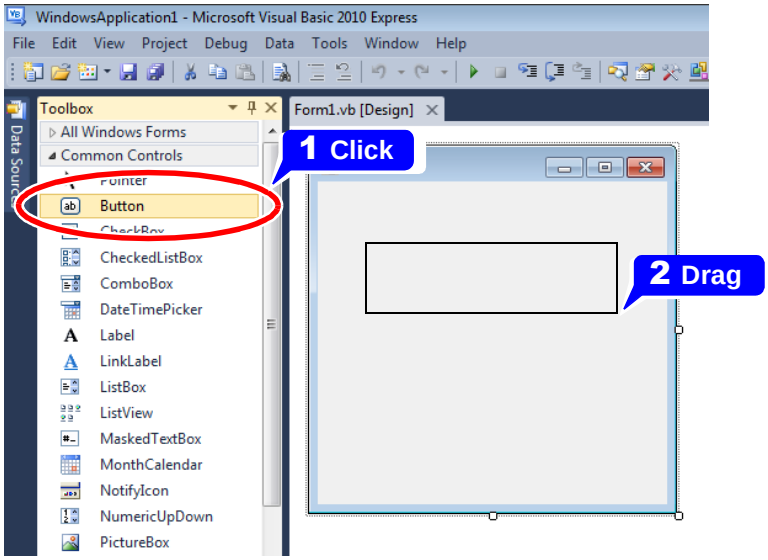
2 Select **[File]** - **[New Project]** .



3 Select **[Windows Forms Application]** from the templates.

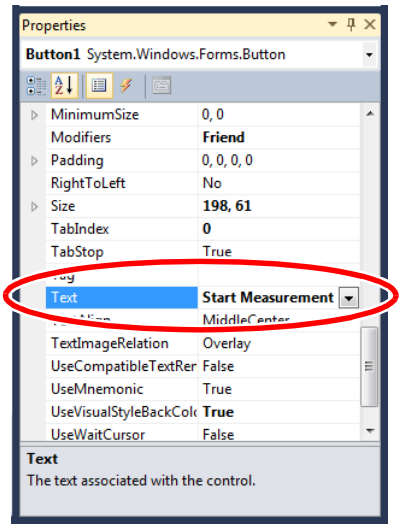
4 Click **[OK]**.

2 Place a button.

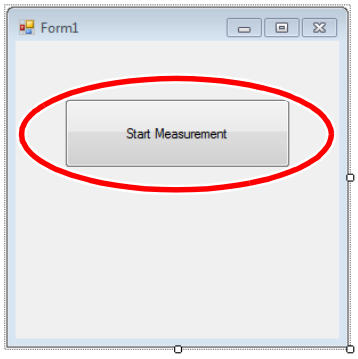


1 Click **[Button]** from **[Common Controls]** of **[Toolbox]**.

2 Drag and drop the button onto the form layout screen.

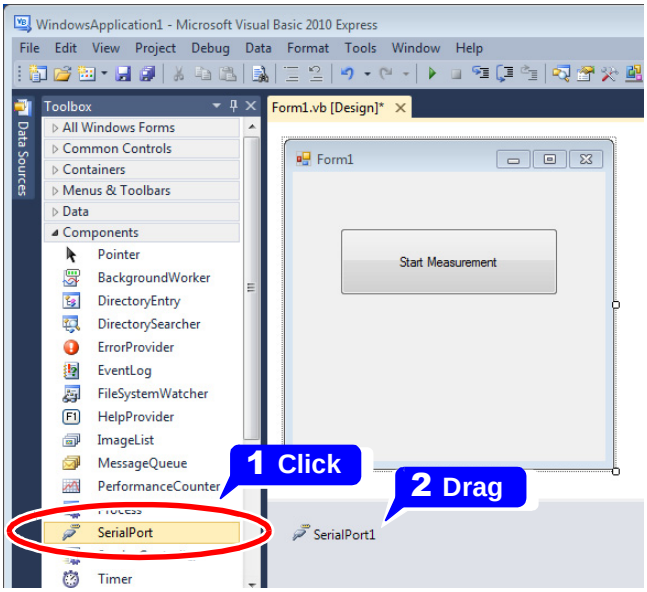


3 Change **[Text]** to "Start Measurement" from the Properties window.



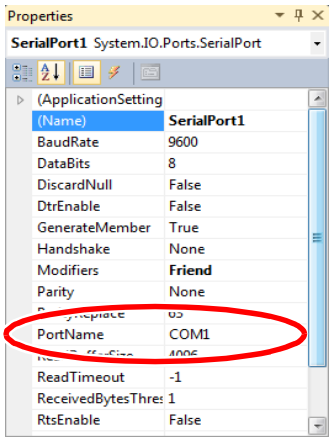
4 The **[Start Measurement]** is placed on the form.

3 Place a serial communication component.



1 Click **[SerialPort]** from **[Components]** of **[Toolbox]**.

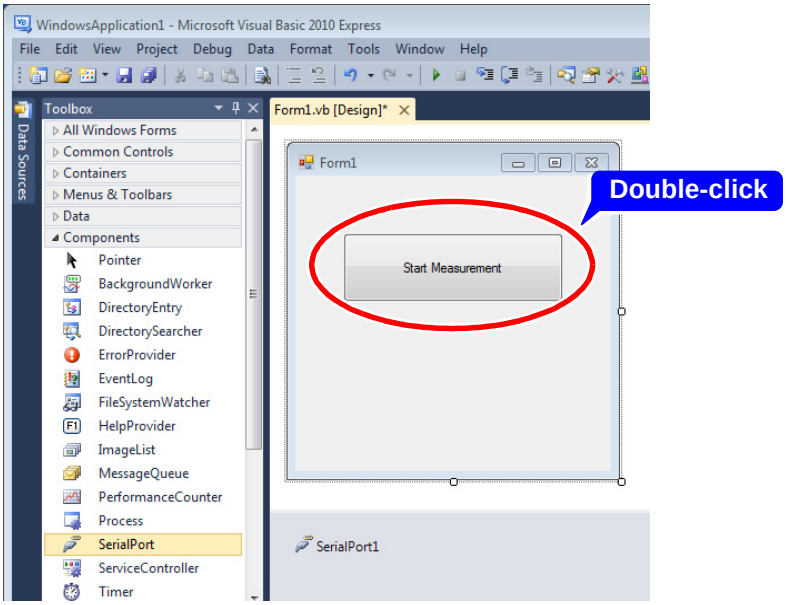
2 Drag and drop the **[SerialPort]** component onto the form layout screen.



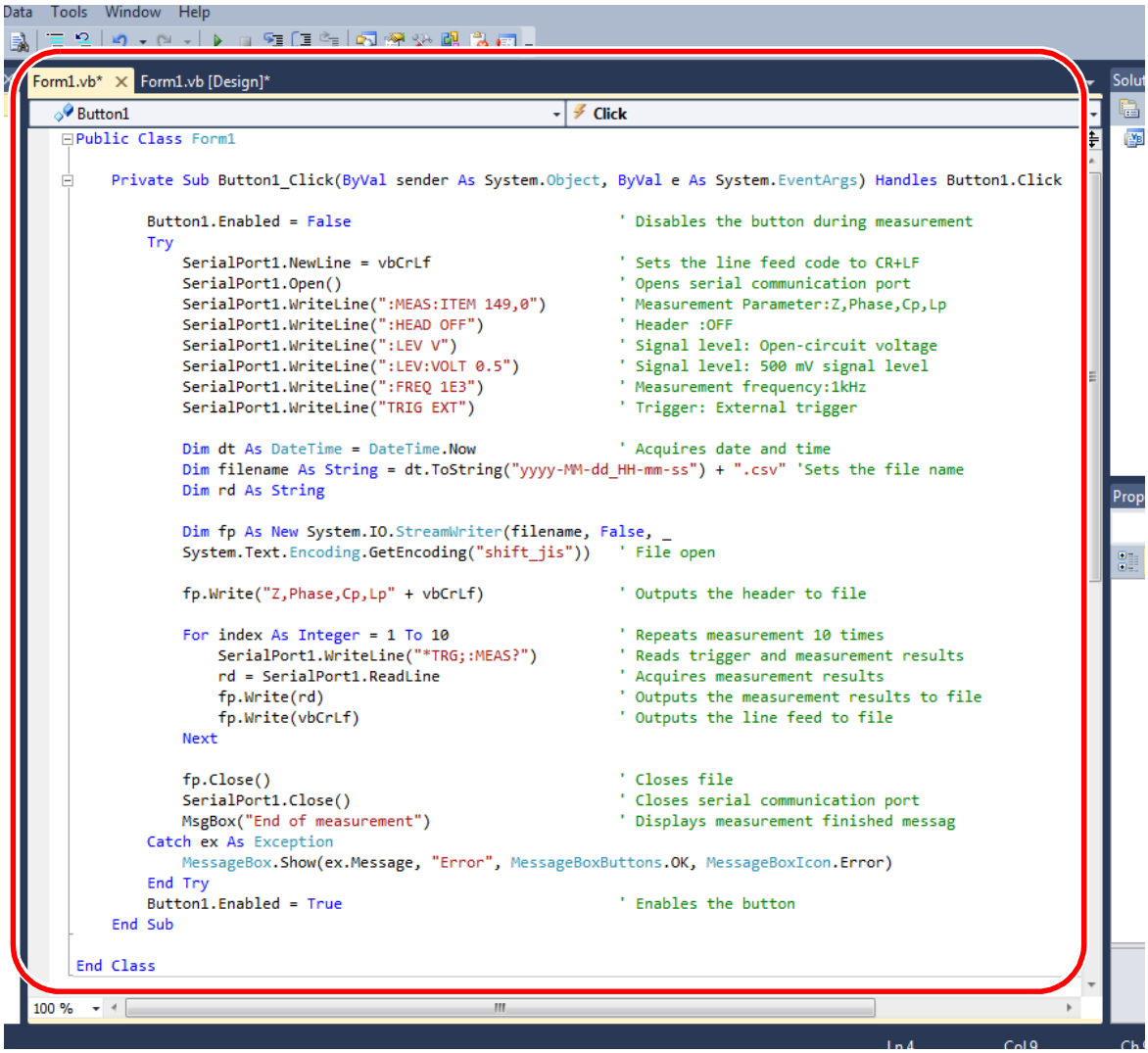
3 Change **[PortName]** to the port name to use for communication from the properties window.

> **NOTE** Check the port to use for communication beforehand.
> **See** "Appendix 3 Checking the USB Virtual COM Port" (p. A9)

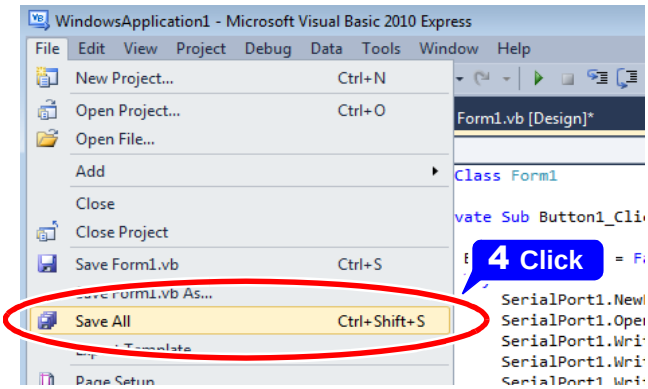
4 Describe the code.



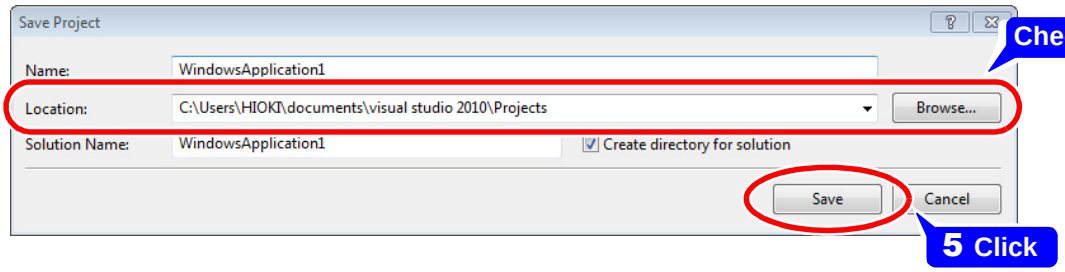
Double-click the placed button to display the code editor.



3 Enter the sample program on page 213 into the code editor.

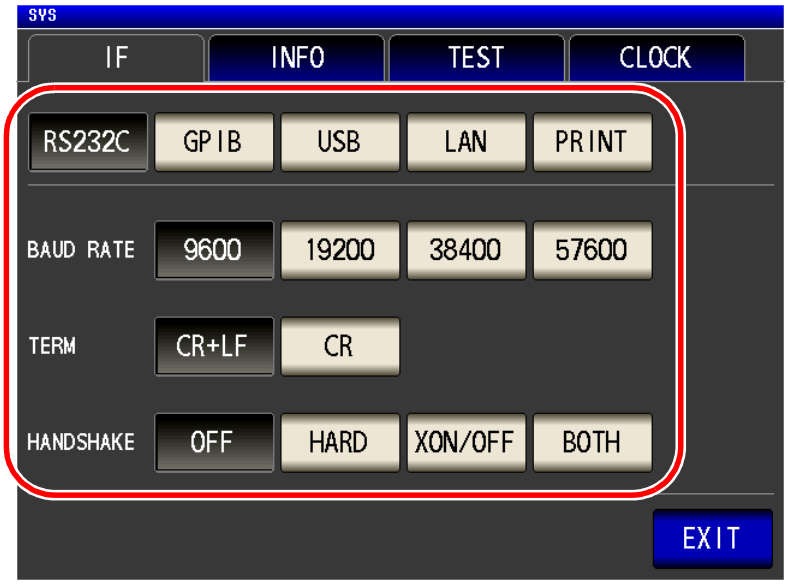


4 Select **[Save All]** from the **[File]** menu.



5 Confirm the save location and then click **[Save]**.

5 Set the interface of IM3570.



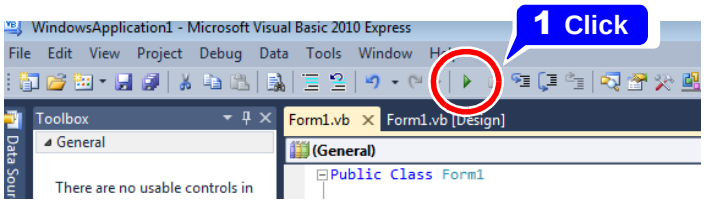
Set the interface settings of IM3570 as shown above.

See "Chapter 2 Connection and Setting Procedure" (p. 3)

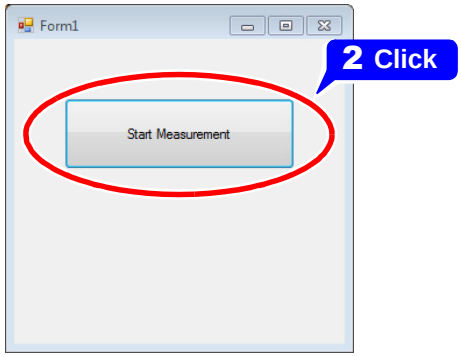
6 Execute the program.

This sample program operates as shown below.

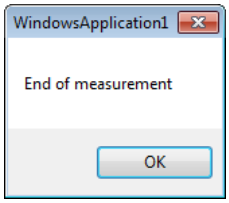
- If you press the [Start Measurement] button, you can set the measurement conditions of IM3570 via RS-232C communication.
- Perform measurement 10 times and save the data to a file in CSV format. The file name is set automatically from the date and time.
- When all measurements are competed normally, the "Measurement Finished" message appears.



1 Click **[Start Debugging]**.



2 Click **[Start Measurement]**.



When measurement is finished, a message appears and the measurement values are saved in the \bin\Debug folder in which the project was saved.

5.2 Sample Programs (Visual Basic 2010)

Shown below is a sample program which uses VB2010 to enact RS-232C communication, set the IM3570 measurement conditions, read measurement results and then save them to file.

```
Public Class Form1

  Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles Button1.Click

    Button1.Enabled = False                          ' Disables the button during measurement
    Try
        SerialPort1.NewLine = vbCrLf                 ' Sets the line feed code to CR+LF

        SerialPort1.Open()                           ' Opens serial communication port

        SerialPort1.WriteLine(":MEAS:ITEM 149,0")    ' Measurement Parameter:Z,Phase,Cp,Lp
        SerialPort1.WriteLine(":HEAD OFF")           ' Header            :OFF
        SerialPort1.WriteLine(":LEV V")              ' Signal level:     Open-circuit voltage
        SerialPort1.WriteLine(":LEV:VOLT 0.5")       ' Signal level:     500 mV signal level
        SerialPort1.WriteLine(":FREQ 1E3")           ' Measurement frequency:1kHz
        SerialPort1.WriteLine("TRIG EXT")            ' Trigger: External trigger

        Dim dt As DateTime = DateTime.Now            ' Acquires date and time
        Dim filename As String = dt.ToString("yyyy-MM-dd_HH-mm-ss") + ".csv"          'Sets the file name
        Dim rd As String

        Dim fp As New System.IO.StreamWriter(filename, False, _
            System.Text.Encoding.GetEncoding("shift_jis"))  ' File open

        fp.Write("Z,Phase,Cp,Lp" + vbCrLf)           ' Outputs the header to file

        For index As Integer = 1 To 10               ' Repeats measurement 10 times
            SerialPort1.WriteLine("*TRG;:MEAS?")     ' Reads trigger and measurement results
            rd = SerialPort1.ReadLine                ' Acquires measurement results
            fp.Write(rd)                             ' Outputs the measurement results to file
            fp.Write(vbCrLf)                         ' Outputs the line feed to file
        Next

        fp.Close()                                   ' Closes file
        SerialPort1.Close()                          ' Closes serial communication port
        MsgBox("End of measurement")                 ' Displays measurement finished messag
    Catch ex As Exception
        MessageBox.Show(ex.Message, "Error", MessageBoxButtons.OK, MessageBoxIcon.Error)
    End Try
    Button1.Enabled = True                           ' Enables the button

  End Sub

End Class
```

Troubleshooting Chapter 6

If the instrument is malfunctioning, check to see if the symptoms correspond to any of the following.
The causes and measures for items without a mark are common to RS-232C, GP-IB, USB, and LAN.

Symptom	Check Item
RS-232C/GP-IB is completely inoperable.	• Is the cable connected properly? • Is the power of all connected devices turned ON? • Is the correct cable being used? • Are the communication conditions set properly? RS-232C • Is the address setting of the instrument set properly? GP-IB • Is the address the same as that of another device? GP-IB • Is the IP address the same as that of another network device? LAN (p. 28) • Has the USB driver been installed properly? USB (p. 11)
Communication cannot be performed properly.	• Are the RS-232C settings (baud rate, data length, parity, and stop bit) of the IM3570 and computer the same? RS-232C • Set the message terminator (delimiter) of the controller properly. See: "Message Terminator" (p. 40)
The keys do not work after communication.	• Press the LOCAL key on the panel of the instrument to cancel the remote state. • Is the LLO (local lock out) command being sent? Send the GTL command to switch to the local state. GP-IB
When an attempt is made to read the data with the INPUT statement, the program stops. RS-232C	• Be sure to send a query before each INPUT. • Did the sent query result in an error?
When an attempt is made to read the data with the INPUT @ (ENTER) statement, the GP-IP bus stops GP-IB	• Be sure to send a query before each INPUT @ (ENTER).Did the sent query result in an error?
A command was sent but the operation is not performed.	• Use *ESR? to view the contents of the standard event status register and check what the error is. • Use *ERR? to check whether an RS-232C communication error has occurred? RS-232C
Several queries were sent, but only one response was returned.	• Did an error occur? • Perform one read for each query sent. If you want to read the data in one go, use a message separator and include everything on one line.
The response message of the query differs from the indication on the panel.	• The response message is created at the point in time when the instrument received the query, so it may not match the indication for the point in time when the data was read by the controller.
Sometimes a service request is not generated. GP-IB	• Are the service request enable register and event status enable registers set properly? • Clear all of the event registers with the *CLS command at the end of the SRQ process sub-routine. If the bit of an event is not cleared once, a service request is not generated for the same event.
Sending the *TRG command results in a beep sound.	• Is the trigger set to the internal trigger? • The *TRG command is only valid for the external trigger setting. An execution error occurs with the internal trigger setting.
The hardware handshake operation is abnormal. RS-232C	• Is a cable with which CA (RTS) and CB (CTS) are shorted being used? Use a cable with which CA (RTS) and CB (CTS) are not shorted.

Appendix

Appendix 1 Device Compliance Statement

"Information on compliance to standards" based on the IEEE 488.2 standard

Item	Description
1. IEEE 488.1 interface functions	See "1.2 GP-IB Specifications" (p. 2)
2. Operation with a device address other than 0 through 30	Such a setting is not possible.
3. Timing of changed device address recognition	A change of address is recognized immediately after changing.
4. Device settings at power on	The status information is cleared, and all other items are preserved. However, the header on/off setting, and response message separator and terminator are all reinitialized.
5. List of message exchange options	• Input buffer capacity and operation See "3.4 About the Output Queue and Input Buffer" (p. 47) Queries to which multiple response message units are returned :BIN:FLIMit:ABSolute? ..... 2 :BIN:FLIMit:DEViation? ..... 2 :BIN:FLIMit:PERcent? ..... 2 :BIN:SLIMit:ABSolute? ..... 2 :BIN:SLIMit:DEViation? ..... 2 :BIN:SLIMit:PERcent? ..... 2 :COMParator:FLIMit:ABSolute? ..... 2 :COMParator:FLIMit:DEViation? ..... 3 :COMParator:FLIMit:PERcent? ..... 3 :COMParator:SLIMit:ABSolute? ..... 2 :COMParator:SLIMit:DEViation? ..... 3 :COMParator:SLIMit:PERcent? ..... 3 :CORRection:LOAD:CONDition? ..... 7 :CORRection:LOAD:DCResistance:CONDition? ..... 4 :CORRection:LOAD:REFerence? ..... 3 :CORRection:SCALe:DATA? ..... 2 :FILE:INFOrmation? ..... 5 :MEASure? ..... * :MEASure:ITEM? ..... 2 :MONItor? ..... 4 :SYSTem:DATE? ..... 3 :SYSTem:TIME? ..... 3 :COMParator:AREA:FIX? ..... 4 :COMParator:AREA:LIMit? ..... 2 :COMParator:AREA:MEAS? ..... 3 :COMParator:PEAK? ..... 4 :COMParator:PEAK:NO? 2

Item	Description
	:GRAPh:VERTical:CENTerdiv? ..... 2 :GRAPh:VERTical:UPPerlower? ..... 2 :LIST:CENTerspan? ..... 3 :LIST:INTerval? ..... 3 :LIST:STARt:STEP? ..... 3 :LIST:STARt:STOP? ..... 4 :MEASure:COMParator:PEAK:MAX? ..... * :MEASure:COMParator:PEAK:MIN? ..... * :SEGMent:STARt:STOP? ..... 4 * The number of response messages varies depending on the settings. • Queries producing responses as syntax checking is performed: All queries produce responses when syntax checking is performed. • Whether any queries produce responses when read: There are no queries which produce response messages at the instant they are read in by the controller. • Whether any commands are coupled: There are no relevant commands.
6. Summary of functional elements for use when constructing device specific commands, and whether compound commands or program headers can be used:	The followings can be used • Program message • Program message terminator • Program message unit • Program message unit separator • Command message unit • Query message unit • Command program header • Query program header • Program data • Character program data • Decimal program data • Compound commands and program headers
7. Buffer capacity limitations for block data	Block data is not used.
8. Summary of program data elements used in expressions, and deepest nesting level allowable in sub-expressions, including syntax restrictions imposed by the device.	Sub-expressions are not used. Character data and decimal data are the only program data elements used.
9. Response syntax for queries	See "4.2 Message Reference" (p. 69)
10. Transmission congestion relating to device-to-device messages which do not conform to the general principles for basic response messages	There are no device to device messages.
11. Response capacity for block data	Block data does not appear in responses.
12. Summary of standard commands and queries used	See "4.1 Message List" (p. 57)
13. Device state after a calibration query has been completed without any problem	The "*CAL?" query is not used.
14. Existence/nonexistence of "*DDT" command	The "*DDT" command is not used.
15. Existence/nonexistence of macro command	Macros are not used.
16. For queries related to identification, explanation of the response to the "*IDN?" query	See "4.2.1 Common Commands" (p. 70)

Item	Description
17. Capacity of the user data storage area reserved for when the "*PUD" command and the "*PUD?" query are being executed	The "*PUD" command and the "*PUD?" query are not used. Further, there is no user data storage area.
18. Resources when the "*RDT" command and the "*RDT?" query are being used	The "*RDT" command and the "*RDT?" query are not used. Further, there is no user data storage area.
19. Conditions which are influenced when "*RST", "*LRN?", "*RCL?", and "*SAV" are used	"*LRN?", "*RCL?", and "*SAV" are not used. The"*RST" command returns the unit to its initial state. See "4.2.1 Common Commands" (p. 70), "Appendix 2 Initial Settings Table" (p. A4)
20. Scope of the self-testing executed as a result of the "*TST?" query	See 4.2.1"Common Commands"; "*TST?" (p. 71)
21. Additional organization of the status data used in a device status report	See "3.6 About Event Registers" (p. 50)
22. Whether commands are overlap or sequential type	All commands except :MEASure?, :MEMory?, :CORRection:OPEN, :CORRection:SHORt, and :CORRection:LOAD are sequence commands.
23. Criterion relating to the functions required at the instant that the termination message is produced, as a response to each command	Termination occurs when the command has been parsed.

Appendix 2 Initial Settings Table

The following table shows the initial settings of the instrument.

Yes: Available/ ←: The same as the left/ No: Unavailable
*1 : When TYPE=ALL is set, the items indicated by Yes (ADJ) are also saved.

Setting Items			Initial setting	Unit Reset Operation Full reset	:PRESet	*RST	Return to initial settings when power is turned on	Panel Save/ Load*1		File Save/ load
								LCR mode	ANALYZER mode	
Measurement mode			LCR	←	←	←	No	Yes	Yes	Yes
Measurement parameter			Z/OFF/θ/OFF	←	←	←	No	Yes	Yes	Yes
Magnification display			OFF	←	←	←	No	No	No	Yes
LCR basic settings	Measurement frequency		1 kHz	←	←	←	No	Yes	Yes	Yes
	Measurement signal level	Mode	V	←	←	←	No	Yes	Yes	Yes
		V	1.00V	←	←	←	No	Yes	Yes	Yes
		CV	1.00V	←	←	←	No	Yes	Yes	Yes
		CC	10.00 mA	←	←	←	No	Yes	Yes	Yes
	Measurement range	Mode	AUTO	←	←	←	No	Yes	Yes	Yes
		Range	300 Ω	←	←	←	No	Yes	Yes	Yes
		LOW Z	OFF	←	←	←	No	Yes	Yes	Yes
	Trigger mode		INT (Internal Trigger)	←	←	←	No	Yes	Yes	Yes
	DC bias	ON/OFF	OFF	←	←	←	No	Yes	Yes	Yes
		Bias value	0V	←	←	←	No	Yes	Yes	Yes
	Measurement speed		MED	←	←	←	No	Yes	Yes	Yes
	Limit	ON/OFF	OFF	←	←	←	No	Yes	Yes	Yes
		Current limit value	100.00 mA	←	←	←	No	Yes	Yes	Yes
		Voltage limit value	5.00 V	←	←	←	No	Yes	Yes	Yes
	Number of times for average		1	←	←	←	No	Yes	Yes	Yes
	Trigger delay		0.0000 s	←	←	←	No	Yes	Yes	Yes
LCR DC resistance measurement	Measurement signal level	Mode	V	←	←	←	No	Yes	No	Yes
		V	1.00 V	←	←	←	No	Yes	No	Yes
		CV	1.00 V	←	←	←	No	Yes	No	Yes
		CC	10.00 mA	←	←	←	No	Yes	No	Yes
	Measurement range	Mode	AUTO	←	←	←	No	Yes	No	Yes
		Range	300 Ω	←	←	←	No	Yes	No	Yes
		LOW Z	OFF	←	←	←	No	Yes	No	Yes
	DC adjustment		ON	←	←	←	No	Yes	No	Yes
	Measurement speed		MED	←	←	←	No	Yes	No	Yes
	Limit	ON/OFF	OFF	←	←	←	No	Yes	No	Yes
		Current limit value	100.00 mA	←	←	←	No	Yes	No	Yes
		Voltage limit value	2.5 V	←	←	←	No	Yes	No	Yes
	Number of times for average		1	←	←	←	No	Yes	No	Yes
	DC delay		0.0003 s	←	←	←	No	Yes	No	Yes

Yes: Available/ ←: The same as the left/ No: Unavailable
*1 : When TYPE=ALL is set, the items indicated by Yes (ADJ) are also saved.

Setting Items			Initial setting	Unit Reset Operation Full reset	:PRESet	*RST	Return to initial settings when power is turned on	Panel Save/ Load*1		File Save/ load
								LCR mode	ANALYZER mode	
Application settings	LCR judgment mode	OFF/COMP/BIN	OFF	←	←	←	No	Yes	Yes	Yes
	Trigger synchronous output	ON/OFF	OFF	←	←	←	No	Yes	Yes	Yes
		Trigger time	0.0010 s	←	←	←	No	Yes	Yes	Yes
	Memory	OFF/IN/ON	OFF	←	←	←	No	Yes	Yes	Yes
		Number of memory items	1000	←	←	←	No	Yes	Yes	Yes
	HIGH-Z Reject	ON/OFF	OFF	←	←	←	No	Yes	Yes	Yes
		Judgment reference value	1000%	←	←	←	No	Yes	Yes	Yes
	Judgment result	Delay between judgment results and EOM	0.0000 s	←	←	←	No	No	No	Yes
		Reset	ON	←	←	←	No	No	No	Yes
	IO trigger	ENABLE	ON	←	←	←	No	No	No	Yes
		Edge	DOWN	←	←	←	No	No	No	Yes
	Key-lock	ON/OFF	OFF	←	←	←	No	No	No	Yes
		Passcode	3570	←	←	←	No	No	No	Yes
	Display digits		6/6/6/6	←	←	←	No	Yes	Yes	Yes
	Backlight		ON	←	←	←	No	No	No	Yes
	Beep sound	Judgment result	NG	←	←	←	No	Yes	Yes	Yes
		Key	ON	←	←	←	No	No	No	Yes
LCR Comparator	Mode		ABS/ABS	←	←	←	No	Yes	No	Yes
	Absolute value mode	Upper limit value	OFF/OFF	←	←	←	No	Yes	No	Yes
		Lower limit value	OFF/OFF	←	←	←	No	Yes	No	Yes
	Percent mode	Reference value	1000/10	←	←	←	No	Yes	No	Yes
		Upper limit value	OFF/OFF	←	←	←	No	Yes	No	Yes
		Lower limit value	OFF/OFF	←	←	←	No	Yes	No	Yes
BIN	Mode		ABS/ABS	←	←	←	No	Yes	No	Yes
	Absolute value mode	Upper limit value	OFF/OFF	←	←	←	No	Yes	No	Yes
		Lower limit value	OFF/OFF	←	←	←	No	Yes	No	Yes
	Percent mode	Reference value	1000/10	←	←	←	No	Yes	No	Yes
		Upper limit value	OFF/OFF	←	←	←	No	Yes	No	Yes
		Lower limit value	OFF/OFF	←	←	←	No	Yes	No	Yes

Appendix 2 Initial Settings Table

Yes: Available/ ←: The same as the left/ No: Unavailable

*1 : When TYPE=ALL is set, the items indicated by Yes (ADJ) are also saved.

Setting Items			Initial setting	Unit Reset Operation Full reset	:PRESet	*RST	Return to initial settings when power is turned on	Panel Save/ Load*1		File Save/ load
								LCR mode	ANALYZER mode	
ANALYZER Basic settings	Sweep parameter		Z-θ	←	←	←	No	No	Yes	Yes
	Main sweep parameter		FREQ	←	←	←	No	No	Yes	Yes
	Trigger		REPEAT	←	←	←	No	No	Yes	Yes
	Display timing		REAL	←	←	←	No	No	Yes	Yes
	Trigger delay		0.0000 s	←	←	←	No	No	Yes	Yes
	Segment sweep		OFF	←	←	←	No	No	Yes	Yes
	Normal sweep	Sweep method	START-STOP	←	←	←	No	No	Yes	Yes
		Sweep start value	1 kHz	←	←	←	No	No	Yes	Yes
		Sweep end value	1 MHz	←	←	←	No	No	Yes	Yes
		Number of points	201	←	←	←	No	No	Yes	Yes
		Setting method of measurement points	LOG	←	←	←	No	No	Yes	Yes
	Sweep signal		1.000 V (V mode)	←	←	←	No	No	Yes	Yes
	Measurement range		AUTO	←	←	←	No	No	Yes	Yes
	Measurement speed		MED	←	←	←	No	No	Yes	Yes
	Number of times for average		1	←	←	←	No	No	Yes	Yes
	Point delay		0.0000 s	←	←	←	No	No	Yes	Yes
	DC bias	ON/OFF	OFF	←	←	←	No	No	Yes	Yes
		Bias value	0 V	←	←	←	No	No	Yes	Yes
Analyzer graph settings	Horizontal	Overwrite	OFF	←	←	←	No	No	Yes	Yes
		Scale	LOG	←	←	←	No	No	Yes	Yes
		Span	SINGLE	←	←	←	No	No	Yes	Yes
	Vertical	Color	1/2	←	←	←	No	No	Yes	Yes
		Scale	LINEAR	←	←	←	No	No	Yes	Yes
		Scale mode	AUTO	←	←	←	No	No	Yes	Yes
	Grid display		PARA1	←	←	←	No	No	Yes	Yes
ANALYZER Comparator settings	Mode		OFF	←	←	←	No	No	Yes	Yes
	Parameter		PARA1	←	←	←	No	No	Yes	Yes
	Area display		PARA1	←	←	←	No	No	Yes	Yes
	Peak No. to judge	Local minimum	1	←	←	←	No	No	Yes	Yes
		Local maximum	1	←	←	←	No	No	Yes	Yes
	Filter for peak search		2	←	←	←	No	No	Yes	Yes
	Reference value settings		MEAS VALUE REFERENCE	←	←	←	No	No	Yes	Yes
	Reference value		1.000000k	←	←	←	No	No	Yes	Yes
	Area Judgment	Upper limit value	OFF/OFF	←	←	←	No	No	Yes	Yes
		Lower limit value	OFF/OFF	←	←	←	No	No	Yes	Yes
	Peak Judgment	Left limit value	OFF/OFF	←	←	←	No	No	Yes	Yes
		Right limit value	OFF/OFF	←	←	←	No	No	Yes	Yes
		Upper limit value	OFF/OFF	←	←	←	No	No	Yes	Yes
		Lower limit value	OFF/OFF	←	←	←	No	No	Yes	Yes
Analyzer search settings	Trace		PARA1	←	←	←	No	No	Yes	Yes
	Mode		L-MAX	←	←	←	No	No	Yes	Yes
	Target value		Target value	←	←	←	No	No	Yes	Yes

Yes: Available/ ←: The same as the left/ No: Unavailable
*1 : When TYPE=ALL is set, the items indicated by Yes (ADJ) are also saved.

Setting Items			Initial setting	Unit Reset Operation Full reset	:PRESet	*RST	Return to initial settings when power is turned on	Panel Save/ Load*1		File Save/ load
								LCR mode	ANALYZER mode	
Open circuit compensation	Compensation mode		OFF	←	No Change	OFF	No	Yes (ADJ)	Yes (ADJ)	Yes
	Parameter type		G-B	←	No Change	G-B	No	Yes (ADJ)	Yes (ADJ)	Yes
	Correction value	G Correction value	0S	←	No Change	0S	No	Yes (ADJ)	Yes (ADJ)	Yes
		B Correction value	0S	←	No Change	0S	No	Yes (ADJ)	Yes (ADJ)	Yes
Short circuit compensation	Compensation mode		OFF	←	No Change	OFF	No	Yes (ADJ)	Yes (ADJ)	Yes
	Parameter type		Rs-X	←	No Change	Rs-X	No	Yes (ADJ)	Yes (ADJ)	Yes
	Correction value	R Correction value	0 Ω	←	No Change	0 Ω	No	Yes (ADJ)	Yes (ADJ)	Yes
		X Correction value	0 Ω	←	No Change	0 Ω	No	Yes (ADJ)	Yes (ADJ)	Yes
Load circuit compensation	ON/OFF		OFF	←	No Change	OFF	No	Yes (ADJ)	Yes (ADJ)	Yes
	Compensation mode		Z-θ	←	No Change	ZPH	No	Yes (ADJ)	Yes (ADJ)	Yes
	Reference value	Impedance reference value	OFF	←	No Change	OFF	No	Yes (ADJ)	Yes (ADJ)	Yes
		Phase reference value	OFF	←	No Change	OFF	No	Yes (ADJ)	Yes (ADJ)	Yes
	Compensation frequency		OFF	←	No Change	OFF	No	Yes(ADJ)	Yes (ADJ)	Yes
	Compensation signal level	Mode	V	←	No Change	V	No	Yes (ADJ)	Yes (ADJ)	Yes
		V	OFF	←	No Change	OFF	No	Yes(ADJ)	Yes (ADJ)	Yes
		CV	OFF	←	No Change	OFF	No	Yes (ADJ)	Yes (ADJ)	Yes
		CC	OFF	←	No Change	OFF	No	Yes (ADJ)	Yes (ADJ)	Yes
	Compensation range	Range	OFF	←	No Change	OFF	No	Yes (ADJ)	Yes (ADJ)	Yes
		LOW Z	OFF	←	No Change	OFF	No	Yes (ADJ)	Yes (ADJ)	Yes
	Compensation DC bias	ON/OFF	OFF	←	No Change	OFF	No	Yes (ADJ)	Yes (ADJ)	Yes
		Bias value	0.00 V	←	No Change	OFF	No	Yes (ADJ)	Yes (ADJ)	Yes
	Compensation value	Impedance coefficient	1	←	No Change	1	No	Yes (ADJ)	Yes (ADJ)	Yes
		Phase coefficient	0	←	No Change	0	No	Yes (ADJ)	Yes (ADJ)	Yes
Cable length compensation			0 m	←	No Change	0 m	No	Yes (ADJ)	Yes(ADJ)	Yes
Scaling compensation	ON/OFF		OFF	←	No Change	OFF	No	Yes (ADJ)	Yes (ADJ)	Yes
	Compensation value	A	1	←	No Change	1	No	Yes (ADJ)	Yes (ADJ)	Yes
		B	0	←	No Change	0	No	Yes (ADJ)	Yes (ADJ)	Yes

Appendix 2 Initial Settings Table

Yes: Available/ ←: The same as the left/ No: Unavailable

*1 : When TYPE=ALL is set, the items indicated by Yes (ADJ) are also saved.

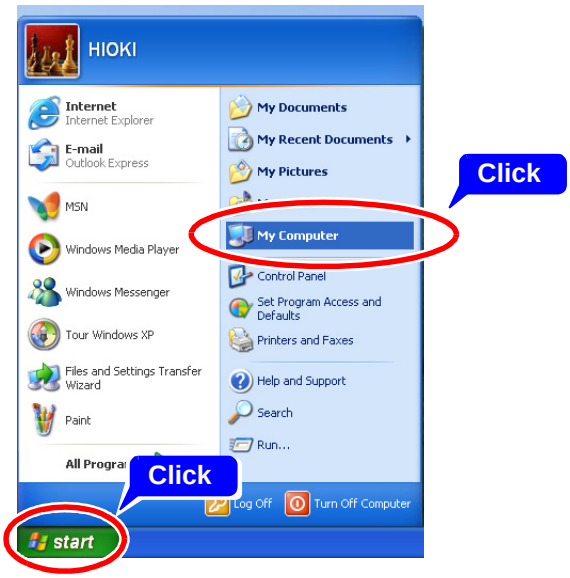
Setting Items			Initial setting	Unit Reset Operation Full reset	:PRESet	*RST	Return to initial settings when power is turned on	Panel Save/ Load*1		File Save/ load
								LCR mode	ANALYZER mode	
Interface	RS-232C	Baud rate	9600	←	No Change	No Change	No	No	No	Yes
		Terminator	CR+LF	←	No Change	No Change	No	No	No	Yes
		Handshake	OFF	←	No Change	No Change	No	No	No	Yes
	GPIB	Terminator	LF	←	No Change	No Change	No	No	No	Yes
		Address	01	←	No Change	No Change	No	No	No	Yes
	USB	Terminator	CR+LF	←	No Change	No Change	No	No	No	Yes
	LAN	IP address	192.168.000.001	←	No Change	No Change	No	No	No	Yes
		Subnet mask	255.255.255.000	←	No Change	No Change	No	No	No	Yes
		Gateway	OFF	←	No Change	No Change	No	No	No	Yes
		Port	3570	←	No Change	No Change	No	No	No	Yes
		Terminator	CR+LF	←	No Change	No Change	No	No	No	Yes
	Printer	Mode	MANUAL	←	No Change	No Change	No	No	No	Yes
		Type	TEXT	←	No Change	No Change	No	No	No	Yes
	Header		OFF	←	No Change	OFF	Yes	No	No	Yes
	Status Byte register		0	No Change	No Change	No Change	Yes	No	No	Yes
	Event register		0	No Change	No Change	No Change	Yes	No	No	Yes
	Enable register		0	No Change	No Change	No Change	Yes	No	No	Yes
	:MEASure:ITEM		0,0	←	←	←	No	Yes	Yes	Yes
	:MEASure:VALid		127	←	←	←	No	Yes	Yes	Yes
	Automatic output of measurement values		OFF	←	←	←	No	No	No	Yes
	Transfer format		ASCII	←	←	←	No	No	No	Yes
	Long format		OFF	←	←	←	No	No	No	Yes
File	Save Format		OFF	←	←	←	No	No	No	Yes
	Save folder		AUTO	←	←	←	No	No	No	Yes
	Header	Date and time	ON	←	←	←	No	No	No	Yes
		Measurement conditions	ON	←	←	←	No	No	No	Yes
		Measurement parameters	ON	←	←	←	No	No	No	Yes
		Delimiter	, (Comma)	←	←	←	No	No	No	Yes
		Quote	" (Double quote)	←	←	←	No	No	No	Yes
Panel Calibration			No calibration	←	No Change	No Change	No	No	No	No
Clock			-	No Change	No Change	No Change	No	No	No	No
Panel	Save type		ALL	←	←	←	No	No	No	Yes
	Panel		Clear all data	←	No Change	Clear all data	No	No	No	Only when ALL SAVE

Appendix 3 Checking the USB Virtual COM Port

Since the USB communication function of IM3570 is COM class compatible, the same control as RS-232C is possible when performing communication with a computer.
Connecting the IM3570 and a computer and setting the interface setting of the IM3570 to USB enables recognition as a virtual COM port on the computer.
The following describes the procedure for checking the virtual COM port number.

For Windows XP

1 Open [My Computer].

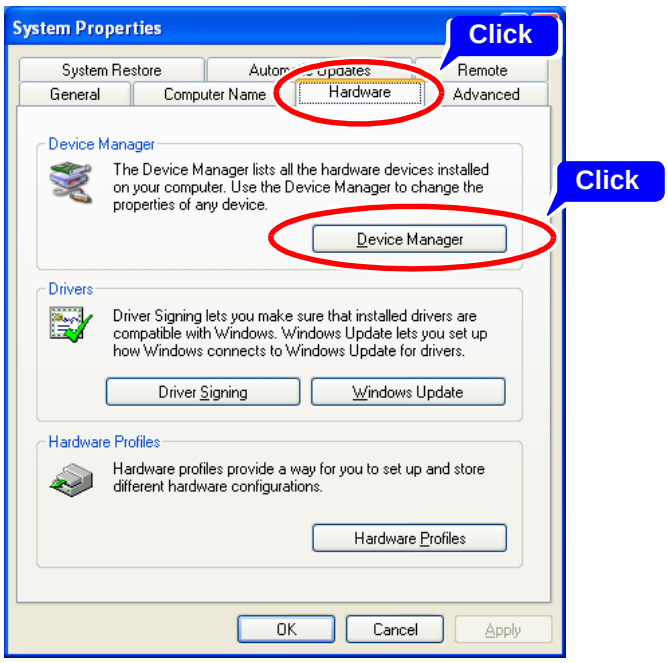


Click **[Start Menu]** and then **[My Computer]**.

2 Open [System Properties].

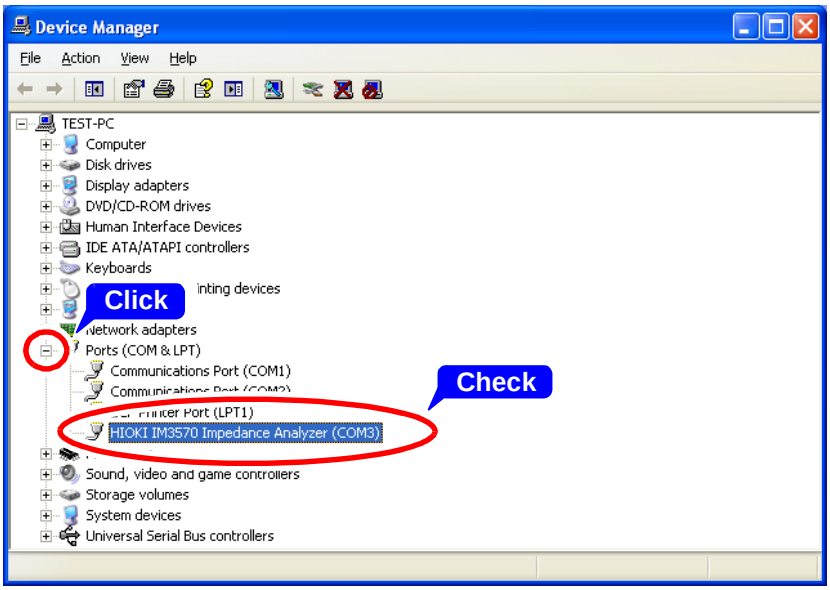
Click **[View system information]**.

3 Start Device Manager.



Click **[Hardware]** tab and then **[Device Manager]**.

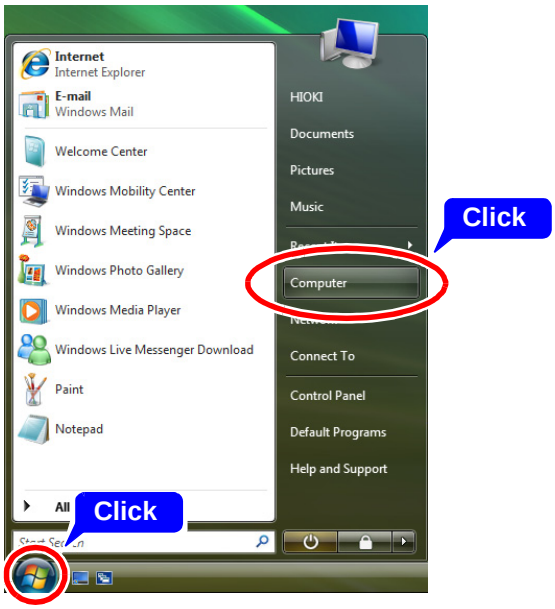
4 Device Manager starts.



Check the COM number on the right of "HIOKI IM3570 Impedance Analyzer" port in the **[Ports]** list.

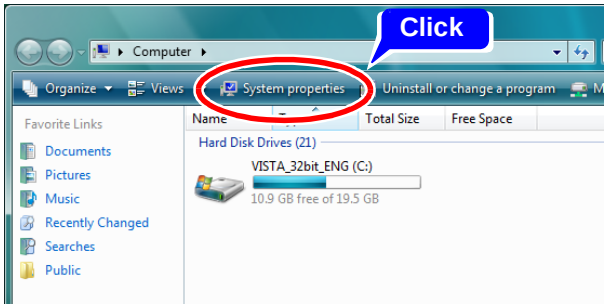
For WindowsVista

1 Open [Computer].



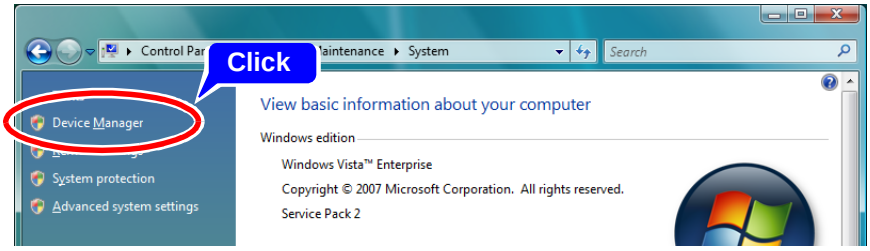
Click **[Start Menu]** and then **[Computer]**.

2 Open [System properties].



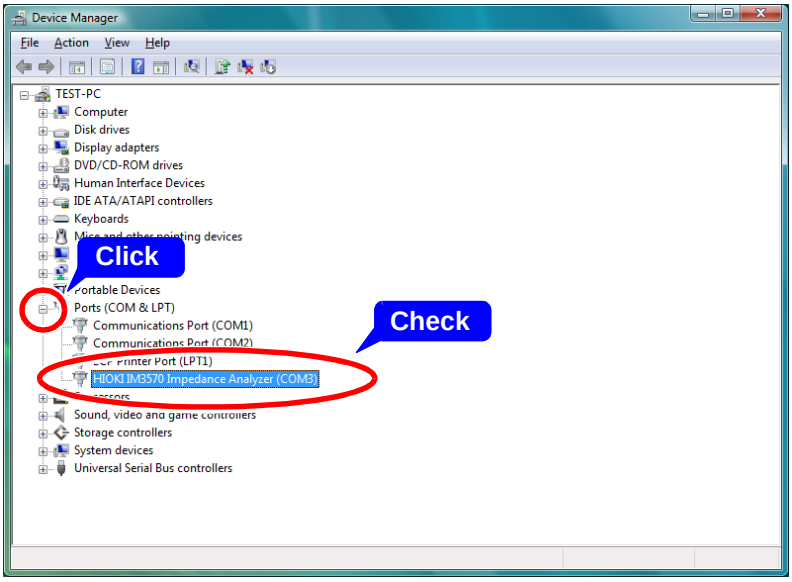
Click **[System properties]**.

3 Start Device Manager.



Click **[Device Manager]**.

4 **Device Manager starts.**



Check the COM number on the right of "HIOKI IM3570 Impedance Analyzer" port in the **[Ports]** list.

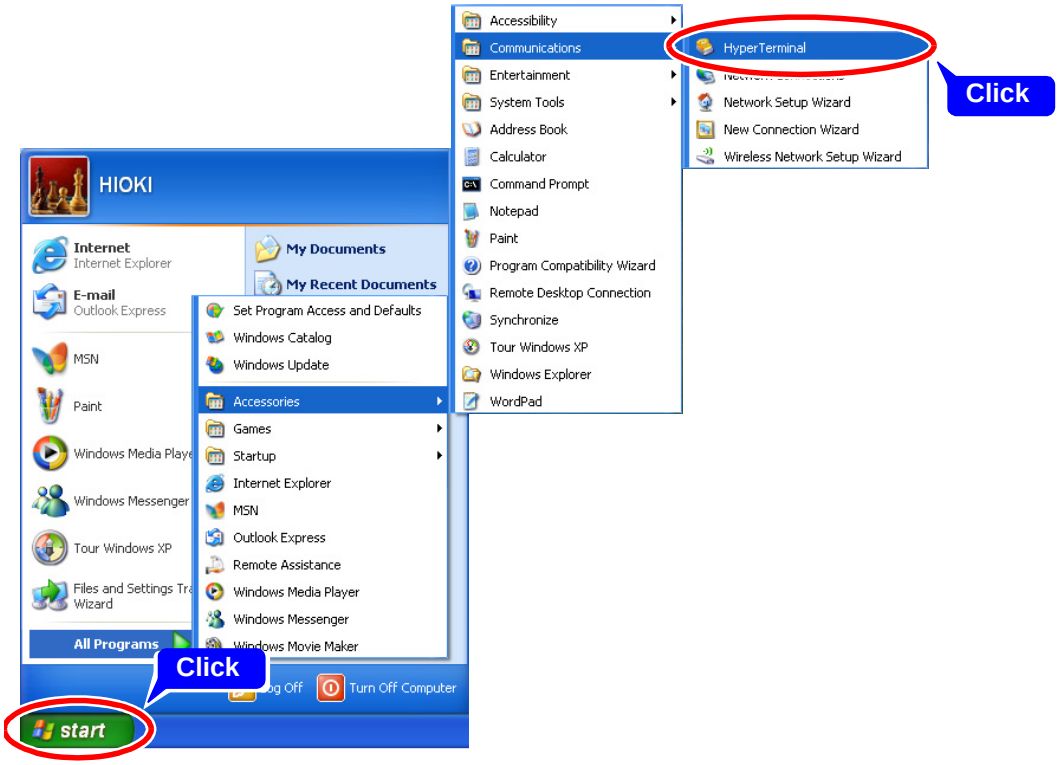
For Windows 7

You can check the COM port with Steps **4** to **7** of the USB drive installation procedure (p. 12).

Appendix 4 Checking RS-232C and USB Communication in Windows

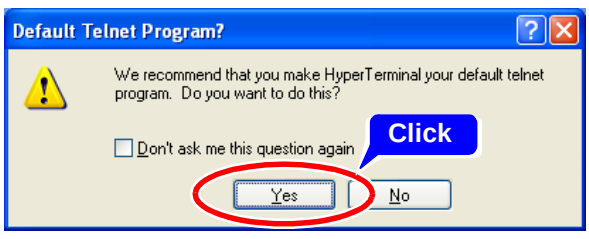
You can use Hyper Terminal which comes standard with Windows XP to check LAN communication.
Hyper Terminal is not supplied with Windows Vista and Windows 7.

1 Start Hyper Terminal.



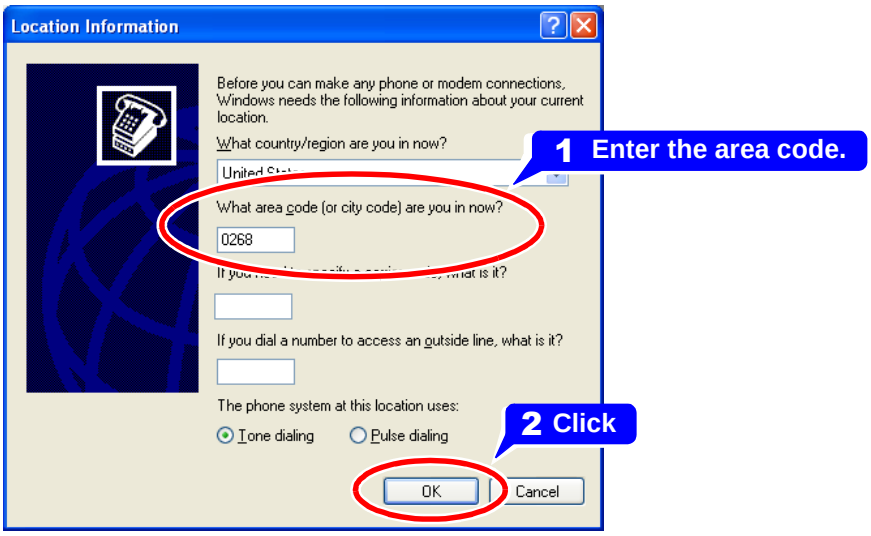
Click **[Start Menu]** - **[All Programs]** - **[Accessories]** - **[Communications]** and **[Hyper Terminal]**.

2 Set the Telnet program settings.



Click **[Yes]**.

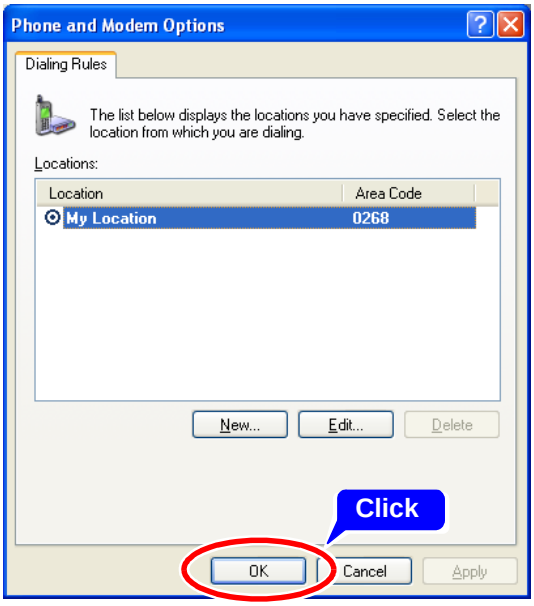
3 Set the information for where you are now.



1 Enter the area code in **[What area code (or city code) are you in now?]**.

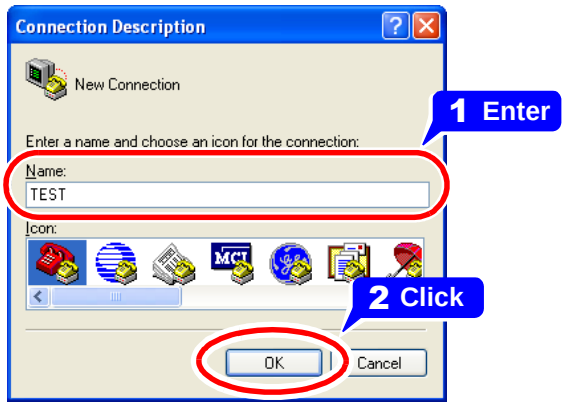
2 Click **[OK]**.

4 Set the phone and modem options.



Click **[OK]**.

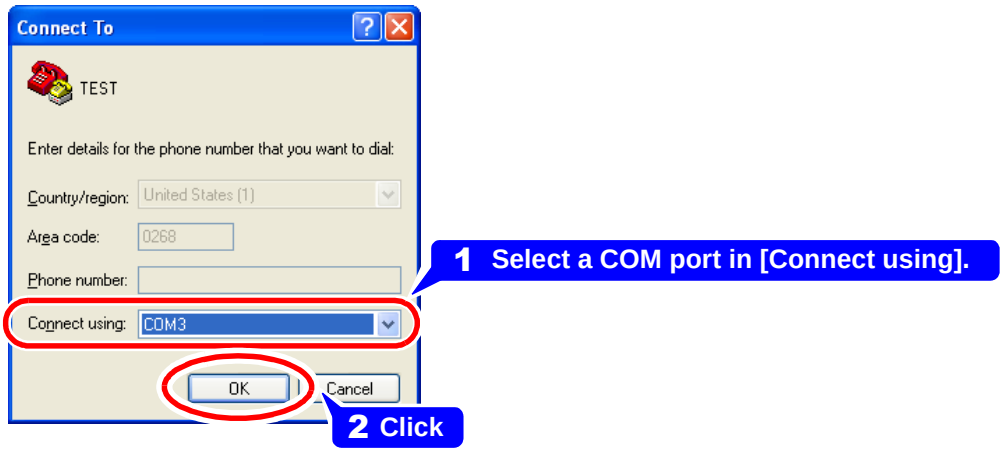
5 Set a name and icon.



1 Enter a name in the **[Name]** field, and select any icon.
(The name and icon are used for the shortcut.)

2 Click **[OK]**.

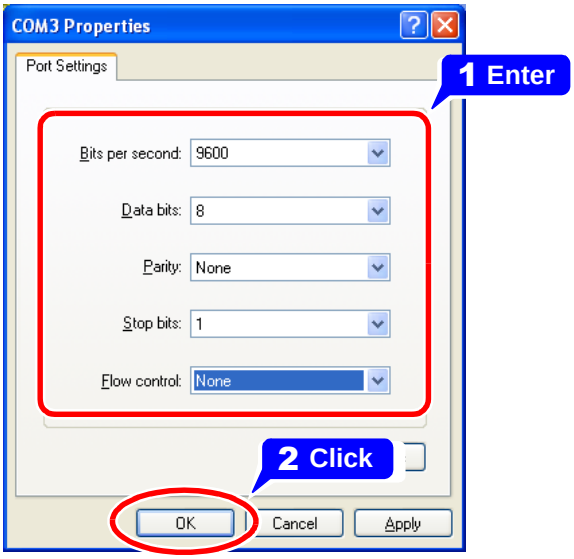
6 Set the connection method.



1 Select a COM port in **[Connect using]**.

2 Click **[OK]**.

7 Set the properties of the COM port to be used.

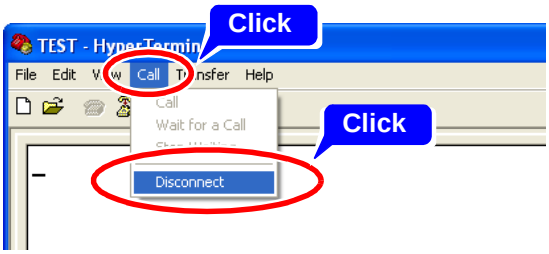


1 Set the properties in accordance with the measuring instrument to be used.
(For the information, refer the instruction manual of the measuring instrument to be used.)

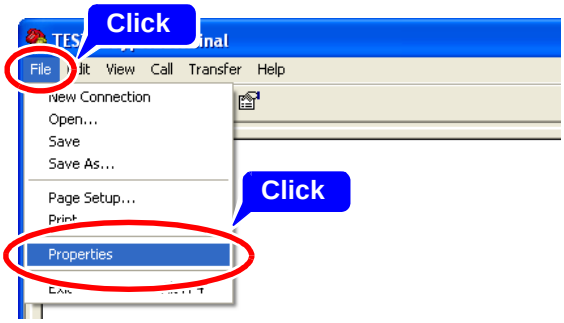
2 Click **[OK]**.

The main screen of Hyper Terminal appears.

8 Select [Disconnect] from the [Call] menu.

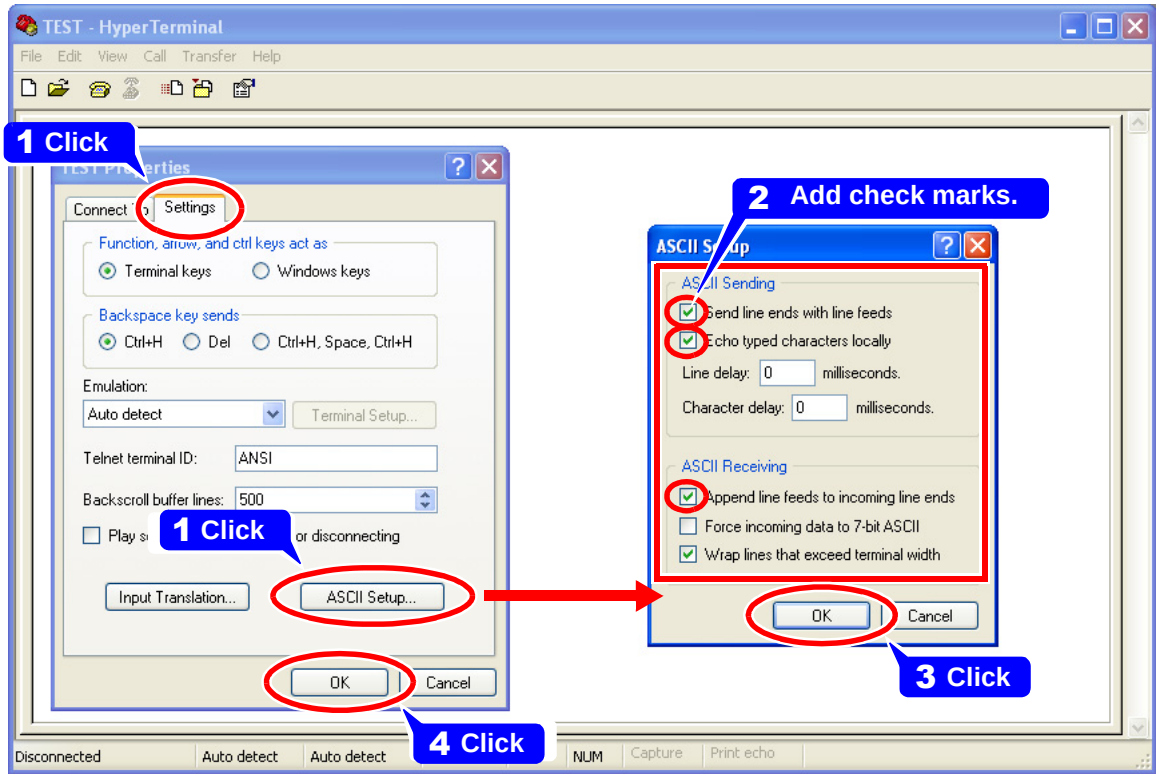


9 Select [Properties] from the [File] menu.



The properties screen appears.

10 Set the ASCII settings.



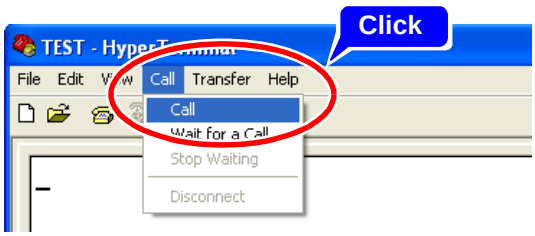
1 Click **[Settings]** tab and then **[ASCII Setup...]**.

2 Add check marks to **[Send line ends with line feeds]**, **[Echo typed characters locally]**, and **[Append line feeds to incoming line ends]**.

3 Click **[OK]** to close **[ASCII Setup]**.

4 Click **[OK]**.

11 Select [Call] from the [Call] menu to connect to the measuring instrument.

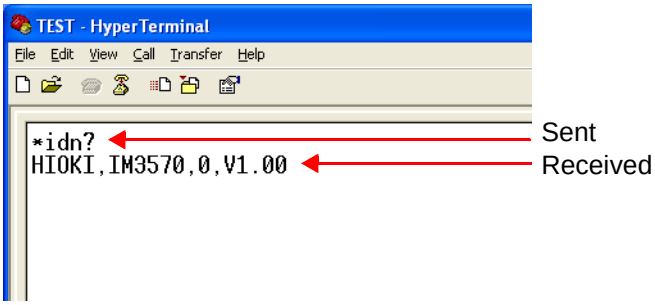


Preparation for communication is completed.

12 Perform communication with the measuring instrument.

Send a character string to the measuring instrument.

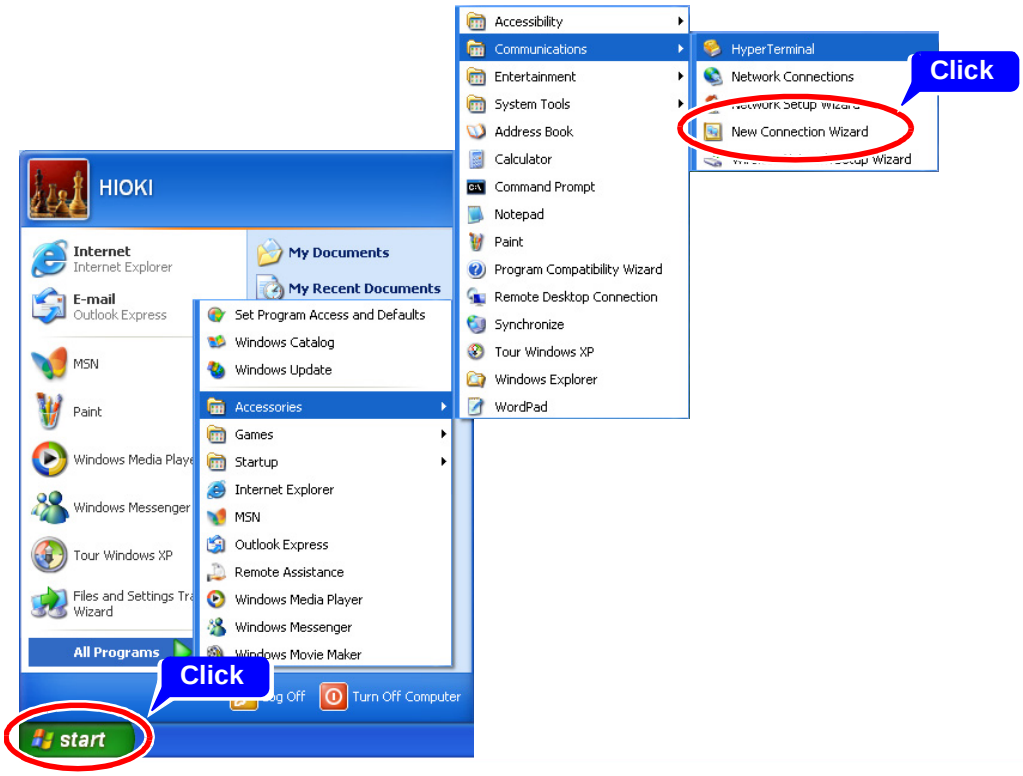
The following shows an example of entering "*idn?" and then pressing the Enter key.
Communication has been established if there is a response from the measuring instrument.
In the following example, the "HIOKI,IM3570,V1.00" character string was received.



Appendix 5 Checking LAN Communication in Windows

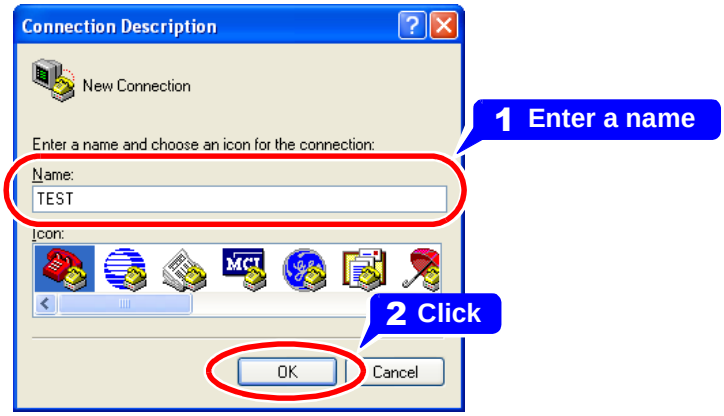
You can use Hyper Terminal which comes standard with Windows XP to check LAN communication.
The following describes the procedure up until performing communication using Hyper Terminal.

1 Launch HyperTeminal.



Click **[Start Menu]** - **[All Programs]** - **[Accessories]** - **[Communications]** and **[Hyper Terminal]**.

2 Specify a connection name.

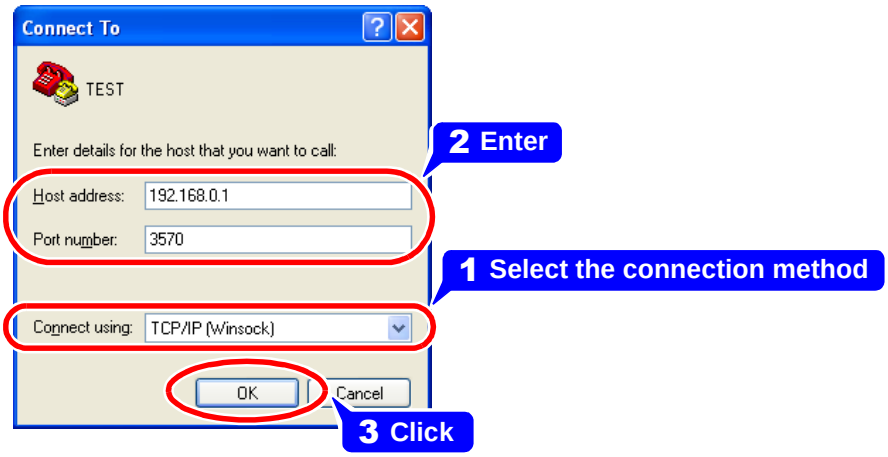


1 Enter a name in the **[Name]** field

2 Click **[OK]**. (You can enter any name.)

A **[Connect To]** dialog appears.

3 Make the connection settings.



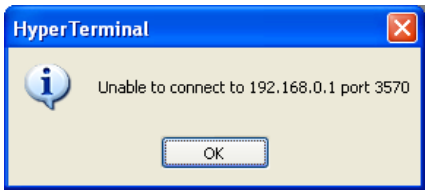
1 In **[Connect using]** select **[TCP/IP (Winsock)]**.

2 • In **[Host address]**, enter the IP address of the instrument.
• In **[Port number]**, enter the port number specified in the **[Command]** page.

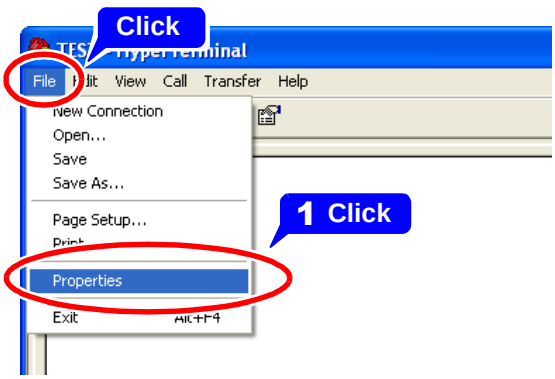
See "Select the IP address." (p. 29)

3 Click **[OK]**.

If the following screen appears, there is a problem with the LAN settings.
Check that the LAN settings of the instrument and the IP address on the computer side are correct.

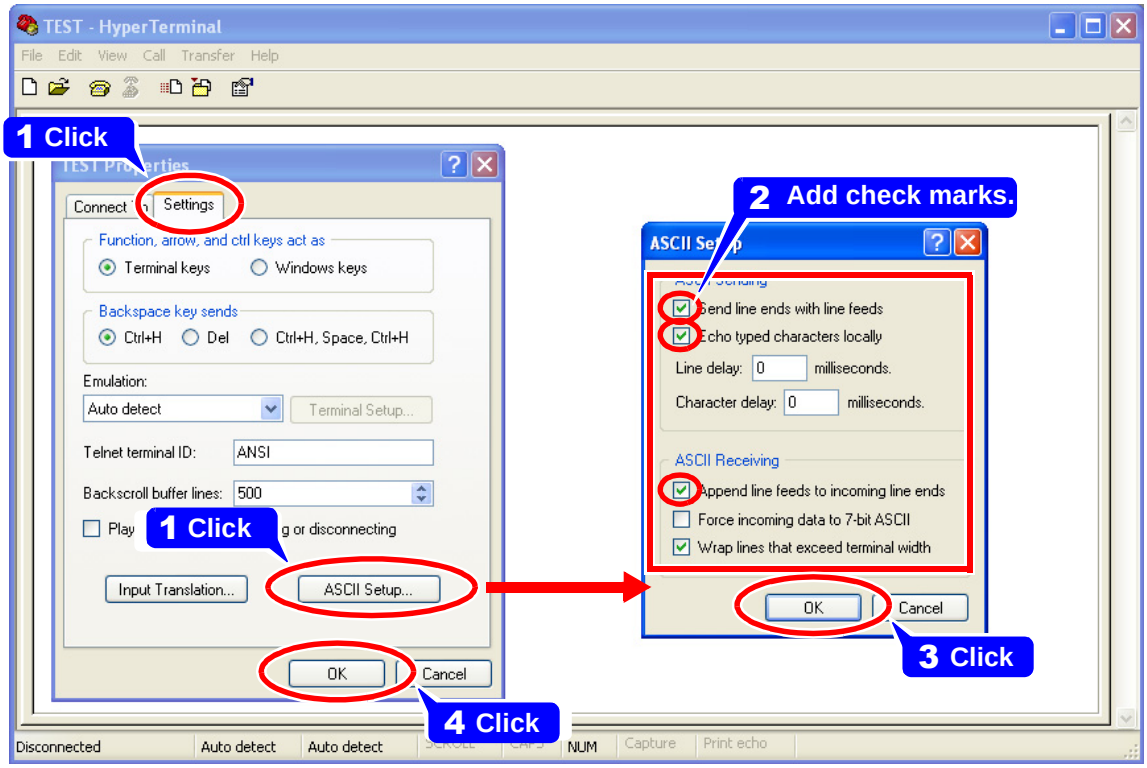


4 Make detailed connection settings.



1 Select **[Properties]** in the **[File]** menu.

The Properties dialog for the specified connection name appears.



1 Click **[Settings]** tab and then **[ASCII Setup...]**.

2 Add check marks to **[Send line ends with line feeds]**, **[Echo typed characters locally]**, and **[Append line feeds to incoming line ends]**.

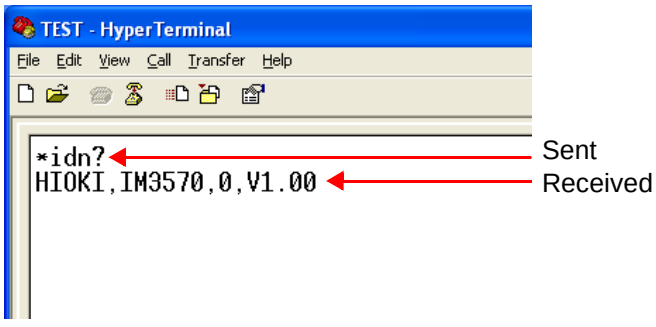
3 Click **[OK]** to close **[ASCII Setup]**.

4 Click **[OK]**.

5 Perform communication with the measuring instrument.

Send a character string to the measuring instrument.

The following shows an example of entering "**`*idn?`**" and then pressing the Enter key.
Communication has been established if there is a response from the measuring instrument.
In the following example, the "HIOKI,IM3570,V1.00" character string was received.



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Edited and published by Hioki E.E. Corporation
Technical Support Section

Printed on recycled paper Printed in Japan