# GPIB Interface
# User's Guide


# (AT6030D)

ATTEN®
INSTRUMENTS

# Table of Contents

# Chapter 1. General Information

## 1-1. Introduction

This spectrum analyzer can control the measurement system while it is connected to the external control device (a host computer or PC). To this end, this spectrum analyzer is equipped with the GPIB interface.

## 1-2. Specifications

The following table shows the specifications of the GPIB provided by the spectrum analyzer.

| Item | Specifications |
|---|---|
| Interface Feature | SH0　 : No transmission feature. <br> AH1　 : Receive feature. <br> L4　　 : Basic listener feature provided. Listen only feature not provided. <br> SR0　 : No service request feature. <br> RL1　 : All Remote/Local feature provided. Local lock feature provided. <br> PP0　 : No parallel poll feature provided. <br> DC1　 : All devices clear feature provided. <br> LE0　 : No expansion listener feature. <br> TE0　 : No expansion talker feature. |

# Chapter 2. Device Connection

## 2-1. Connection between external device and GPIB cable, and its Requirements

The GPIB cable is connected to the GPIB connector in the back panel of the system, and the other end of the cable is connected to the GPIB connector in an external device.

▶ The maximum number of connection between them :
up to 15 set

▶ The maximum length of connection path between them :
up to 20m or less than 2m per device

▶ Message transfer mode :
Byte serial and Bit parallel synchronization data transfer using the three-tier hand shake protocol.

▶ Data transfer speed :
Up to 1M bytes in the set distance by Tri-state drive.
Actual data transfer is determined by the transfer rate of the slowest device connected to the bus.

▶ Assignable address :
First address: 31 talk, 31 listen.
up to one talk and 14 listeners can be connected within a set time.

▶ Multiple control capability :
Only one controller is valid within a set time in a system having more than one controller. While a current controller can pass the control ownership to another controller, only a system controller can take the absolute control. However, only one system controller is allowed.

## 2-2. GPIB Connector

The IEEE-488 GPIB connector complies with the ANSI/IEEE standard 488.2-1987.

| Pin Number | Signal | Pin Number | Signal |
|:---:|:---:|:---:|:---:|
| 1 | DIO 1 | 13 | DIO 5 |
| 2 | DIO 2 | 14 | DIO 6 |
| 3 | DIO 3 | 15 | DIO 7 |
| 4 | DIO 4 | 16 | DIO 8 |
| 5 | EOI | 17 | REN |
| 6 | DAV | 18 | Ground |
| 7 | NRFD | 19 | Ground |
| 8 | NDAC | 20 | Ground |
| 9 | IFC | 21 | Ground |
| 10 | SRQ | 22 | Ground |
| 11 | ATN | 23 | Ground |
| 12 | Ground | 24 | Ground |

IEEE-488 GPIB Connector Pin Specification
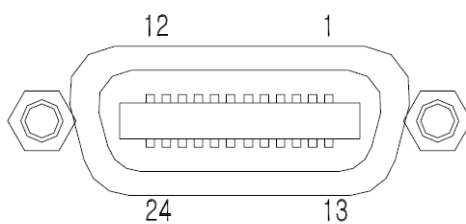


IEEE-488 GPIB Connector

## 2-3. How to Set GPIB Address

  You can set the GPIB address of this equipment using the key pad in the front panel. Setting scope of GPIB address is from No. 1 to No. 30. To set, press the key pad in the front panel in the following order.

SYSTEM >> Config I/O >> GPIB Address
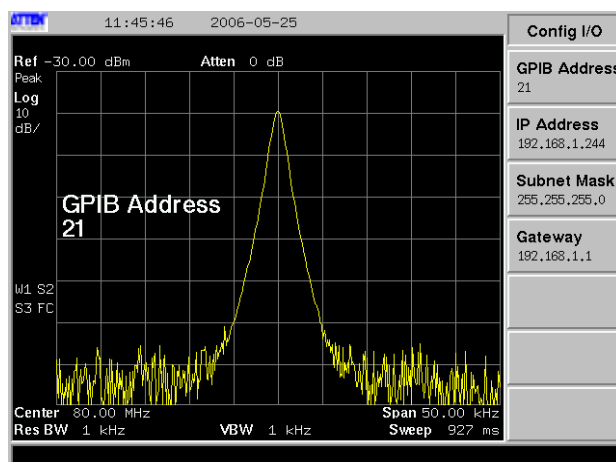


[Fig. 2-1] GPIB Address Change Menu
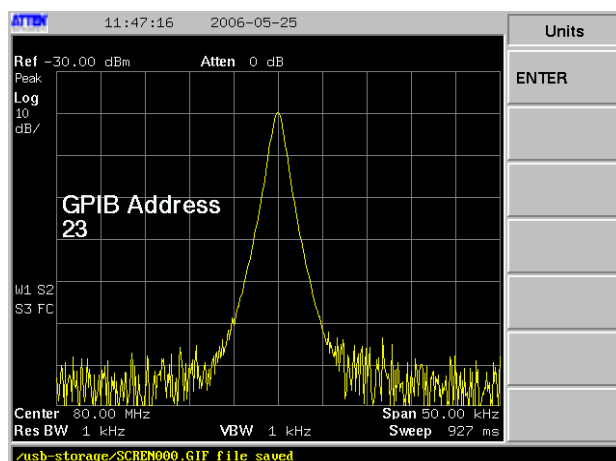


[Fig. 2-2] GPIB Address Change
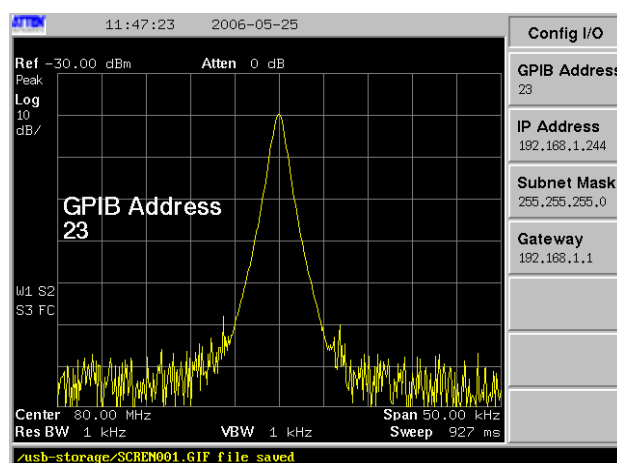
[Fig. 2-3] GPIB Address Change Completed

  Change the GPIB address as shown in the above figure. You can change GPIB address using number key pad only.

## 2-4. Example of Connection using NI GPIB Card

 Execute Interactive Control program in the National Instruments Program group if NI GPIB card and driver program are installed.



[Fig. 2-4] GPIB Communication Screen

:ibdev

   enter board index : 0

   enter primary address : 21

   enter secondary address : 0

   enter timeout : 13

   enter 'EOI on last byte' flag : 1

   enter end-of-string mode/byte : 0

   Use idbev command to open the device. Equipment of primary address No. 21 was assigned to the board index No. 0. Secondary address is not used. Set the timeout 10 second and set to use END message and not to use EOS mode.

ud0: ibwrt

   enter string: "*IDN?"

   Send short message(*IDN?) to request the ID of equipment, board index No. 0. Use the command, ibwrt to send the short message. Group the short message to send with big quotation mark.

ud0: ibrd

   enter byte count: 50

   It is the command to get the short message from the equipment with board index No. 0. Since ID of equipment was requested using *IDN? Earlier, use ibrd command to get the requested data. ID of equipment consists of manufacturer, model name, serial number and firmware version.

ud0: ibwrt

   enter string: ":freq:center 1.25ghz"

   It is the command to set the center frequency of Spectrum Analyzer. Use ibwrt to send short message as above. See Section 4-12 Frequency Subsystem.

ud0: ibwrt

   enter string: ":freq:center?"

It is the command to read the center frequency of Spectrum Analyzer set above. Use ibwrt to send short message as above. See Section 4-12 Frequency Subsystem

ud0: ibrd

   enter byte count:   50

It is the command to get the short message from the equipment with board index No. 0. Read the center frequency set above.

# Chapter 3. Message Type

## 3-1. Command Type

A command does not distinguish a capital letter from a small letter. The following displays diverse methods of using one command. The following examples are all the same. The examples bring forth the same consequence.

| Command | Actually applicable command |
|---|---|
| :CALCulate:MARKer1\|2\|3\|4:MODE NORMal\|DELTa\|BAND\|SPAN\|OFF | • :CALCULATE:MARKER1:MODE  NORMAL<br>• :calc:marker1:mode  normal<br>• :CALC:MARK1:MODE  NORMAL<br>• :calc:mark1:mode  norm |
| :FREQuency:CENTer  \<freq> | • :FREQUENCY:CENTER  1GHZ<br>• :freq:center  1  ghz<br>• :freq:cent  1.0  ghz |
| :TRACe:DATA?  \<trace_name><br>\<trace_name> is TRACE1\|2\|3 | • :TRACE:DATA?  TRACE1<br>• :trac:data?  trace1 |

## 3-2. Special Text on Command

| Special text | Meaning | Example |
|---|---|---|
| \| | You should select one parameter among many parameters. You can have different result upon what parameter you select. You can select one parameter at one time. | Command<br>:CALCulate:MARKer1\|2\|3\|4:MODE NORMal\|DELTa\|BAND\|SPAN\|OFF<br>The selectable parameters include normal, delta, band, span, off.<br><br>Ex)<br>:calc:mark2:mode   delt |
| <> | <> is not used as the text goes. It means that you should put a relevant parameter in the place. | Command<br>:FREQuency:CENTer   <freq><br><br>Ex)<br>:freq:cent   125mhz |
| ;(semicolon) | Separator<br><br>It is an indication distinguishing each command when giving more than one command at a time. | Ex)<br>:freq:center 1ghz;:freq:span 2mhz<br><br>:freq:center 1ghz<br>:freq:span 2mhz<br>It is the same as the one when you make two commands successively. |
| :(colon) | It is a slight variable of SCPI command as a command type of this device. | Ex)<br>:freq:center 1ghz<br><br>Wrong ex) |

| | SCPI command is divided with subsystems, and the subsystem is subdivided with subsections. When giving a command by using SCPI command, always put :(colon) in front of subsystem and subsection. | freq:center 1ghz The command was not recognized. |
|---|---|---|

# 3-3. Parameter

### &lt;freq&gt;

  Input a frequency. The basic unit is Hz. If you do not use any unit separately, it is recognized as Hz.
The unit that you can input includes Hz, kHz, MHz, GHz.

### &lt;integer&gt;

  Integer parameter does not need any unit.

### &lt;string&gt;

  String parameter comprises alphabets. On the LCD screen of a spectrum analyzer, it is only written with capital letters. If there is any small letter on the parameter, it is changed to a capital letter for display.

### &lt;ampl&gt;

  Input a level. The basic unit is dBm. If you do not use any unit, it is recognized as dBm.

### &lt;rel_ampl&gt;

  Input a relative level value. The basic unit is dB. If you do not use any unit, it is recognized as dB.

### &lt;time&gt;

  Input a time. The basic unit is ms. If you do not use any unit, it is recognized as ms.
The unit that you can use includes ms, s.

### &lt;delay&gt;

  Input a delay of external trig. The basic unit is ms. If you do not use any unit, it is recognized as ms.
The unit that you can use includes ms, s.

## <trace_name>

It is used only for the query of trace data. The only one is used among TRACE1, TRACE2, TRACE3.

## <year>

Input a year. Do not attach a unit. The input coverage ranges from 2000 to 2037.

## <month>

Input a month. Do not attach a unit. The input coverage ranges from Jan. to Dec.
When you input a month, be sure to input a number of two figures.

**Ex)** Input January as 01, and May as 05.

## <day>

Input a day. Do not attach a unit. The input coverage ranges from 01 to 31.
When you input a day, be sure to input a number of two figures.

**Ex)** Input the $1^{st}$ day as 01, and the fifth day as 05.

## <hour>

Input a time. Do not attach a unit. The input coverage ranges from 00 to 23.
When you input a time, be sure to input a number of two figures.

**Ex)** Input 1 hour as 01, and 5 hour as 05.

## <minute>

Input a minute. Do not attach a unit. The input coverage ranges from 00 to 59.
When you input a minute, be sure to input a number of two figures.

**Ex)** Input 1 minute as 01, and 5 minute as 05.

## <second>

Input a second. Do not attach a unit. The input coverage ranges from 00 to 59.
When you input a second, be sure to input a number of two figures.

**Ex)** Input 1 second as 01, 5 second as 05, and 10 second as 10.

## <definite_length_block>

definite_length_block data comprise Ascii header and binary data.

Ascii header starts from '#'. And then, it is followed by the byte number of binary data.

**Ex)** #512320 +  12320 Binary data of a byte

\# : It indicates the start of Ascii header.

5 : It indicates how many texts are brought forth after '5' which is the first indication

within the header. It also means that there will be five figures of 12320 next to 5.

12320 : It indicates the byte number of binary data which will be continued after Ascii

header. It also means that the byte number of binary data is 12320.

# Chapter **4**. Detailed Description on Command

## 4-1. Command Type

▶ IEEE Common Commands

▶ Abort Subsystem

▶ Average Subsystem

▶ Bandwidth Subsystem

▶ Calculate Subsystem (Marker)

▶ Calibration Subsystem

▶ Configure Subsystem

▶ Detector Subsystem

▶ Display Subsystem

▶ Format Subsystem

▶ Frequency Subsystem

▶ Hcopy Subsystem

▶ Initiate Subsystem

▶ Power Subsystem

▶ Sweep Subsystem

▶ System Subsystem

▶ Trace Subsystem

▶ Trigger Subsystem

▶ Unit Subsystem

# 4-2. IEEE Common Commands

Not all commands of IEEE Common Commands are executed under analyzer.

Four types of IEEE Common Commands는 *CAL?, *IDN?, *RST, *TST are executed under analyzer.

■ **Calibration Query**

- *CAL?

  Executes Alignments, and returns to 0.

■ **Identification Query**

- *IDN?

  Returns to device information. The device information is divided with four parts, and each are separated by comma.

  The each part is as follows.

  1. Manufacturing company

  2. Model no.

  3. Serial no.

  4. Firmware version

■ **Reset**

- *RST

  Performs Factory Preset.

  It performs the same function as :SYSTem:PRESet.

■ **Self Test Query**

- *TST?

  It performs a self-test of a device.

  *TST? Always returns to 0 under analyzer. And, it does not perform an actual self-test.

## 4-3. Abort Subsystem

■ Abort

:ABORt

Restart swim or measurement.

It performs the same function as clicking a restart button on a front board.

# 4-4. Average Subsystem

■ Turn Averaging On/Off

:AVERage   OFF|ON

:AVERage?

  It performs or stops the average function.

■ Set the Average Count

:AVERage:COUNt   <integer>

:AVERage:COUNt?

  When the average function is turned on, it sets up a frequency of actually performing the average.

■ Type of Averaging for Measurements

:AVERage:TYPE   VIDeo|PWR

:AVERage:TYPE?

  When the average function is turned on, it sets up how the trace average is calculated.

■ Turn Automatic Averaging On/Off

:AVERage:TYPE:AUTO   ON

:AVERage:TYPE:AUTO?

  It sets up the average type as AUTO.

## 4-5. Bandwidth Subsystem

■ **Resolution Bandwidth**

:BANDwidth  <freq>

:BANDwidth?

  It sets up Resolution bandwidth.

■ **Resolution Bandwidth Automatic**

:BANDwidth:AUTO  ON

:BANDwidth:AUTO?

  It sets up Resolution bandwidth in connection with Span.

■ **Video Bandwidth**

:BANDwidth:VIDeo  <freq>

:BANDwidth:VIDeo?

  It sets up Video bandwidth.

■ **Video Bandwidth Automatic**

:BANDwidth:VIDeo:AUTO  ON

:BANDwidth:VIDeo:AUTO?

  It sets up Video bandwidth in connection with Resolution bandwidth.

■ **Video to Resolution Bandwidth Ratio**

:BANDwidth:VIDeo:RATio  <integer>

:BANDwidth:VIDeo:RATio?

  It sets up the ratio of Video bandwidth versus Resolution bandwidth.

■ **Video to Resolution Bandwidth Ratio Mode Select**

:BANDwidth:VIDeo:RATio:AUTO  ON

:BANDwidth:VIDeo:RATio:AUTO?

  It sets up the ratio of VBW / RBW as Auto.

# 4-6. Calculate Subsystem (MARKer)

■ **Marker Mode**

:CALCulate:MARKer1|2|3|4:MODE   NORMal |DELTa|BAND|SPAN|OFF

:CALCulate:MARKer1|2|3|4:MODE?

  It sets up a marker mode.

■ **Markers All Off on All Traces**

:CALCulate:MARKer:AOFF

  It deletes all markers on the current LCD screen.

■ **Marker to Trace**

:CALCulate:MARKer1|2|3|4:TRACe  〈integer〉

:CALCulate:MARKer1|2|3|4:TRACe?

  It allots a marker to designated trace.

■ **Marker to Trace Auto**

:CALCulate:MARKer1|2|3|4:TRACe:AUTO   ON

:CALCulate:MARKer1|2|3|4:TRACe:AUTO?

  It automatically allots a marker to trace.

The allotment is made in order of Clear-write, Max-hold, Min-hold, and View.

  **Ex1)** If Trace1(Clear-write), Trace2(Max-hold), Trace3(Min-hold), a marker is allotted to Trace 1.

  **Ex2)** If Trace1(Max-hold), Trace2(Clear-write), Trace3(View), a marker is allotted to Trace 2.

■  Marker Table On/Off

:CALCulate:MARKer:TABLe:STATe   OFF|ON

:CALCulate:MARKer:TABLe:STATe?

  It turns on/off a marker table.

■  Marker Peak (Maximum) Search

:CALCulate:MARKer:MAXimum

  It puts the current marker on the maximum point of trace.

■  Marker Next Peak (Maximum) Search

:CALCulate:MARKer:MAXimum:NEXT

  It puts the current marker on the next highest peak.

■  Marker Peak (Maximum) Left Search

:CALCulate:MARKer:MAXimum:LEFT

  It puts the current marker on the next highest peak on the left.

■  Marker Peak (Maximum) Right Search

:CALCulate:MARKer:MAXimum:RIGHt

  It puts the current marker on the next highest peak on the right.

■  Marker Peak (Minimum) Search

:CALCulate:MARKer:MINimum

  It puts the current marker on the minimum point of trace.

■ **Peak to Peak Delta Markers**

:CALCulate:MARKer:PTPeak

  After changing a marker mode to delta, it puts a marker on the maximum point and minimum point.

■ **Continuous Peaking Marker Function**

:CALCulate:MARKer:CPEak   OFF|ON

:CALCulate:MARKer:CPEak?

  It turns on/off Continuous peak function.

■ **Set Center Frequency to the Marker Value**

:CALCulate:MARKer:CENTer

  It changes Center frequency to the current marker frequency.

■ **Set Center Frequency Step Size to the Marker Value**

:CALCulate:MARKer:STEP

  It changes Step frequency to the current marker frequency.

■ **Set Start Frequency to the Marker Value**

:CALCulate:MARKer:STARt

  It changes Start frequency to the current marker frequency.

■ **Set Stop Frequency to the Marker Value**

:CALCulate:MARKer:STOP

  It changes Stop frequency to the current marker frequency.

■ Set Span to the Marker Value

:CALCulate:MARKer:SPAN

   It is applied only when a marker mode is delta.

If the current marker mode is delta, a frequency between two markers is set up as span.

■ Set Reference Level to the Marker Value

:CALCulate:MARKer:RLEVel

   It changes a Reference level to a level where a marker is currently placed.

■ Continuous Signal Tracking Function

:CALCulate:MARKer:TRCKing   OFF|ON

:CALCulate:MARKer:TRCKing?

   It turns on/off Signal tracking function.

# 4-7. Calibration Subsystem

■ **Align All Instrument Assemblies**

:CALibration

:CALibration?

  It makes Alignments and returns to 0.

■ **Automatic Alignment**

:CALibration:AUTO  OFF|ON

:CALibration:AUTO?

  It turns on/off Auto Alignments.

■ **Query the Internal or External Frequency Reference**

:CALibration:FREQuency:REFerence  INT|EXT

:CALibration:FREQuency:REFerence?

  It determines what to use as reference 10MHz.

INT : Use internal TOXO 10MHz as analyzer reference frequency.

EXT : Use external input port frequency as analyzer reference frequency.

■ **Output Internal 80MHz**

:CALibration:FREQuency:OUT  ON|OFF

:CALibration:FREQuency:OUT?

  It sets up the output of external 80MHz.

# 4-8. Configure Subsystem

■ **Configure the Basic Spectrum Analyzer State**

:CONFigure:SANalyzer

  It changes to spectrum mode when it is in a Measurement mode.

It is the same as clicking a Meas off key.

## 4-9. Detector Subsystem

■ **Automatic Detection Type Selected**

:DETector:AUTO   ON

:DETector:AUTO?

  It changes to a Auto Detector mode.

■ **Type of Detection**

:DETector   PEAK|NEGative|NORMal|SAMPle|AVERage

:DETector?

  It sets up a Detector mode.

# 4-10. Display Subsystem

## ■ Active Function Position

:DISPlay:AFUNction   BOTTom|CENTer|TOP

:DISPlay:AFUNction?

   It sets up the position of active function block.

## ■ Date and Time Display

:DISPlay:DATE   OFF|ON

:DISPlay:DATE?

   It turns on/off the time and date of LCD screen.

## ■ Date and Time Display Format

:DISPlay:DATE:FORMat   MDY|YMD

:DISPlay:DATE:FORMat?

   It sets up the indication type of date.

MDY : It indicates in order of month, date, and year.

YMD : It indicates in order of year, month, and date.

## ■ Display Annotation Title Data

:DISPlay:TITLe   <string>

:DISPlay:TITLe?

   It sets up a title on the upper left of LCD screen as <string>.

## ■ Turn the Full Screen Display On/Off

:DISPlay:FULLSCReen   OFF|ON

:DISPlay:FULLSCReen?

   It turns on/off the whole screen.

■ **Trace Graticule Display**

:DISPlay:GRID    OFF|ON

:DISPlay:GRID?

  It turns on/off a lattice of a graph where trace is drawn.

■ **Display Line Amplitude**

:DISPlay:DLINe    <ampl>

:DISPlay:DLINe?

  It sets up the position of a display line. Only unit dBm.

■ **Display Line On/Off**

:DISPlay:DLINe:STATe    OFF|ON

:DISPlay:DLINe:STATe?

  It turns on/off a display line.

■ **Trace Y-Axis Reference Level**

:DISPlay:AMPlitude:RLEVel    <ampl>

:DISPlay:AMPlitude:RLEVel?

  It sets up a position of a reference level. Only unit dBm.

■ **Trace Y-Axis Reference Level Offset**

:DISPlay:AMPlitude:RLEVel:OFFSet    <rel_ampl>

:DISPlay:AMPlitude:RLEVel:OFFSet?

  It sets up a reference level offset.

■ **Trace Y-Axis Amplitude Scaling**

:DISPlay:AMPlitude:PDIVision    <rel_ampl>

:DISPlay:AMPlitude:PDIVision?

  It sets up the size of one unit area of a lattice of a trace graph.

# 4-11. Format Subsystem

It sets up a type of trace data(Binary data) transferred between a device and a terminal. The value set here is applied only with TRACe:DATA? query.

■ **Byte Order**

:FORMat:BORDer   NORMal|SWAPped

:FORMat:BORDer?

It sets up a byte order of trace data(Binary data) transferred between a device and a terminal.

> **Normal** : As for the data byte order, MSB(Most significant byte) is the first output, and LSB(Least significant byte) is the last output.
>
> **Swapped** : As for the data byte order, LSB(Least significant byte) is the first output, and MSB Most significant byte) is the last output.

■ **Numeric Data format**

:FORMat:DATA   ASCii |INTeger,32

:FORMat:DATA?

> It sets up a type of trace data(Binary data) transferred between a device and a terminal.
>
> **Ascii** : The data type of a level transferred is the set of Ascii characters. Each level is separated with comma. As for a unit, a unit set in the current device is outputted.
>
> **Integer, 32** : Binary 32 bit data are outputted. The unit is mdBm.

## 4-12. Frequency Subsystem

■ **Center Frequency**

:FREQuency:CENTer   <freq>

:FREQuency:CENTer   UP|DOWN

:FREQuency:CENTer?

　It sets up Center frequency.


■ **Center Frequency Step Size**

:FREQuency:CENTer:STEP   <freq>

:FREQuency:CENTer:STEP?

　It sets up the step size of Center frequency.


■ **Center Frequency Step Size Automatic**

:FREQuency:CENTer:STEP:AUTO   ON

:FREQuency:CENTer:STEP:AUTO?

　It makes the step size of Center frequency automatically set at a fixed portion of span frequency.


■ **Start Frequency**

:FREQuency:STARt   <freq>

:FREQuency:STARt?

　It sets up Start frequency.


■ **Stop Frequency**

:FREQuency:STOP   <freq>

:FREQuency:STOP?

　It sets up Stop frequency.

■ **Frequency Span**

:FREQuency:SPAN   <freq>

:FREQuency:SPAN?

  It sets up Span frequency.

■ **Full Frequency Span**

:FREQuency:SPAN:FULL

  It sets up Span frequency as 3GHz.

■ **Last Frequency Span**

:FREQuency:SPAN:PREVious

  It sets up Span frequency as the previously set frequency.

# 4-13. Hcopy Subsystem

■ **Print a Hard Copy**

:HCOPy

  It outputs print data. When the current printer port is set up as a parallel port, output data as a parallel port, and when it is set up as USB port, output data as USB port.

■ **Printer Type**

:HCOPy:TYPE CENT|USB

:HCOPy:TYPE?

  It sets up a port to output print data.

■ **Set Printer Driver**

:HCOPy:DRIVer LJ|DJ|DJN|DYMO|ED9|ED24|SC|SCN|SP|SPN

:HCOPy:DRIVer:?

  It sets up a printer driver. It selects a relevant printer driver according to a printer concerned.

     **LJ** : LaserJet printer

     **DJ, DJN** : DeskJet printer

     **DYMO** : DYMO Label printer

     **ED9** : Epson 9pin Dot printer

     **ED24** : Epson 24pin Dot printer

     **SC, SCN** : Epson Stylus Color printer

     **SP, SPN** : Epson Stylus Photo printer

### ■ Page Orientation

:HCOPy:PAGE:ORIentation   LANDscape|PORTrait

:HCOPy:PAGE:ORIentation?

  It sets up the direction of a paper.

### ■ Printed Page Size

:HCOPy:PAGE:SIZE   EXECutive|LETTer|LEGal|A4|A3

:HCOPy:PAGE:SIZE?

  It sets up the size of a paper.

## 4-14. Initiate Subsystem

■ **Continuous or Single Measurements**

:INITiate:CONTinuous   OFF|ON

:INITiate:CONTinuous?

   It sets up a Sweep type.

ON : It sets up Continuous sweep.

OFF : It sets up Single sweep.

■ **Pause the Measurement**

:INITiate:PAUSe

   It temporarily stops Sweep or Measurement.

This command is applicable only for measurement.

■ **Resume the Measurement**

:INITiate:RESume

   It resumes Sweep or Measurement when Pause is set up.

This command is applicable only for measurement.

■ **Restart the Measurement**

:INITiate:RESTart

   It resumes Sweep or Measurement.

## 4-15. Power Subsystem

■ **Input Attenuation**

:POWer:ATTenuation  &lt;rel_ampl&gt;

:POWer:ATTenuation?

  It sets up Attenuation.

■ **Input Port Attenuator Auto**

:POWer:ATTenuation:AUTO   ON

:POWer:ATTenuation:AUTO?

  It links Attenuation setup with a reference level.

■ **Pre amp**

:POWer:PREAMP   ON|OFF

:POWer:PREAMP?

  It sets up Pre amp.

■ **Pre amp Auto**

:POWer:PREAMP:AUTO   ON

:POWer:PREAMP:AUTO?

  It links Pre amp setup with a reference level.

## 4-16. Sweep Subsystem

■ **Sweep Time**

:SWEep:TIME　<time>

:SWEep:TIME?

　It sets up a sweep time.

■ **Automatic Sweep Time**

:SWEep:TIME:AUTO　ON

:SWEep:TIME:AUTO?

　It links a sweep time with span frequency.

## 4-17. System Subsystem

■ **GPIB Address**

:SYSTem:COMMunicate:GPIB:ADDRess  <integer>

:SYSTem:COMMunicate:GPIB:ADDRess?

It sets up a GPIB address.

■ **Display System Configuration**

:SYSTem:CONFigure:STATe   OFF|ON

:SYSTem:CONFigure:STATe?

It outputs a show system screen indicating system information.

■ **Preset**

:SYSTem:PRESet

It performs factory preset or user preset according to a preset type of the current device.

■ **Save User Preset**

:SYSTem:PRESet:SAVE

It saves the current state. When a user performs a user preset, it restores the saved state with this command.

■ **Preset Type**

:SYSTem:PRESet:TYPE   FACTory|USER

:SYSTem:PRESet:TYPE?

It sets up a preset type of a device. When a user click a preset key, it determines whether to perform a factory preset or a user preset.

### ■ Power On Type

:SYSTem:PON:TYPE   PRESet|LAST

:SYSTem:PON:TYPE?

  It sets up a power on type of a device. When the power of the device is on, it determines how to set up the initial condition.

### ■ Set Date

:SYSTem:DATE <year>,<month>,<day>

:SYSTem:DATE?

  It sets up the date of a device.

### ■ Set Time

:SYSTem:TIME <hour>,<minute>,<second>

:SYSTem:TIME?

  It sets up a time of a device.

## 4-18. Trace Subsystem

■ Select Trace Display Mode

:TRACe1|2|3:MODE   WRITe|MAXHold|MINHold|VIEW|BLANk

:TRACe1|2|3:MODE?

   It sets up a mode of trace concerned.

■ Transfer Trace Data

:TRACe:DATA?   <trace_name>

   It inquires trace data.

The data type is outputted in a type set up in format:data command.

## 4-19. Trigger Subsystem

■ **Trigger Source**

:TRIGger:SOURce   FREErun|VIDeo|LINE|EXTernal

:TRIGger:SOURce?

  It sets up a trigger type.

■ **Video Trigger Level Amplitude**

:TRIGger:VIDeo:LEVel   <ampl>

:TRIGger:VIDeo:LEVel?

  It is command to set up a trigger level when a trigger type is video. Only unit dBm.

■ **External Trigger Slope**

:TRIGger:EXTernal:SLOPe   POSitive|NEGative

:TRIGger:EXTernal:SLOPe?

  It sets up an edge of an external trigger signal to start measurement when a trigger type is external.

■ **External Trigger Delay Value**

:TRIGger:DELay   <delay>

:TRIGger:DELay?

  It determines whether to use delay when a trigger type is external.

The possible input coverage ranges from 10msec to 10s.

■ **External Trigger Delay Enable**

:TRIGger:DELay:STATe   OFF|ON

:TRIGger:DELay:STATe?

  It determines whether to use delay when a trigger type is external.

## 4-20. Unit Subsystem

■ Select Power Units of Measure

:UNIT:POWer   DBM|DBMV|DBUV|V|W

:UNIT:POWer?

  It sets up a unit of a level.

## 4-21. External Switch Subsystem

■ Select External Switch

:EXTSW 1|2|3|4

:EXTSW?

It sets up external switch.