DG5000 Series Function/Arbitrary Waveform Generator Programming Guide

This manual is for users who want to use remote commands to control **RIGOL** DG5000 Series Function/Arbitrary Waveform Generator. We assume that readers of this manual have read User's Guide for DG5000 and gotten familiar with the usage of the generator.

DG5000 Series instrument can communicate with the PC through USB, LAN and GPIB instrument buses. For the usage of each communication method, please refer to the User's Guide of this instrument.
Users can use the SCPI commands to program and control the instrument, after the DG5000 Series instrument is reliably connected with the PC via one of the above-mentioned methods. All the command words are transimmited to the instrument from the PC and identified as ASCII string to realize operation, control and secondary development of the instrument.

The following operations can be realized through programming:

- Set up the signal generator.
- Output waveform data from the signal generator.

Main topics of this manual:

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Introduction to the SCPI Language

SCPI (Standard Commands for Programmable Instrument) is a programmable instrument standard instruction set based on IEEE 488.2 and is usually divided into two sections: IEEE 488.2 Common Commands and Control Commands defined for SCPI Instruments.

Common commands, the syntax and semanteme of which follows the provisions of IEEE 488.2, are defined by IEEE 488.2 and must be supported by the instrument. The common commands work independently of measurement and are used for controlling the reset, self-test and status operations. For more detalis, refer to "**IEEE 488.2 Common Command**".

Control Commands defined for SCPI Instrument are used to measure and read data, control the on/off switching and so on, involving all measurement functions and some specific functional functions.

The topics of this section:

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Syntax

SCPI commands present a hierarchical tree structure and contain multiple sub-systems, each of which is made up of a root keyword and one or more sub-keywords. The command string usually starts with ":", the keywords are separated by ":" and are followed by the parameter settings available, "?" is added at the end of the command string to indicate query and the command and parameter are separated by "space".

For Example,
:DISPlay:SAVer:HLIGht:COLor <color>
:DISPlay:SAVer:HLIGht:COLor?

DISPlay is the root keyword of the command. **SAVer**, **HLIGht** and **COLor** are the second-level, third-level and forth-level keywords respectively. The command string starts with ":" which separate the multiple-level keywords. <color> represents the parameters available for setting, "?" represents query and the command string **:DISPlay:SAVer:HLIGht:COLor** and parameter **<color>** are separated by "space".

"," is generally used for separating different parameters contained in the same command, for example,
:MMEMory:COPY <directory_name>,<file_name>

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Symbol Description

The following four symbols are not the content of SCPI commands but usually used to describe the parameters in the commands.

Braces { }

The parameters enclosed in braces are optional and can be ignored or set for one or more times. For example,

[:TRACe]:DATA[:DATA] VOLATILE,<value>{,<value>}

In the command, the floating point voltage value in {,<value>} can be ignored or be set to one or more voltage values.

Vertical Bar |

The vertical bar is used to separate multiple parameters and one of the parameters must be selected when sending the command. For example,

:DISPlay:SAVer[:STATe] ON|OFF

In the command, the command parameters available are "ON" or "OFF".

Triangle Brackets < >

The parameter enclosed in the triangle brackets must be replaced by an effective value. For example,

:DISPlay:BRIGtness <brightness>|MINimum|MAXimum

:DISPlay:BRIGtness 10

Square Brackets [ ]

The content (command keyword) is optional and will be executed regardless of whether it is ommitted or not. For example,

[:SOURce<n>]:MOD[:STATe]?

Sending the following four commands would have the same effect:

:MOD?

:MOD:STATe?

:SOURce1:MOD?

:SOURce1:MOD:STATe?

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Parameter Type

The parameters of the commands introduced in this manual contains 6 types: boolean, keyword, integer, consecutive real number, discrete and ASCII character string.

Boolean
The parameter could be "ON" or "OFF". For example,
:DISPlay:SAVer[:STATe] ON|OFF

Keyword
The parameter should be one of the values listed. For example,
[:SOURce<n>]:BURSt:MODE TRIGgered|GATed|INFinity
The parameter could be "TRIGgered", "GATed" or "INFinity".

Integer
Unless otherwise noted, the parameter should be any integer within the effective value range. Note: at this point, please do not set the parameter to a decimal, otherwise errors will occur. For example,
:SYSTem:COMMunicate:GPIB[:SELF]:ADDRess <integer>
The parameter<integer> could be any integer within 0-30.

Consecutive Real Number
The parameter could be any value within the effective value range according to the accuracy requirement (the default accuracy contains up to 6 digits after the decimal points). For example,
[:SOURce<n>]:MOD:AM[:DEPTh]<depth>|MINimum|MAXimum
The parameter<depth> can be set to any real number within 0-120.

Discrete
The parameter could only be a specified value and these values are discontinuous. For example,
[:SOURce<n>]:MOD[:STATe]?
The parameter<n> could only be 1 or 2.

ASCII Character String
The parameter should be the combinations of ASCII characters. For example,
:MMEMory:MDIRectory <dir_name>
The parameter <dir_name> is a character string.

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Command Abbreviation

Since all commands are case-insensitive, you can use any of them. But if abbreviation is used, all the capital letters in the command must be written completely. For example,

:SYSTem:COMMunicate:USB:INFormation?

can be abbreviated to

:SYST:COMM:USB:INF?

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Command System

DG5000 Series command system mainly contains the following types:

Explanation:
In this command system, commands relating to parameter settings such as frequency and amplitude could have units. The units supported by each parameter and the default units are listed in the table below:

Parameter	Units Supported	Default Units
Frequency	MHZ/KHZ/HZ/UHZ	HZ
Amplitude	VPP/MVPP/VRMS/MVRMS/DBM	VPP/VRMS/DBM (depend on the parameter currently set)
Offset/High Level/Low Level	V/MV	V
Time	MS/S/US/NS	S
Phase	°	°
Duty Cycle/Modulation Depth and so on	%	%

- MHZ equals to mHz.
- MVPP, MVRMS and MV equal to mVPP, mVRMS and mV respectively.
- MS equals to ms.

Note:
For the explanations of the parameter range in the commands, DG5352 is taken as an example in this manual.

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IEEE 488.2 Common Command Introduction

IEEE standard defines the common commands used for querying the basic information of the instrument or executing basic operations. These commands usually start with "*" and the length of the keywords of the command is usually 3 characters.

*IDN?
*RST
*TRG

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*IDN?

Syntax

*IDN?

Description

Query and return the ID character string of the instrument.

Example

Rigol Technologies,DG5352,DG53520002,00.01.07

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*RST

Syntax

*RST

Description

Reset the instrument to its default value.

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Utility, System, Preset

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*TRG

Syntax

*TRG

Description

Trigger the instrument to output a sweep or burst.

Explanation

This command is available only when Sweep or Burst function is enabled (refer to the [:SOURce<n>]:SWEep:STATe or [:SOURce<n>]:BURSt:[:STATe] command) and its source is manual (refer to the [:SOURce<n>]:SWEep:TRIGger:SOURce or [:SOURce<n>]:BURSt:TRIGger:SOURce command).

Front Panel

Sweep/Burst, Source, Manual

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COUPling Subsystem

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:COUPling[:STATe]

Syntax

:COUPling[:STATe] ON|OFF
:COUPling[:STATe]?

Description

Turn the channel coupling function on or off.
The query returns ON or OFF.

Explanation

The coupling function is only available when Sine, Square, Ramp or Arb (not DC) is enabled.

Example

:COUP:STAT ON
The query returns ON.

Default Setting

OFF

Front Panel

Utility, Coupling, Coupling

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:COUPling:TYPE

Syntax

:COUPling:TYPE PHASE|FREQ
:COUPling:TYPE?

Description

Select the coupling type: Frequency Deviation or Phase Deviation.
The query returns PHASE or FREQ.

Example

:COUP:TYPE PHASE
The query returns PHASE.

Explanation

The coupling mark (a green symbol "*") is displayed at the position of the current coupling type (Frequency or Phase).

Default Setting

FREQ (Frequency Deviation)

Front Panel

Utility, Coupling, Type


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:COUPling:CHannel:BASE

Syntax

:COUPling:CHannel:BASE CH1|CH2
:COUPling:CHannel:BASE?

Description
Set the coupling base channel as CH1 or CH2.
The query returns CH1 or CH2.

Example

:COUP:CH:BASE CH1
The query returns CH1.

Explanation

Turn off the coupling function before executing this command.

Default Setting

CH2

Front Panel

Utility, Coupling, Base

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:COUPling:PHASe:DEViation

Syntax

:COUPling:PHASe:DEViation <deviation>
:COUPling:PHASe:DEViation?

Description

Set the phase deviation of phase coupling and the default unit is "°".
The query returns the phase deviation value in scientific notation.

Example

:COUP:PHAS:DEV 10
The query returns 1.000000E+01.

Explanation

<deviation> is the phase deviation to be set and the range available is from 0° to 360°.

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Utility, Coupling, Type, PhaseDev

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:COUPling:FREQuency:DEViation

Syntax

:COUPling:FREQuency:DEViation <deviation>
:COUPling:FREQuency:DEViation?

Description

Set the frequency deviation of frequency coupling and the default unit is "Hz".
The query returns the frequency deviation value in scientific notation.

Example

:COUP:FREQ:DEV 10
The query returns 1.000000E+01.

Explanation

<deviation> is the frequency deviation to be set and the range available is from 0 Hz to 350 MHz.

Front Panel

Utility, Coupling, Type, FreqDev

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DIGItal Subsystem

:DIGItal commands are used to configure the DG5000 Logic signal output module. Install DG-POD-A before using these commands.

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:DIGItal:CONFIG

Syntax

:DIGItal:CONFIG

Description

Parameter configuration instruction for the logic signal output module.

Example

:DIGI:CONFIG

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- This command is the parameter configuration instruction for the logic signal output module. Other commands can only modify parameters but not change the module configuration. The modified parameters can be configured only after this command is used.

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:DIGItal[:DATA]

Syntax

:DIGItal[:DATA] VOLATILE,<flag>,< binary_block_data >

Description

Send the data used for the output of the logic signal output module to the volatile memory.

Example

:DIGI VOLATILE,END,#120101010110101111

Explanation

● This command is only valid when DG5000 is installed with DG-POD-A and is powered on (refer to the :DIGItal:STATe command).
● The data sent to the volatile memory can be output from the data output channel of DG-POD-A.
● <flag> represents the state of the data transmission and can be set to CON or END. "CON": there is still data packet after this one; "END": this is the last data packet and data transmission is finished.
● <binary_block_data> is the binary data to be sent and the range is from 0000 to 3FFF. The length of the data should be no more than 32768 Bytes and the binary data block starts with #.
For example, send **:DIGItal VOLATILE,CON,#532768binary data**
the number **5** following **#** represents that the data length information **32768** holds 5 characters and **32768** represents the number of bytes of the **binary data**.

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:DIGItal:INTErval

Syntax

:DIGItal:INTErval <integer>|MINimum|MAXimum
:DIGItal:INTErval? [MINimum|MAXimum]

Description

Set the trigger interval of auto trigger for the logic signal output module.
The query returns the trigger interval in scientific notation.

Example

:DIGI:INTE 2
The query returns 2.000000E+00.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- This command is only applicable to auto trigger (default). To modify the trigger mode, refer to the [:SOURce<n>]:BURSt:TRIGger:SOURce command. When the module is using **Burst** trigger, after the new parameters are configured (refer to the :DIGItal:CONFIG command), the module generates the first output under the new configuration only when four continuous triggers are received and then generates a output each time a trigger is received.
- This command only modifies the trigger interval of the protocol currently selected.
- <integer> is an integer parameter and its range is from 0s to 30s.

Default Setting

0

Front Panel

User*, TrigInt

:DIGItal:LENGth

Syntax

:DIGItal:LENGth <integer>|MINimum|MAXimum
:DIGItal:LENGth? [MINimum|MAXimum]

Description

Set the output data length for the logic signal output module.
The query returns the data length in scientific notation.

Example

:DIGI:LENG 2
The query returns 2.000000E+00.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- This command only modifies the output data length of the protocol currently selected.
- <integer> is an integer parameter and its minimum is 1Byte. If the current code pattern of the output data is USER (refer to the :DIGItal:PATTern command), the sum of <integer> and user data offset (refer to the :DIGItal:OFFSet command) can not exceed the upper limits of the user space (262144Bytes) and the output data length of the protocol selected (as shown in the table below).

Protocol Type	Upper Limit of Output Data Length (Byte)
RS232	35840
SPI	40960
IIC	10240
PO	131072

Default Setting

1

Front Panel

User*, OutpLen

:DIGItal:OFFSet

Syntax

:DIGItal:OFFSet <integer>|MINimum|MAXimum
:DIGItal:OFFSet? [MINimum|MAXimum]

Description

Set the user data offset for the logic signal output module.
The query returns the offset in scientific notation.

Example

:DIGI:OFFS 2
The query returns 2.000000E+00.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command) and the code pattern of the output data of the module is set to USER (refer to the :DIGItal:PATTern command).
- This command only modifies the offset of the protocol currently selected.
- <integer> is an integer parameter and its range is from 0 byte to 262143 bytes. <integer>=1 represents the first byte data stored in user space will not be output.

Default Setting

0

Front Panel

User*, Pattern, User, Numeric Keypad/Knob

:DIGItal:PATTern

Syntax

:DIGItal:PATTern ALL0|ALL1|01|8PRBS|16PRBS|32PRBS|USER
:DIGItal:PATTern?

Description

Set the code pattern of the output data for the logic signal output module.
The query returns ALL0, ALL1, 01, 8PRBS, 16PRBS, 32PRBS or USER.

Example

:DIGI:PATT ALL0
The query returns ALL0.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- This command only modifies the code pattern of the output data of the protocol currently selected.
- When "USER" is selected, users can set the data output offset (refer to the :DIGItal:OFFSet command).

Default Setting

01

Front Panel

User*, Pattern (ALL_0/ALL_1/01/8PRBS/16PRBS/32PRBS/User)

:DIGItal:PROTocol

Syntax

:DIGItal:PROTocol RS232|SPI|IIC|PO
:DIGItal:PROTocol?

Description

Select protocol type for the logic signal output module.
The query returns RS232, SPI, IIC or PO.

Example

:DIGI:PROT PO
The query returns PO.

Explanation

This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).

Default Setting

RS232

Front Panel

User*, Protocol (RS232/SPI/IIC/PO)


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:DIGItal:RATE

Syntax

:DIGItal:RATE <rate>|MINimum|MAXimum
:DIGItal:RATE? [MINimum|MAXimum]

Description

Set the data output rate for the logic signal output module.
The query returns the output rate in scientific notation.

Example

:DIGI:RATE 1000
The query returns 1.000000E+03.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- The command only modifies the data output rate of the protocol currently selected.
- <rate> is an integer parameter and its range depends on the protocol currently selected as shown in the table below.

Protocol Type	Rate Range	Default Value
RS232	1bps to 60Mbps	9600bps
SPI	1bps to 60Mbps	1000bps
IIC	1bps to 15Mbps	1000bps
PO	1bps to 100Mbps	1000bps

Front Panel

User*, Config, BaudRate/Rate

:DIGItal:STATe

Syntax

:DIGItal:STATe ON|OFF
:DIGItal:STATe?

Description

Power the logic signal output module on or off.
The query returns ON or OFF.

Example

:DIGI:STAT ON
The query returns ON.

Explanation

This command is available only when the DG-POD-A is installed on DG5000.

Default Setting

OFF

Front Panel

Utility, Digital (PowerOff/PowerOn)

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:DIGItal:IIC

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:DIGItal:IIC:ADDRess

Syntax

:DIGItal:IIC:ADDRess <integer>
:DIGItal:IIC:ADDRess?

Description

Set the IIC address.
The query returns any integer between 0 and 127.

Example

:DIGI:IIC:ADDR 127
The query returns 127.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command) and the IIC address is set to User (refer to the :DIGItal:IIC:ADDRess:STATe command).
- <integer> is an integer parameter and its range is from 0 to 127.

Default Setting

0

Front Panel

User*, Protocol (IIC), Config, Address (User), Numeric Keypad/Knob


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:DIGItal:IIC:ADDRess:STATe

Syntax

:DIGItal:IIC:ADDRess:STATe USER|NONE
:DIGItal:IIC:ADDRess:STATe?

Description

Set the IIC address state.
The query returns USER or NONE.

Example

:DIGI:IIC:ADDR:STAT NONE
The query returns NONE.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- USER: send the IIC address and the address sent is the address set by the :DIGItal:IIC:ADDRess command. NONE: do not send the IIC address.

Default Setting

USER

Front Panel

User*, Protocol (IIC), Config, Address


PREV


NEXT

:DIGItal:IIC:CHANnel:SCLK

Syntax

:DIGItal:IIC:CHANnel:SCLK <channel>
:DIGItal:IIC:CHANnel:SCLK?

Description

Set the clock line of IIC output.
The query returns D0, D1, ……, D14 or D15.

Example

:DIGI:IIC:CHAN:SCLK 7
The query returns D7.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- <channel> is an integer parameter and its range is from 0 to 15. Note, <channel> can not be set to the channel currently selected as data line (refer to the :DIGItal:IIC:CHANnel:SDA command).

Default Setting

0

Front Panel

User*, Protocol (IIC), Channel Setting, SCLK


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NEXT

:DIGItal:IIC:CHANnel:SDA

Syntax

:DIGItal:IIC:CHANnel:SDA <channel>
:DIGItal:IIC:CHANnel:SDA?

Description

Set the data line of IIC output.
The query returns D0, D1,……, D14 or D15.

Example

:DIGI:IIC:CHAN:SDA 8
The query returns D8.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- <channel> is an integer parameter and its range is from 0 to 15. Note, <channel> can not be set to the channel currently selected as clock line (refer to the :DIGItal:IIC:CHANnel:SCLK command).

Default Setting

1

Front Panel

User*, Protocol (IIC), Channel Setting, SDA


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:DIGItal:IIC:MODE

Syntax

:DIGItal:IIC:MODE WRITe|READ
:DIGItal:IIC:MODE?

Description

Set write or read as the IIC operation mode.
The query returns WRITE or READ.

Example

:DIGI:IIC:MODE READ
The query returns READ.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- WRITe: write data; READ: read data.

Default Setting

WRITe

Front Panel

User*, Protocol (IIC), Config, Operate


PREV


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:DIGItal:PO

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:DIGItal:PO:BITOrder

Syntax

:DIGItal:PO:BITOrder MSB|LSB
:DIGItal:PO:BITOrder?

Description

Set the bit order of PO data output.
The query returns MSB or LSB.

Example

:DIGI:PO:BITO MSB
The query returns MSB.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- LSB: Least Significant Bit. For example, when the data is 00001111, D0 outputs the least significant bit 1 and D7 outputs the most significant bit 0.
  MSB: Most Significant Bit. When the data is 00001111, D0 outputs the most significant bit 0 and D7 outputs the least significant bit 1.

Default Setting

LSB

Front Panel

User*, Protocol (PO), Config, BitOrder.

:DIGItal:PO:CHANnel:PHASe

Syntax

:DIGItal:PO:CHANnel:PHASe 0|90|180|270
:DIGItal:PO:CHANnel:PHASe?

Description

Set the phase of PO clock line (refer to the :DIGItal:PO:CHANnel:SCLK command).
The query returns 0, 90, 180 or 270.

Example

:DIGI:PO:CHAN:PHAS 90
The query returns 90.

Explanation

This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).

Default Setting

0

Front Panel

User*, Protocol (PO), Channel Setting, Phase


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:DIGItal:PO:CHANnel:SCLK

Syntax

:DIGItal:PO:CHANnel:SCLK C0|C1
:DIGItal:PO:CHANnel:SCLK?

Description

Set the clock line of PO data output.
The query returns C0 or C1.

Example

:DIGI:PO:CHAN:SCLK C1
The query returns C1.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- C0 and C1 represent DCLK0 and DCLK1 on the module respectively.

Default Setting

C0

Front Panel

User*, Protocol (PO), Channel Setting, SCLK


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NEXT

:DIGItal:PO:CHANnel:STATe

Syntax

:DIGItal:PO:CHANnel:STATe <integer>|ON|OFF
:DIGItal:PO:CHANnel:STATe?

Description

Set the data line of PO data output.
The query returns any integer between 1 and 65534, ON or OFF.

Example

:DIGI:PO:CHAN:STAT 21
The query returns 21.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- <integer>: decimal data. It can be set to any integer between 0 (0000000000000000 in binary) and 65535 (1111111111111111 in binary) and is used to represent the on/off state of the data channels D15~D0 (0 represents on, 1 represents off). For example, when <integer> is set to 21 (0000 0000 0001 0101), D0, D2 and D4 are set as data lines.
- ON: set all the 16 channels (D15~D0) to data lines (equal to setting <integer> to 65535).
- OFF: turn all the 16 channels (D15~D0) off (equal to setting <integer> to 0).

Default Setting

ON

Front Panel

User*, Protocol (PO), Channel Setting, DataLine

:DIGItal:PO:TSTATe

Syntax

:DIGItal:PO:TSTATe <channel>|NONE
:DIGItal:PO:TSTATe?

Description

Set the mask data channel under PO protocol.
The query returns D0, D1, ……, D14, D15 or NONE.

Example

:DIGI:PO:TSTAT 1
The query returns D1.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- <channel> is an integer parameter and its range is from 0 to 15. "NONE" represents that no mask channel is set.

Default Setting

NONE

Front Panel

User*, Protocol (PO), Config, Mask Chan


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:DIGItal:PO:ZSTATe

Syntax

:DIGItal:PO:ZSTATe <integer>
:DIGItal:PO:ZSTATe?

Description

Set the tri-state channel of PO data output.
The query returns any integer between 0 and 65535.

Example

:DIGI:PO:ZSTAT 21
The query returns 21.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- <integer>: decimal data. It can be set to any integer between 0 (0000000000000000 in binary) and 65535 (1111111111111111 in binary) and is used to mark one or more channels in D15~D0 (0 represents normal output, 1 represents tri-state output) as tri-state channels. For example, when <integer> is set to 21 (0000 0000 0001 0101), D0, D2 and D4 are set as tri-state channels.

Default Setting

0

Front Panel

User*, Protocol (PO), Config, TriState Chan

:DIGItal:RS232

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:DIGItal:RS232:BAUD

Syntax

:DIGItal:RS232:BAUD <baudrate>
:DIGItal:RS232:BAUD?

Description

Set the baud rate of RS232 data transmission.
The query returns the baud rate in "<baudrate>BPS" format.

Example

:DIGI:RS232:BAUD 19200
The query returns 19200BPS.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- <baudrate> is an integer parameter and its range is from 1bps to 60Mbps.

Default Setting

9600

Front Panel

User*, Protocol (RS232), Config, BaudRate


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:DIGItal:RS232:BITs

Syntax

:DIGItal:RS232:BITs 5|6|7|8
:DIGItal:RS232:BITs?

Description

Set the data bits per frame in RS232 transmission.
The query returns 5, 6, 7 or 8.

Example

:DIGI:RS232:BIT 7
The query returns 7.

Explanation

This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).

Default Setting

8

Front Panel

User*, Protocol (RS232), Config, #Data


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:DIGItal:RS232:CHANnel:TX

Syntax

:DIGItal:RS232:CHANnel:TX <channel>
:DIGItal:RS232:CHANnel:TX?

Description

Set the RS232 data output channel.
The query returns D0, D1, ……, D14 or D15.

Example

:DIGI:RS232:CHAN:TX 1
The query returns D1.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- <channel> is an integer parameter and its range is from 0 to 15.

Default Setting

0

Front Panel

User*, Protocol (RS232), Channel Setting, TX


PREV


NEXT

:DIGItal:RS232:PARity

Syntax

:DIGItal:RS232:PARity NONe|ODD|EVEN|FIX0|FIX1
:DIGItal:RS232:PARity?

Description

Set the parity mode of RS232.
The query returns NON, ODD, EVEN, FIX0 or FIX1.

Example

:DIGI:RS232:PAR ODD
The query returns ODD.

Explanation

This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).

Default Setting

NON

Front Panel

User*, Protocol (RS232), Config, Verify


PREV


NEXT

:DIGItal:RS232:SBIT

Syntax

:DIGItal:RS232:SBIT 1|1.5|2
:DIGItal:RS232:SBIT?

Description

Set the stop bit of RS232.
The query returns 1, 1.5 or 2.

Example

:DIGI:RS232:SBIT 1.5
The query returns 1.5.

Explanation

This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).

Default Setting

1

Front Panel

User*, Protocol (RS232), Config, StopBit


PREV


NEXT

:DIGItal:SPI

PREV

NEXT

:DIGItal:SPI:BYTEs

Syntax

:DIGItal:SPI:BYTEs <byte>
:DIGItal:SPI:BYTEs?

Description

Set the data bits per frame in SPI transmission.
The query returns 1, 2 or 3.

Example

:DIGI:SPI:BYTE 2
The query returns 2.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- <byte> is an integer parameter and can be set to 1, 2 or 3. This parameter is limited by data output length (refer to the :DIGItal:LENGth command). For example, if the data output length is 1Byte, <byte> can not be set to 2Bytes or 3Bytes and if data output length is 2Bytes, <byte> can not be set to 3Bytes.

Default Setting

1

Front Panel

User*, Protocol (SPI), Config, #Data

:DIGItal:SPI:CHANnel:CS

Syntax

:DIGItal:SPI:CHANnel:CS <channel>
:DIGItal:SPI:CHANnel:CS?

Description

Set the CS line of SPI output.
The query returns D0, D1, ……, D14 or D15.

Example

:DIGI:SPI:CHAN:CS 9
The query returns D9.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- <channel> is an integer parameter and its range is from 0 to 15. Note, <channel> can not be set to the channels currently selected as the clock line (refer to the :DIGItal:SPI:CHANnel:SCLK command) and data line (refer to the :DIGItal:SPI:CHANnel:SDA command).

Default Setting

2

Front Panel

User*, Protocol (SPI), Channel Setting, CS


PREV


NEXT

:DIGItal:SPI:CHANnel:SCLK

Syntax

:DIGItal:SPI:CHANnel:SCLK <channel>
:DIGItal:SPI:CHANnel:SCLK?

Description

Set the clock line of SPI output.
The query returns D0, D1, ……, D14 or D15.

Example

:DIGI:SPI:CHAN:SCLK 7
The query returns D7.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- <channel> is an integer parameter and its range is from 0 to 15. Note,<channel> can not be set to the channels currently selected as CS line (refer to the :DIGItal:SPI:CHANnel:CS command) and data line (refer to the :DIGItal:SPI:CHANnel:SDA command).

Default Setting

0

Front Panel

User*, Protocol (SPI), Channel Setting, SCLK


PREV


NEXT

:DIGItal:SPI:CHANnel:SDA

Syntax

:DIGItal:SPI:CHANnel:SDA <channel>
:DIGItal:SPI:CHANnel:SDA?

Description

Set the data line of SPI output.
The query returns D0, D1, ……, D14 or D15.

Example

:DIGI:SPI:CHAN:SDA 8
The query returns D8.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- <channel> is an integer parameter and its range is from 0 to 15. Note,<channel> can not be set to the channels currently selected as CS line (refer to the :DIGItal:SPI:CHANnel:CS command) and clock line (refer to the :DIGItal:SPI:CHANnel:SCLK command).

Default Setting

1

Front Panel

User*, Protocol (SPI), Channel Setting, SDA


PREV


NEXT

:DIGItal:SPI:CPHA

Syntax

:DIGItal:SPI:CPHA 0|1
:DIGItal:SPI:CPHA?

Description

Set the clock phase of SPI.
The query returns 0 or 1.

Example

:DIGI:SPI:CPHA 1
The query returns 1.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- 1: set the phase to 180°; 0: set the phase to 0°.

Default Setting

0

Front Panel

User*, Protocol (SPI), Config, CPHA


PREV


NEXT

:DIGItal:SPI:CPOL

Syntax

:DIGItal:SPI:CPOL 0|1
:DIGItal:SPI:CPOL?

Description

Set the clock polarity of SPI.
The query returns 0 or 1.

Example

:DIGI:SPI:CPOL 1
The query returns 1.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- 1: set to positive polarity; 0: set to negative polarity.

Default Setting

0

Front Panel

User*, Protocol (SPI), Config, CPOL


PREV


NEXT

:DIGItal:SPI:CSLEvel

Syntax

:DIGItal:SPI:CSLEvel HIGH|LOW
:DIGItal:SPI:CSLEvel?

Description

Set the CS level of SPI.
The query returns HIGH or LOW.

Example

:DIGI:SPI:CSLE HIGH
The query returns HIGH.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- HIGH: high level; LOW: low level.

Default Setting

LOW

Front Panel

User*, Protocol (SPI), Config, CSLevel


PREV


NEXT

:DIGItal:VOLTage

PREV

NEXT

:DIGItal:VOLTage:ANALog

Syntax

:DIGItal:VOLTage:ANALog <voltage>
:DIGItal:VOLTage:ANALog?

Description

Set the analog channel voltage for the logic signal output module.
The query returns the voltage in scientific notation.

Example

:DIGI:VOLT:ANAL 2.5
The query returns 2.500000E+00.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- This command only modifies the analog channel voltage of the protocol currently selected.
- <voltage> is a real parameter and its ranges available are 2.0V to 4.5V (when protocol type is set to RS232) and 1.4V to 9.4V (when protocol type is set to SPI, IIC or PO).
- When the analog channel voltage is greater than 4.2V, digital channel voltage (refer to the :DIGItal:VOLTage:DIGItal command) is automatically adjusted to be 3/8 of the analog channel voltage.

Default Setting

2.5V (when the protocol type is set to RS232), 3.3V (when the protocol type is set to SPI, IIC or PO)

Front Panel

User*, Channel Setting, AnalogCh

:DIGItal:VOLTage:ANALog:STATe

Syntax

:DIGItal:VOLTage:ANALog:STATe ON|OFF
:DIGItal:VOLTage:ANALog:STATe?

Description

Enable or disable the analog channel for the logic signal output module.
The query returns ON or OFF.

Example

:DIGI:VOLT:ANAL:STAT OFF
The query returns OFF.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command).
- This command only modifies the analog channel state of the protocol currently selected.

Default Setting

ON

Front Panel

User*, Channel Setting, AnalogCh


PREV


NEXT

:DIGItal:VOLTage:DIGItal

Syntax

:DIGItal:VOLTage:DIGItal <voltage>
:DIGItal:VOLTage:DIGItal?

Description

Set the digital channel voltage for the logic signal output module.
The query returns the voltage in scientific notation.

Example

:DIGI:VOLT:DIGI 2.5
The query returns 2.500000E+00.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command) and the protocol type of the module is set to SPI, IIC or PO (refer to the :DIGItal:PROTocol command).
- This command only modifies the digital channel voltage of the protocol currently selected.
- <voltage> is a real parameter and its range is from 1.4V to 4.2V.
- When the analog channel voltage (refer to the :DIGItal:VOLTage:ANALog command) is greater than 4.2V, the digital channel voltage is automatically adjusted to be 3/8 of the analog channel voltage.

Default Setting

3.3V

Front Panel

User*, Channel Setting, DigitCh

:DIGItal:VOLTage:DIGItal:STATe

Syntax

:DIGItal:VOLTage:DIGItal:STATe ON|OFF
:DIGItal:VOLTage:DIGItal:STATe?

Description

Enable or disable the digital channel for the logic signal output module.
The query returns ON or OFF.

Example

:DIGI:VOLT:DIGI:STAT OFF
The query returns OFF.

Explanation

- This command is available only when the DG-POD-A is installed on DG5000 and is powered on (refer to the :DIGItal:STATe command) and the protocol type of the module is set to SPI, IIC or PO (refer to the :DIGItal:PROTocol command).
- This command only modifies the digital channel state of the protocol currently selected.

Default Setting

ON

Front Panel

User*, Channel Setting, DigitCh


PREV


NEXT

DISPlay Subsystem

PREV

NEXT

:DISPlay:BRIGhtness

Syntax

:DISPlay:BRIGhtness <brightness>|MINimum|MAXimum
:DISPlay:BRIGhtness? [MINimum|MAXimum]

Description

Set the display brightness of the screen.
The query returns the brightness percentage.

Example

:DISP:BRIG 47% The query returns 47%.
:DISP:BRIG 49% The query returns 52%.

Explanation

- The value range of <brightness>: 5% to 100%(or 5 to 100).
- The screen has 19 brightness levels: 5, 10, 15, 21, 26, 31, 36, 42, 47, 52, 57, 63, 68, 73, 78, 84, 89, 94 and 100.
- If the set brightness value is not one of the 19 brightness levels, the brightness will be automatically adjusted to the right level higher than the set one. For example, the set parameter is 49% and the query returns 52%.
- This setting is stored in non-volatile memory and will not be influenced by "Preset" (*RST).

Front Panel

Utility, System, Display, Light

PREV


NEXT

:DISPlay:SAVer:IMMediate

Syntax

:DISPlay:SAVer:IMMediate

Description

Enter screen saver state immediately.

Front Panel

Utility, System, ScrnSvr

PREV

NEXT

:DISPlay:SAVer[:STATe]

Syntax

:DISPlay:SAVer[:STATe] ON|OFF
:DISPlay:SAVer[:STATe]?

Description

Enable or disable the screen saver mode.
The query returns ON or OFF.

Default Setting

ON

Front Panel

Utility, System, ScrnSvr

PREV

NEXT

:DISPlay[:WINDow]:HLIGht:COLor

Syntax

:DISPlay[:WINDow]:HLIGht:COLor <color>
:DISPlay[:WINDow]:HLIGht:COLor?

Description

Set the backgound color of the parameter or the menu selected on the interface.
The query returns RED, DEEPRED, YELLOW, GREEN, AZURE, NAVYBLUE, BLUE, LILAC, PURPLE or ARGENT.

Example

:DISP:HLIG:COL YELLOW
The query returns YELLOW.

Explanation

- <color> can be set to RED, DEEPRED, YELLOW, GREEN, AZURE, NAVYBLUE, BLUE, LILAC, PURPLE or ARGENT.
- This setting is stored in non-volatile memory and will not be influenced by "Preset" (*RST).

Front Panel

Utility, System, Display, Color

PREV

NEXT

MMEMory Subsystem

PREV

NEXT

:MMEMory:CATalog?

Syntax

:MMEMory:CATalog?

Description

Query all the files and folders under the current catalog.

Return Value

Format: {space used, remaining space,"size, attribute, name"…}. Where, the unit of the space used and the remaining space is "Byte", the file attribute appears blank and the folder attribute is DIR. For Example,
196608,1073004544,"4000,,000.RIQ","1364,,3333.RSF","1364,,2222.RSF","1365,DIR,ABCD"

PREV

NEXT

:MMEMory:CDIRectory

Syntax

:MMEMory:CDIRectory <directory_name>
:MMEMory:CDIRectory?

Description

Change the current directory to the directory specified by <directory_name>.
The query returns the current directory in character string.

Example

:MMEM:CDIR "D:\"
The query returns "D:\".

Explanation

• <directory_name>: character string enclosed in double quotation marks and the length is limited within 300 characters.
• If the directory set does not exist, prompt message "Error generated by remote interface command!" is displayed.

Front Panel

Store/Recall

PREV

NEXT

:MMEMory:RDIRectory?

Syntax

:MMEMory:RDIRectory?

Description

Query the disks currently available.

Return Value

Format: "number, "disk 1: ", "disk 2: ",... ".
For example, return "2,"C:","D:"".

Front Panel

Store/Recall

PREV

NEXT

:MMEMory:MDIRectory

Syntax

:MMEMory:MDIRectory <dir_name>

Description

Create a folder under the current directory using the filename specified by<dir_name>.

Example

:MMEM:MDIR "a12"

Explanation

- <dir_name>: character string enclosed in double quotation marks and the length is limited within 40 characters.
- If the specified filename already exists, the prompt message "Error generated by remote interface command!" is displayed.

Front Panel

Store/Recall, Browser (File), New Directory

PREV

NEXT

:MMEMory:COPY

Syntax

:MMEMory:COPY <directory_name>,<file_name>

Description

Copy the file specified by <file_name> under the current directory to the directory (not the current directory) specified by <directory_name>.

Example

:MMEM:COPY "D:\","0.RSF"

Explanation

• <directory_name>: the target directory. Characters enclosed in double quotation marks and the length is limited within 300 characters;
• <file_name>: the name of the file to be copied. Characters (with suffix) enclosed in double quotation marks and the length is limited within 40 characters.

Front Panel

Store/Recall, Copy, Paste

PREV

NEXT

:MMEMory:DELete

Syntax

:MMEMory:DELete <file_name>

Description

Delete the file or folder specified by <file_name> under the current directory.

Example

:MMEM:DEL "11.RSF"

Explanation

<file_name>: the name of the file or folder to be deleted. Character string (the filename should have suffix) enclosed in double quotation marks and the length is limited within 40 characters.

Front Panel

Store/Recall, Delete

PREV

NEXT

:MMEMory:LOAD

Syntax

:MMEMory:LOAD <file_name>

Description

Load the file specified by <file_name> under the current directory.

Example

:MMEM:LOAD "00.RSF"

Explanation

• <file_name>: the name of the file to be loaded. Character string (with suffix) enclosed in double quotation marks and the length is limited within 40 characters.
• The file types available include State File (.RSF) and Arb wave File (.RAF). If the "Frequency Hopping" option is currently installed, FH Map (.RHM), FH List (.RHL) and FH Sequence (.RHS) file types are also available.
• Arb wave and FH files are loaded to the current channel.

Front Panel

Store/Recall, Recall

PREV

NEXT

:MMEMory:STORe

Syntax

:MMEMory:STORe <file_name>

Description

Store the file under the current directory with the filename specified by <file_name>.

Example

:MMEM:STOR "cs.RSF"

Explanation

• <file_name>: the name of the file to be stored. Character string (with suffix) enclosed in double quotation marks and the length is limited within 30 characters.
• The file types available include State File (.RSF) and Arb wave File (.RAF). If the "Frequency Hopping" option is currently installed, FH Map (.RHM), FH List (.RHL) and FH Sequence (.RHS) file types are also available.
• Arb wave and FH files store the current channel data.

Front Panel

Store/Recall, Save

PREV

NEXT

OUTPut Subsystem

:OUTPut[<n>] commands are used to set and control the output parameters and state of the channel. <n> represents the label number of the channel and the value can be 1 or 2. The operation is on CH1 by default.

PREV

NEXT

:OUTPut[<n>][:STATe]

Syntax

:OUTPut[<n>][:STATe] ON|OFF
:OUTPut[<n>][:STATe]?

Description

Enable or disable the output of the [Output] connector at the front panel corresponding to the channel.
The query returns ON or OFF.

Example

:OUTP ON
The query returns ON.

Default Setting

OFF

Front Panel

The Output buttons corresponding to CH1 and CH2.

PREV

NEXT

:OUTPut[<n>]:IMPedance

Syntax

:OUTPut[<n>]:IMPedance <ohms>|INFinity|MINimum|MAXimum
:OUTPut[<n>]:IMPedance? [MINimum|MAXimum]

Description

Set the output impedance of the [Output] connector at the front panel and the default unit is "Ω". The query returns the specific impedance value or INFINITY (High Z).

Example

:OUTP2:IMP 50
The query returns 50.

Explanation

- <ohms>: the range available is from 1 to 10000 (1 Ω to 10 kΩ).
- Completely compatible with the :OUTPut[<n>]:LOAD command.

Default Setting

INFinity (High Z)

Front Panel

Utility, CH1 Set/CH2 Set, Resi


PREV


NEXT

:OUTPut[<n>]:LOAD

Syntax

:OUTPut[<n>]:LOAD <ohms>|INFinity|MINimum|MAXimum
:OUTPut[<n>]:LOAD? [MINimum|MAXimum]

Description

Set the output impedance of the [Output] connector at the front panel and the default unit is "Ω". The query returns the specific impedance value or INFINITY (High Z).

Example

:OUTP2:LOAD 50
The query returns 50.

Explanation

- <ohms>: the range available is from 1 to 10000 (1 Ω to 10 kΩ).
- Complete compatibility with the **:OUTPut[<n>]:IMPedance** instruction.

Default Setting

INFinity (High Z)

Front Panel

Utility, CH1 Set/CH2 Set, Resi

PREV

NEXT

:OUTPut[<n>]:POLarity

Syntax

:OUTPut[<n>]:POLarity NORMal|INVerted
:OUTPut[<n>]:POLarity?

Description

Set the output polarity of the signal at the [Output] connector to normal or invert.
The query returns NORMAL or INVERTED.

Example

:OUTP1:POL INV
The query returns INVERTED.

Explanation

- The waveform inverts relatively to the offset voltage.
- After inversion: none offset voltage is changed; the waveform under the Graphic mode is not invert; the sync signal related to the waveform is not invert.

Default Setting

NORMal

Front Panel

Utility, CH1 Set/CH2 Set, Output


PREV


NEXT

:OUTPut[<n>]:SYNC[:STATe]

Syntax

:OUTPut[<n>]:SYNC[:STATe] ON|OFF
:OUTPut[<n>]:SYNC[:STATe]?

Description

Enable or disable the sync signal on the [Sync] connector.
The query returns ON or OFF.

Example

:OUTP:SYNC ON
The query returns ON.

Explanation

When sync signal is disabled, the output level on the [Sync] connector is logic low level.

Default Setting

ON

Front Panel

Utility, CH1 Set/CH2 Set, Sync

PREV

NEXT

:OUTPut[<n>]:SYNC:POLarity

Syntax

:OUTPut[<n>]:SYNC:POLarity POSitive|NEGative
:OUTPut[<n>]:SYNC:POLarity?

Description

Set the sync signal on the [Sync] connector to normal or invert.
The query returns POS or NEG.

Example

:OUTP2:SYNC:POL POS
The query returns POS.

Default Setting

POSitive

Front Panel

Utility, CH1 Set/CH2 Set, Polarity

PREV

NEXT

:OUTPut[<n>]:ATTenuation

Syntax

:OUTPut[<n>]:ATTenuation 1X|2X|5X|10X
:OUTPut[<n>]:ATTenuation?

Description

Set the attenuation (amplication) coefficient of the signal on the [Output] connector.
The query returns 1X, 2X, 5X or 10X.

Example

:OUTP:ATT 5X
The query returns 5X.

Explanation

The actual output amplitude is the product of the amplitude displayed on the screen and the attenuation coefficient.

Default Setting

1X

Front Panel

Utility, CH1 Set/CH2 Set, Attenuat


PREV


NEXT

SOURce Subsystem

[:SOURce<n>] series commands are used to set the relative parameters of the output signal of basic waveform, arbitrary waveform, modulated waveform (Mod), sweep waveform (Sweep) and burst waveform (Burst). <n> represents the label number of the channel and the value can be 1 or 2. The operation is on CH1 by default.

The following types are included:

PREV

NEXT

[:SOURce<n>]:APPLy

PREV

NEXT

[:SOURce<n>]:APPLy:SINusoid

Syntax

[:SOURce<n>]:APPLy:SINusoid [<freq>[,<amp>[,<offset>[,<phase>]]]]

Description

Output a sine waveform with specified frequency, amplitude, DC offset and start phase.

Example

:APPL:SIN 20000,2.5,0.5,10

Explanation

- <freq>: 1 μHz to 350 MHz and the default unit is "Hz".
- <amp>: limited by the "Resistance" and "Freq/Period" settings. For details, please refer to the User's Guide of this product. The default unit is "Vpp".
- <offset>: limited by the "Resistance" and "Ampl/HoLevel" settings. For details, please refer to the User's Guide of this product. The default unit is "Vdc".
- <phase>: 0°to 360°and the default unit is "°".
- Output waveform immediately after executing the command.

Default Setting

1 kHz, 5 Vpp, 0 Vdc, 0°

Front Panel

Sine


PREV


NEXT

[:SOURce<n>]:APPLy:SQUare

Syntax

[:SOURce<n>]:APPLy:SQUare [<freq>[,<amp>[,<offset>[,<phase>]]]]

Description

Output a square waveform with specified frequency, amplitude, DC offset and start phase.

Example

:APPL:SQU 20000,2.5,0.5,10

Explanation

- <freq>: 1 μHz to 120 MHz and the default unit is "Hz".
- <amp>: limited by the "Resistance" and "Freq/Period" settings. For details, please refer to the User's Guide of this product. The default unit is "Vpp".
- <offset>: limited by the "Resistance" and "Ampl/HoLevel" settings. For details, please refer to the User's Guide of this product. The default unit is "Vdc".
- <phase>: 0°to 360°and the default unit is "°".
- Output waveform immediately after executing the command.

Default Setting

1 kHz, 5 Vpp, 0 Vdc, 0°

Front Panel

Square


PREV


NEXT

[:SOURce<n>]:APPLy:RAMP

Syntax

[:SOURce<n>]:APPLy:RAMP [<freq>[,<amp>[,<offset>[,<phase>]]]]

Description

Output a ramp waveform with specified frequency, amplitude, DC offset and start phase.

Example

:APPL:RAMP 20000,2.5,0.5,10

Explanation

- <freq>: 1 μHz to 5 MHz and the default unit is "Hz".
- <amp>: limited by the "Resistance" and "Freq/Period" settings. For details, please refer to the User's Guide of this product. The default unit is "Vpp".
- <offset>: limited by the "Resistance" and "Ampl/HoLevel" settings. For details, please refer to the User's Guide of this product. The default unit is "Vdc".
- <phase>: 0°to 360°and the default unit is "°".
- Output waveform immediately after executing the command.

Default Setting

1 kHz, 5 Vpp, 0 Vdc, 0°

Front Panel

Ramp


PREV


NEXT

[:SOURce<n>]:APPLy:PULSe

Syntax

[:SOURce<n>]:APPLy:PULSe [<freq>[,<amp>[,<offset>[,<delay>]]]]

Description

Output a pulse waveform with specified frequency, amplitude, DC offset and delay.

Example

:APPL:PULS 20000,2.5,0.5,0.00002

Explanation

- <freq>: 1 μHz to 50 MHz and the default unit is "Hz".
- <amp>: limited by the "Resistance" and "Freq/Period" settings. For details, please refer to the User's Guide of this product. The default unit is "Vpp".
- <offset>: limited by the "Resistance" and "Ampl/HoLevel" settings. For details, please refer to the User's Guide of this product. The default unit is "Vdc".
- <delay>: 0 s to the pulse period and the default unit is "s".
- Output waveform immediately after executing the command.

Default Setting

1 kHz, 5 Vpp, 0 Vdc, 0 ns

Front Panel

Pulse


PREV


NEXT

[:SOURce<n>]:APPLy:NOISe

Syntax

[:SOURce<n>]:APPLy:NOISe [<amp>[,<offset>]]

Description

Output a noise waveform with specified amplitude and DC offset.

Example

:APPL:NOIS 2.5,0.5

Explanation

- <amp>: limited by the "Resistance" and "Freq/Period" settings. For details, please refer to the User's Guide of this product. The default unit is "Vpp".
- <offset>: limited by the "Resistance" and "Ampl/HoLevel" settings. For details, please refer to the User's Guide of this product. The default unit is "Vdc".
- Output waveform immediately after executing the command.

Default Setting

5 Vpp, 0 Vdc

Front Panel

Noise

PREV

NEXT

[:SOURce<n>]:APPLy:USER

Syntax

[:SOURce<n>]:APPLy:USER [<freq>[,<amp>[,<offset>[,<phase>]]]]

Description

Output an arbitrary waveform with specified frequency, amplitude, DC offset and start phase.

Example

:APPL:USER 20000,2.5,0.5, 10

Explanation

- <freq>: 1 μHz to 50 MHz and the default unit is "Hz".
- <amp>: limited by the "Resistance" and "Freq/Period" settings. For details, please refer to the User's Guide of this product. The default unit is "Vpp".
- <offset>: limited by the "Resistance" and "Ampl/HoLevel" settings. For details, please refer to the User's Guide of this product. The default unit is "Vdc".
- <phase>: 0°to 360°and the default unit is "°".
- Output waveform immediately after executing the command.
- When the arbitrary waveform is DC, the instrument will directly pick up the offset parameter to modify the DC parameter while the frequency, amplitude and phase parameters will be discarded.

Default Setting

1 kHz, 5 Vpp, 0 Vdc, 0°

Front Panel

Arb

[:SOURce<n>]:APPLy?

Syntax

[:SOURce<n>]:APPLy?

Description

Query the current configuration of the function generator and returns a character string enclosed in double quotation marks.

Return Value

- Return Value Format: "waveform name, frequency, amplitude, offset, start phase/delay".
- Items without a corresponding value is replaced by "DEF".

For example, "NOISE,DEF,3.500000E+00,-2.000000E+00,DEF"

PREV

NEXT

[:SOURce<n>]:BURSt

PREV

NEXT

[:SOURce<n>]:BURSt:MODE

Syntax

[:SOURce<n>]:BURSt:MODE TRIGgered|GATed|INFinity
[:SOURce<n>]:BURSt:MODE?

Description

Select the Burst type: N Cycle, Gated or Infinite.
The query returns TRIG, GAT or INF.

Example

:SOUR1:BURS:MODE GAT
The query returns GAT.

Default Setting

TRIGgered (N Cycle)

Front Panel

Burst, Type

PREV

NEXT

[:SOURce<n>]:BURSt:NCYCles

Syntax

[:SOURce<n>]:BURSt:NCYCles <cycles>|MINimum|MAXimum
[:SOURce<n>]:BURSt:NCYCles? [MINimum|MAXimum]

Description

Set the cycle number of the Burst.
The query returns the value of the cycle number.

Example

:BURS:NCYC 2
The query returns 2.

Explanation

- This command is only valid in N Cycle mode.
- <cycles>: the range available is from 1 to 1 000 000.

Default Setting

1

Front Panel

Burst, Type (N Cyc)


PREV


NEXT

[:SOURce<n>]:BURSt[:STATe]

Syntax

[:SOURce<n>]:BURSt[:STATe] ON|OFF
[:SOURce<n>]:BURSt[:STATe]?

Description

Enable or disable the Burst function.
The query returns ON or OFF.

Example

:BURS:STAT ON
The query returns ON.

Explanation

When Burst is enabled, Sweep or Mod function is turned off automatically (if it is turned on currently).

Front Panel

Burst

PREV

NEXT

[:SOURce<n>]:BURSt:TDELay

Syntax

[:SOURce<n>]:BURSt:TDELay <delay>|MINimum|MAXimum
[:SOURce<n>]:BURSt:TDELay? [MINimum|MAXimum]

Description

Set the time that the signal generator holds from recieving a trigger signal to starting outputing the N Cycle (or Infinite) burst and the default unit is "s".
The query returns the time value in scientific notation.

Example

:BURS:TDEL 2.5
The query returns 2.500000E+00.

Explanation

- This command is valid in N Cycle and Infinite mode.
- <delay>: 0 s to 85 s. When internal trigger source is used, the delay of the N cycle burst is also limited by the carrier period, pulse period and number of cycles.

Default Value

0 s

Front Panel

Burst, Type (N Cyc or Infinite), Delay


PREV


NEXT

[:SOURce<n>]:BURSt:PHASe

Syntax

[:SOURce<n>]:BURSt:PHASe <phase>|MINimum|MAXimum
[:SOURce<n>]:BURSt:PHASe? [MINimum|MAXimum]

Description

Set the start phase of the burst and the default unit is "°".
The query returns the phase value in scientific notation.

Example

:BURS:PHAS 10
The query returns 1.000000E+01.

Explanation

- <phase>: the range available is from 0°to 360°.
- For sine, square and ramp waveforms, 0° is the point where the waveform passes through 0 V (or DC offset value) positively.
- For arbitrary waveform, 0° is the first waveform point.
- For pulse and noise waveforms, this setting is invalid.

Default Value

0°

Front Panel

Burst, Start Phase


PREV


NEXT

[:SOURce<n>]:BURSt:INTernal:PERiod

Syntax

[:SOURce<n>]:BURSt:INTernal:PERiod <period>|MINimum|MAXimum
[:SOURce<n>]:BURSt:INTernal:PERiod? [MINimum|MAXimum]

Description

Set the Burst period (the time from the beginning of the N Cycle burst to the beginning of the next burst) and the default unit is "s".
The query returns the period value in scientific notation.

Example

:BURS:INT:PER 0.5
The query returns 5.000000E-01.

Explanation

- This command is only applicable to N Cycle burst in internal trigger mode.
- Burst Period ≥ 1 μs + Waveform Period ×Burst Number . (the waveform period is the period of the burst function (sine, square etc.)).
- If the set Burst period is too small, the signal generator will automatically increase this period to allow the output with specified cycle number.

Default Value

10 ms

Front Panel

Burst, Type (N Cyc), Source (Internal), Burst Period

[:SOURce<n>]:BURSt:GATE:POLarity

Syntax

[:SOURce<n>]:BURSt:GATE:POLarity NORMal|INVerted
[:SOURce<n>]:BURSt:GATE:POLarity?

Description

Output burst waveform when the gated signal on the [ExtTrig] connector at the rear panel is high level or low level.
The query returns NORM or INV.

Example

:BURS:GATE:POL NORM
The query returns NORM.

Explanation

This command is only valid in Gated Burst mode.

Default Value

Positive

Front Panel

Burst, Type (Gated), Polarity

PREV

NEXT

[:SOURce<n>]:BURSt:TRIGger[:IMMediate]

Syntax

[:SOURce<n>]:BURSt:TRIGger[:IMMediate]

Description

Trigger the instrument immediately.

Explanation

This command is valid only when the trigger source is in manual mode.

PREV

NEXT

[:SOURce<n>]:BURSt:TRIGger:SLOPe

Syntax

[:SOURce<n>]:BURSt:TRIGger:SLOPe POSitive|NEGative
[:SOURce<n>]:BURSt:TRIGger:SLOPe?

Description

Select to enable the burst output on the "Leading" or "Trailing" edge of the external trigger signal. The query returns POS or NEG.

Example

:BURS:TRIG:SLOP NEG
The query returns NEG.

Explanation

This command is only valid when external trigger source is selected.

Default Setting

POS (Leading)

Front Panel

Burst, Scource (External), SlopeIn

PREV


NEXT

[:SOURce<n>]:BURSt:TRIGger:TRIGOut

Syntax

[:SOURce<n>]:BURSt:TRIGger:TRIGOut OFF|POSitive|NEGative
[:SOURce<n>]:BURSt:TRIGger:TRIGOut?

Description

Specify the edge type of the trigger output signal.
The query returns OFF, POS or NEG.

Example

:BURS:TRIG:TRIGO POS
The query returns POS.

Explanation

- OFF: disable the trigger output signal.
  POSitive (Leading): output the trigger signal on the rising edge.
  NEGative (Trailing): output the trigger signal on the falling edge.
- Valid when trigger source is in "Internal" or "Manual" mode.

Default Setting

OFF

Front Panel

Burst, Source (Internal or Manual), Trig Out


PREV


NEXT

[:SOURce<n>]:BURSt:TRIGger:SOURce

Syntax

[:SOURce<n>]:BURSt:TRIGger:SOURce INTernal|EXTernal|MANual
[:SOURce<n>]:BURSt:TRIGger:SOURce?

Description

Set the Burst trigger source type to Internal, External or Manual.
The query returns INT, EXT or MAN.

Example

:BURS:TRIG:SOUR MAN
The query returns MAN.

Default Setting

INTernal

Front Panel

Burst, Source

PREV

NEXT

[:SOURce<n>]:FREQuency

PREV

NEXT

[:SOURce<n>]:FREQuency[:FIXed]

Syntax

[:SOURce<n>]:FREQuency[:FIXed] <frequency>|MINimum|MAXimum
[:SOURce<n>]:FREQuency[:FIXed]? [MINimum|MAXimum]

Description

Set the frequency of the basic waveform and the default unit is "Hz".
The query returns the frequency value in scientific notation.

Example

:FREQ:FIX 1500
The query returns 1.500000E+03.

Explanation

Different waveforms correspond to different frequency ranges.
- Sine: 1 μHz to 350 MHz
- Square: 1 μHz to 120 MHz
- Ramp: 1 μHz to 5 MHz
- Pulse: 1 μHz to 50 MHz
- Arb: 1 μHz to 50 MHz

Default Value

1 kHz

Front Panel

Sine/Square/Ramp/Pulse/Arb, Freq/Period


PREV


NEXT

[:SOURce<n>]:FREQuency:CENTer

Syntax

[:SOURce<n>]:FREQuency:CENTer <frequency>|MINimum|MAXimum
[:SOURce<n>]:FREQuency:CENTer? [MINimum|MAXimum]

Description

Set the center frequency of the Sweep and the default unit is "Hz".
The query returns the frequency value in scientific notation.

Example

:FREQ:CENT 600
The query returns 6.000000E+02.

Explanation

Different sweep waveforms correspond to different center frequency ranges.
- Sine: 1 μHz to 250 MHz
- Square: 1 μHz to 120 MHz
- Ramp: 1 μHz to 5 MHz
- Arb: 1 μHz to 50 MHz (except the built-in DC waveform)

Default Value

550 Hz

Front Panel

Sweep, Start/Center


PREV


NEXT

[:SOURce<n>]:FREQuency:SPAN

Syntax

[:SOURce<n>]:FREQuency:SPAN <frequency>|MINimum|MAXimum
[:SOURce<n>]:FREQuency:SPAN? [MINimum|MAXimum]

Description

Set the frequency span of the Sweep and the default unit is "Hz".
The query returns the frequency span value in scientific notation.

Example

:FREQ:SPAN 1100
The query returns 1.100000E+03.

Explanation

Different sweep waveforms correspond to different frequency span ranges.
- Sine: 0 Hz to 250 MHz
- Square: 0 Hz to 120 MHz
- Ramp: 0 Hz to 5 MHz
- Arb: 0 Hz to 50 MHz (except the built-in DC waveform)

Default Value

900 Hz

Front Panel

Sweep, End/Span


PREV


NEXT

[:SOURce<n>]:FREQuency:STARt

Syntax

[:SOURce<n>]:FREQuency:STARt <frequency>|MINimum|MAXimum
[:SOURce<n>]:FREQuency:STARt? [MINimum|MAXimum]

Description

Set the start frequency of the Sweep and the default unit is "Hz".
The query returns the frequency value in scientific notation.

Example

:FREQ:STAR 50
The query returns 5.000000E+01.

Explanation

Different sweep waveforms correspond to different start frequency ranges.
- Sine: 1 μHz to 250 MHz
- Square: 1 μHz to 120 MHz
- Ramp: 1 μHz to 5 MHz
- Arb: 1 μHz to 50 MHz (except the built-in DC waveform)

Default Value

100 Hz

Front Panel

Sweep, Start/Center


PREV


NEXT

[:SOURce<n>]:FREQuency:STOP

Syntax

[:SOURce<n>]:FREQuency:STOP <frequency>|MINimum|MAXimum
[:SOURce<n>]:FREQuency:STOP? [MINimum|MAXimum]

Description

Set the end frequency of the Sweep and the default unit is "Hz".
The query returns the frequency value in scientific notation.

Example

:FREQ:STOP 1150
The query returns 1.150000E+03.

Explanation

Different sweep waveforms correspond to different end frequency ranges.
- Sine: 1 μHz to 250 MHz
- Square: 1 μHz to 120 MHz
- Ramp: 1 μHz to 5 MHz
- Arb: 1 μHz to 50 MHz (except the built-in DC waveform)

Default Value

1 kHz

Front Panel

Sweep, End/Span


PREV


NEXT

[:SOURce<n>]:FUNCtion

PREV

NEXT

[:SOURce<n>]:FUNCtion[:SHAPe]

Syntax

[:SOURce<n>]:FUNCtion[:SHAPe]
SINusoid|SQUare|RAMP|PULSe|NOISe|USER|DC|SINC|EXPRise|EXPFall|CARDiac|GAUSsian
|HAVersine|LORentz|ARBPULSE|DUAltone
[:SOURce<n>]:FUNCtion[:SHAPe]?

Description

Select waveform.
The query returns SIN, SQU, RAMP, PULSE, NOISE, USER, DC, SINC, EXPR, EXPF, CARD, GAUS, HAV, LOR, ARBPULSE or DUA.

Example

:FUNC:SHAP SQU
The query returns SQU.

Explanation

- If the modulation, sweep and burst mode are not currently enabled, this command selects the waveform to be output.
- If the modulation, sweep or burst mode is currently enabled, this command selects the carrier waveform of the corresponding function.
- Send the :FUNCtion DC command and the instrument will automatically disable the modulation, sweep or burst function (currently enabled).

Default Value

SIN

Front Panel

Sine/Square/Ramp/Pulse/Noise/Arb

[:SOURce<n>]:FUNCtion:RAMP:SYMMetry

Syntax

[:SOURce<n>]:FUNCtion:RAMP:SYMMetry <symmetry>|MINimum|MAXimum
[:SOURce<n>]:FUNCtion:RAMP:SYMMetry? [MINimum|MAXimum]

Description

Set the symmetry of the ramp waveform, expressed in % and support settings without %.
The query returns the symmetry in scientific notation.

Example

:FUNC:RAMP:SYMM 80% or :FUNC:RAMP:SYMM 80
The query returns 8.000000E+01.

Explanation

The range of the symmetry is from 0% to 100%.

Default Value

50%

Front Panel

Ramp, Symmetry

PREV


NEXT

[:SOURce<n>]:FUNCtion:SQUare:DCYCle

Syntax

[:SOURce<n>]:FUNCtion:SQUare:DCYCle <percent>|MINimum|MAXimum
[:SOURce<n>]:FUNCtion:SQUare:DCYCle? [MINimum|MAXimum]

Description

Set the duty cycle of the square waveform, expressed in % and support settings without %. The query returns the duty cycle in scientific notation.

Example

:FUNC:SQU:DCYC 70% or :FUNC:SQU:DCYC 70
The query returns 7.000000E+01.

Explanation

The duty cycle range is limited by the "Freq/Period" setting.
- Frequency ≤ 10 MHz: 20% to 80%
- 10 MHz < Frequency ≤ 40 MHz: 40% to 60%
- Frequency > 40 MHz: 50%

Default Value

50%

Front Panel

Square, Duty Cycle


PREV


NEXT

[:SOURce<n>]:FUNCtion:ARB:MODE

Syntax

[:SOURce<n>]:FUNCtion:ARB:MODE INTernal|PLAY
[:SOURce<n>]:FUNCtion:ARB:MODE?

Description

Select the output mode of the arbitrary waveform: "INTernal" (also called Normal) or "PLAY". The query returns INT or PLAY.

Example

:FUNC:ARB:MODE PLAY
The query returns PLAY.

Front Panel

Arb, Mode

PREV

NEXT

[:SOURce<n>]:FUNCtion:ARB:SAMPLE

Syntax

[:SOURce<n>]:FUNCtion:ARB:SAMPLE <sampledivv>|MINimum|MAXimum
[:SOURce<n>]:FUNCtion:ARB:SAMPLE? [MINimum|MAXimum]

Description

Set the frequency division coefficient of the sample rate of the arbitrary waveform.
The query returns integer coefficient value.

Example

:FUNC:ARB:SAMPLE 1
The query returns 1.

Explanation

- The functional relationship between the sample rate "fs" and the frequency division coefficient "N" is shown below:
  When N≤2, fs = 1G/2^N
  When N>2, fs = 1G/((N-2)*8)
  The range of N is from 0 to 268435456(2^{28}).
- Valid only in "Play" mode.

Default Value

0

Front Panel

Arb, Mode (Play), Sample


PREV


NEXT

[:SOURce<n>]:MARKer

PREV
NEXT

[:SOURce<n>]:MARKer[:STATe]

Syntax

[:SOURce<n>]:MARKer[:STATe] ON|OFF
[:SOURce<n>]:MARKer[:STATe]?

Description

Enable or disable the "Mark" frequency function.
The query returns ON or OFF.

Example

:MARKer ON
The query returns ON.

Explanation

The mark frequency function is not available in step sweep mode.

Front Panel

Sweep, MarkFreq

PREV

NEXT

[:SOURce<n>]:MARKer:FREQuency

Syntax

[:SOURce<n>]:MARKer:FREQuency <frequency>|MINimum|MAXimum
[:SOURce<n>]:MARKer:FREQuency? [MINimum|MAXimum]

Description

Set the mark frequency of the Sweep and the default unit is "Hz".
The query returns the frequency value in scientific notation.

Example

:MARK:FREQ 800
The query returns 8.000000E+02.

Explanation

The range is limited by the "Start Frequency" and "End Frequency".

Default Value

550 Hz

Front Panel

Sweep, MarkFreq

PREV


NEXT

[:SOURce<n>]:MOD

PREV

NEXT

[:SOURce<n>]:MOD[:STATe]

Syntax

[:SOURce<n>]:MOD[:STATe] ON|OFF
[:SOURce<n>]:MOD[:STATe]?

Description

Enable or disable the modulating function.
The query returns ON or OFF.

Example

:SOUR:MOD:STAT ON
The query returns ON.

Explanation

When Mod is enabled, Sweep or Burst function will be turned off automatically (if it is turned on currently).

Front Panel

Mod

PREV

NEXT

[:SOURce<n>]:MOD:TYPe

Syntax

[:SOURce<n>]:MOD:TYPe AM|FM|PM|ASK|FSK|PSK|PWM|IQ
[:SOURce<n>]:MOD:TYPe?

Description

Select the modulating type of the signal generator.
The query returns AM, FM, PM, ASK, FSK, PSK, PWM or IQ.

Example

:SOUR:MOD:TYP PM
The query returns PM.

Explanation

- PWM modulation is valid only when Pulse is turned on.
- IQ modulation is valid only when Sine is turned on.

Front Panel

Mod, Type

PREV

NEXT

[:SOURce<n>]:MOD:AM[:DEPTh]

Syntax

[:SOURce<n>]:MOD:AM[:DEPTh] <depth>|MINimum|MAXimum
[:SOURce<n>]:MOD:AM[:DEPTh]? [MINimum|MAXimum]

Description

Set the amplitude vibration degree of the AM (Modulation Depth), expressed in percentage.
The query returns the modulation depth percentage in scientific notation.

Example

:MOD:AM:DEPT 80%
The query returns 8.000000E+01.

Explanation

<depth>: the range available is from 0% to 120%.
- When it is 0%, the output amplitude is half of the specified value.
- When it is 100%, the output amplitude is equal to the specified value.
- When it is higher than 100%, the output of the instrument will not exceed 10 Vpp (the load is 50 Ω).

Front Panel

Mod, Type (AM), AM Depth

PREV

NEXT

[:SOURce<n>]:MOD:AM:INTernal:FREQuency

Syntax

[:SOURce<n>]:MOD:AM:INTernal:FREQuency <frequency>|MINimum|MAXimum
[:SOURce<n>]:MOD:AM:INTernal:FREQuency? [MINimum|MAXimum]

Description

Set the AM modulating waveform frequency and the default unit is "Hz".
The query returns the frequency value in scientific notation.

Example

:MOD:AM:INT:FREQ 25
The query returns 2.500000E+01.

Explanation

- This command is only available when internal modulating source is selected.
- <frequency>: the range available is from 2 mHz to 50 kHz.

Default Value

100 Hz

Front Panel

Mod, Type (AM), Source (Internal), AM_Freq

PREV


NEXT

[:SOURce<n>]:MOD:AM:INTernal:FUNCtion

Syntax

[:SOURce<n>]:MOD:AM:INTernal:FUNCtion
SINusoid|SQUare|TRIangle|RAMP|NRAMp|NOISe|USER
[:SOURce<n>]:MOD:AM:INTernal:FUNCtion?

Description

Select AM modulating waveform shape.
The query returns SIN, SQU, TRI, RAMP, NRAM, NOIS or USER.

Example

:MOD:AM:INT:FUNC SQU
The query returns SQU.

Explanation

This command is only available when internal modulating source is slected.

Default Setting

SIN

Front Panel

Mod, Type (AM), Source (Internal), Shape

PREV


NEXT

[:SOURce<n>]:MOD:AM:SOURce

Syntax

[:SOURce<n>]:MOD:AM:SOURce INTernal|EXTernal
[:SOURce<n>]:MOD:AM:SOURce?

Description

Select the AM modulating source type: Internal or External.
The query returns INT or EXT.

Example

:MOD:AM:SOUR EXT
The query returns EXT.

Default Setting

INTernal (Internal)

Front Panel

Mod, Type (AM), Source

PREV

NEXT

[:SOURce<n>]:MOD:FM[:DEViation]

Syntax

[:SOURce<n>]:MOD:FM[:DEViation] <deviation>|MINimum|MAXimum
[:SOURce<n>]:MOD:FM[:DEViation]? [MINimum|MAXimum]

Description

Set the frequency deviation of the FM modulating waveform relative to the carrier waveform frequency and the default unit is "Hz".
The query returns the deviation value in scientific notation.

Example

:MOD:FM:DEV 700
The query returns 7.000000E+02.

Explanation

Frequency deviation <deviation> should fulfill the following conditions:
• Less than or equal to the carrier waveform frequency.
• Frequency Deviation + Carrier Waveform Frequency ≤ The upper limit of the current Carrier Waveform Frequency + 1 kHz.

Front Panel

Mod, Type (FM), Deviation

PREV

NEXT

[:SOURce<n>]:MOD:FM:INTernal:FREQuency

Syntax

[:SOURce<n>]:MOD:FM:INTernal:FREQuency <frequency>|MINimum|MAXimum
[:SOURce<n>]:MOD:FM:INTernal:FREQuency? [MINimum|MAXimum]

Description

Set the FM modulating waveform frequency and the default unit is "Hz".
The query returns the frequency value in scientific notation.

Example

:MOD:FM:INT:FREQ 1200
The query returns 1.200000E+03.

Explanation

- This command is only available when internal modulating source is selected.
- <frequency>: the range available is from 2 mHz to 50 kHz.

Default Value

100 Hz

Front Panel

Mod, Type (FM), Source (Internal), FM_Freq

PREV


NEXT

[:SOURce<n>]:MOD:FM:INTernal:FUNCtion

Syntax
[:SOURce<n>]:MOD:FM:INTernal:FUNCtion
SINusoid|SQUare|TRIangle|RAMP|NRAMp|NOISe|USER
[:SOURce<n>]:MOD:FM:INTernal:FUNCtion?

Description

Select the FM modulating waveform shape.
The query returns SIN, SQU, TRI, RAMP, NRAM, NOIS or USER.

Example

:MOD:FM:INT:FUNC SQU
The query returns SQU.

Explanation

This command is only available when internal modulating source is selected.

Default Setting

SIN

Front Panel

Mod, Type (FM), Source (Internal), Shape

PREV


NEXT

[:SOURce<n>]:MOD:FM:SOURce

Syntax

[:SOURce<n>]:MOD:FM:SOURce INTernal|EXTernal
[:SOURce<n>]:MOD:FM:SOURce?

Description

Set the FM modulating source type: Internal or External.
The query returns INT or EXT.

Example

:MOD:FM:SOUR INT
The query returns INT.

Default Setting

INTernal (Internal)

Front Panel

Mod, Type (FM), Source

PREV

NEXT

[:SOURce<n>]:MOD:PM[:DEViation]

Syntax

[:SOURce<n>]:MOD:PM[:DEViation] <deviation>|MINimum|MAXimum
[:SOURce<n>]:MOD:PM[:DEViation]? [MINimum|MAXimum]

Description

Set the deviation of the PM modulating waveform phase relative to the carrier waveform phase and the default unit is "°".
The query returns the phase deviation value in scientific notation.

Example

:MOD:PM:DEV 90
The query returns 9.000000E+01.

Explanation

<deviation>: the range available is from 0°to 360°.

Front Panel

Mod, Type (PM), Deviation

PREV

NEXT

[:SOURce<n>]:MOD:PM:INTernal:FREQuency

Syntax

[:SOURce<n>]:MOD:PM:INTernal:FREQuency <frequency>|MINimum|MAXimum
[:SOURce<n>]:MOD:PM:INTernal:FREQuency?

Description

Set the PM modulating waveform frequency and the default unit is "Hz".
The query returns the frequency value in scientific notation.

Example

:MOD:PM:INT:FREQ 1200
The query returns 1.200000E+03.

Explanation

- <frequency>: the range available is from 2 mHz to 50 kHz.
- This command is only available when internal modulating source is selected.

Default Value

100 Hz

Front Panel

Mod, Type (PM), PM_Freq

PREV


NEXT

[:SOURce<n>]:MOD:PM:INTernal:FUNCtion

Syntax

[:SOURce<n>]:MOD:PM:INTernal:FUNCtion
SINusoid|SQUare|TRIangle|RAMP|NRAMp|NOISe|USER
[:SOURce<n>]:MOD:PM:INTernal:FUNCtion?

Description

Select the PM modulating waveform shape.
The query returns SIN, SQU, TRI, RAMP, NRAM, NOIS or USER.

Example

:MOD:PM:INT:FUNC SQU
The query returns SQU.

Explanation

This command is only available when internal modulating source is selected.

Default Setting

SIN

Front Panel

Mod, Type (PM), Source (Internal), Shape

PREV


NEXT

[:SOURce<n>]:MOD:PM:SOURce

Syntax

[:SOURce<n>]:MOD:PM:SOURce INTernal|EXTernal
[:SOURce<n>]:MOD:PM:SOURce?

Description

Set the PM modulating source type: Internal or External.
The query returns INT or EXT.

Example

:MOD:PM:SOUR INT
The query returns INT.

Default Setting

INTernal (Internal)

Front Panel

Mod, Type (PM), Source

PREV

NEXT

[:SOURce<n>]:MOD:ASKey[:FREQency]

Syntax

[:SOURce<n>]:MOD:ASKey[:FREQency] <frequency>|MINimum|MAXimum
[:SOURce<n>]:MOD:ASKey[:FREQency]? [MINimum|MAXimum]

Description

Set the frequency at which the outoput amplitude "shifts" between the "carrier waveform amplitude" and the "modulating amplitude". The default unit is "Hz".
The query returns the rate value in scientific notation.

Example

:SOUR1:MOD:ASK 150
The query returns 1.500000E+02.

Explanation

- This command is only available when internal modulating source is selected.
- The range available is from 2 mHz to 1 MHz.

Default Value

100 Hz

Front Panel

Mod, Type (ASK), Source (Internal), ASK Rate

PREV

NEXT

[:SOURce<n>]:MOD:ASKey:INTernal:AMPLitude

Syntax

[:SOURce<n>]:MOD:ASKey:INTernal:AMPLitude <amplitude>|MINimum|MAXimum
[:SOURce<n>]:MOD:ASKey:INTernal:AMPLitude? [MINimum|MAXimum]

Description

Set the ASK modulating waveform amplitude and the default unit is "Vpp".
The query returns the amplitude value in scientific notation.

Example

:MOD:ASK:INT:AMPL 2.5
The query returns 2.500000E+00.

Explanation

<amplitude>: the amplitude range (High Z) available is from 0 to 10 Vpp.

Default Value

2 Vpp

Front Panel

Mod, Type (ASK), Source (ASK), ModAmp

PREV


NEXT

[:SOURce<n>]:MOD:ASKey:SOURce

Syntax

[:SOURce<n>]:MOD:ASKey:SOURce INTernal|EXTernal
[:SOURce<n>]:MOD:ASKey:SOURce?

Description

Set the ASK modulating source type: Internal or External.
The query returns INT or EXT.

Example

:MOD:ASK:SOUR INT
The query returns INT.

Default Setting

INTernal (Internal)

Front Panel

Mod, Type (ASK), Source

PREV

NEXT

[:SOURce<n>]:MOD:ASKey:POLarity

Syntax

[:SOURce<n>]:MOD:ASKey:POLarity POSitive|NEGative
[:SOURce<n>]:MOD:ASKey:POLarity?

Description

Select the "Positive" or "Negative" polarity of the modulating waveform to control the output amplitude.
The query returns POS or NEG.

Example

:MOD:ASK:POL NEG
The query returns NEG.

Front Panel

Mod, Type (ASK), Polarity

PREV

NEXT

[:SOURce<n>]:MOD:FSKey[:FREQuency]

Syntax

[:SOURce<n>]:MOD:FSKey[:FREQuency] <frequency>|MINimum|MAXimum
[:SOURce<n>]:MOD:FSKey[:FREQuency]? [MINimum|MAXimum]

Description

Set the alternating frequency ("hop" frequency) of the FSK and the default unit is "Hz".
The query returns the frequency value in scientific notation.

Example

:MOD:FSK 100
The query returns 1.000000E+02.

Explanation

Different carrier waveforms correspond to different frequency ranges<frequency>:
- Sine: 1 μHz to 250 MHz
- Square: 1 μHz to 120 MHz
- Ramp: 1 μHz to 5 MHz
- Arb: 1 μHz to 50 MHz

Front Panel

Mod, Type (FSK), HopFreq

PREV

NEXT

[:SOURce<n>]:MOD:FSKey:INTernal:RATE

Syntax

[:SOURce<n>]:MOD:FSKey:INTernal:RATE <rate>|MINimum|MAXimum
[:SOURce<n>]:MOD:FSKey:INTernal:RATE? [MINimum|MAXimum]

Description

Set the frequency at which the FSK output frequency "shifts" between the "carrier frequency" and the "hop Frequency". The default unit is "Hz".
The query returns the rate value in scientific notation.

Example

:SOUR:MOD:FSK 150
The query returns 1.500000E+02.

Explanation

- This command is only available when internal modulating source is selected.
- <rate>: the frequency range available is from 2 mHz to 1 MHz.

Default Value

100 Hz

Front Panel

Mod, Type (FSK), Source (Internal), FSK Rate

PREV

NEXT

[:SOURce<n>]:MOD:FSKey:SOURce

Syntax

[:SOURce<n>]:MOD:FSKey:SOURce INTernal|EXTernal
[:SOURce<n>]:MOD:FSKey:SOURce?

Description

Set the FSK modulating source type: Internal or External.
The query returns INT or EXT.

Example

:MOD:FSK:SOUR INT
The query returns INT.

Default Setting

INTernal (Internal)

Front Panel

Mod, Type (FSK), Source

PREV

NEXT

[:SOURce<n>]:MOD:FSKey:POLarity

Syntax

[:SOURce<n>]:MOD:FSKey:POLarity POSitive|NEGative
[:SOURce<n>]:MOD:FSKey:POLarity?

Description

Select the "Positive" or "Negative" polarity of the modulating waveform to control the output frequency.
The query returns POS or NEG.

Example

:MOD:FSK:POL NEG
The query returns NEG.

Front Panel

Mod, Type (FSK), Polarity

PREV

NEXT

[:SOURce<n>]:MOD:PSKey:INTernal:RATE

Syntax

[:SOURce<n>]:MOD:PSKey:INTernal:RATE <rate>|MINimum|MAXimum
[:SOURce<n>]:MOD:PSKey:INTernal:RATE? [MINimum|MAXimum]

Description

Set the frequency at which the PSK output phase "shifts" between the "carrier phase" and the "modulating phase". The default unit is "Hz".
The query returns the rate value in scientific notation.

Example

:MOD:PSK:INT:RATE 150
The query returns 1.500000E+02.

Explanation

- This command is only available when internal modulating source is selected.
- <rate>: the frequency range available is from 2 mHz to 1 MHz.

Default Value

100 Hz

Front Panel

Mod, Type (PSK), Source (Internal), PSK Rate

PREV


NEXT

[:SOURce<n>]:MOD:PSKey:PHASe

Syntax

[:SOURce<n>]:MOD:PSKey:PHASe <phase>|MINimum|MAXimum
[:SOURce<n>]:MOD:PSKey:PHASe [MINimum|MAXimum]

Description

Set the PSK modulating waveform phase.
The query returns the phase value in scientific notation.

Example

:MOD:PSK:PHAS 90
The query returns 9.000000E+01.

Explanation

<phase>: the phase range available is from 0°to 360°.

Default Value

180°

Front Panel

Mod, Type (PSK), Phase

PREV


NEXT

[:SOURce<n>]:MOD:PSKey:POLarity

Syntax

[:SOURce<n>]:MOD:PSKey:POLarity POSitive|NEGative
[:SOURce<n>]:MOD:PSKey:POLarity?

Description

Select the "Positive" or "Negative" polarity of the modulating waveform to control the output phase.
The query returns POS or NEG.

Example

:MOD:PSK:POL NEG
The query returns NEG.

Front Panel

Mod, Type (PSK), Polarity

PREV

NEXT

[:SOURce<n>]:MOD:PSKey:SOURce

Syntax

[:SOURce<n>]:MOD:PSKey:SOURce INTernal|EXTernal
[:SOURce<n>]:MOD:PSKey:SOURce?

Description

Set the PSK modulating source type: Internal or External.
The query returns INT or EXT.

Example

:MOD:PSK:SOUR INT
The query returns INT.

Default Setting

INTernal (Internal)

Front Panel

Mod, Type (PSK), Source

PREV

NEXT

[:SOURce<n>]:MOD:PWM:INTernal:FREQuency

Syntax

[:SOURce<n>]:MOD:PWM:INTernal:FREQuency <frequency>|MINimum|MAXimum
[:SOURce<n>]:MOD:PWM:INTernal:FREQuency?

Description

Set the PWM modulating waveform frequency and the default unit is "Hz".
The query returns the frequency value in scientific notation.

Example

:MOD:PWM:INT:FREQ 150
The query returns 1.500000E+02.

Explanation

- This command is only available when internal modulating source is selected.
- <frequency>: the range available is from 2 mHz to 50 kHz.

Default Value

100 Hz

Front Panel

Mod, Type (PWM), Source (Internal), PWM Freq

PREV

NEXT

[:SOURce<n>]:MOD:PWM:INTernal:FUNCtion

Syntax

[:SOURce<n>]:MOD:PWM:INTernal:FUNCtion
SINusoid|SQUare|TRIangle|RAMP|NRAMp|NOISe|USER
[:SOURce<n>]:MOD:PWM:INTernal:FUNCtion?

Description

Select Sine, Square, Triangle, UpRamp, DnRamp, Noise or Arb as the PWM modulating source. The query returns SIN, SQU, TRI, RAMP, NRAMP, NOIS or USER.

Example

:MOD:PWM:INT:FUNC SQU
The query returns SQU.

Explanation

This command is only valid when internal modulating source is selected.

Default Setting

SIN

Front Panel

Mod, Type (PWM), Source (Internal), Shape

PREV

NEXT

[:SOURce<n>]:MOD:PWM:SOURce

Syntax

[:SOURce<n>]:MOD:PWM:SOURce INTernal|EXTernal
[:SOURce<n>]:MOD:PWM:SOURce?

Description

Set the PWM modulating source type:Internal or External.
The query returns INT or EXT.

Example

:MOD:PWM:SOUR INT
The query returns INT.

Default Setting

INTernal (Internal)

Front Panel

Mod, Type (PWM), Source

PREV

NEXT

[:SOURce<n>]:MOD:PWM[:DEViation]:DCYCle

Syntax

[:SOURce<n>]:MOD:PWM[:DEViation]:DCYCle <percent>|MINimum|MAXimum
[:SOURce<n>]:MOD:PWM[:DEViation]:DCYCle? [MINimum|MAXimum]

Description

Set the duty cycle deviation namely the variation in duty cycle (expressed in %) of the modulated waveform from the duty cycle of the original pulse waveform.
The query returns the deviation value in scientific notation.

Example

:MOD:PWM:DCYC 45%
The query returns 4.500000E+01.

Explanation

Duty cycle <percent> fulfills the following conditions:
- The range available: 0% to 50%
- Duty cycle deviation cannot exceed the current duty cycle deviation.
- Duty cycle deviation is limited by the minimum duty cycle and the current edge time setting.

Default Value

20%

Front Panel

Mod, Type (PWM), DutyDev


PREV


NEXT

[:SOURce<n>]:MOD:PWM[:DEViation][:WIDTh]

Syntax

[:SOURce<n>]:MOD:PWM[:DEViation][:WIDTh] <deviation>|MINimum|MAXimum
[:SOURce<n>]:MOD:PWM[:DEViation][:WIDTh]? [MINimum|MAXimum]

Description

Set the pulse width deviation namely the variation in width (expressed in seconds) of the modulated waveform from the width of the original pulse waveform.
The query returns the pulse width deviation in scientific notation.

Example

:MOD:PWM:DEV:WIDT 0.0002
The query returns 2.000000E-04.

Explanation

The pulse width deviation <deviation> fulfills the following conditions:
- The range available: 0 s to 500 ks.
- The pulse width deviation can not exceed the current pulse width.
- The pulse width deviation is limited by the minimum pulse width and the current edge time setting.

Front Panel

Mod, Type (PWM), WidthDev

PREV


NEXT

[:SOURce<n>]:MOD:IQ:INTernal:RATE

Syntax

[:SOURce<n>]:MOD:IQ:INTernal:RATE <rate>|MINimum|MAXimum
[:SOURce<n>]:MOD:IQ:INTernal:RATE? [MINimum|MAXimum]

Description

Set the transmission rate of the IQ code pattern and the default unit is "bps".
The query returns the IQ code rate in scientific notation.

Example

:MOD:IQ:INT:RATE 100
The query returns 1.000000E+02.

Explanation

- <rate>: the range available is from 1 bps to 1 Mbps.
- This command is available only when internal modulating source is selected.

Default Value

9600 bps

Front Panel

Mod, Type (IQ), Source (Internal), Rate

PREV


NEXT

[:SOURce<n>]:MOD:IQ:PATTern

Syntax

[:SOURce<n>]:MOD:IQ:PATTern PN9|PN11|PN15|PN23|FIX4|USER
[:SOURce<n>]:MOD:IQ:PATTern?

Description

Select the pre-defined code pattern inside the instrument or the user-defined code pattern. The query returns PN9, PN11, PN15, PN23, FIX4 or USER.

Example

:MOD:IQ:PATT PN11
The query returns PN11.

Explanation

This command is only available when internal modulating source is selected.

Front Panel

Mod, Type (IQ), Source (Internal), Pattern

PREV

NEXT

[:SOURce<n>]:MOD:IQ:PATTern:FIX4

Syntax

[:SOURce<n>]:MOD:IQ:PATTern:FIX4 <value>
[:SOURce<n>]:MOD:IQ:PATTern:FIX4?

Description

Set the FIX4 repeat sequence code pattern.
The query returns the current code pattern.

Example

:MOD:IQ:PATT:FIX4 10
The query returns 10.

Explanation

<value>: the range available is from 0 to 15 (namely 0000 to 1111).

Front Panel

Mod, Type (IQ), Source (Internal), Pattern (FIXed4)

PREV

NEXT

[:SOURce<n>]:MOD:IQ[:DATA]

Syntax

[:SOURce<n>]:MOD:IQ[:DATA] VOLATILE,<binary_block_data>

Description

Send binary data block to the volatile memory.

Explanation

<binary_block_data> is the binary data to be sent and the range is from 0000 to FFFF. The length of the data is 1 to 4000 bytes and the binary data block starts with #.
For example, send **:MOD:IQ VOLATILE,#41000binary data**
The number **4** following **#** represents that the data length information **1000** holds 4 characters and **1000** represents the number of bytes of the **binary data**.

PREV

NEXT

[:SOURce<n>]:MOD:IQ:FORMat

Syntax

[:SOURce<n>]:MOD:IQ:FORMat
BPSK|QPSK|OQPSK|8PSK|16PSK|4QAM|8QAM|16QAM|32QAM|64QAM
[:SOURce<n>]:MOD:IQ:FORMat?

Description

Set the IQ mapping type.
The query returns BPSK, QPSK, OQPSK, 8PSK, 16PSK, 4QAM, 8QAM, 16QAM, 32QAM or 64QAM.

Example

:MOD:IQ:FORM 8QAM
The query returns 8QAM.

Explanation

This command is only available when internal modulating source is selected.

Front Panel

Mod, Type (IQ), Source (Internal), Mapping Select

PREV

NEXT

[:SOURce<n>]:MOD:IQ:SOURce

Syntax

[:SOURce<n>]:MOD:IQ:SOURce INTernal|EXTernal
[:SOURce<n>]:MOD:IQ:SOURce?

Description

Set the IQ signal source type: Internal or External.
The query returns INT or EXT.

Example

:MOD:IQ:SOUR EXT
The query returns EXT.

Default Setting

INTernal

Front Panel

Mod, Type (IQ), Source

PREV

NEXT

[:SOURce<n>]:PERiod

[:SOURce<n>]:PERiod[:FIXed]

PREV

NEXT

[:SOURce<n>]:PERiod[:FIXed]

Syntax

[:SOURce<n>]:PERiod[:FIXed] <period>|MINimum|MAXimum
[:SOURce<n>]:PERiod[:FIXed]? [MINimum|MAXimum]

Description

Set the basic waveform period and the default unit is "s".
The query returns the period value in scientific notation.

Example

:PER 0.1
The query returns 1.000000E-01.

Explanation

Different waveforms correspond to different period ranges.
- Sine: 2.8 ns to 1.0000 Ms
- Square: 8.3 ns to 1.0000 Ms
- Ramp: 200.0 ns to 1.0000 Ms
- Pulse: 20.0 ns to 1.0000 Ms
- Arb: 20.0 ns to 1.0000 Ms

Default Value

1 ms

Front Panel

Sine/Square/Ramp/Pulse/Arb, Freq/Period

[:SOURce<n>]:PHASe

[:SOURce<n>]:PHASe[:ADJust]

[:SOURce<n>]:PHASE:INITiate

PREV

NEXT

[:SOURce<n>]:PHASe[:ADJust]

Syntax

[:SOURce<n>]:PHASe[:ADJust] <phase>|MINimum|MAXimum
[:SOURce<n>]:PHASe[:ADJust]? [MINimum|MAXimum]

Description

Set the start phase of the basic waveform and the default unit is "°".
The query returns the phase value in scientific notation.

Example

:PHAS 90
The query returns 9.000000E+01.

Explanation

The phase range available is from 0°to 360°.

Front Panel

Sine/Square/Ramp/Arb, Start Phase

PREV

NEXT

[:SOURce<n>]:PHASe:INITiate

Syntax

[:SOURce<n>]:PHASe:INITiate

Description

Execute align phase operation.

Explanation

This setting is invalid when any one of the dual channels is in modulating mode.

Front Panel

Sine/Square/Ramp/Arb, Align Phase

PREV

NEXT

[:SOURce<n>]:PULSe

PREV

NEXT

[:SOURce<n>]:PULSe:DCYCle

Syntax

[:SOURce<n>]:PULSe:DCYCle <percent>|MINimum|MAXimum
[:SOURce<n>]:PULSe:DCYCle? [MINimum|MAXimum]

Description

Set the pulse duty cycle, expressed in %.
The query returns the duty cycle value in scientific notation.

Example

:PULS:DCYC 60
The query returns 6.000000E+01.

Explanation

• Related to the pulse width and changing any one of them will automatically change the other one.
• The pulse duty cycle is limited by the "Minimum Pulse Width (4 ns)" and the "Pulse Period":
  Pulse Duty Cycle ≥ 100 × Minimum Pulse Width ÷ Pulse Period
  Pulse Duty Cycle ≤ 100 ×(1 - 2 × Minimum Pulse Width ÷ Pulse Period)

Front Panel

Pulse, Width/Duty

PREV

NEXT

[:SOURce<n>]:PULSe:DELay

Syntax

[:SOURce<n>]:PULSe:DELay <delay>|MINimum|MAXimum
[:SOURce<n>]:PULSe:DELay? [MINimum|MAXimum]

Description

Set the delayed time of the pulse and the default unit is "s".
The query returns the pulse delay in scientific notation.

Example

:PULS:DEL 0.008
The query returns 8.000000E-03.

Explanation

The delay range available is from 0 s to pulse period.

Default Value

0 ns

Front Panel

Pulse, Delay

PREV


NEXT

[:SOURce<n>]:PULSe:HOLD

Syntax

[:SOURce<n>]:PULSe:HOLD WIDTh|DUTY
[:SOURce<n>]:PULSe:HOLD?

Description

Select to hold at the "Pulse Width" or "Duty Cycle" state.
The query returns WIDT or DUTY.

Example

:PULS:HOLD WIDT
The query returns WIDT.

Front Panel

Pulse, Width/Duty

PREV

NEXT

[:SOURce<n>]:PULSe:TRANsition[:LEADing]

Syntax

[:SOURce<n>]:PULSe:TRANsition[:LEADing] <seconds>|MINimum|MAXimum
[:SOURce<n>]:PULSe:TRANsition[:LEADing]? [MINimum|MAXimum]

Description

Set the rising edge of the pulse and the default unit is "s".
The query returns the time value in scientific notation and the default unit is "s".

Example

:PULS:TRAN 0.000001
The query returns 1.000000E-06.

Explanation

- The range of the rising edge time is from 2.5 ns to 1 ms and is divided into 5 scales:
  2.5 ns to 12 ns;
  12.2 ns to 108 ns;
  108.1 ns to 2.2 us;
  2.2001 us to 38.5 us;
  38.5 us to 1 ms.
- Related to the setting of the trailing edge and the two must at the same scale.

Front Panel

Pulse, Leading

PREV


NEXT

[:SOURce<n>]:PULSe:TRANsition:TRAiling

Syntax

[:SOURce<n>]:PULSe:TRANsition:TRAiling <seconds>|MINimum|MAXimum
[:SOURce<n>]:PULSe:TRANsition:TRAiling? [MINimum|MAXimum]

Description

Set the falling edge of the pulse and the default unit is "s".
The query returns the time value in scientific notation and the default unit is "s".

Example

:PULS:TRAN:TRA 0.000001
The query returns 1.000000E-06.

Explanation

- The range of the falling edge time is from 2.5 ns to 1 ms and is divided into 5 scales:
  2.5 ns to 12 ns;
  12.2 ns to 108 ns;
  108.1 ns to 2.2 us;
  2.2001 us to 38.5 us;
  38.5 us to 1 ms.
- Related to the setting of the rising edge and the two must at the same scale.

Front Panel

Pulse, Trailing

PREV


NEXT

[:SOURce<n>]:PULSe:WIDTh

Syntax

[:SOURce<n>]:PULSe:WIDTh <seconds>|MINimum|MAXimum
[:SOURce<n>]:PULSe:WIDTh? [MINimum|MAXimum]

Description

Set the pulse width (the time from the 50% threshold of a rising edge amplitude to the 50% threshold of the next falling edge amplitude) and the default unit is "s".
The query returns the pulse width value in scientific notation.

Example

:PULS:WIDT 0.5ms
The query returns 5.000000E-04.

Explanation

- Related to the duty cyle and changing any one of them will automatically change the other one.
- Limited by the "Minimum Pulse Width (4 ns)" and "Pulse Period".
  Pulse Width ≥ Minimum Pulse Width
  Pulse Width ≤ Pulse Period - 2 × Minimum Pulse Width

Front Panel

Pulse, Width/Duty

PREV

NEXT

[:SOURce<n>]:SWEep

PREV

NEXT

[:SOURce<n>]:SWEep:HTIMe:STARt

Syntax

[:SOURce<n>]:SWEep:HTIMe:STARt <seconds>|MINimum|MAXimum
[:SOURce<n>]:SWEep:HTIMe:STARt? [MINimum|MAXimum]

Description

Set the start hold time of the sweep and the default unit is "s".
The query returns the time value in scientific notation.

Example

:SWE:HTIM:STAR 1s
The query returns 1.000000E+00.

Explanation

The range available is from 0 s to 300 s.

Default Value

0 s

Front Panel

Sweep, Start Hold

PREV


NEXT

[:SOURce<n>]:SWEep:HTIMe:STOP

Syntax

[:SOURce<n>]:SWEep:HTIMe:STOP <seconds>|MINimum|MAXimum
[:SOURce<n>]:SWEep:HTIMe:STOP? [MINimum|MAXimum]

Description

Set the end hold time of the Sweep and the default unit is "s".
The query returns the time value in scientific notation.

Example

:SWE:HTIM:STOP 1s
The query returns 1.000000E+00.

Explanation

The range available is from 0 s to 300 s.

Default Value

0 s

Front Panel

Sweep, End Hold

PREV


NEXT

[:SOURce<n>]:SWEep:RTIMe

Syntax

[:SOURce<n>]:SWEep:RTIMe <seconds>|MINimum|MAXimum
[:SOURce<n>]:SWEep:RTIMe? [MINimum|MAXimum]

Description

Set the return time of the Sweep and the defaut unit is "s".
The query returns the time value in scientific notation.

Example

:SWE:RTIM 5s
The query returns 5.000000E+00.

Explanation

The range available is from 0 s to 300 s.

Default Value

0 s

Front Panel

Sweep, ReturnTime

PREV


NEXT

[:SOURce<n>]:SWEep:SPACing

Syntax

[:SOURce<n>]:SWEep:SPACing LINear|LOGarithmic|STEp
[:SOURce<n>]:SWEep:SPACing?

Description

Select the sweep type: Linear, Log or step.
The query returns LIN, LOG or STE.

Default Setting

LIN (Linear)

Front Panel

Sweep, SwpType

PREV

NEXT

[:SOURce<n>]:SWEep:STATe

Syntax

[:SOURce<n>]:SWEep:STATe OFF|ON
[:SOURce<n>]:SWEep:STATe?

Description

Enable or disable the frequency sweep function.
The query returns OFF or ON.

Example

:SWE:STAT ON
The query returns ON.

Explanation

After Sweep is enabled, Mod or Burst functions will be turned off automatically (if it is turned on currently).

Front Panel

Sweep

PREV

NEXT

[:SOURce<n>]:SWEep:STEp

Syntax

[:SOURce<n>]:SWEep:STEp <steps>|MINimum|MAXimum
[:SOURce<n>]:SWEep:STEp? [MINimum|MAXimum]

Description

Set the step number of step sweep.
The query returns an integer.

Example

:SWE:STE 5
The query returns 5.

Explanation

The range of <steps> is from 2 to 2048.
After Sweep is enabled, the Mod and Burst functions will be disabled automatically (if currently enabled).

Front Panel

Sweep, SwpType (Step), StepNum

PREV

NEXT

[:SOURce<n>]:SWEep:TIME

Syntax

[:SOURce<n>]:SWEep:TIME <seconds>|MINimum|MAXimum
[:SOURce<n>]:SWEep:TIME? [MINimum|MAXimum]

Description

Set the sweep time and the default unit is "s".
The query returns the time value in scientific notation.

Example

:SWE:TIME 5
The query returns 5.000000E+00.

Explanation

The range available is from 1 ms to 300 s.

Default Value

1 s

Front Panel

Sweep, SwpTime

PREV


NEXT

[:SOURce<n>]:SWEep:TRIGger[:IMMediate]

Syntax

[:SOURce<n>]:SWEep:TRIGger[:IMMediate]

Description

Trigger the instrument immediately.

Explanation

This command is only valid when the trigger source is in manual mode.

PREV

NEXT

[:SOURce<n>]:SWEep:TRIGger:SLOPe

Syntax

[:SOURce<n>]:SWEep:TRIGger:SLOPe POSitive|NEGative
[:SOURce<n>]:SWEep:TRIGger:SLOPe?

Description

Select to enable the frequency sweep output on the "Leading" or "Trailing" edge of the external trigger signal.

Example

:SWE:TRIG:SLOP NEG
The query returns NEG.

Explanation

This command is only valid when external trigger source is selected.

Default Setting

POS (Leading)

Front Panel

Sweep, Source (External), SlopeIn

PREV


NEXT

[:SOURce<n>]:SWEep:TRIGger:TRIGOut

Syntax

[:SOURce<n>]:SWEep:TRIGger:TRIGOut OFF|POSitive|NEGative
[:SOURce<n>]:SWEep:TRIGger:TRIGOut?

Description

Set the output edge of the sweep trigger.
The query returns OFF, POS or NEG.

Explanation

- OFF: disable the trigger output signal.
  POSitive (Leading): output the trigger signal on the rising edge.
  NEGative (Trailing): output the trigger signal on the falling edge.
- Valid when the trigger source is "Internal" or "External".

Default Setting

OFF

Front Panel

Sweep, Source (Internal or Manual), TrigOut

PREV

NEXT

[:SOURce<n>]:SWEep:TRIGger:SOURce

Syntax

[:SOURce<n>]:SWEep:TRIGger:SOURce INTernal|EXTernal|MANual
[:SOURce<n>]:SWEep:TRIGger:SOURce?

Description

Select the sweep trigger source type.
The query returns INT, EXT or MAN.

Default Setting

INTernal (Internal)

Front Panel

Sweep, Source

PREV

NEXT

[:SOURce<n>]:VOLTage

PREV

NEXT

[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:HIGH

Syntax

[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:HIGH <voltage>|MINimum|MAXimum
[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:HIGH? [MINimum|MAXimum]

Description

Set the high level of the basic waveform and the default unit is "V".
The query returns the high level value in scientific notation.

Example

:VOLT:HIGH 5
The query returns 5.000000E+00.

Explanation

Upper limit: 10 V (High Z)/5 V (50 Ω)
Lower limit: must be higher than the low level

Default Value

2.5 V

Front Panel

Sine/Square/Ramp/Pulse/Noise/Arb, Ampl/HoLevel

PREV


NEXT

[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:LOW

Syntax

[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:LOW <voltage>|MINimum|MAXimum
[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:LOW? [MINimum|MAXimum]

Description

Set the low level of the basic waveform and the default unit is "V".
The query returns the low level value in scientific notation.

Example

:VOLT:LOW -2
The query returns -2.000000E+00.

Explanation

Lower limit: -10 V (High Z)/-5 V (50 Ω)
Upper limit: must be lower than the high level

Default Value

-2.5 V

Front Panel

Sine/Square/Ramp/Pulse/Noise/Arb, Offset/LoLevel

PREV


NEXT

[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:OFFSet

Syntax

[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:OFFSet <voltage>|MINimum|MAXimum
[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:OFFSet? [MINimum|MAXimum]

Description

Set the DC offset voltage and the default unit is "Vdc".
The query returns the offset voltage value in scientific notation.

Example

:VOLT:OFFS 0.1
The query returns 1.000000E-01.

Explanation

The offset range is limited by the "Resistance" and "Ampl/HoLevel" settings. For details, please refer to the User's Guide of this product.

Default Value

0 Vdc

Front Panel

Sine/Square/Ramp/Pulse/Noise/Arb, Offset/LoLevel

PREV

NEXT

[:SOURce<n>]:VOLTage[:LEVel][:IMMediate][:AMPLitude]

Syntax

[:SOURce<n>]:VOLTage[:LEVel][:IMMediate][:AMPLitude] <amplitude>|MINimum|MAXimum
[:SOURce<n>]:VOLTage[:LEVel][:IMMediate][:AMPLitude]? [MINimum|MAXimum]

Description

Set the basic waveform amplitude and the default unit is "Vpp".
The query returns the amplitude value in scientific notation.

Example

:VOLT 2.5
The query returns 2.500000E+00.

Explanation

The amplitude is limited by the "Resistance" and "Freq/Period" settings. For details, please refer to the User's Guide of this product.

Default Value

5 Vpp

Front Panel

Sine/Square/Ramp/Pulse/Noise/Arb, Ampl/HoLevel

PREV


NEXT

[:SOURce<n>]:VOLTage:RANGe:AUTO

Syntax

[:SOURce<n>]:VOLTage:RANGe:AUTO OFF|ON
[:SOURce<n>]:VOLTage:RANGe:AUTO?

Description

Enable or disable the range hold.
The query returns AUTO or HOLD.

Example

:VOLT:RANG:AUTO ON
The query returns AUTO.

Explanation

• ON (AUTO): disable the range hold and enable automatic optimization. The generator select the best setting for the output amplifier and attenuator.
• OFF (HOLD): enable the range hold and disable automatic optimization to eliminate the waveform incontinuity caused by turning on/off the relay when altering the amplitude, but the amplitude precision might be affected.

Default Setting

OFF (HOLD)

Front Panel

Utility, CH1 Set/CH2 Set, Range


PREV


NEXT

[:SOURce<n>]:VOLTage:UNIT

Syntax

[:SOURce<n>]:VOLTage:UNIT VPP|VRMS|DBM
[:SOURce<n>]:VOLTage:UNIT?

Description

Set the amplitude unit.
The query returns VPP, VRMS or DBM.

Example

:VOLT:UNIT VRMS

Explanation

- VPP: peak-peak value;
  VRMS: effective value;
  DBM: relative value.
- DBM is not available when the output is High Z.

Front Panel

Sine/Square/Ramp/Pulse/Noise/Arb, Ampl/HoLevel

PREV

NEXT

SYSTem Subsystem

PREV


NEXT

:SYSTem:BEEPer:STATe

Syntax

:SYSTem:BEEPer:STATe ON|OFF
:SYSTem:BEEPer:STATe?

Description

Turn the beeper on or off.
The query returns ON or OFF.

Example

:SYST:BEEP:STAT ON
The query returns ON.

Front Panel

Utility, System, Beep

PREV

NEXT

:SYSTem:BEEPer[:IMMediate]

Syntax

:SYSTem:BEEPer[:IMMediate]

Description

The beeper immediately generate a beep.

PREV

NEXT

:SYSTem:RESTART

Syntax

:SYSTem:RESTART

Description

Restart the instrument.

Front Panel

Power Key

PREV

NEXT

:SYSTem:SHUTDOWN

Syntax

:SYSTem:SHUTDOWN

Description

Power-off

Front Panel

Power Key

PREV

NEXT

:SYSTem:POWeron

Syntax

:SYSTem:POWeron DEFault|LASt
:SYSTem:POWeron?

Description

Set the configuration to be used at power-on.
The query returns DEFAULT or LAST.

Example

:SYST:POW DEF
The query returns DEFAULT.

Explanation

DEFault: the instrument uses the default configuration at power-on.
LASt: the instrument uses the last configuration at power-on.

Default Setting

DEFault

Front Panel

Utility, System, PowerOn

PREV

NEXT

:SYSTem:SWItch

Syntax

:SYSTem:SWItch ON|OFF

Description

Disable or enable the power key at the front panel.

Example

:SYSTem:SWItch OFF

Explanation

ON: disable. After power-on, the instrument starts automatically when the power switch at the rear panel is turned on.
OFF: enable. After power-on, you need to turn on the power switch at the rear panel and then press the power key at the front panel to start the instrument.

PREV

NEXT

:SYSTem:ROSCillator:SOURce

Syntax

:SYSTem:ROSCillator:SOURce INT|EXT
:SYSTem:ROSCillator:SOURce?

Description

Set the reference clock source type: Internal or External.
The query returns INT or EXT.

Example

:SYST:ROSC:SOUR EXT
The query returns EXT.

Default Setting

INTernal

Front Panel

Utility, System, CLK

PREV

NEXT

:SYSTem:ERRor?

Syntax

:SYSTem:ERRor?

Description

Query the error event queue.

Return Value

The query returns the error event information. For exampl: -220, "Parameter error".
If there is no error, the query returns: 0, "No Error".

PREV

NEXT

:SYSTem:KLOCk

Syntax

:SYSTem:KLOCk[:STATe] ON|OFF
:SYSTem:KLOCk[:STATe]?

Description

Lock or unlock the front panel remotely.
The query returns ON or OFF.

Example

:SYST:KLOC ON
The query returns ON.

Explanation

ON: the front panel is locked and the "  " icon is displayed at the upper right side of the screen.

PREV

NEXT

:SYSTem:LANGuage

Syntax

:SYSTem:LANGuage ENGLish|SCHinese
:SYSTem:LANGuage?

Description

Set the system language type: English or Simplified Chinese.
The query returns ENGL or SCH.

Example

:SYST:LANG ENGL
The query returns ENGL.

Front Panel

Utility, System, Language

PREV

NEXT

:SYSTem:CSCopy

Syntax

:SYSTem:CSCopy CH1,CH2|CH2,CH1.

Description

Copy the parameter configuration of CH1 (CH2) to CH2 (CH1).

Example

:SYST:CSC CH1,CH2

Explanation

- Only available for dual-channel instruments.
- Invalid in coupling mode.

Front Panel

Utility, Copy Channel

PREV

NEXT

:SYSTem:VERSion?

Syntax

:SYSTem:VERSion?

Description

Query and return SCPI version information.

Return Value

For example return: 1999.0

PREV

NEXT

:SYSTem:COMMunicate:LAN:DHCP[:STATe]

Syntax

:SYSTem:COMMunicate:LAN:DHCP[:STATe] ON|OFF
:SYSTem:COMMunicate:LAN:DHCP[:STATe]?

Description

Turn the DHCP mode on/off.
The query returns ON or OFF.

Example

:SYST:COMM:LAN:DHCP ON
The query returns ON.

Explanation

In this mode, the DHCP in the current network assigns network parameters such as IP address for the signal generator.

Front Panel

Utility, I/O Setup, LAN, DHCP

PREV

NEXT

:SYSTem:COMMunicate:LAN:AUTOip[:STATe]

Syntax

:SYSTem:COMMunicate:LAN:AUTOip[:STATe] ON|OFF
:SYSTem:COMMunicate:LAN:AUTOip[:STATe]?

Description

Turn the AutoIP mode on/off.
The query returns ON or OFF.

Example

:SYST:COMM:LAN:AUTO ON
The query returns ON.

Explanation

• In this mode, the generator acquires IP address within 169.254.0.1 and 169.254.255.254 and subnet mask 255.255.0.0 automatically based on the current network configuration.
• Set the DHCP to "Off" to enable this mode.

Front Panel

Utility, I/O Setup, LAN, AutoIP

PREV

NEXT

:SYSTem:COMMunicate:LAN:STATic[:STATe]

Syntax

:SYSTem:COMMunicate:LAN:STATic[:STATe] ON|OFF
:SYSTem:COMMunicate:LAN:STATic[:STATe]?

Description

Turn the ManualIP mode on/off.
The query returns ON or OFF.

Example

:SYST:COMM:LAN:STAT ON
The query returns ON.

Explanation

- In this mode, users define the network parameters such as the IP address of the signal generator.
- Set DHCP and AutoIP to "Off" to enable this mode.

Front Panel

Utility, I/O Setup, LAN, AutoIP

PREV

NEXT

:SYSTem:COMMunicate:LAN:IPADdress

Syntax

:SYSTem:COMMunicate:LAN:IPADdress <ip_addr>
:SYSTem:COMMunicate:LAN:IPADdress?

Description

Set the IP address for the signal generator.
The query returns the IP address in nnn.nnn.nnn.nnn format.

Example

:SYST:COMM:LAN:IPAD 192.168.1.88
The query returns 192.168.1.88.

Explanation

• <ip_addr> is the IP address to be set and the format is nnn.nnn.nnn.nnn. The range of the first nnn is from 0 to 223 (except 127). The range of the other three nnn is from 0 to 255.
• The setting is stored in the non-volatile memory and will be loaded automatically when the generator is powered on the next time if DHCP and AutoIP are set as "Off".

Front Panel

Utility, I/O Setup, LAN, ManualIP (ON), IP Address

PREV

NEXT

:SYSTem:COMMunicate:LAN:SMASk

Syntax

:SYSTem:COMMunicate:LAN:SMASk <mask>
:SYSTem:COMMunicate:LAN:SMASk?

Description

Set the subnet mask for the signal generator.
The query returns the subnet mask in nnn.nnn.nnn.nnn format.

Example

SYST:COMM:LAN:SMAS 255.255.255.0
The query returns 255.255.255.0.

Explanation

• <mask> is the subnet mask to be set and the format is nnn.nnn.nnn.nnn, where the range of nnn is from 0 to 255.
• This setting is stored in the non-volatile memory and will be automatically loaded when the generator is powered on next time if DHCP and AutoIP are "Off".

Front Panel

Utility, I/O Setup, LAN, ManualIP (ON), SubMask

PREV

NEXT

:SYSTem:COMMunicate:LAN:GATEway

Syntax

:SYSTem:COMMunicate:LAN:GATEway <address>
:SYSTem:COMMunicate:LAN:GATEway?

Description

Set the default gateway for the signal generator.
The query returns the default gateway in nnn.nnn.nnn.nnn format.

Example

:SYST:COMM:LAN:GATE 192.168.1.1
The query returns 192.168.1.1.

Explanation

• <address> is the default gateway to be set and the format is nnn.nnn.nnn.nnn, The range of the first nnn is from 0 to 223 (except 127), The range of the other three nnn is from 0 to 255.
• This setting is stored in the non-volatile memory and will be automatically loaded when the generator is powered on next time if DHCP and AutoIP are "Off".

Front Panel

Utility, I/O Setup, LAN, ManualIP (ON), Default Gateway

PREV

NEXT

:SYSTem:COMMunicate:LAN:HOSTname

Syntax

:SYSTem:COMMunicate:LAN:HOSTname <name>
:SYSTem:COMMunicate:LAN:HOSTname?

Description

Set the host name for the signal generator.
The query returns the host name.

Example

:SYST:COMM:LAN:HOST RigolDG5000
The query returns RIGOLDG5000.

Explanation

- <name>is the host name to be set and can include letters, numbers, dot and dash with up to 16-character length.
- This setting is stored in non-volatile memory.

Front Panel

Utility, I/O Setup, LAN, Host Name

PREV

NEXT

:SYSTem:COMMunicate:LAN:DOMain

Syntax

:SYSTem:COMMunicate:LAN:DOMain <name>
:SYSTem:COMMunicate:LAN:DOMain?

Description

Set the domain name for the signal generator.
The query returns the domain name.

Example

:SYST:COMM:LAN:DOM Rigol
The query returns RIGOL.

Explanation

- <name> is the domain name to be set and can include letters, numbers, dot and dash with up to 16-character length.
- This setting is stored in non-volatile memory.

Front Panel

Utility, I/O Setup, LAN, Domain Name

PREV

NEXT

:SYSTem:COMMunicate:LAN:DNS

Syntax

:SYSTem:COMMunicate:LAN:DNS <address>
:SYSTem:COMMunicate:LAN:DNS?

Description

Set the DNS server address for the signal generator.
The query returns the DNS server address in nnn.nnn.nnn.nnn format.

Example

:SYST:COMM:LAN:DNS 202.106.46.151
The query returns 202.106.46.151.

Explanation

• <address> is the DNS server address to be set and the format is nnn.nnn.nnn.nnn, The range of the first nnn is from 0 to 223 (except 127), The range of the other three nnn is from 0 to 255.
• This setting is stored in non-volatile memory.

Front Panel

Utility, I/O Setup, LAN, ManualIP (ON), DNS Server

PREV

NEXT

:SYSTem:COMMunicate:LAN:MAC?

Syntax

:SYSTem:COMMunicate:LAN:MAC?

Description

Query and return the MAC address.

Return Value

For example, return 00-14-0E-42-12-CF

PREV

NEXT

:SYSTem:COMMunicate:USB[:SELF]:CLASs

Syntax

:SYSTem:COMMunicate:USB[:SELF]:CLASs COMPuter|PRINter
:SYSTem:COMMunicate:USB[:SELF]:CLASs?

Description

Select the device type to be connected to the instrument via the USB Device interface of the signal generator.
The query returns COMP or PRIN.

Example

:SYST:COMM:USB:CLAS COMP
The query returns COMP.

Front Panel

Utility, I/O Setup, USB Dev

PREV

NEXT

:SYSTem:COMMunicate:USB:INFormation?

Syntax

:SYSTem:COMMunicate:USB:INFormation?

Description

Query the USB information.

Return Value

For example, :USB0::0X1AB1::0X0640::DG5A000000001::INSTR

PREV

NEXT

:SYSTem:COMMunicate:GPIB[:SELF]:ADDRess

Syntax

:SYSTem:COMMunicate:GPIB[:SELF]:ADDRess <integer>
:SYSTem:COMMunicate:GPIB[:SELF]:ADDRess?

Description

Set the GPIB address for the signal generator.
The query returns the value from 0 to 30.

Example

:SYST:COMM:GPIB:SELF:ADDRess 2
The query returns 2.

Explanation

- <integer> is the GPIB address to be set and the range is from 0 to 30.
- The address selected is stored in non-volatile memory.

Front Panel

Utility, I/O Setup, GPIB Address

PREV

NEXT

TRACe Subsystem

PREV

NEXT

[:TRACe]:DATA[:DATA]

Syntax

[:TRACe]:DATA[:DATA] VOLATILE,<value>{,<value>}

Description

Download floating point voltage value into the volatile memory. The range of the number of the floating points is from -1 to +1 and the data length can not exceed 512 kpts.

Example

:DATA VOLATILE,-0.6,-0.5,-0.4,-0.3,-0.2,-0.1,0,0.1,0.2,0.3,0.4,0.5,0.6

Explanation

After the command is sent, the instrument will switch the current channel to output volatile waveform automatically and modify the interpolation mode and the number of editable points at the same time. The data downloaded using this command can be edited on the instrument.

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NEXT

[:TRACe]:DATA:DAC16

Syntax

[:TRACe]:DATA:DAC16 VOLATILE,<flag>,<binary_block_data>

Description

Download the waveform edited into the DDRII.

Explanation

• This command consists of two parts. The first part is the command character string ([:TRACe]:DATA:DAC16 VOLATILE,<flag>,) and the second part is the binary data to be downloaded (<binary_block_data>).
• <flag> represents the data transmission state and can be set to CON or END. "CON": there are still data packets after the current one; "END": this is the last data packet and the data transmission is finished.
• <binary_block_data> is the binary data to be downloaded and the range is from 0000 to 3FFF. The data length must be 16 kpts (32 kBytes).
The binary data block starts with #.
For example, send **:DATA:DAC16 VOLATILE,CON,#532768binary data**
The number **5** following **#** represents that the data length information **32768** holds 5 characters and **32768** represents the number of bytes of the **binary data**. As each waveform point holds two bytes, the number of bytes must be an even number.
• When the <flag> in the command received is END, the instrument will automatically switch to arbitrary waveform output.
• If the total length of the waveform to be downloaded is 16 kpts and the waveform is downloaded into the instrument in one operation, users can edit the data on the instrument. Otherwise, local editing is not supported.

PREV

NEXT

[:TRACe]:DATA:DAC

Syntax

[:TRACe]:DATA:DAC VOLATILE,[<binary_block_data>|<value>,<value>,<value>…]

Description

Send binary data block or decimal DAC value to the volatile memory.

Explanation

• <binary_block_data> is the binary data to be sent. The range is from 0000 to 3FFF and the data length is 4 Bytes (2 pts) to 32768 Bytes (16 kpts). The binary data block starts with #.
For example, send **:DATA:DAC VOLATILE,#516384binary data**
The number **5** following **#** represents that the data length information **16384** holds 5 characters and **16384** represents the number of bytes of the **binary data**. As each waveform point holds two bytes, the number of bytes must be an even number.
• <value>,<value>,<value>...: when the data does not start with #, the decimal DAC value can be sent in character string format.
For example, send **:DATA:DAC VOLATILE,0,16883,8192,0,16383**
5 data points are sent totally.
• For data with less than 16384 points, the instrument will extend the data to 16384 points using uniform interpolation automatically.
• After this command is sent, the instrument will switch the current channel to output volatile waveform automatically and modify the interpolation mode and the number of editable points. The data downloaded using this command can be edited on the instrument.

PREV

NEXT

[:TRACe]:DATA:VALue

Syntax

[:TRACe]:DATA:VALue VOLATILE,<point>,<data>

Description

Modify the decimal interger value of a certain point in the volatile memory.

Example

:DATA:VAL VOLATILE,2,8192
Modify the second point to the decimal number 8192.

Explanation

- <point>: the point to be modified;
- <data>: a decimal data and the range is from 0 to 16383.
- This command is only available when the current output waveform is arbitrary waveform and the type of the arbitrary waveform is volatile.

PREV

NEXT

[:TRACe]:DATA:VALue?

Syntax

[:TRACe]:DATA:VALue? VOLATILE,<point>

Description

Query the decimal integer value of a certain point in the volatile memory.
The query returns a decimal value and the range is from 0 to 16383.

Example

:DATA:VAL? VOLATILE,2
The query returns 4095.

Explanation

- <point> is the point to be queried.
- This command is only available when the current output waveform is arbitrary waveform and the type of the arbitrary waveform is volatile.

PREV

NEXT

[:TRACe]:DATA:LOAD?

Syntax

[:TRACe]:DATA:LOAD? VOLATILE
[:TRACe]:DATA:LOAD? <num>

Description

Query the number of arbitrary waveform data packets in the volatile memory.
Read the specified data packet in the volatile memory.

Explanation

First, send the [:TRACe]:DATA:LOAD? VOLATILE command to query the number of arbitrary waveform data packets in the volatile memory and the query returns a decimal value.
The length of each data packet is 32768 Bytes. The query returns 1 if the length of the current arbitrary waveform is 32768 Bytes.
Then, send the [:TRACe]:DATA:LOAD? <num> command to read the data in the numth data packet, wherein, the range of <num> is from 1 to the number of data packets.
For example, send the **:DATA:LOAD? 1** command to get the first data packet (start with #, then the number of characters of the data length information, then the data length information and finally the data) with 32768 Bytes length in the volatile memory.

PREV

NEXT

[:TRACe]:DATA:POINts

Syntax

[:TRACe]:DATA:POINts VOLATILE,<value>|MINimum|MAXimum
[:TRACe]:DATA:POINts? VOLATILE[,MINimum|MAXimum]

Description

Set the number of the initial points.
Query the number of the initial points of the edited waveform.

Explanation

- The range of <value> is from 2 to 524288.
- After this command is sent, the instrument will switch to arbitrary waveform (volatile waveform) output mode automatically and initialize the volatile waveform to waveform with the specified number of points and 0 amplitude. At this point, you can send the [:TRACe]:DATA:VALue command to set the amplitude of the specified point.

Return Value

The query returns an integer between 2 and 524288 representing the number of the initial points of the edited waveform.

Front Panel

Arb, Create New, Init #Points

PREV

NEXT

[:TRACe]:DATA:POINts:INTerpolate

Syntax

[:TRACe]:DATA:POINts:INTerpolate LINear|SINC|OFF
[:TRACe]:DATA:POINts:INTerpolate?

Description

Set the interpolation mode between the defined points of the waveform.
The query returns LINEAR, SINC or OFF.

Example

:DATA:POIN:INT LIN
The query returns LINEAR.

Explanation

- LINear: the waveform editor will connect the two defined points with a straight line.
- SINC: the waveform editor will connect the two points with a smooth curve.
- OFF: turn off the interpolation. The waveform editor will hold a constant voltage level between two points and create a step waveform.
- This command is only available when the instrument is in arbitrary waveform output mode and the type of the arbitrary waveform is volatile.

Front Panel

Arb, Create New/Edit Wform, Interp

PREV


NEXT

Programming Demos

This chapter lists some programming demos to illustrate how to use commands to realize the common functions of the generator in the development environments of Visual C++ 6.0, Visual Basic 6.0 and LabVIEW 8.6. All demos are based on NI (National Instrument)-VISA (Virtual Instrument Software Architecture).

NI-VISA is an API (application programming interface) written by NI on the basis of VISA standards. You can use NI-VISA to realize the communication between the generator and the PC via instrument buses such as USB. As VISA has defined a set of software commands, users can control the instrument without understanding the working state of the interface bus. For more details, please refer to NI-VISA help.

Topics of this chapter:

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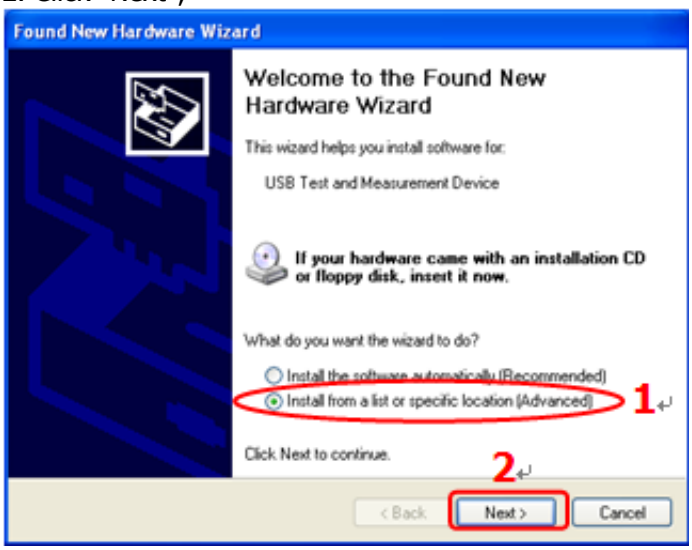
Programming Preparations

First make sure your computer has installed the VISA library of NI (download it from http://www.ni.com/visa/). Here, the default installation path is C:\Program Files\IVI Foundation\VISA.

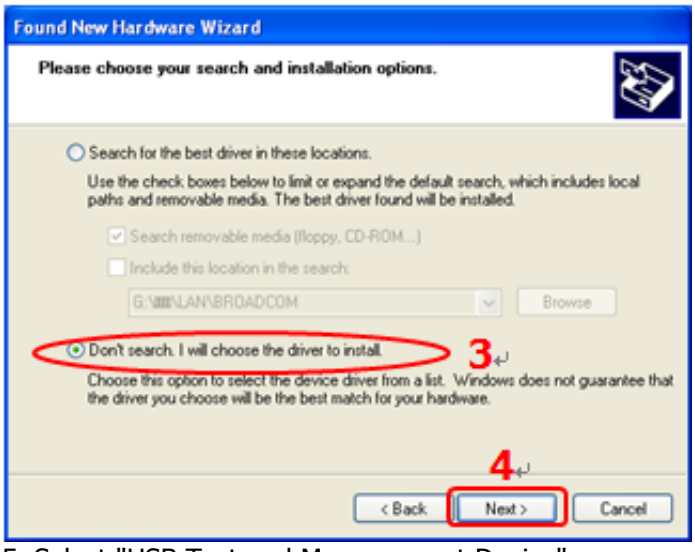
Here, the USB Device interface of the generator is used to communicate with the PC and please use the USB cable to connect the USB Device interface at the rear panel of the generator to the USB interface of the PC.

After successful connection, turn on the instrument. A "**Found New Hardware Wizard**" dialog box appears on the PC at the first connection. Please follow the instructions to install the "USB Test and Measurement Device" (the installation procedures are as follows).

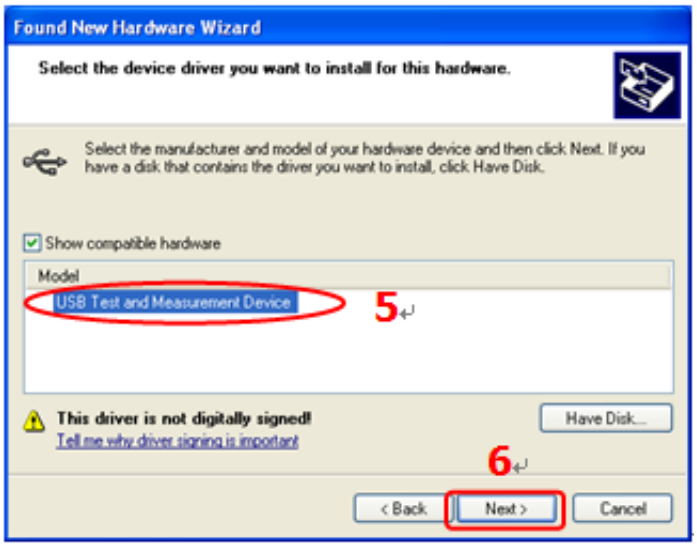
1. Select "Install from a list or specific location (Advanced)";
2. Click "Next";

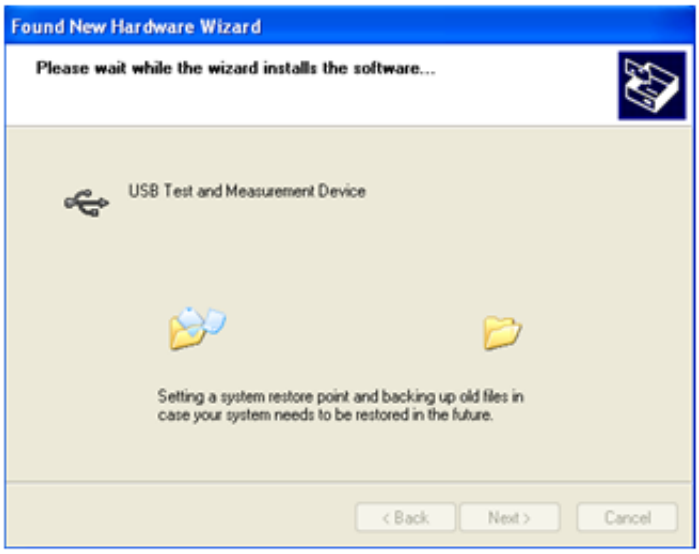


3. Select "Do not search. I will choose the device to install.";
4. Click "Next";

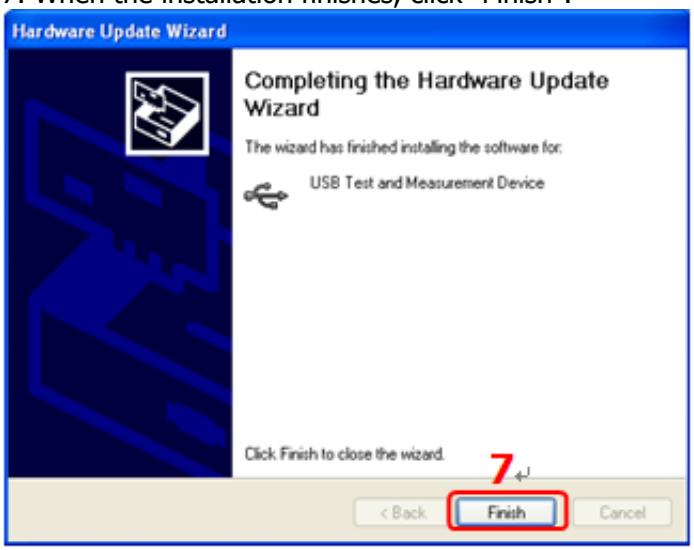


5. Select "USB Test and Measurement Device";
6. Click "Next";





7. When the installation finishes, click "Finish".



By now, the programming preparations are finished. In the following part, the programming demos in Visual C++ 6.0, Visual Basic 6.0 and LabVIEW 8.6 development environments are introduced in detail.

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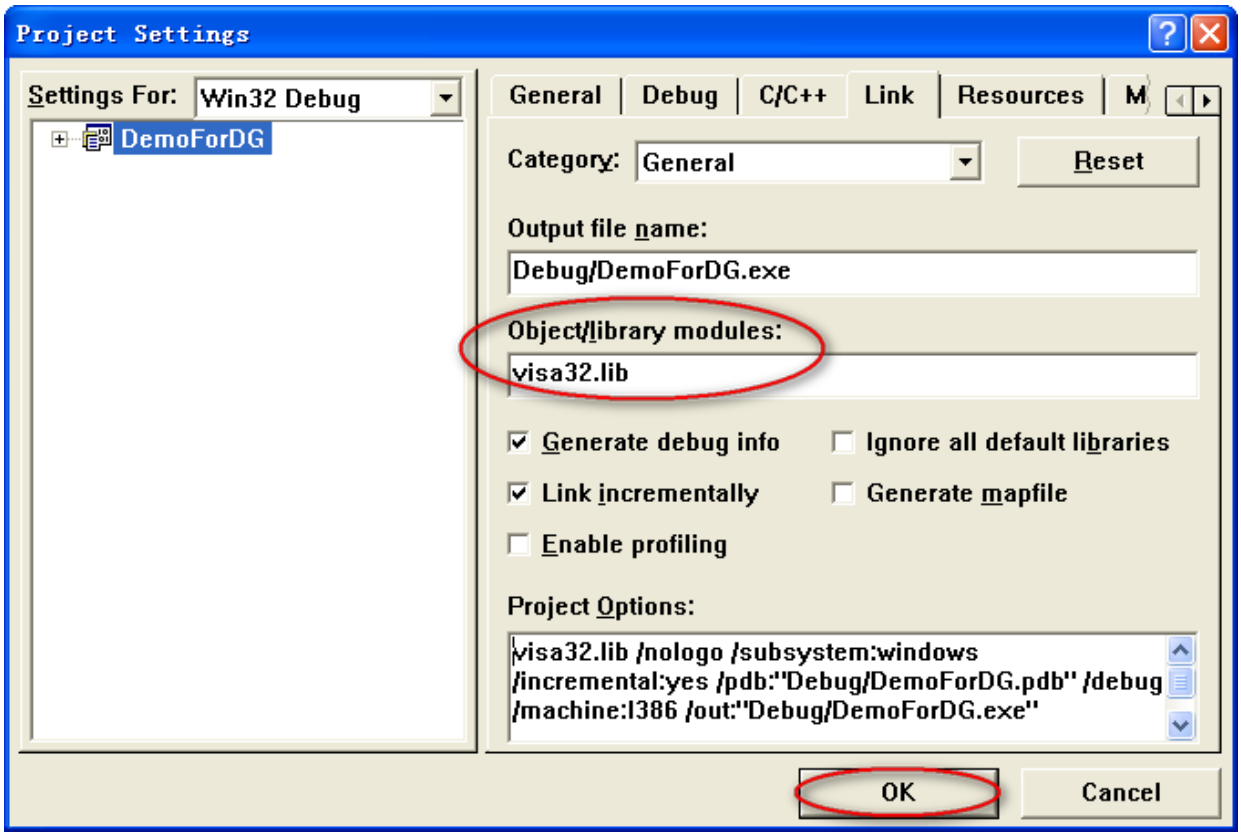
Visual C++ 6.0 Programming Demo

Enter the Visual C++6.0 programming environment and follow the steps below.

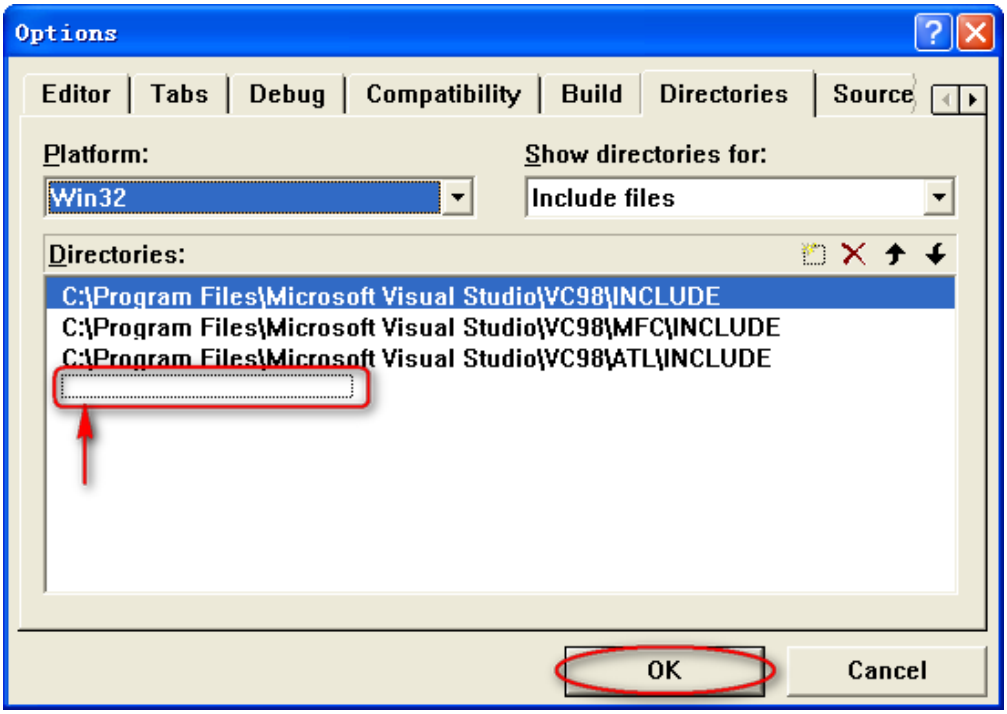
1. Build a MFC project based on dialog box.

2. Open the **Link** tab in **Project→Settings** and add **visa32.lib** to the **Object/library modules** manually.



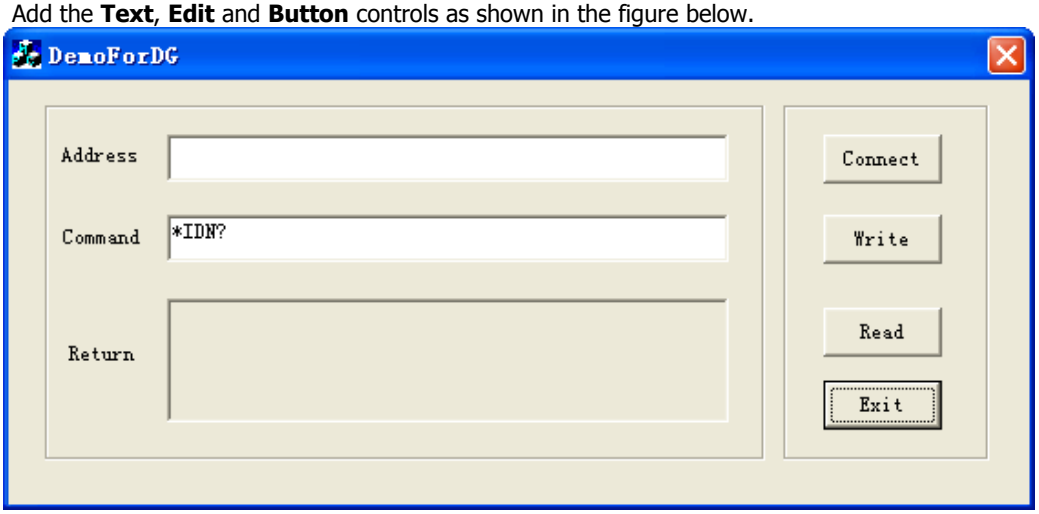
3. Open the **Directories** tab in **Tools→Options**.
Select **Include files** in **Show directories for** and double-click at the place pointed out by the red arrow in **Directories** to add the path of **Include**: C:\Program Files\IVI Foundation\VISA\WinNT\include.

Select **Library files** in **Show directories for** and double-click at the place pointed out by the red arrow in **Directories** to add the path of **Lib**: C:\Program Files\IVI Foundation\VISA\WinNT\lib\msc.



Note: at present, VISA library has been added.

4. Add the **Text**, **Edit** and **Button** controls as shown in the figure below.



5. Add the control variables.

Open the **Member Variables** tab in **View→ClassWizard** and add the following three variables:
Instrument address: CString m_strInstrAddr
Command: CString m_strCommand
Return Value: CString m_strResult

6. Encapsulate the read and write operations of VISA.

1) Encapsulate the write operation of VISA for easier operation.

```
bool CDemoForDGDlg::InstrWrite(CString strAddr, CString strContent)  //Write //operation
{
```

```
	ViSession defaultRM,instr;
	ViStatus status;
	ViUInt32 retCount;
	char * SendBuf = NULL;
	char * SendAddr = NULL;
	bool bWriteOK = false;
	CString str;

	// Change the address's data style from CString to char*
	SendAddr = strAddr.GetBuffer(strAddr.GetLength());
	strcpy(SendAddr,strAddr);
	strAddr.ReleaseBuffer();

	// Change the command's data style from CString to char*
	SendBuf = strContent.GetBuffer(strContent.GetLength());
	strcpy(SendBuf,strContent);
	strContent.ReleaseBuffer();

	//open a VISA resource
	status = viOpenDefaultRM(&defaultRM);
	if (status < VI_SUCCESS)
	{
		AfxMessageBox("No VISA resource was opened!");
		return false;
	}

	status = viOpen(defaultRM, SendAddr, VI_NULL, VI_NULL, &instr);

	//Write command to the instrument
	status = viWrite(instr, (unsigned char *)SendBuf, strlen(SendBuf), &retCount);

	//Close the system
	status = viClose(instr);
	status = viClose(defaultRM);

	return bWriteOK;
}
```

2) Encapsulate the read operation of VISA for easier operation.

```
bool CDemoForDGDlg::InstrRead(CString strAddr, CString *pstrResult)  //Read //operation
{
	ViSession defaultRM,instr;
	ViStatus status;
	ViUInt32 retCount;
	char * SendAddr = NULL;
	unsigned char RecBuf[MAX_REC_SIZE];
	bool bReadOK = false;
	CString str;

	// Change the address's data style from CString to char*
	SendAddr = strAddr.GetBuffer(strAddr.GetLength());
	strcpy(SendAddr,strAddr);
	strAddr.ReleaseBuffer();
```

```
    memset(RecBuf,0,MAX_REC_SIZE);

    //Open a VISA resource
    status = viOpenDefaultRM(&defaultRM);
    if (status < VI_SUCCESS)
    {
        // Error Initializing VISA...exiting
        AfxMessageBox("No VISA resource was opened!");
        return false;
    }

    //Open the instrument
    status = viOpen(defaultRM, SendAddr, VI_NULL, VI_NULL, &instr);

    //Read from the instrument
    status = viRead(instr, RecBuf, MAX_REC_SIZE, &retCount);

    //close the system
    status = viClose(instr);
    status = viClose(defaultRM);

    (*pstrResult).Format("%s",RecBuf);

    return bReadOK;
}
```

7. Add the control message response codes.

1) Connect to the instrument

```
void CDemoForDGDlg::OnBtConnectInstr()        // Connect to the instrument
{
    // TODO: Add your control notification handler code here
    ViStatus status;
    ViSession defaultRM;
    ViString expr = "?*";
    ViPFindList findList = new unsigned long;
    ViPUInt32 retcnt = new unsigned long;
    ViChar instrDesc[1000];
    CString strSrc = "";
    CString strInstr = "";
    unsigned long i = 0;
    bool bFindDG = false;

    status = viOpenDefaultRM(&defaultRM);
    if (status < VI_SUCCESS)
    {
        // Error Initializing VISA...exiting
        MessageBox("No VISA instrument was opened ! ");
        return ;
    }

    memset(instrDesc,0,1000);

    // Find resource
    status = viFindRsrc(defaultRM,expr,findList, retcnt, instrDesc);
```

```
        for (i = 0;i < (*retcnt);i++)
        {
            // Get instrument name
            strSrc.Format("%s",instrDesc);
            InstrWrite(strSrc,"*IDN?");
            ::Sleep(200);
            InstrRead(strSrc,&strInstr);

           // If the instrument(resource) belongs to the DG series then jump out //from the loop
            strInstr.MakeUpper();
            if (strInstr.Find("DG") >= 0)
            {
                bFindDG = true;
                m_strInstrAddr = strSrc;
                break;
            }

            //Find next instrument
            status =  viFindNext(*findList,instrDesc);
        }

        if (bFindDG == false)
        {
            MessageBox("Didn't find any DG!");
        }
        UpdateData(false);
    }
```

2) Write Operation

```
void CDemoForDGDlg::OnBtWrite()                    //Write operation

{

    // TODO: Add your control notification handler code here

    UpdateData(true);

    if (m_strInstrAddr.IsEmpty())

    {

        MessageBox("Please connect to the instrument first!");

    }

    InstrWrite(m_strInstrAddr,m_strCommand);

    m_strResult.Empty();

    UpdateData(false);

}
```

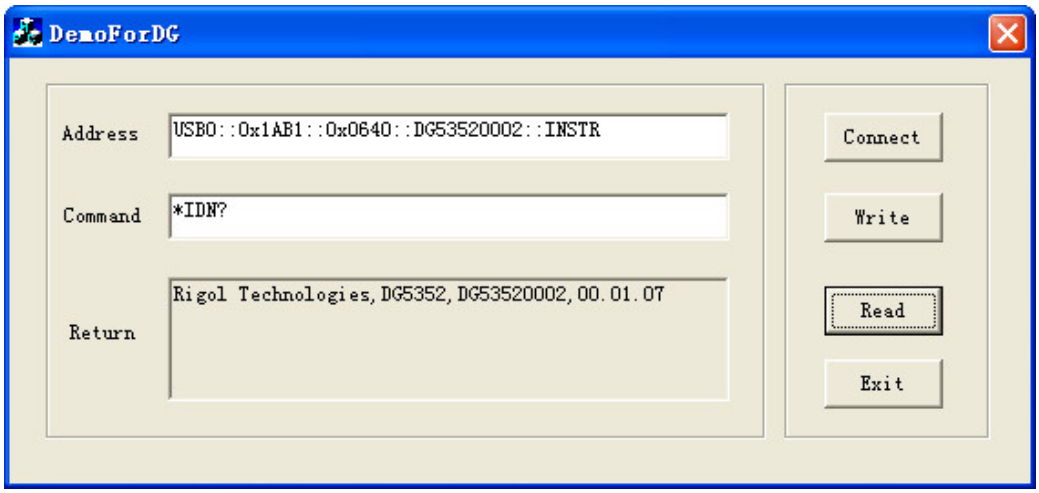
3) Read Operation

```
void CDemoForDGDlg::OnBtRead()                    //Read operation
{
    // TODO: Add your control notification handler code here
    UpdateData(true);
    InstrRead(m_strInstrAddr,&m_strResult);
    UpdateData(false);
}
```

8. Execution Result

1) Click "Connect" to search for the generator;
2) Input "*IDN?" in the "Command" edit box;
3) Click "Write" to write the command into the generator;
4) Click "Read" to read the return value.

The execution result is as shown in the figure below.



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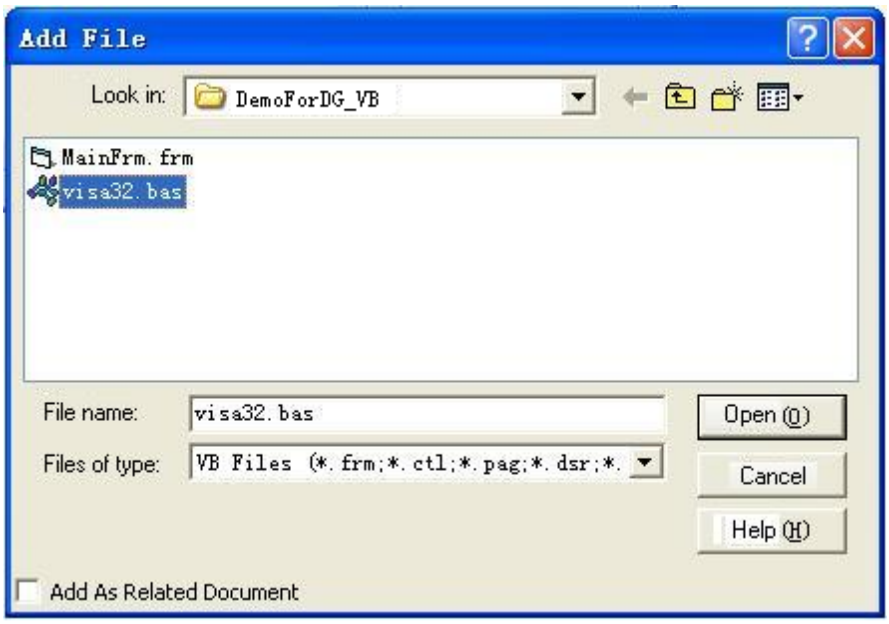
Visual Basic 6.0 Programming Demo

Enter the Visual Basic 6.0 programming environment and follow the steps below.

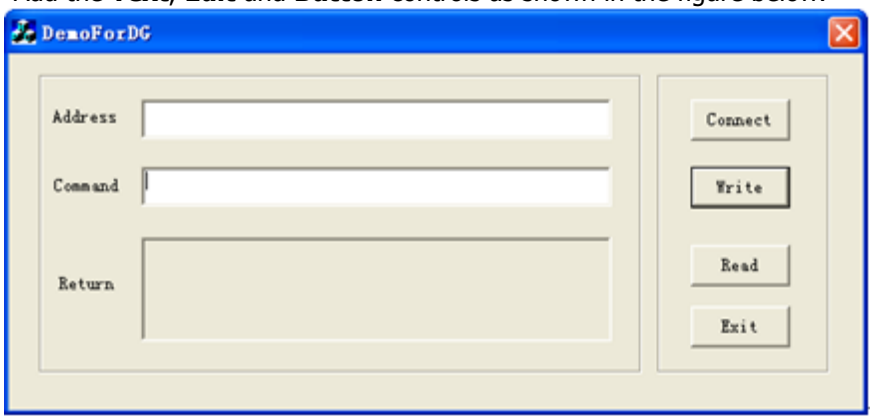
1. Build a standard application program project (Standard EXE).

2. Open **Project→Add File...** and add **visa32.bas** which contains all VISA functions and constant statements to the project.



Then add the **Declare Sub Sleep Lib "kernel32" (ByVal dwMilliseconds As Long) statement** into the **visa32.bas**, or create a new module to declare the **Sleep** function.

3. Add the **Text**, **Edit** and **Button** controls as shown in the figure below.



4. Encapsulate the write and read operations of VISA.

1) Encapsulate the write operation of VISA for easier operation.

```
'-------------------------------------------------------
'Function Name：InstrWrite
'Function：  Send command to the instrument
'Input：  rsrcName,instrument(resource) name
            strCmd,Command
'-------------------------------------------------------
Public Sub InstrWrite(rsrcName As String, strCmd As String)
    Dim status As Long
    Dim dfltRM As Long
    Dim sesn As Long
    Dim rSize As Long

      'Initialize the system
      status = viOpenDefaultRM(dfltRM)
    'Failed to initialize the system
    If (status < VI_SUCCESS) Then
        MsgBox " No VISA resource was opened ! "
        Exit Sub
    End If
    'Open the VISA instrument
    status = viOpen(dfltRM, rsrcName, VI_NULL, VI_NULL, sesn)
    'Failed to open the instrument
    If (status < VI_SUCCESS) Then
        MsgBox "Failed to open the instrument ! "
        Exit Sub
    End If

    'Write command to the instrument
    status = viWrite(sesn, strCmd, Len(strCmd), rSize)
      'Failed to write to the instrument
      If (status < VI_SUCCESS) Then
        MsgBox " Faild to write to the instrument ! "
        Exit Sub
    End If

    'Close the system
    status = viClose(sesn)
    status = viClose(dfltRM)

End Sub
```

2) Encapsulate the read operation of VISA for easier operation.

```
'-------------------------------------------------------
'Function Name：InstrRead
'Function：  Read the return value from the instrument
'Input：  rsrcName,Resource name
'Return：The string gotten from the instrument
```

```
'-------------------------------------------------------
Public Function InstrRead(rsrcName As String) As String
    Dim status As Long
    Dim dfltRM As Long
    Dim sesn As Long
    Dim strTemp0 As String * 256
    Dim strTemp1 As String
    Dim rSize As Long

    'Begin by initializing the system
    status = viOpenDefaultRM(dfltRM)
    'Initial failed
    If (status < VI_SUCCESS) Then
        MsgBox " Failed to open the instrument! "
        Exit Function
    End If
    'Open the instrument
    status = viOpen(dfltRM, rsrcName, VI_NULL, VI_NULL, sesn)
    'Open instrument failed
    If (status < VI_SUCCESS) Then
        MsgBox " Failed to open the instrument! "
        Exit Function
    End If

    ' Read from the instrument
    stasus = viRead(sesn, strTemp0, 256, rSize)
    ' Read failed
    If (status < VI_SUCCESS) Then
        MsgBox " Failed to read from the instrument! "
        Exit Function
    End If

    'Close the system
    status = viClose(sesn)
    status = viClose(dfltRM)

    ' Remove the space at the end of the string
    strTemp1 = Left(strTemp0, rSize)
    InstrRead = strTemp1
End Function
```

5. Add the control event codes.

1) Connect to the instrument

```
' Connect to the instrument
Private Sub CmdConnect_Click()
    Const MAX_CNT = 200
    Dim status As Long
    Dim dfltRM As Long
    Dim sesn As Long
```

```
    Dim fList As Long
    Dim buffer As String * MAX_CNT, Desc As String * 256
    Dim nList As Long, retCount As Long
    Dim rsrcName(19) As String * VI_FIND_BUFLEN, instrDesc As String * VI_FIND_BUFLEN
    Dim i, j As Long
      Dim strRet As String
    Dim bFindDG As Boolean

    'Initialize the system
    status = viOpenDefaultRM(dfltRM)
    ' Initialize failed
    If (status < VI_SUCCESS) Then
       MsgBox " No VISA resource was opened  ! "
       Exit Sub
    End If

    ' Find instrument resource
    Call viFindRsrc(dfltRM, "USB?*INSTR", fList, nList, rsrcName(0))
    ' Get the list of the instrument(resource)
    strRet = ""
    bFindDG = False
    For i = 0 To nList - 1
       ' Get the instrument name
       InstrWrite rsrcName(i), "*IDN?"
       Sleep 200
       strRet = InstrRead(rsrcName(i))
       ' Continue to switch the resource until find a DG instrument
       strRet = UCase(strRet)
       j = InStr(strRet, "DG")
       If (j >= 0) Then
          bFindDG = True
          Exit For
       End If

       Call viFindNext(fList + i - 1, rsrcName(i))
    Next i
    'Dispaly
    If (bFindDG = True) Then
       TxtInsAddr.Text = rsrcName(i)
    Else
       TxtInsAddr.Text = ""
    End If
End Sub
```

2) Write Operation

```
'Write the command to the instrument
Private Sub CmdWrite_Click()
    If (TxtInsAddr.Text = "") Then
       MsgBox ("Please write the instrument address ! ")
```

```
    End If

    InstrWrite TxtInsAddr.Text, TxtCommand.Text
End Sub
```

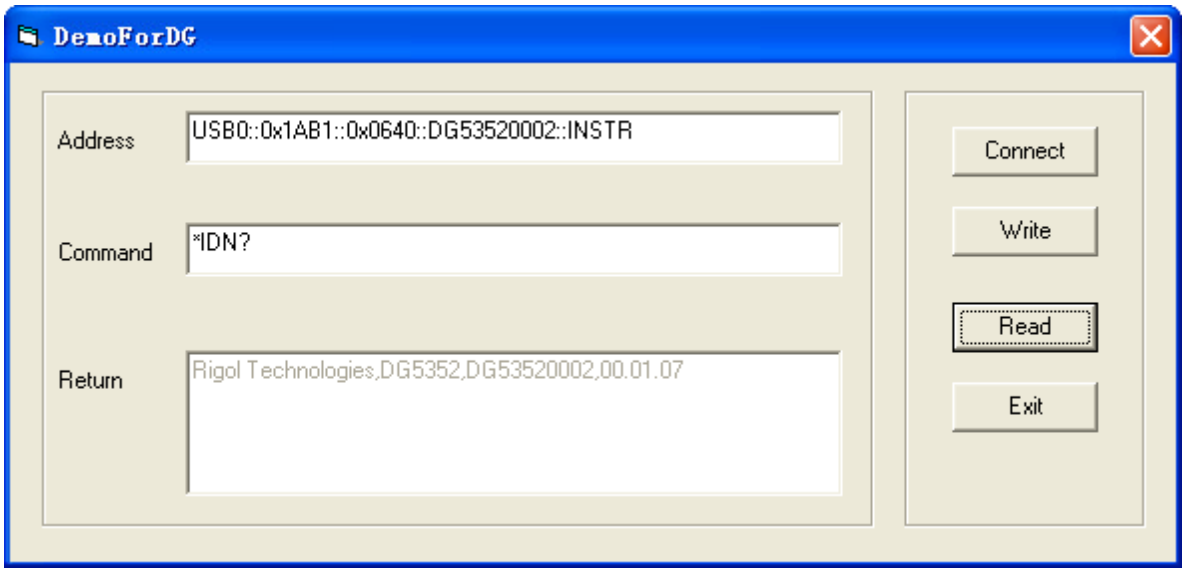
3) Read Operation

```
'Read the return value from the instrument
Private Sub CmdRead_Click()
    Dim strTemp As String
    strTemp = InstrRead(TxtInsAddr.Text)
    TxtReturn.Text = strTemp
End Sub
```

6. Execution Result

1) Click "Connect" to search for the generator;
2) Input "*IDN?" in the "Command" edit box;
3) Click "Write" to write the command into the generator;
4) Click "Read" to read the return value.

The execution result is as shown in the figure below.



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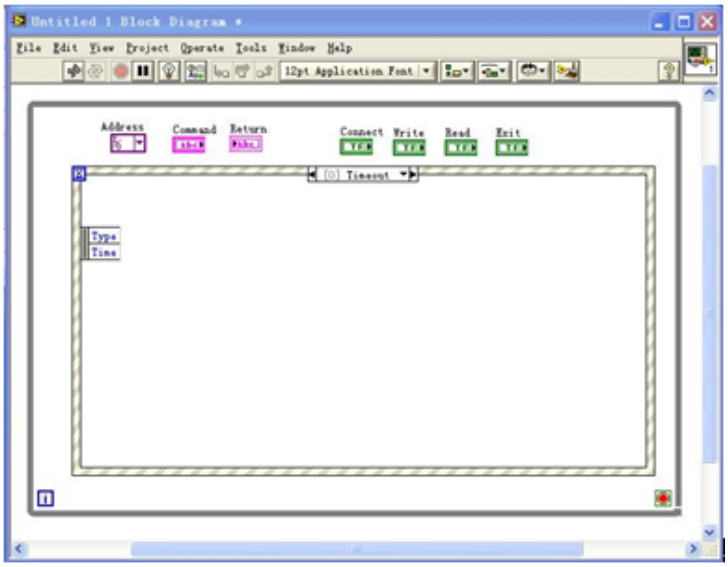
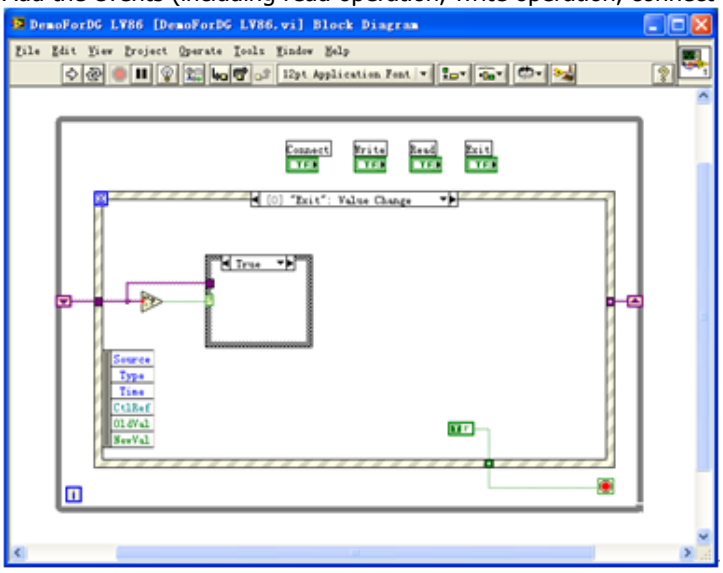
LabVIEW 8.6 Programming Demo

Enter the Labview 8.6 programming environment and follow the steps below.

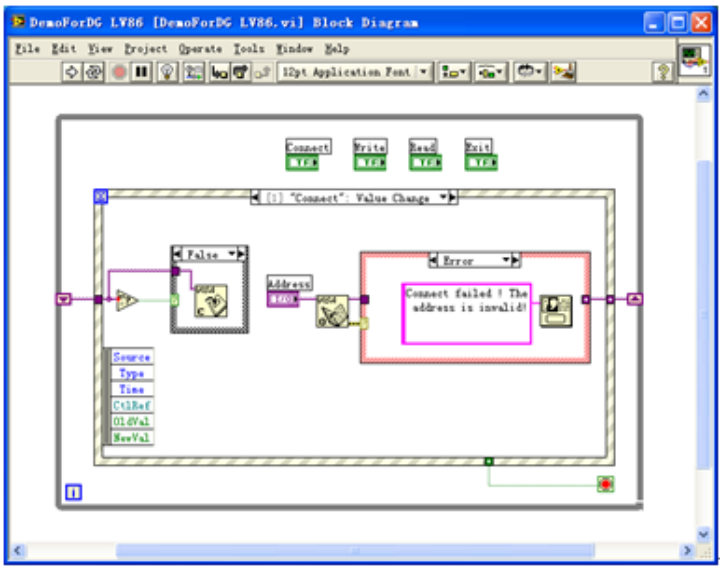
1. Create the event structure



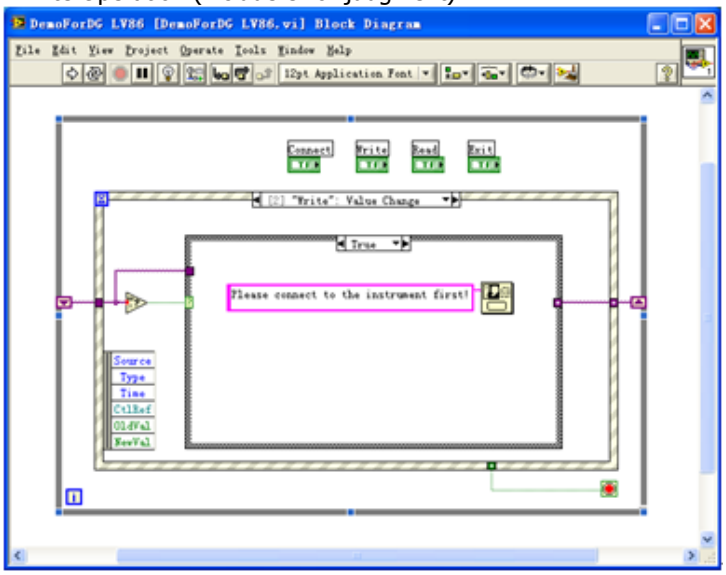
2. Add the events (including read operation, write operation, connect to the instrument and exit)

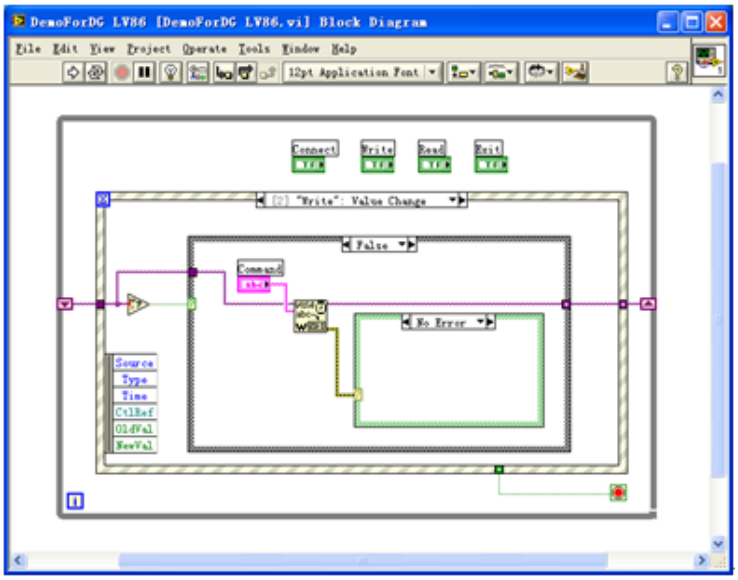


3. Connect to the instrument

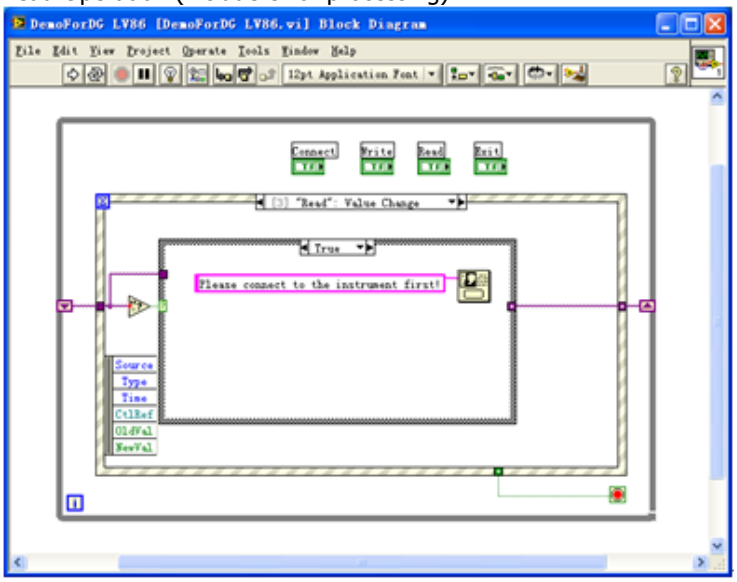


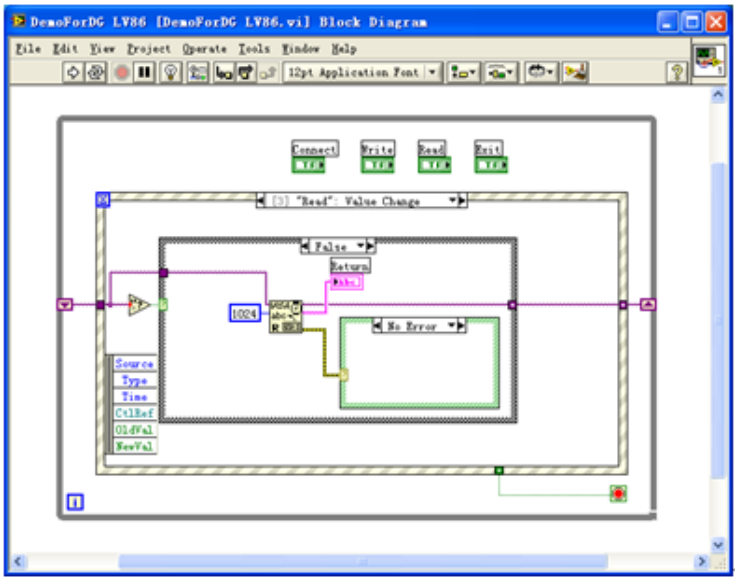
4. Write Operation (include error judgment)



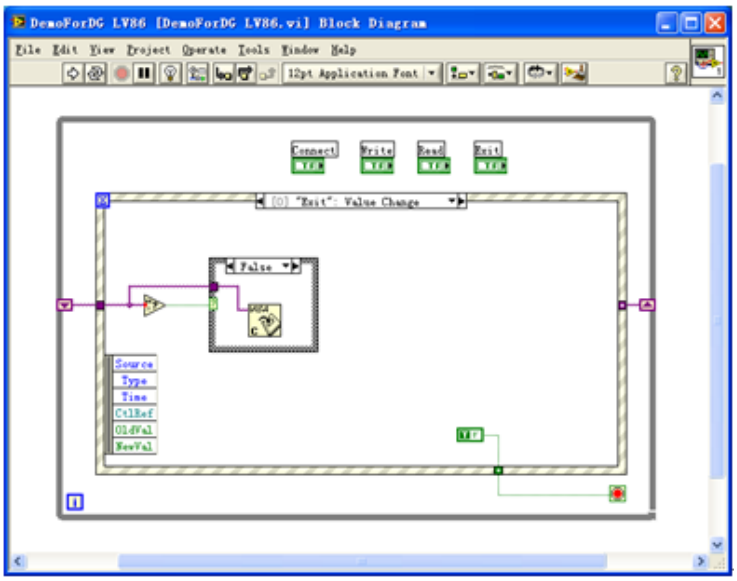


5. Read Operation (include error processing)

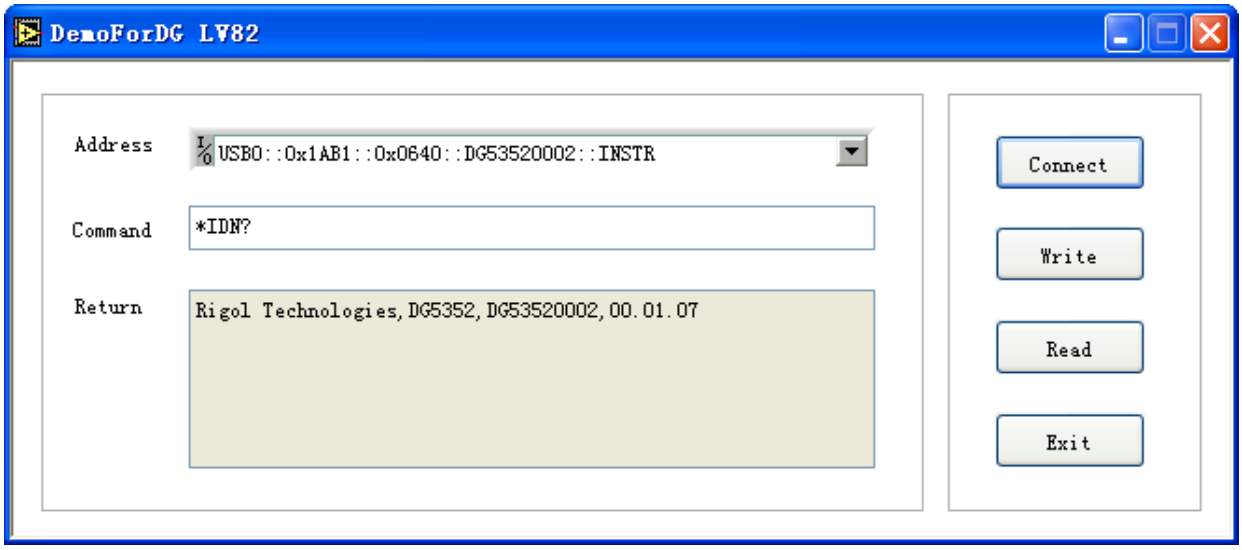




6. Exit



7. Execution Result


DemoForDG LV82
Address
USB0::0x1AB1::0x0640::DG53520002::INSTR
Command
*IDN?
Return
Rigol Technologies,DG5352,DG53520002,00.01.07
Connect
Write
Read
Exit

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[:TRACe]:DATA:LOAD?

[:TRACe]:DATA:POINts

[:TRACe]:DATA:POINts:INTerpolate

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