RIGOL

Programming Guide

DS2000 Series Digital Oscilloscope

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RIGOL Technologies, Inc.

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Document Overview

This manual introduces how to program and control **RIGOL** DS2000 series digital oscilloscope using SCPI commands through remote interfaces. DS2000 can communicate with the PC via USB, LAN or GPIB (with the **RIGOL** USB-GPIB interface converter) interface.

Main topics in this manual:

Contents

1 SCPI Overview

SCPI (abbreviation for Standard Commands for Programmable Instruments) is a standard command set for program control instrument (programmable instrument). SCPI is build upon the existing IEEE488.1 and IEEE 488.2 standards and conforms to various standardized instrument programming languages such as the floating-point aritmetic rule of IEEE754 standard and 7-bit coded character of ISO646 information interchange (equivalent to ASCII programming). 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.

Main topics of this chapter:

Syntax

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,
:CALCulate:ADVanced:EXPRession <expression>
:CALCulate:ADVanced:EXPRession?

CALCulate is the root keyword of the command. **ADVance** and **EXPRession** are the second-level and third-level keywords respectively. The command string starts with "**:**" which separates the multiple-level keywords. **<expression>** represents parameters available for setting, "**?**" represents query and the command **:CALCulate:ADVance:EXPRession** and the parameter **<expression>** are separated by space.

"," is generally used for separating different parameters contained in the same command, for example,
:SYSTem:DATE <year>,<month>,<day>

Symbol Description

The following symbols will not be sent with the command.

1. **Braces { }**
   The parameters enclosed in the braces are optional and are usually separated by the vertical bar "|". When using the command, one of the parameters must be selected.

2. **Vertical Bar |**
   The vertical bar is used to separate multiple parameters and one of the parameters must be selected when using the command.

3. **Square Brackets [ ]**
   The content in the square brackets can be omitted.

4. **Triangle Brackets < >**
   The parameter enclosed in the triangle brackets must be replaced by an effective value.

Parameter Type

1. Bool

The parameter could be OFF, ON, 0 or 1. For example,
:MEASure:ADISplay <bool>
:MEASure:ADISplay?
Wherein,
<bool> can be set to {{0|OFF}|{1|ON}}.
The query returns 0 or 1.

2. Discrete

The parameter could be any of the values listed. For example,
:ACQuire:TYPE <type>
:ACQuire:TYPE?
Wherein,
<type> can be set to NORMal|AVERages|PEAK|HRESolution.
The query returns the abbreviations (NORM, AVER, PEAK or HRES).

3. Integer

Unless otherwise noted, the parameter can be any integer (NR1 format) within the effective value range. Note that do not set the parameter to a decimal, otherwise errors will occur. For example,
:DISPlay:GBRightness <brightness>
:DISPlay:GBRightness?
Wherein,
<brightness> can be set to any integer between 0 and 100.
The query returns an integer between 0 and 100.

4. Real

The parameter can be any real number within the effective value range and this command accepts decimal (NR2 format) and scientific notation (NR3 format) parameter input. For example,
:FUNCtion:WREPlay:INTerval <interval>
:FUNCtion:WREPlay:INTerval?
Wherein,
<interval> can be set to any real number between 0.0000001 or 1.000000e-07

(namely 100 ns) and 10 or 0.1e+02 (namely 10 s).

The query returns a real number in scientific notation.

5. ASCII String

The parameter should be the combinations of ASCII characters.

For example,

:CALCulate:ADVanced:EXPRession <expression>

:CALCulate:ADVanced:EXPRession?

Wherein,

<expression> can be set to CH1+CH2

The query returns the ASCII character string.

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,

:MEASure:ADISplay?
can be abbreviated to
:MEAS:ADIS?

2 Command System

This chaper introduces the command subsystems in the DS2000 command set. Note that the explanations and parameter ranges here are based on DS2202.

Main topics of this chapter:

:AUToscale

Syntax

:AUToscale

Description

Enable the auto setting function.

Explanation

This command is not available when the current state of the Pass/Fail function is "Enable Test". For details, refer to the :MASK:ENABle command.

The oscilloscope will adjust the vertical scale, horizontal time base and trigger mode for optimum display of the waveform. Note that to use the auto setting, the frequency of the signal under test should be no lower than 50 Hz, the duty cycle be greater than 1% and the amplitude be at least 20 mVpp.

:CLEar

Syntax

:CLEar

Description

Clear all the waveforms on the screen.

Explanation

Waveform will still be displayed if the oscilloscope is in RUN state.

:RUN

Syntax

:RUN

Description

Start the oscilloscope.

Explanation

You can use the :STOP command to set the oscilloscope to STOP.

:SINGle

Syntax

:SINGle

Description

Set the oscilloscope to single trigger mode.

Explanation

In single trigger mode, the oscilloscope triggers once the trigger conditions are met and then stops.

In single trigger mode, using the :TFORce command can generate a trigger signal forcefully.

You can use the :RUN and :STOP command to set the oscilloscope to Auto trigger mode or STOP state respectively.

:STOP

Syntax

:STOP

Description

Stop the oscilloscope.

Explanation

You can use the :RUN command to set the oscilloscope to Run.

:TFORce

Syntax

:TFORce

Description

Generate a trigger signal forcefully.

Explanation

Force trigger is applicable to normal and single trigger modes.

:TLHAlf

Syntax

:TLHAlf

Description

Set the trigger level to the vertical midpoint of the trigger signal amplitude.

IEEE 488.2 Common Commands

IEEE 488.2 standard defines some common commands used for querying the basic information of the instrument or executing basic operations. These commands usually start with "*" and the keyword of the command is usually 3-character long.

- *CLS
- *ESE
- *ESR?
- *IDN?
- *OPC
- *RST
- *SRE
- *STB?
- *TST?

*CLS

Syntax

*CLS

Description

Clear all the event registers in the register set and clear the error queue.

*ESE

Syntax

*ESE <mask>

*ESE?

Description

Set enable register for the standard event register set.

Query the current value of the enable register of the standard event register set.

Parameter

Name	Type	Range	Default
<mask>	Integer	0 to 255	0

Explanation

<mask> is the sum of the weights of all the bits between bit 0 and bit 7 that have already been set. If the bit has already been set, the corresponding binary bit is 1; otherwise, it is 0.

Definitions of the bits in ESE register:

Bit	Weights	Name	Enable
7	128	PON	Power On
6	64	URQ	User Request
5	32	CME	Command Error
4	16	EXE	Execution Error
3	8	DDE	Dev. Dependent Error
2	4	QYE	Query Error
1	2	RQL	Request Control
0	1	OPC	Operation Complete

Return Format

The query returns an integer between 0 and 255 which equals the sum of the weights of all the bits that have already been set in the register.

For example, the query returns 144 if bit 4 (16 in decimal) and bit 7 (128 in decimal) are enabled.

Example

*ESE 16

The query returns 16 (bit 4 is enabled).

*ESR?

Syntax

*ESR?

Description

Query the current value of the event status register for the standard event register set.

Explanation

Definitions of the bits of ESE register:

Bit	Weights	Name	Enable
7	128	PON	Power On
6	64	URQ	User Request
5	32	CME	Command Error
4	16	EXE	Execution Error
3	8	DDE	Dev. Dependent Error
2	4	QYE	Query Error
1	2	RQL	Request Control
0	1	OPC	Operation Complete

Return Format

The query returns an integer between 0 and 255 which equals the sum of the weights of all the bits that have already been set in the register.
For example, the query returns 144 if bit 4 (16 in decimal) and bit 7 (128 in decimal) are enabled.

Example

*ESR?
The query returns 32 (bit 5 is enabled).

*IDN?

Syntax

*IDN?

Description

Query the current device information.

Return Format

Rigol Technologies,<model>,<serial number>,X.XX.XX

<model>: the model number of the instrument.

<serial number>: the serial number of the instrument.

X.XX.XX: the software version of the instrument.

Example

*IDN?

The query returns RIGOL TECHNOLOGIES,DS2202,DS2A0000000001,00.00.01.

*OPC

Syntax

*OPC

*OPC?

Description

Set the Operation Complete bit (bit 0) in the standard event status register to 1 after the current operation is finished.

Query whether the current operation is finished.

Return Format

The query returns 1 if the current operation is finished; otherwise, returns 0.

*RST

Syntax

*RST

Description

Restore the instrument to the default values.

*SRE

Syntax

*SRE <mask>

*SRE?

Description

Set the enable register for the state byte register set.

Query the current value of the enable register of the state byte register set.

Parameter

Name	Type	Range	Default
<mask>	Integer	0 to 255	0

Explanation

<mask> is the sum of the weights of all the bits between bit 0 and bit 7 that have already been set. If the bit has already been set, the corresponding binary bit is 1; otherwise, it is 0.

Definitions of the bits of SRE register:

Bit	Weights	Name	Enable
7	128	OPER	Operation Status Reg
6	64	--	Not used
5	32	ESB	Event Status Bit
4	16	MAV	Message Available
3	8	--	Not used
2	4	MSG	Message
1	2	USR	User
0	1	TRG	Trigger

Return Format

The query returns an integer between 0 and 255 which equals the sum of the weights of all the bits that have already been set in the register.

For example, the query returns 144 if bit 4 (16 in decimal) and bit 7 (128 in decimal) are enabled.

Example

*SRE 16

The query returns 16 (bit 4 is enabled).

*STB?

Syntax

*STB?

Description

Query the condition register for the state byte register set.

Explanation

Definitions of the bits of SRE register:

Bit	Weights	Name	Enable
7	128	OPER	Operation Status Reg
6	64	--	Not used
5	32	ESB	Event Status Bit
4	16	MAV	Message Available
3	8	--	Not used
2	4	MSG	Message
1	2	USR	User
0	1	TRG	Trigger

Return Format

The query returns an integer between 0 and 255 which equals the sum of the weights of all the bits that have already been set in the register.
For example, the query returns 144 if bit 4 (16 in decimal) and bit 7 (128 in decimal) are enabled.

Example

*STB?
The query returns 24 (bit 3 and bit 4 are enabled).

*TST?

Syntax

*TST?

Description

Perform a self-test.

Explanation

The self-test result is denoted by a 32-bit binary number. If the corresponding binary bit is 0, the self-test item passes the test; while 1 indicates a failure. The return value is the decimal integer corresponding to the binary number.

The self-test item represented by each bit is as shown in the figure below. The bit that is not used is always 0.

bit0: system voltage
bit1: analog voltage
bit2: storage system
bit3: digital core
bit4: digital IO
bit8: battery
bit9: fan 1
bit10: fan 2
bit12: inlet temperature
bit13: outlet temperature
bit16: real-time clock

Return Format

The query returns a decimal integer.

Example

*TST?
The query returns 0.

:ACQuire Subsystem

:ACQuire:AVERages

Syntax

:ACQuire:AVERages <count>
:ACQuire:AVERages?

Description

Set the number of averages and the value should be a power function of 2.
Query the current number of averages of the oscilloscope.

Parameter

Name	Type	Range	Default
<count>	Integer	2 to 8192	2

Explanation

Use the :ACQuire:TYPE command to select the average acquisition mode. In this mode, the oscilloscope averages the waveforms from multiple samples to reduce the random noise of the input signal and improve the vertical resolution. The greater the number of averages is, the lower the noise will be and the higher the vertical resolution will be but the slower the response of the displayed waveform to the waveform changes will be.

Return Format

The query returns an integer between 2 and 8192.

Example

:ACQuire:AVERages 128
The query returns 128.

:ACQuire:MDEPth

Syntax

:ACQuire:MDEPth <mdep>
:ACQuire:MDEPth?

Description

Set the memory depth of the oscilloscope namely the number of waveform points that can be stored in a single trigger sample.
Query the current memory depth of the oscilloscope.

Parameter

Name	Type	Range	Default
<mdep>	Discrete	Refer to **Explanation**	AUTO

Explanation

When a single channel is on:
<mdep> can be set to AUTO|14000|140000|1400000|14000000|56000000.
When dual channels are on:
<mdep> can be set to AUTO|7000|70000|700000|7000000|28000000.

Return Format

The query returns the actual number of points (integer) or AUTO.

Example

:ACQuire:MDEPth 1400000
The query returns 1400000.

:ACQuire:SRATe?

Syntax

:ACQuire:SRATe?

Description

Query the current sample rate.

Return Format

The query returns the sample rate in scientific notation.

Example

:ACQuire:SRATe?

The query returns 2.000000e+09.

:ACQuire:TYPE

Syntax

:ACQuire:TYPE <type>

:ACQuire:TYPE?

Description

Set the acquisition mode of the sample.

Query the current acquisition mode of the sample.

Parameter

Name	Type	Range	Default
<type>	Discrete	{NORMal|AVERages|PEAK|HRESolution}	NORMal

Explanation

When AVERages is selected, use the :ACQuire:AVERages command to set the number of averages.

Return Format

The query returns NORM, AVER, PEAK or HRES.

Example

:ACQuire:TYPE AVERages

The query returns AVER.

:ACQuire:AALias

Syntax

:ACQuire:AALias <bool>

:ACQuire:AALias?

Description

Enable or disable the antialiasing function of the oscilloscope.

The query returns the current state of the antialiasing function of the oscilloscope.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:ACQuire:AALias ON

The query returns 1.

:BUS<n> Subsystems

:BUS<n>:MODE

Syntax

:BUS<n>:MODE <mode>

:BUS<n>:MODE?

Description

Set the decoding mode of bus 1 or 2.

Query the current decoding mode of bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<mode>	Discrete	{PARallel|RS232|IIC|SPI}	PARallel

Return Format

The query returns PAR, RS232, IIC or SPI.

Example

:BUS1:MODE SPI

The query returns SPI.

:BUS<n>:DISPlay

Syntax

:BUS<n>:DISPlay <bool>

:BUS<n>:DISPlay?

Description

Enable or disable the display of bus 1 or 2.

Query the current display status of bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:BUS1:DISPlay ON

The query returns 1.

:BUS<n>:FORMat

Syntax

:BUS<n>:FORMat <format>

:BUS<n>:FORMat?

Description

Set the display format of bus 1 or 2 to hexadecimal, decimal, binary or ASCII.

Query the current display format of bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<format>	Discrete	{HEX|DEC|BIN|ASCii}	HEX

Return Format

The query returns HEX, DEC, BIN or ASC.

Example

:BUS1:FORMat DEC

The query returns DEC.

:BUS<n>:EVENt

Syntax

:BUS<n>:EVENt <bool>

:BUS<n>:EVENt?

Description

Enable or disable the event table of bus 1 or bus 2.

Query the current status of the event table of bus 1 or bus 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:BUS1:EVENt ON

The query returns 1.

:BUS<n>:EEXPort

Syntax

:BUS<n>:EEXPort

Description

Export the event table of bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--

Explanation

The data list can be exported to external USB storage device in CSV format if USB storage device is currently connected.

:BUS<n>:PARallel

- :BUS<n>:PARallel:CLK
- :BUS<n>:PARallel:SLOPe
- :BUS<n>:PARallel:BSET
- :BUS<n>:PARallel:THReshold
- :BUS<n>:PARallel:OFFSet

:BUS<n>:PARallel:CLK

Syntax

:BUS<n>:PARallel:CLK <sour>

:BUS<n>:PARallel:CLK?

Description

Set the clock channel source of parallel decoding on bus 1 or 2.

Query the current clock channel source of parallel decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<sour>	Discrete	{CHANnel1|CHANnel2|OFF}	OFF

Explanation

When OFF is selected, no clock channel is set and the oscilloscope samples data once the channel data jumps. At this point, the edge set by the :BUS<n>:PARallel:SLOPe command can be ignored.

Return Format

The query returns CHAN1, CHAN2 or OFF.

Example

:BUS1:PARallel:CLK CHANnel2

The query returns CHAN2.

:BUS<n>:PARallel:SLOPe

Syntax

:BUS<n>:PARallel:SLOPe <pos>

:BUS<n>:PARallel:SLOPe?

Description

Set the oscilloscope to sample the channel data on the rising edge, falling edge or rising&falling edges of the clock.

Query on which kind of edge of the clock the oscilloscope samples the data channel.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<pos>	Discrete	{POSitive|NEGative|BOTH}	POSitive

Explanation

When no clock channel is set (refer to the :BUS<n>:PARallel:CLK command), the oscilloscope samples data once the channel data jumps and the edge set by this command can be ignored.

Return Format

The query returns POS, NEG or BOTH.

Example

:BUS1:PARallel:SLOPe NEGative

The query returns NEG.

:BUS<n>:PARallel:BSET

Syntax

:BUS<n>:PARallel:BSET <b0>,<b1>,<b2>...<b19>

:BUS<n>:PARallel:BSET?

Description

This command specifies channel source for each bit and sets the data width (up to 20bits: from bit 0 to bit 19).

Query the current channel source of each bit.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<b0>	Discrete	{CHANnel1|CHANnel2 }	CHANnel1
<b1>	Discrete	{CHANnel1|CHANnel2	CHANnel2
<b2>	Discrete	{CHANnel1|CHANnel2 }	CHANnel1
...	...	...	...
<b19>	Discrete	{CHANnel1|CHANnel2	CHANnel1

Explanation

The setting sequence of the bits is LSB. For example, when setting CHAN2,CHAN1, bit 0 is CHAN2 and bit 1 is CHAN1.

Return Format

The query returns the channel sources (separated by commas) of all the bits in the current data channel. For example, CHAN2,CHAN1.

Example

:BUS1:PARallel:BSET CHAN1,CHAN2

The query returns CHAN1,CHAN2.

:BUS<n>:PARallel:THReshold

Syntax

:BUS<n>:PARallel:THReshold <sour>,<thre>

:BUS<n>:PARallel:THReshold? <sour>

Description

Set the threshold of the channel of parallel decoding on bus 1 or 2.

Query the current threshold of the channel of parallel decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<sour>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<thre>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the current threshold in scientific notation.

Example

:BUS1:PARallel:THReshold CHANnel2,2.4

The query returns 2.400000e+00.

:BUS<n>:PARallel:OFFSet

Syntax

:BUS<n>:PARallel:OFFSet <val>

:BUS<n>:PARallel:OFFSet?

Description

Set the vertical offset in parallel decoding on bus 1 or 2. Enable the display of the bus (refer to the :BUS<n>:DISPlay command), before using this command.

Query the current vertical offset in parallel decoding on bus 1 or bus 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<val>	Integer	Normal[1]: -166 to 148 Statistic[2]: -163 to 143 Half screen[3]: -103 to 52	0

Note[1]: the screen display is normal and the statistic function is not enabled (refer to the :MEASure:STATistic:DISPlay command).

Note[2]: the screen display is normal and the statistic function is enabled (refer to the :MEASure:STATistic:DISPlay command).

Note[3]: the screen is divided into two windows (refer to the :TIMebase:DELay:ENABle and :CALCulate:FFT:SPLit commands).

Return Format

The query returns the offset in integer.

Example

:BUS1:PARallel:OFFSet 2

The query returns 2.

:BUS<n>:RS232

:BUS<n>:RS232:TX

Syntax

:BUS<n>:RS232:TX <source>

:BUS<n>:RS232:TX?

Description

Set the transmitting channel of RS232 decoding on bus 1 or 2 or do not set this channel.

Query the current transmitting channel of RS232 decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<source>	Discrete	{CHANnel1|CHANnel2|OFF}	CHANnel1

Return Format

The query returns CHAN1, CHAN2 or OFF.

Example

:BUS1:RS232:TX CHANnel2

The query returns CHAN2.

:BUS<n>:RS232:RX

Syntax

:BUS<n>:RS232:RX <source>

:BUS<n>:RS232:RX?

Description

Set the receiving channel of RS232 decoding on bus 1 or 2 or do not set this channel. Query the current receiving channel of RS232 decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<source>	Discrete	{CHANnel1|CHANnel2|OFF}	CHANnel2

Return Format

The query returns CHAN1, CHAN2 or OFF.

Example

:BUS1:RS232:RX CHANnel2

The query returns CHAN2.

:BUS<n>:RS232:POLarity

Syntax

:BUS<n>:RS232:POLarity <pol>
:BUS<n>:RS232:POLarity?

Description

Set the polarity of RS232 decoding on bus 1 or 2.
Query the current polarity of RS232 decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<pol>	Discrete	{POSitive|NEGative}	NEGative

Return Format

The query returns POS or NEG.

Example

:BUS1:RS232:POLarity NEGative
The query returns NEG.

:BUS<n>:RS232:ENDian

Syntax

:BUS<n>:RS232:ENDian <endian>

:BUS<n>:RS232:ENDian?

Description

Set the endian of data transmission of RS232 decoding on bus 1 or 2.

Query the current endian of data transmission of RS232 decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<endian>	Discrete	{MSB|LSB}	LSB

Return Format

The query returns MSB or LSB.

Example

:BUS1:RS232:ENDian MSB

The query returns MSB.

:BUS<n>:RS232:BAUD

Syntax

:BUS<n>:RS232:BAUD <baud>

:BUS<n>:RS232:BAUD?

Description

Set the baud rate of data transmission of RS232 decoding on bus 1 or 2.

Query the current baud rate of data transmission of RS232 decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<baud>	Discrete	{2400|4800|9600|19200|38400|57600|115200|USER}	9600

Note: when the baud rate is set to USER, you need to set a specific baud rate using the :BUS<n>:RS232:BUSer command.

Return Format

The query returns the baud rate currently set and the unit is bps.

Example

:BUS1:RS232:BAUD 4800

The query returns 4800.

:BUS<n>:RS232:BUSer

Syntax

:BUS<n>:RS232:BUSer <baud>

:BUS<n>:RS232:BUSer?

Description

Set the user-defined baud rate of data transmission in RS232 decoding on bus 1 or 2.

Query the current user-defined baud rate of RS232 decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<baud>	Integer	50 to 1000000	9600

Return Format

The query returns the current baud rate and the unit is bps.

Example

:BUS1:RS232:BUSer 19200

The query returns 19200.

:BUS<n>:RS232:DBITs

Syntax

:BUS<n>:RS232:DBITs <bits>

:BUS<n>:RS232:DBITs?

Description

Set the data width of RS232 decoding on bus 1 or 2.

Query the current data width of RS232 decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<bits>	Discrete	{5|6|7|8|9}	8

Return Format

The query returns 5, 6, 7, 8 or 9.

Example

:BUS1:RS232:DBITs 7

The query returns 7.

:BUS<n>:RS232:SBITs

Syntax

:BUS<n>:RS232:SBITs <stop bits>

:BUS<n>:RS232:SBITs?

Description

Set the stop bit after each frame of data in RS232 decoding on bus 1 or 2.

Query the current stop bit after each frame of data in RS232 decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<stop bits>	Discrete	{1|1.5|2}	1

Return Format

The query returns 1, 1.5 or 2.

Example

:BUS1:RS232:SBITs 2

The query returns 2.

:BUS<n>:RS232:PARity

Syntax

:BUS<n>:RS232:PARity <parity>
:BUS<n>:RS232:PARity?

Description

Set the even-odd check mode of data transmission of RS232 decoding on bus 1 or 2. Query the current even-odd check mode of data transmission of RS232 decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<parity>	Discrete	{NONE|ODD|EVEN}	NONE

Return Format

The query returns NONE, ODD or EVEN.

Example

:BUS1:RS232:PARity NONE
The query returns NONE.

:BUS<n>:RS232:PACKet

Syntax

:BUS<n>:RS232:PACKet <bool>

:BUS<n>:RS232:PACKet?

Description

Enable or disable the packet end in data transmission.

Query the current status of the packet end in data transmission.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Explanation

When the packet end is enabled, several data blocks are combined according to the packet end.

Return Format

The query returns 0 or 1.

Example

:BUS1:RS232:PACKet ON

The query returns 1.

:BUS<n>:RS232:PEND

Syntax

:BUS<n>:RS232:PEND <package end>

:BUS<n>:RS232:PEND?

Description

Set the packet end of data transmission.

Query the current packet end of data transmission.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<package end>	Discrete	{NULL|LF|CR|SP|FF}	NULL

Explanation

The hexadecimal numbers corresponding to the parameters are as follows.

NULL: 00; LF: 0A; CR: 0D; SP: 20; FF: FF.

Return Format

The query returns NULL, LF, CR, SP or FF.

Example

:BUS1:RS232:PEND FF

The query returns FF.

:BUS<n>:RS232:TTHReshold

Syntax

:BUS<n>:RS232:TTHReshold <tthre>

:BUS<n>:RS232:TTHReshold?

Description

Set the threshold of the transmitting channel of R232 decoding on bus 1 or 2.

Query the current threshold of the transmitting channel of R232 decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<tthre>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the threshold set in scientific notation.

Example

:BUS1:RS232:TTHReshold 2.4

The query returns 2.400000e+00.

:BUS<n>:RS232:RTHReshold

Syntax

:BUS<n>:RS232:RTHReshold <rthre>

:BUS<n>:RS232:RTHReshold?

Description

Set the threshold of the receiving channel of R232 decoding on bus 1 or 2.

Query the current threshold of the receiving channel of R232 decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<rthre>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the threshold set in scientific notation.

Example

:BUS1:RS232:RTHReshold 2.4

The query returns 2.400000e+00.

:BUS<n>:RS232:OFFSet

Syntax

:BUS<n>:RS232:OFFSet <val>

:BUS<n>:RS232:OFFSet?

Description

Set the vertical offset in RS232 decoding on bus 1 or 2. Before using this command, enable the bus display (refer to the :BUS<n>:DISPlay command).

Query the current vertical offset in RS232 decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<val>	Integer	Normal[1]: -166 to 148 Statistic[2]: -163 to 143 Half screen[3]: -103 to 52	0

Note[1]: the screen display is normal and the statistic function is not enabled (refer to the :MEASure:STATistic:DISPlay command).

Note[2]: the screen display is normal and the statistic function is enabled (refer to the :MEASure:STATistic:DISPlay command).

Note[3]: the screen is divided into two windows (refer to the :TIMebase:DELay:ENABle and :CALCulate:FFT:SPLit commands).

Return Format

The query returns the offset in integer.

Example

:BUS1:RS232:OFFSet 2

The query returns 2.

:BUS<n>:IIC

:BUS<n>:IIC:SCLK:SOURce

Syntax

:BUS<n>:IIC:SCLK:SOURce <sour>

:BUS<n>:IIC:SCLK:SOURce?

Description

Set the clock channel source of IIC decoding on bus 1 or 2.

Query the current clock channel source of IIC decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<sour>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:BUS1:IIC:SCLK:SOURce CHANnel2

The query returns CHAN2.

:BUS<n>:IIC:SCLK:THReshold

Syntax

:BUS<n>:IIC:SCLK:THReshold <thre>

:BUS<n>:IIC:SCLK:THReshold?

Description

Set the threshold of the clock channel of IIC decoding on bus 1 or 2.

Query the current threshold of the clock channel of IIC decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<thre>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the threshold set in scientific notation.

Example

:BUS1:IIC:SCLK:THReshold 2.4

The query returns 2.400000e+00.

:BUS<n>:IIC:SDA:SOURce

Syntax

:BUS<n>:IIC:SDA:SOURce <sour>

:BUS<n>:IIC:SDA:SOURce?

Description

Set the data channel source of IIC decoding on bus 1 or 2.

Query the current data channel source of IIC decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<sour>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns CHAN1 or CHAN2.

Example

:BUS1:IIC:SDA:SOURce CHANnel2

The query returns CHAN2.

:BUS<n>:IIC:SDA:THReshold

Syntax

:BUS<n>:IIC:SDA:THReshold <thre>

:BUS<n>:IIC:SDA:THReshold?

Description

Set the threshold of the data channel of IIC decoding on bus 1 or 2.

Query the current threshold of the data channel of IIC decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<thre>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the threshold set in scientific notation.

Example

:BUS1:IIC:SDA:THReshold 2.4

The query returns 2.400000e+00.

:BUS<n>:IIC:OFFSet

Syntax

:BUS<n>:IIC:OFFSet <val>

:BUS<n>:IIC:OFFSet?

Description

Set the vertical offset in IIC decoding on bus 1 or 2. Before using this command, enable the bus display (refer to the :BUS<n>:DISPlay command).

Query the current vertical offset in IIC decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<val>	Integer	Normal[1]: -166 to 148 Statistic[2]: -163 to 143 Half screen[3]: -103 to 52	0

Note[1]: the screen display is normal and the statistic function is not enabled (refer to the :MEASure:STATistic:DISPlay command).

Note[2]: the screen display is normal and the statistic function is enabled (refer to the :MEASure:STATistic:DISPlay command).

Note[3]: the screen is divided into two windows (refer to the :TIMebase:DELay:ENABle and :CALCulate:FFT:SPLit commands).

Return Format

The query returns the offset in integer.

Example

:BUS1:IIC:OFFSet 2

The query returns 2.

:BUS<n>:SPI

:BUS<n>:SPI:SCLK:SOURce

Syntax

:BUS<n>:SPI:SCLK:SOURce <sour>

:BUS<n>:SPI:SCLK:SOURce?

Description

Set the clock channel source of SPI decoding on bus 1 or 2.

Query the current clock channel source of SPI decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<sour>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:BUS1:SPI:SCLK:SOURce CHANnel2

The query returns CHAN2.

:BUS<n>:SPI:SCLK:SLOPe

Syntax

:BUS<n>:SPI:SCLK:SLOPe <pos>

:BUS<n>:SPI:SCLK:SLOPe?

Description

Set the clock edge type in SPI decoding on bus 1 or 2.

Query the current clock edge type in SPI decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<pos>	Discrete	{POSitive|NEGative}	POSitive

Return Format

The query returns POS or NEG.

Example

:BUS1:SPI:SCLK:SLOPe NEGative

The query returns NEG.

:BUS<n>:SPI:SCLK:THReshold

Syntax

:BUS<n>:SPI:SCLK:THReshold <thre>

:BUS<n>:SPI:SCLK:THReshold?

Description

Set the threshold of the clock channel of SPI decoding on bus 1 or 2.

Query the current threshold of the clock channel of SPI decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<thre>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the threshold set in scientific notation.

Example

:BUS1:SPI:SCLK:THReshold 2.4

The query returns 2.400000e+00.

:BUS<n>:SPI:SDA:SOURce

Syntax

:BUS<n>:SPI:SDA:SOURce <sour>

:BUS<n>:SPI:SDA:SOURce?

Description

Set the data channel source in SPI decoding on bus 1 or 2.

Query the current data channel source in SPI decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<sour>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns CHAN1 or CHAN2.

Example

:BUS1:SPI:SDA:SOURce CHANnel1

The query returns CHAN1.

:BUS<n>:SPI:SDA:POLarity

Syntax

:BUS<n>:SPI:SDA:POLarity <pos>

:BUS<n>:SPI:SDA:POLarity?

Description

Set the polarity of the SDA data line in SPI decoding on bus 1 or 2.

Query the current polarity of the SDA data line in SPI decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<pos>	Discrete	{HIGH|LOW}	LOW

Return Format

The query returns HIGH or LOW.

Example

:BUS1:SPI:SDA:POLarity HIGH

The query returns HIGH.

:BUS<n>:SPI:SDA:THReshold

Syntax

:BUS<n>:SPI:SDA:THReshold <thre>

:BUS<n>:SPI:SDA:THReshold?

Description

Set the threshold of the data channel in SPI decoding on bus 1 or 2.

Query the current threshold of the data channel in SPI decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<thre>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the threshold set in scientific notation.

Example

:BUS1:SPI:SDA:THReshold 2.4

The query returns 2.400000e+00.

:BUS<n>:SPI:DBITs

Syntax

:BUS<n>:SPI:DBITs <width>

:BUS<n>:SPI:DBITs?

Description

Set the data width in SPI decoding on bus 1 or 2.

Query the current data width in SPI decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<width>	Integer	4 to 32	8

Return Format

The query returns an integer between 4 and 32.

Example

:BUS1:SPI:DBITs 10

The query returns 10.

:BUS<n>:SPI:ENDian

Syntax

:BUS<n>:SPI:ENDian <endian>

:BUS<n>:SPI:ENDian?

Description

Set the endian of data transmission in SPI decoding on bus 1 or 2.

Query the current endian of data transmission in SPI decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<endian>	Discrete	{MSB|LSB}	MSB

Return Format

The query returns MSB or LSB.

Example

:BUS1:SPI:ENDian MSB

The query returns MSB.

:BUS<n>:SPI:OFFSet

Syntax

:BUS<n>:SPI:OFFSet <val>

:BUS<n>:SPI:OFFSet?

Description

Set the vertical offset in SPI decoding on bus 1 or 2. Before using this command, enable the bus display (refer to the :BUS<n>:DISPlay command).

Query the vertical offset in SPI decoding on bus 1 or 2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<val>	Integer	Normal[1]: -166 to 148 Statistic[2]: -163 to 143 Half screen[3]: -103 to 52	0

Note[1]: the screen display is normal and the statistic function is not enabled (refer to the :MEASure:STATistic:DISPlay command).

Note[2]: the screen display is normal and the statistic function is enabled (refer to the :MEASure:STATistic:DISPlay command).

Note[3]: the screen is divided into two windows (refer to the :TIMebase:DELay:ENABle and :CALCulate:FFT:SPLit commands).

Return Format

The query returns the offset in integer.

Example

:BUS1:SPI:OFFSet 2

The query returns 2.

:CALCulate Subsystem

:CALCulate:MODE

Syntax

:CALCulate:MODE <mod>

:CALCulate:MODE?

Description

Select the type of the math operation or disable the math operation function.

Query the type of the current math operation.

Parameter

Name	Type	Range	Default
<mod>	Discrete	{ADD|SUB|MULTiply|DIVision|FFT|LOGic|ADVanced|OFF}	OFF

Return Format

The query returns ADD, SUB, MULT, DIV, FFT, LOG, ADV or OFF.

Example

:CALCulate:MODE FFT

The query returns FFT.

:CALCulate:ADD

- :CALCulate:ADD:SA
- :CALCulate:ADD:SB
- :CALCulate:ADD:INVert
- :CALCulate:ADD:VSCale
- :CALCulate:ADD:VOFFset

:CALCulate:ADD:SA

Syntax

:CALCulate:ADD:SA <source>

:CALCulate:ADD:SA?

Description

Select the channel source of signal source A of the addition operation.

Query the current channel source of signal source A of the addition operation.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:CALCulate:ADD:SA CHANnel2

The query returns CHAN2.

:CALCulate:ADD:SB

Syntax

:CALCulate:ADD:SB <source>

:CALCulate:ADD:SB?

Description

Select the channel source of signal source B of the addition operation.

Query the current channel source of signal source B of the addition operation.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:CALCulate:ADD:SB CHANnel2

The query returns CHAN2.

:CALCulate:ADD:INVert

Syntax

:CALCulate:ADD:INVert <bool>

:CALCulate:ADD:INVert?

Description

Enable or disable the inverted display of the addition operation result.

Query the current status of the inverted display of the addition operation result.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:CALCulate:ADD:INVert ON

The query returns 1.

:CALCulate:ADD:VSCale

Syntax

:CALCulate:ADD:VSCale <scale>

:CALCulate:ADD:VSCale?

Description

Set the vertical scale of the addition operation result.

Query the current vertical scale of the addition operation result.

Parameter

Name	Type	Range	Default
<scale>	Real	0.02V to 500V Related to the current channel scale	2V

Note: for the channel scale, refer to the :CHANnel<n>:SCALe command.

Return Format

The query returns the vertical scale in scientifc notation.

Example

:CALCulate:ADD:VSCale 2

The query returns 2.000000e+00.

:CALCulate:ADD:VOFFset

Syntax

:CALCulate:ADD:VOFFset <offs>

:CALCulate:ADD:VOFFset?

Description

Set the vertical offset of the addition operation result.

Query the current vertical offset of the addition operation result.

Parameter

Name	Type	Range	Default
<offs>	Real	-40 × VScale to 40 × VScale	0

Note: for the VScale (the vertical scale of MATH), refer to the :CALCulate:ADD:VSCale command.

Return Format

The query returns the vertical offset in scientific notation.

Example

:CALCulate:ADD:VOFFset 2

The query returns 2.000000e+00.

:CALCulate:SUB

- :CALCulate:SUB:SA
- :CALCulate:SUB:SB
- :CALCulate:SUB:INVert
- :CALCulate:SUB:VSCale
- :CALCulate:SUB:VOFFset

:CALCulate:SUB:SA

Syntax

:CALCulate:SUB:SA <source>

:CALCulate:SUB:SA?

Description

Select the channel source of signal source A of subtraction operation.

Query the current channel source of signal source A of subtraction operation.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:CALCulate:SUB:SA CHANnel2

The query returns CHAN2.

:CALCulate:SUB:SB

Syntax

:CALCulate:SUB:SB <source>

:CALCulate:SUB:SB?

Description

Select the channel source of signal source B of subtraction operation.

Query the current channel source of signal source B of subtraction operation.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:CALCulate:SUB:SB CHANnel2

The query returns CHAN2.

:CALCulate:SUB:INVert

Syntax

:CALCulate:SUB:INVert <bool>

:CALCulate:SUB:INVert?

Description

Enable or disable the inverted display of the subtraction operation result.

Query the current status of the inverted display of the subtraction operation result.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:CALCulate:SUB:INVert ON

The query returns 1.

:CALCulate:SUB:VSCale

Syntax

:CALCulate:SUB:VSCale <scale>

:CALCulate:SUB:VSCale?

Description

Set the vertical scale of the subtraction operation result.

Query the current vertical scale of the subtraction operation result.

Parameter

Name	Type	Range	Default
<scale>	Real	0.02V to 500V Related to the current channel scale	2V

Note: for the channel scale, refer to the :CHANnel<n>:SCALe command.

Return Format

The query returns the vertical scale in scientific notation.

Example

:CALCulate:SUB:VSCale 2

The query returns 2.000000e+00.

:CALCulate:SUB:VOFFset

Syntax

:CALCulate:SUB:VOFFset <offs>

:CALCulate:SUB:VOFFset?

Description

Set the vertical offset of the subtraction operation result.

Query the current vertical offset of the subtraction operation result.

Parameter

Name	Type	Range	Default
<offs>	Real	-40 × VScale to 40 × VScale	0

Note: for the VScale (the vertical scale of MATH), refer to the :CALCulate:SUB:VSCale command.

Return Format

The query returns the vertical offset in scientific notation.

Example

:CALCulate:SUB:VOFFset 2

The query returns 2.000000e+00.

:CALCulate:MULTiply

- :CALCulate:MULTiply:SA
- :CALCulate:MULTiply:SB
- :CALCulate:MULTiply:INVert
- :CALCulate:MULTiply:VSCale
- :CALCulate:MULTiplay:VOFFset

:CALCulate:MULTiply:SA

Syntax

:CALCulate:MULTiply:SA <source>

:CALCulate:MULTiply:SA?

Description

Select the channel source of signal source A of multiplication operation.

Query the current channel source of signal source A of multiplication operation.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:CALCulate:MULTiply:SA CHANnel2

The query returns CHAN2.

:CALCulate:MULTiply:SB

Syntax

:CALCulate:MULTiply:SB <source>

:CALCulate:MULTiply:SB?

Description

Select the channel source of signal source B of multiplication operation.

Query the current channel source of signal source B of multiplication operation.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Reuturn Format

The query returns CHAN1 or CHAN2.

Example

:CALCulate:MULTiply:SB CHANnel2

The query returns CHAN2.

:CALCulate:MULTiply:INVert

Syntax

:CALCulate:MULTiply:INVert <bool>

:CALCulate:MULTiply:INVert?

Description

Enable or disable the inverted display of the multiplication operation result.

Query the current status of the inverted display of the multiplication operation result.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:CALCulate:MULTiply:INVert ON

The query returns 1.

:CALCulate:MULTiply:VSCale

Syntax

:CALCulate:MULTiply:VSCale <scale>

:CALCulate:MULTiply:VSCale?

Description

Set the vertical scale of the multiplication operation result.

Query the current vertical scale of the multiplication operation result.

Parameter

Name	Type	Range	Default
<scale>	Real	5.0e-08U to 1.0e+07U Related to the current channel scale	2U

Note: for the channel scale, refer to the :CHANnel<n>:SCALe command.

Return Format

The query returns the vertical scale in scientific notation.

Example

:CALCulate:MULTiply:VSCale 2

The query returns 2.000000e+00.

:CALCulate:MULTiply:VOFFset

Syntax

:CALCulate:MULTiply:VOFFset <offs>

:CALCulate:MULTiply:VOFFset?

Description

Set the vertical offset of the multiplication operation result.

Query the current vertical offset of the multiplication operation result.

Parameter

Name	Type	Range	Default
<offs>	Real	-40 × VScale to 40 × VScale	0

Note: for the VScale (the vertical scale of MATH), refer to the :CALCulate:MULTiply:VSCale command.

Return Format

The query returns the vertical offset in scientific notation.

Example

:CALCulate:MULTiply:VOFFset 2

The query returns 2.000000e+00.

:CALCulate:DIVision

- :CALCulate:DIVision:SA
- :CALCulate:DIVision:SB
- :CALCulate:DIVision:INVert
- :CALCulate:DIVision:VSCale
- :CALCulate:DIVision:VOFFset

:CALCulate:DIVision:SA

Syntax

:CALCulate:DIVision:SA <source>

:CALCulate:DIVision:SA?

Description

Select the channel source of signal source A of division operation.

Query the current channel source of signal source A of division operation.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:CALCulate:DIVision:SA CHANnel2

The query returns CHAN2.

:CALCulate:DIVision:SB

Syntax

:CALCulate:DIVision:SB <source>

:CALCulate:DIVision:SB?

Description

Select the channel source of signal source B of division operation.

Query the current channel source of signal source B of division operation.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:CALCulate:DIVision:SB CHANnel2

The query returns CHAN2.

:CALCulate:DIVision:INVert

Syntax

:CALCulate:DIVision:INVert <bool>

:CALCulate:DIVision:INVert?

Decsription

Enable or disable the inverted display of the division operation result.

Query the current status of the inverted display of the division operation result.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:CALCulate:DIVision:INVert ON

The query returns 1.

:CALCulate:DIVision:VSCale

Syntax

:CALCulate:DIVision:VSCale <scale>

:CALCulate:DIVision:VSCale?

Description

Set the vertical scale of the division operation result.

Query the current vertical scale of the division operation result.

Parameter

Name	Type	Range	Default
<scale>	Real	5.0e-07U to 5.0e+08U Related to the current channel scale	2U

Note: for the channel scale, refer to the :CHANnel<n>:SCALe command.

Return Format

The query returns the vertical scale in scientific notation.

Example

:CALCulate:DIVision:VSCale 2

The query returns 2.000000e+00.

:CALCulate:DIVision:VOFFset

Syntax

:CALCulate:DIVision:VOFFset <offs>

:CALCulate:DIVision:VOFFset?

Description

Set the vertical offset of the division operation result.

Query the current vertical offset of the division operation result.

Parameter

Name	Type	Range	Default
<offs>	Real	-40 × VScale to 40 × VScale	0

Note: for the VScale (the vertical scale of MATH), refer to the :CALCulate:DIVision:VSCale command.

Return Format

The query returns the vertical offset in scientific notation.

Example

:CALCulate:DIVision:VOFFset 2

The query returns 2.000000e+00.

:CALCulate:FFT

:CALCulate:FFT:SOURce

Syntax

:CALCulate:FFT:SOURce <source>

:CALCulate:FFT:SOURce?

Description

Select the signal source of FFT operation.

Query the current signal source of FFT operation.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:CALCulate:FFT:SOURce CHANnel2

The query returns CHAN2.

:CALCulate:FFT:WINDow

Syntax

:CALCulate:FFT:WINDow <window>

:CALCulate:FFT:WINDow?

Description

Select the window function of the FFT operation.

Query the current window function of the FFT operation.

Parameter

Name	Type	Range	Default
<window>	Discrete	{RECTangle|HANNing|HAMMing|BLACkman}	RECTangle

Return Format

The query returns RECT, HANN, HAMM or BLAC.

Example

:CALCulate:FFT:WINDow HANNing

The query returns HANN.

:CALCulate:FFT:SPLit

Syntax

:CALCulate:FFT:SPLit <bool>

:CALCulate:FFT:SPLit?

Description

Enable or disable the split display of the FFT operation.

Query the current status of the split display of the FFT operation.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	1|ON

Return Format

The query returns 0 or 1.

Example

:CALCulate:FFT:SPLit OFF

The query returns 0.

:CALCulate:FFT:VSMode

Syntax

:CALCulate:FFT:VSMode <vmode>

:CALCulate:FFT:VSMode?

Description

Set the vertical scale of the FFT operation result to linear or log.

Query the current vertical scale of the FFT operation result.

Parameter

Name	Type	Range	Default
<vmode>	Discrete	{VRMS|DBVRms}	VRMS

Return Format

The query returns VRMS or DBVR.

Example

:CALCulate:FFT:VSMode DBVRms

The query returns DBVR.

:CALCulate:FFT:VSCale

Syntax

:CALCulate:FFT:VSCale <vscale>

:CALCulate:FFT:VSCale?

Description

Set the vertical scale of the FFT operation result.

Query the current vertical scale of the FFT operation result.

Parameter

Name	Type	Range	Default
<vscale>	Real	Related to the current FFT display mode: dBVrms: 1 to 100 Vrms: 0.01 to 200, related to the current channel scale (from channel scale/128 to channel scale*128)	10dBVrms/div

Note:

For the FFT display mode, refer to the :CALCulate:FFT:VSMode command.

For the channel scale, refer to the :CHANnel<n>:SCALe command. Once you change the channel scale, the range of <vscale> will be changed only after the MATH channel is re-activated.

Return Format

The query returns the vertical scale in scientific notation.

Example

:CALCulate:FFT:VSCale 2

The query returns 2.000000e+00.

:CALCulate:FFT:VOFFset

Syntax

:CALCulate:FFT:VOFFset <offs>

:CALCulate:FFT:VOFFset?

Description

Set the vertical offset of the FFT operation result.

Query the current vertical offset of the FFT operation result.

Parameter

Name	Type	Range	Default
<offs>	Real	-40 × VScale to 40 × VScale	0

Note: for the VScale (the vertical scale of MATH), refer to the :CALCulate:FFT:VSCale command.

Return Format

The query returns the vertical offset in scientifc notation.

Example

:CALCulate:FFT:VOFFset 2

The query returns 2.000000e+00.

:CALCulate:FFT:HSCale

Syntax

:CALCulate:FFT:HSCale <hscale>

:CALCulate:FFT:HSCale?

Description

Set the horizontal coefficient in FFT operation. This command indirectly sets the FFT horizontal scale.

Query the current horizontal coefficient in FFT operation.

Parameter

Name	Type	Range	Default
<hscale>	Discrete	{1|2|3|4}	1

Note: you can use the :CALCulate:FFT:HSPan command to set the horizontal scale of FFT directly.

Explanation

1: Horizontal Scale=the current FFT sample rate of the screen/20.

2: Horizontal Scale=the current FFT sample rate of the screen/40.

3: Horizontal Scale=the current FFT sample rate of the screen/100.

4: Horizontal Scale=the current FFT sample rate of the screen/200.

Return Format

The query returns 1, 2, 3 or 4.

Example

:CALCulate:FFT:HSCale 2

The query returns 2.

:CALCulate:FFT:HOFFset

Syntax

:CALCulate:FFT:HOFFset <offs>

:CALCulate:FFT:HOFFset?

Description

Set the horizontal offset of the FFT operation result and the unit is Hz.

Query the current horizontal offset of the FFT operation result.

Parameter

Name	Type	Range	Default
<offs>	Real	-0.4*the current FFT sample rate of the screen to +0.4*the current FFT sample rate of the screen	0

Note: the current FFT sample rate of the screen = number of points per grid horizontally/horizontal time base. For the horizontal time base, refer to the :TIMebase[:MAIN]:SCALe command.

Return Format

The query returns the horizontal offset in scientific notation.

Example

:CALCulate:FFT:HOFFset 10000000

The query returns 1.000000e+07.

:CALCulate:FFT:HSPan

Syntax

:CALCulate:FFT:HSPan

:CALCulate:FFT:HSPan?

Description

Set the horizontal scale of the FFT operation result.

Query the current horizontal scale of the FFT operation result.

Parameter

Name	Type	Range	Default
	Real	The current FFT sample rate of the screen/200 to the current FFT sample rate of the screen/20	5MHz/div

Note:

The step is 1X-2X-5X-10X within the range.

The current FFT sample rate of the screen =the number of points per grid horizontally/horizontal time base. For the horizontal time base, refer to the :TIMebase[:MAIN]:SCALe command.

You can use the :CALCulate:FFT:HSCale command to set the horizontal scale of FFT operation indirectly.

Return Format

The query returns the current horizontal scale in scientific notation and the unit is Hz/div.

Example

:CALCulate:FFT:HSPan 2500000

The query returns 2.500000e+06.

:CALCulate:FFT:HCENter

Syntax

:CALCulate:FFT:HCENter

:CALCulate:FFT:HCENter?

Description

Set the center frequency of the FFT operation result and the unit is Hz.

Query the current center frequency of the current FFT operation result.

Parameter

Name	Type	Range	Default
	Real	Horizontal offset of the operation result +7*the current horizontal scale	35MHz

Note: for the horizontal offset, refer to the :CALCulate:FFT:HOFFset command; for the horizontal scale, refer to the :CALCulate:FFT:HSCale and :CALCulate:FFT:HSPan commands.

Return Format

The query returns the frequency value in scientific notation.

Example

:CALCulate:FFT:HCENter 10000000

The query returns 1.000000e+07.

:CALCulate:LOGic

:CALCulate:LOGic:SA

Syntax

:CALCulate:LOGic:SA <source>

:CALCulate:LOGic:SA?

Description

Select the channel source of signal source A of logic operation.

Query the current channel source of signal source A of logic operation.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Explanation

The signal source specified by this command is used instead of the signal source specified by the :CALCulate:LOGic:SB command if the current logic operation type is NOT.

Return Format

The query returns CHAN1 or CHAN2.

Example

:CALCulate:LOGic:SA CHANnel2

The query returns CHAN2.

:CALCulate:LOGic:SB

Syntax

:CALCulate:LOGic:SB <source>

:CALCulate:LOGic:SB?

Description

Select the channel source of signal source B of logic operation.

Query the current channel source of signal source B of logic operation.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Explanation

The signal source specified by the :CALCulate:LOGic:SA command is used instead of the signal source specified by this command if the current logic operation type is NOT.

Return Format

The query returns CHAN1 or CHAN2.

Example

:CALCulate:LOGic:SB CHANnel2

The query returns CHAN2.

:CALCulate:LOGic:INVert

Syntax

:CALCulate:LOGic:INVert <bool>

:CALCulate:LOGic:INVert?

Description

Enable or disable the inverted display of the logic operation result.

Query the current status of the inverted display of the logic operation result.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:CALCulate:LOGic:INVert ON

The query returns 1.

:CALCulate:LOGic:VSCale

Syntax

:CALCulate:LOGic:VSCale <scale>

:CALCulate:LOGic:VSCale?

Description

Set the vertical scale of the logic operation result.

Query the current vertical scale of the logic operation result.

Parameter

Name	Type	Range	Default
<scale>	Real	0.05U to 100U	1U

Return Format

The query returns the vertical scale in scientific notation.

Example

:CALCulate:LOGic:VSCale 2

The query returns 2.000000e+00.

:CALCulate:LOGic:VOFFset

Syntax

:CALCulate:LOGic:VOFFset <offs>

:CALCulate:LOGic:VOFFset?

Description

Set the vertical offset of the logic operation result.

Query the current vertical offset of the logic operation result.

Parameter

Name	Type	Range	Default
<offs>	Real	-40 × VScale to 40 × VScale	0

Note: for the VScale (the vertical scale of MATH), refer to the :CALCulate:LOGic:VSCale command.

Return Format

The query returns the vertical offset in scientific notation.

Example

:CALCulate:LOGic:VOFFset 2

The query returns 2.000000e+00.

:CALCulate:LOGic:OPERator

Syntax

:CALCulate:LOGic:OPERator <oper>

:CALCulate:LOGic:OPERator?

Description

Select the operator of logic operation.

Query the operator of the current logic operation.

Parameter

Name	Type	Range	Default
<oper>	Discrete	{AND|OR|NOT|XOR}	AND

Return Format

The query returns AND, OR, NOT or XOR.

Example

:CALCulate:LOGic:OPERator XOR

The query returns XOR.

:CALCulate:LOGic:ATHReshold

Syntax

:CALCulate:LOGic:ATHReshold <thre>

:CALCulate:LOGic:ATHReshold?

Description

Set the threshold of logic channel A.

Query the current threshold of logic channel A.

Parameter

Name	Type	Range	Default
<thre>	Real	Screen Range (the offset changes with the scale)	0

Return Format

The query returns the current threshold in scientific notation.

Example

:CALCulate:LOGic:ATHReshold 2

The query returns 2.000000e+00.

:CALCulate:LOGic:BTHReshold

Syntax

:CALCulate:LOGic:BTHReshold <thre>

:CALCulate:LOGic:BTHReshold?

Description

Set the threshold of logic channel B.

Query the current threshold of logic channel B.

Parameter

Name	Type	Range	Default
<thre>	Real	Screen Range (the offset changes with the scale)	0

Return Format

The query returns the current threshold in scientific notation.

Example

:CALCulate:LOGic:BTHReshold 2

The query returns 2.000000e+00.

:CALCulate:ADVanced

:CALCulate:ADVanced:EXPRession

Syntax

:CALCulate:ADVanced:EXPRession <expression>

:CALCulate:ADVanced:EXPRession?

Description

Set the expression of advanced operation.

Query the current expression of advanced operation.

Parameter

Name	Type	Range	Default
<expression>	ASCII character string	Refer to **Explanation**	CH1+CH2

Explanation

Input the valid expression using the characters as shown in the figure below. Note that the length of the expression should be no greater than 64 bytes.

Return Format

The query returns the current expression in character string.

Example

:CALCulate:ADVanced:EXPRession CH1+2

The query returns CH1+2.

:CALCulate:ADVanced:INVert

Syntax

:CALCulate:ADVanced:INVert <bool>

:CALCulate:ADVanced:INVert?

Description

Enable or disable the inverted display of the advanced operation result.

Query the current status of the inverted display of the advanced operation result.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:CALCulate:ADVanced:INVert ON

The query returns 1.

:CALCulate:ADVanced:VARiable1

Syntax

:CALCulate:ADVanced:VARiable1 <numeric_value>

:CALCulate:ADVanced:VARiable1?

Description

Set the variable1 in the advanced operation expression.

Query the current value variable1 in the advanced operation expression.

Parameter

Name	Type	Range	Default
<numeric_value>	Real	-9.9999e-09 to 9.9999e+09	0

Explanation

This command determines the value of variable1 that the :CALCulate:ADVanced:EXPRession command might refer to.

Return Format

The query returns the current value of variable1 in scientific notation.

Example

:CALCulate:ADVanced:VARiable1 606

The query returns 6.060000e+02.

:CALCulate:ADVanced:VARiable2

Syntax

:CALCulate:ADVanced:VARiable2 <numeric_value>

:CALCulate:ADVanced:VARiable2?

Description

Set the variable2 in the advanced operation expression.

Query the current value of variable2 in the advanced operation expression.

Parameter

Name	Type	Range	Default
<numeric_value>	Real	-9.9999e-09 to 9.9999e+09	0

Explanation

This command determines the value of variable2 that the :CALCulate:ADVanced:EXPRession command might refer to.

Return Format

The query returns the current value of variable2 in scientific notation.

Example

:CALCulate:ADVanced:VARiable2 606

The query returns 6.060000e+02.

:CALCulate:ADVanced:VSCale

Syntax

:CALCulate:ADVanced:VSCale <numeric_value>

:CALCulate:ADVanced:VSCale?

Description

Set the vertical scale of the advanced operation result.

Query the current vertical scale of the advanced operation result.

Parameter

Name	Type	Range	Default
<numeric_value>	Real	2.0e-02V to 5.0e+02V Related to the current channel scale	2V

Note: for the channel scale, refer to the :CHANnel<n>:SCALe command.

Return Format

The query returns the vertical scale in scientific notation.

Example

:CALCulate:ADVanced:VSCale 2

The query returns 2.000000e+00.

:CALCulate:ADVanced:VOFFset

Syntax

:CALCulate:ADVanced:VOFFset <offs>

:CALCulate:ADVanced:VOFFset?

Description

Set the vertical offset of the advanced operation result.

Query the current vertical offset of the advanced operation result.

Parameter

Name	Type	Range	Default
<offs>	Real	-40 × VScale to 40 × VScale	0

Note: for the VScale (the vertical scale of MATH), refer to the :CALCulate:ADVanced:VSCale command.

Return Format

The query returns the vertical offset in scientific notation.

Example

:CALCulate:ADVanced:VOFFset 2

The query returns 2.000000e+00.

:CALibrate Subsystem

- :CALibrate:DATE?
- :CALibrate:STARt
- :CALibrate:TIME?
- :CALibrate:QUIT

:CALibrate:DATE?

Syntax

:CALibrate:DATE?

Description

Query the date of the last calibration.

Return Format

The query returns the date in <year>,<month>,<day> format.
Wherein, <day> and <month> are double-digit figures and <year> is a four-digit figure.

Example

:CALibrate:DATE?
The query returns the date of the last calibration, for example, 2012,03,09.

:CALibrate:STARt

Syntax

:CALibrate:STARt

Description

The oscilloscope starts to execute self-calibration.

Explanation

The self-calibration can make the oscilloscope quickly reach its optimum working state to obtain the most accurate measurement values.

The functions of most of the keys are disabled during the self-calibration.

:CALibrate:TIME?

Syntax

:CALibrate:TIME?

Description

Query the time used by the last calibration.

Return Format

The query returns the time in <hours>,<minutes>,<seconds> format.
Wherein, <hours>, <minutes> and <seconds> are all double-digit figures.

Example

:CALibrate:TIME?
The query returns the time used by the last calibration, for example, 13,57,38, namely 13 hours, 57 minutes and 38 seconds.

:CALibrate:QUIT

Syntax

:CALibrate:QUIT

Description

Exit the calibration at any time.

:CHANnel<n> Subsystem

:CHANnel<n>:BWLimit

Syntax

:CHANnel<n>:BWLimit <type>

:CHANnel<n>:BWLimit?

Description

Set the bandwidth limit of CH1 or CH2 to 20M (20 MHz), 100M (100 MHz) or OFF (turn bandwidth limit off).

Query the current bandwidth limit of CH1 or CH2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<type>	Discrete	{20M|100M|OFF}	OFF

Note: for DS2072 and DS2012, the bandwidth limit can only be 20MHz.

Return Format

The query returns 20M, 100M or OFF.

Example

:CHANnel1:BWLimit 20M

The query returns 20M.

:CHANnel<n>:COUPling

Syntax

:CHANnel<n>:COUPling <coupling>
:CHANnel<n>:COUPling?

Description

Set the coupling mode of CH1 or CH2 to AC, DC or GND.
Query the current coupling mode of CH1 or CH2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<coupling>	Discrete	{AC|DC|GND}	DC

Return Format

The query returns AC, DC or GND.

Example

:CHANnel1:COUPling AC
The query returns AC.

:CHANnel<n>:DISPlay

Syntax

:CHANnel<n>:DISPlay <bool>

:CHANnel<n>:DISPlay?

Description

Enable or disable CH1 or CH2.

Query the current status of CH1 or CH2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:CHANnel1:DISPlay ON

The query returns 1.

:CHANnel<n>:INVert

Syntax

:CHANnel<n>:INVert <bool>

:CHANnel<n>:INVert?

Description

Enable or disable the inverted display of CH1 or CH2.

Query the current status of the inverted display of CH1 or CH2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:CHANnel1:INVert ON

The query returns 1.

:CHANnel<n>:OFFSet

Syntax

:CHANnel<n>:OFFSet <offset>

:CHANnel<n>:OFFSet?

Description

Set the vertical offset of the waveform of CH1 or CH2.

Query the current vertical offset of the waveform of CH1 or CH2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<offset>	Real	500μV/div to 50mV/div: ± 2V 51mV/div to 200mV/div: ± 10V 205mV/div to 2V/div: ± 50V 2.05V/div to 10V/div: ± 100V	CHANnel1: 2V CHANnel2: -2V

Return Format

The query returns the vertical offset in scientific notation.

Example

:CHANnel1:OFFSet 0.01

The query returns 1.000000e-02.

:CHANnel<n>:SCALe

Syntax

:CHANnel<n>:SCALe <scale>

:CHANnel<n>:SCALe?

Description

Set the vertical scale of the waveform of CH1 or CH2.

Query the current vertical scale of the waveform of CH1 or CH2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<scale>	Real	500μV to 10V	1V

Note: the range of the vertical scale is related to the probe ratio currently set. For the setting of the probe ratio, refer to the :CHANnel<n>:PROBe command.

Return Format

The query returns the vertical scale in scientific notation.

Example

:CHANnel1:SCALe 1

The query returns 1.000000e+00.

:CHANnel<n>:PROBe

Syntax

:CHANnel<n>:PROBe <atten>

:CHANnel<n>:PROBe?

Description

Set the probe attenuation ratio of CH1 or CH2.

Query the probe attenuation ratio of CH1 or CH2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<atten>	Discrete	{0.01|0.02|0.05|0.1|0.2|0.5|1|2|5|10|20|50|100|200|500|1000}	1

Return Format

The query returns the attenuation ratio currently set.

Example

:CHANnel1:PROBe 10

The query returns 10.

:CHANnel<n>:UNITs

Syntax

:CHANnel<n>:UNITs <units>

:CHANnel<n>:UNITs?

Description

Set the amplitude display unit of CH1 or CH2.

Query the current amplitude display unit of the CH1 or CH2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<units>	Discrete	{VOLTage|WATT|AMPere|UNKNown}	VOLTage

Return Format

The query returns VOLT, WATT, AMP or UNKN.

Example

:CHANnel1:UNITs VOLTage

The query returns VOLT.

:CHANnel<n>:VERNier

Syntax

:CHANnel<n>:VERNier <bool>

:CHANnel<n>:VERNier?

Description

Enable or disable the fine adjustment function of the vertical scale of CH1 or CH2. Query the current status of the fine adjustment function of the vertical scale of CH1 or CH2.

Parameter

Name	Type	Range	Default
<n>	Discrete	{1|2}	--
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:CHANnel1:VERNier ON

The query returns 1.

:CURSor Subsystem

- :CURSor:MODE
- :CURSor:MANual
- :CURSor:TRACk

:CURSor:MODE

Syntax

:CURSor:MODE <mode>

:CURSor:MODE?

Description

Set the mode of cursor measurement.

Query the current mode of cursor measurement.

Parameter

Name	Type	Range	Default
<mode>	Discrete	{OFF|MANual|TRACk|AUTO}	OFF

Explanation

OFF: disable the cursor measurement.

MANual: enable the manual cursor measurement.

TRACk: enable the track cursor measurement.

AUTO: enable the auto cursor measurement.

Return Format

The query returns OFF, MAN, TRAC or AUTO.

Example

:CURSor:MODE MANual

The query returns MAN.

:CURSor:MANual

:CURSor:MANual:TYPE

Syntax

:CURSor:MANual:TYPE <type>

:CURSor:MANual:TYPE?

Description

Select the cursor type of manual cursor measurement.

Query the current cursor type of manual cursor measurement.

Parameter

Name	Type	Range	Default
<type>	Discrete	{TIME|AMPLitude}	TIME

Explanation

TIME: select X cursors which are usually used to measure time parameters.

AMPLitude: select Y cursors which are usually used to measure voltage parameters.

Return Format

The query returns TIME or AMPL.

Example

:CURSor:MANual:TYPE AMPLitude

The query returns AMPL.

:CURSor:MANual:SOURce

Syntax

:CURSor:MANual:SOURce <source>
:CURSor:MANual:SOURce?

Description

Set the channel source of manual cursor measurement.
Query the current channel source of manual cursor measurement.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2|MATH|NONE}	CHANnel1

Note: only channels currently enabled can be selected as the channel source.

Explanation

CHANnel1, CHANnel2: select CH1 or CH2 as the measurement source of cursor A.
MATH: select the waveform of the math operation channel as the measurement source of cursor A.
NONE: do not use cursor A.

Return Format

The query returns CHAN1, CHAN2, MATH or NONE.

Example

:CURSor:MANual:SOURce CHANnel2
The query returns CHAN2.

:CURSor:MANual:TUNit

Syntax

:CURSor:MANual:TUNit <unit>
:CURSor:MANual:TUNit?

Description

Set the horizontal unit in manual cursor measurement.
Query the current horizontal unit in manual cursor measurement.

Parameter

Name	Type	Range	Default
<unit>	Discrete	{SECond|HZ|PERCentage|DEGRee}	SECond

Explanation

SECond: when this unit is selected, in the measurement results, CurA, CurB and ΔX are in s and 1/ΔX is in Hz.
HZ: when this unit is selected, in the measurement results, CurA, CurB and ΔX are in Hz and 1/ΔX is in s.
PERCentage: when this unit is selected, in the measurement results, CurA, CurB and ΔX are in %.
DEGRee: when this unit is selected, in the measurement results, CurA, CurB and ΔX are in °.

Return Format

The query returns SEC, HZ, PERC or DEGR.

Example

:CURSor:MANual:TUNit DEGRee
The query returns DEGR.

:CURSor:MANual:VUNit

Syntax

:CURSor:MANual:VUNit <unit>
:CURSor:MANual:VUNit?

Description

Set the vertical unit in manual cursor measurement.
Query the current vertical unit in manual cursor measurement.

Parameter

Name	Type	Range	Default
<unit>	Discrete	{SUNit|PERCent}	SUNit

Explanation

SUNit: when this unit is selected, in the measurement results, the units of CurA, CurB and ΔY will automatically be set to the unit of the current signal source.
PERCent: when this unit is selected, in the measurement results, CurA, CurB and ΔY are in %.

Return Format

The query returns SUN or PERC.

Example

:CURSor:MANual:VUNit PERCent
The query returns PERC.

:CURSor:MANual:CAX

Syntax

:CURSor:MANual:CAX <ax>

:CURSor:MANual:CAX?

Description

Set the horizontal position of cursor A in manual cursor measurement.

Query the current horizontal position of cursor A in manual cursor measurement.

Parameter

Name	Type	Range	Default
<ax>	Integer	0 to 699	150

Return Format

The query returns an integer between 0 and 699.

Example

:CURSor:MANual:CAX 200

The query returns 200.

:CURSor:MANual:CBX

Syntax

:CURSor:MANual:CBX <bx>

:CURSor:MANual:CBX?

Description

Set the horizontal position of cursor B in manual cursor measurement.

Query the current horizontal position of cursor B in manual cursor measurement.

Parameter

Name	Type	Range	Default
<bx>	Integer	0 to 699	550

Return Format

The query returns an integer between 0 and 699.

Example

:CURSor:MANual:CBX 200

The query returns 200.

:CURSor:MANual:CAY

Syntax

:CURSor:MANual:CAY <ay>

:CURSor:MANual:CAY?

Description

Set the vertical position of cursor A in manual cursor measurement.

Query the current vertical position of cursor A in manual cursor measurement.

Parameter

Name	Type	Range	Default
<ay>	Integer	0 to 399	100

Return Format

The query returns an integer between 0 and 399.

Example

:CURSor:MANual:CAY 200

The query returns 200.

:CURSor:MANual:CBY

Syntax

:CURSor:MANual:CBY <by>
:CURSor:MANual:CBY?

Description

Set the vertical position of cursor B in manual cursor measurement.
Query the current vertical position of cursor B in manual cursor measurement.

Parameter

Name	Type	Range	Default
<by>	Integer	0 to 399	300

Return Format

The query returns an integer between 0 and 399.

Example

:CURSor:MANual:CBY 200
The query returns 200.

:CURSor:MANual:AXValue?

Syntax

:CURSor:MANual:AXValue?

Description

Query the X value at cursor A in manual cursor measurement.

Explanation

For the horizontal position of cursor A, refer to the :CURSor:MANual:CAX command. The unit is determined by the horizontal unit currently selected (refer to the :CURSor:MANual:TUNit command).

Return Format

The query returns the X value at cursor A in scientific notation.

Example

:CURSor:MANual:AXValue?

The query returns -4.000000e-06.

:CURSor:MANual:AYValue?

Syntax

:CURSor:MANual:AYValue?

Description

Query the Y value at cursor A in manual cursor measurement.

Explanation

For the vertical position of cursor A, refer to the :CURSor:MANual:CAY command. The unit is determined by the vertical unit currently selected (refer to the :CURSor:MANual:VUNit command).

Return Format

The query returns the Y value at cursor A in scientific notation.

Example

:CURSor:MANual:AYValue?

The query returns 3.400000e-01.

:CURSor:MANual:BXValue?

Syntax

:CURSor:MANual:BXValue?

Description

Query the X value at cursor B in manual cursor measurement.

Explanation

For the horizontal position of cursor B, refer to the :CURSor:MANual:CBX command. The unit is determined by the horizontal unit currently selected (refer to the :CURSor:MANual:TUNit command).

Return Format

The query returns the X value at cursor B in scientific notation.

Example

:CURSor:MANual:BXValue?

The query returns 5.120000e-06.

:CURSor:MANual:BYValue?

Syntax

:CURSor:MANual:BYValue?

Description

Query the Y value at cursor B in manual cursor measurement.

Explanation

For the vertical position of cursor B, refer to the :CURSor:MANual:CBY command.
The unit is determined by the vertical unit currently selected
(the :CURSor:MANual:VUNit command).

Return Format

The query returns the Y value at cursor B in scientific notation.

Example

:CURSor:MANual:BYValue?
The query returns -4.360000e+00.

:CURSor:MANual:XDELta?

Syntax

:CURSor:MANual:XDELta?

Description

Query the difference ΔX between the X values at cursor A and cursor B in manual cursor measurement.

Explanation

For the horizontal position of cursor A, refer to the :CURSor:MANual:CAX command. For the horizontal position of cursor B, refer to the :CURSor:MANual:CBX command. The unit is determined by the horizontal unit currently selected (refer to the :CURSor:MANual:TUNit command).

Return Format

The query returns the current difference ΔX in scientific notation.

Example

:CURSor:MANual:XDELta?

The query returns 9.120000e-06.

:CURSor:MANual:IXDelta?

Syntax

:CURSor:MANual:IXDelta?

Description

Query the reciprocal (1/ΔX) of the difference between the X values at cursor A and cursor B in manual cursor measurement.

Explanation

For the horizontal position of cursor A, refer to the :CURSor:MANual:CAX command. For the horizontal position of cursor B, refer to the :CURSor:MANual:CBX command. The unit is determined by the reciprocal of the horizontal unit currently selected (refer to the :CURSor:MANual:TUNit command).

Return Format

The query returns the 1/ΔX value in scientific notation.

Example

:CURSor:MANual:IXDelta?

The query returns 1.096491e+05.

:CURSor:MANual:YDELta?

Syntax

:CURSor:MANual:YDELta?

Description

Query the difference ΔY between the Y values at cursor A and cursor B in manual cursor measurement.

Explanation

For the vertical position of cursor A, refer to the :CURSor:MANual:CAY command. For the vertical position of cursor B, refer to the :CURSor:MANual:CBY command. The unit is determined by the vertical unit currently selected (refer to the :CURSor:MANual:VUNit command).

Return Format

The query returns the current difference ΔY in scientific notation.

Example

:CURSor:MANual:YDELta?

The query returns -4.700000e+00.

:CURSor:TRACk

:CURSor:TRACk:SOURce1

Syntax

:CURSor:TRACk:SOURce1 <source>
:CURSor:TRACk:SOURce1?

Description

Set the measurement source of cursor A in track cursor measurement.
Query the current measurement source of cursor A in track cursor measurement.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2|MATH|NONE}	CHANnel1

Note: only channels currently enabled can be selected as the channel source.

Explanation

CHANnel1, CHANnel2: select CH1 or CH2 as the measurement source of cursor A.
MATH: select the waveform of the math operation channel as the measurement source of cursor A.
NONE: do not use cursor A.

Return Format

The query returns CHAN1, CHAN2, MATH or NONE.

Example

:CURSor:TRACk:SOURce1 CHANnel2
The query returns CHAN2.

:CURSor:TRACk:SOURce2

Syntax

:CURSor:TRACk:SOURce2 <source>
:CURSor:TRACk:SOURce2?

Description

Set the measurement source of cursor B in track cursor measurement.
Query the current measurement source of cursor B in track cursor measurement.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2|MATH|NONE}	CHANnel1

Note: only channels currently enabled can be selected as the channel source.

Explanation

CHANnel1, CHANnel2: select CH1 or CH2 as the measurement source of cursor B.
MATH: select the waveform of the math operation channel as the measurement source of cursor B.
NONE: do not use cursor B.

Return Format

The query returns CHAN1, CHAN2, MATH or NONE.

Example

:CURSor:TRACk:SOURce2 CHANnel2
The query returns CHAN2.

:CURSor:TRACk:CAX

Syntax

:CURSor:TRACk:CAX <ax>

:CURSor:TRACk:CAX?

Description

Set the horizontal position of cursor A in track cursor measurement.

Query the current horizontal position of cursor A in track cursor measurement.

Parameter

Name	Type	Range	Default
<ax>	Integer	0 to 699	150

Return Format

The query returns an integer between 0 and 699.

Example

:CURSor:TRACk:CAX 200

The query returns 200.

:CURSor:TRACk:CBX

Syntax

:CURSor:TRACk:CBX <bx>

:CURSor:TRACk:CBX?

Description

Set the horizontal position of cursor B in track cursor measurement.

Query the current horizontal position of cursor B in track cursor measurement.

Parameter

Name	Type	Range	Default
<bx>	Integer	0 to 699	550

Return Format

The query returns an integer between 0 and 699.

Example

:CURSor:TRACk:CBX 200

The query returns 200.

:CURSor:TRACk:CAY?

Syntax

:CURSor:TRACk:CAY?

Description

Query the vertical position of cursor A in track cursor measurement.

Return Format

The query returns an integer.

Example

:CURSor:TRACk:CAY?

The query returns 300.

:CURSor:TRACk:CBY?

Syntax

:CURSor:TRACk:CBY?

Description

Query the vertical position of cursor B in track cursor measurement.

Return Format

The query returns an integer.

Example

:CURSor:TRACk:CBY?

The query returns 100.

:CURSor:TRACk:AXValue?

Syntax

:CURSor:TRACk:AXValue?

Description

Query the X value at cursor A in track cursor measurement and the unit is s.

Return Format

The query returns the X value at cursor A in scientific notation.

Explanation

For the horizontal position of cursor A, refer to the :CURSor:TRACk:CAX command.

Example

:CURSor:TRACk:AXValue?

The query returns -3.820000e-06.

:CURSor:TRACk:AYValue?

Syntax

:CURSor:TRACk:AYValue?

Description

Query the Y value at cursor A in track cursor measurement.

Explanation

For the vertical position of cursor A, refer to the :CURSor:TRACk:CAY? command. The unit is determined by the unit (refer to the :CHANnel<n>:UNITs command) selected by the signal source (refer to the :CURSor:TRACk:SOURce1 command) of cursor A.

Return Format

The query returns the Y value at cursor A in scientific notation.

Example

:CURSor:TRACk:AYValue?

The query returns 4.000000e-02.

:CURSor:TRACk:BXValue?

Syntax

:CURSor:TRACk:BXValue?

Description

Query the X value at cursor B in track cursor measurement and the unit is s.

Explanation

For the horizontal position of cursor B, refer to the :CURSor:TRACk:CBX command.

Return Format

The query returns the X value at cursor B in scientific notation.

Example

:CURSor:TRACk:BXValue?

The query returns 4.000000e-06.

:CURSor:TRACk:BYValue?

Syntax

:CURSor:TRACk:BYValue?

Description

Query the Y value at cursor B in track cursor measurement.

Explanation

For the vertical position of cursor B, refer to the :CURSor:TRACk:CBY? command. The unit is determined by the unit (refer to the :CHANnel<n>:UNITs command) selected by the signal source (refer to the :CURSor:TRACk:SOURce2 command) of cursor B.

Return Format

The query returns the Y value at cursor B in scientific notation.

Example

:CURSor:TRACk:BYValue?

The query returns 4.000000e-02.

:CURSor:TRACk:XDELta?

Syntax

:CURSor:TRACk:XDELta?

Description

Query the difference ΔX between the X values at cursor A and cursor B in track cursor measurement and the unit is s.

Explanation

For the horizontal position of cursor A, refer to the :CURSor:TRACk:CAX command.
For the horizontal position of cursor B, refer to the :CURSor:TRACk:CBX command.

Return Format

The query returns the current difference ΔX in scientific notation.

Example

:CURSor:TRACk:XDELta?
The query returns 7.820000e-06.

:CURSor:TRACk:YDELta?

Syntax

:CURSor:TRACk:YDELta?

Description

Query the difference ΔY between the Y values at cursor A and cursor B in track cursor measurement.

Explanation

For the vertical position of cursor A, refer to the :CURSor:TRACk:CAY? command. For the vertical position of cursor B, refer to the :CURSor:TRACk:CBY? command. The unit is determined by the unit (refer to the :CHANnel<n>:UNITs command) of the current signal source.

Return Format

The query returns the current difference ΔY in scientific notation.

Example

:CURSor:TRACk:YDELta?

The query returns -4.000000e-02.

:CURSor:TRACk:IXDelta?

Syntax

:CURSor:TRACk:IXDelta?

Description

Query the reciprocal (1/ΔX) of the difference between the X values at cursor A and cursor B in track cursor measurement and the unit is Hz.

Explanation

For the horizontal position of cursor A, refer to the :CURSor:TRACk:CAX command.
For the horizontal position of cursor B, refer to the :CURSor:TRACk:CBX command.

Return Format

The query returns the 1/ΔX value in scientific notation.

Example

:CURSor:TRACk:IXDelta?
The query returns 1.278772e+05.

:DISPlay Subsystem

:DISPlay:CLEar

Syntax

:DISPlay:CLEar

Description

Clear all the waveforms on the screen.

Explanation

If the oscilloscope is in RUN state (refer to the :RUN command), new waveforms will be displayed.

You can also use the :CLEar command to clear all the waveforms on the screen.

:DISPlay:TYPE

Syntax

:DISPlay:TYPE <type>
:DISPlay:TYPE?

Description

Set the display mode of the waveform on the screen.
Query the current display mode of the waveform on the screen.

Parameter

Name	Type	Range	Default
<type>	Discrete	{VECTors|DOTS}	VECTors

Explanation

VECTors: the sample points are connected by lines and displayed. Normally, this mode can provide the most vivid waveform to view the steep edge of the waveform (such as square waveform).
DOTS: display the sample points directly. You can directly view each sample point and use the cursor to measure the X and Y values of the sample point.

Return Format

The query returns VECT or DOTS.

Example

:DISPlay:TYPE DOTS
The query returns DOTS.

:DISPlay:GRADing:TIME

Syntax

:DISPlay:GRADing:TIME <time>
:DISPlay:GRADing:TIME?

Description

Set the persistence time and the unit is s.
Query the current persistence time.

Parameter

Name	Type	Range	Default
<time>	Discrete	{MIN|0.05|0.1|0.2|0.5|1|2|5|10|20|INFinite}	MIN

Explanation

MIN: set the persistence time to its minimum to view the waveform changing in high refresh rate.
Specific Values: a certain value between 0.05 s and 20 s, enable to observe glitch that changes relatively slowly or glitch with low occurrence probability.
INFinite: in this mode, the oscilloscope displays the newly acquired waveform without clearing the waveform formerly acquired. Enable to measure noise and jitter as well as capture incidental events.

Return Format

The query returns the persistence time set.

Example

:DISPlay:GRADing:TIME 0.1
The query returns 0.1.

:DISPlay:WBRightness

Syntax

:DISPlay:WBRightness <time>

:DISPlay:WBRightness?

Description

Set the waveform brightness and the unit is %.

Query the current waveform brightness.

Parameter

Name	Type	Range	Default
<time>	Integer	0 to 100	50

Return Format

The query returns an integer between 0 and 100.

Example

:DISPlay:WBRightness 60

The query returns 60.

:DISPlay:GRID

Syntax

:DISPlay:GRID <grid>
:DISPlay:GRID?

Description

Set the grid type of screen display.
Query the current grid type of screen display.

Parameter

Name	Type	Range	Default
<grid>	Discrete	{FULL|HALF|NONE}	FULL

Explanation

FULL: turn the background grid and coordinate on.
HALF: turn the background grid off.
NONE: turn the background grid and coordinate off.

Return Format

The query returns FULL, HALF or NONE.

Example

:DISPlay:GRID NONE
The query returns NONE.

:DISPlay:GBRightness

Syntax

:DISPlay:GBRightness <brightness>
:DISPlay:GBRightness?

Description

Set the brightness of the screen grid and the unit is %.
Query the current brightness of the screen grid.

Parameter

Name	Type	Range	Default
<brightness>	Integer	0 to 100	50

Return Format

The query retruns an integer between 0 and 100.

Example

:DISPlay:GBRightness 60
The query returns 60.

:DISPlay:MPERsistence

Syntax

:DISPlay:MPERsistence <time>

:DISPlay:MPERsistence?

Description

Set the menu display time and the unit is s.

Query the current menu display time.

Parameter

Name	Type	Range	Default
<time>	Discrete	{1|2|5|10|20|INFinite}	INFinite

Return Format

Query the menu display time set.

Example

:DISPlay:MPERsistence 20

The query returns 20.

:DISPlay:DATA?

Syntax

:DISPlay:DATA?

Description

Read the bitmap data stream of the image currently displayed.

Explanation

The command is sent from the PC to the instrument through the VISA interface. The instrument responds to the command and directly returns the bitmap data stream of the image currently displayed to the buffer area of the PC.

Return Format

Th format of the bitmap data stream:

Component	TMC Blockheader	BMP Data
Size (length)	N[1] +2	800*480*3+54=1152054[2]
Example	#9001152054	BM...
Explanation	TMC Blockheader ::= #NXXXXXX is used to describe the length of the data stream. Wherein, # is the start denoter of the data stream; N is less than or equal to 9 and the N figures following it denotes the length of the data stream in bytes. For example, #9001152054; wherein, N is 9 and 001152054 denotes that the data stream contains 1152054 bytes of effective data.	Specific bitmap data.

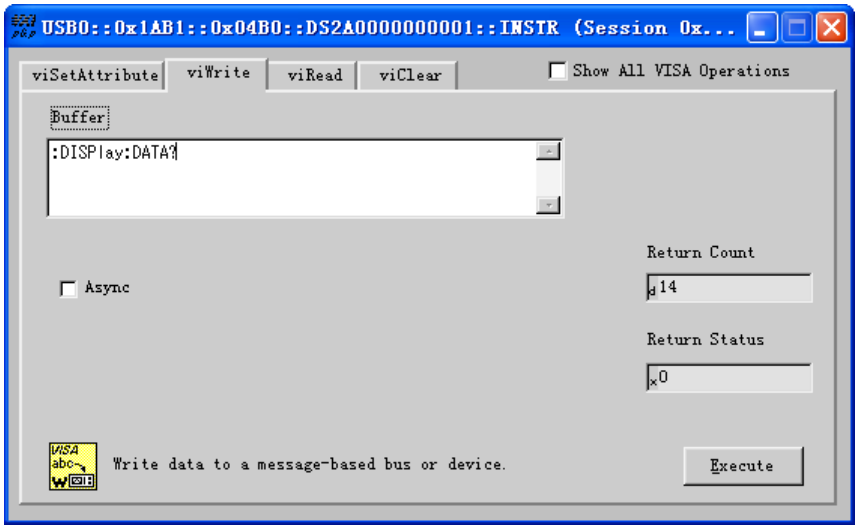
Note[1]: N is the width used to describe the data length in the TMC header. For example, #90000.

Note[2]: the width is 800, the height is 480, the bit depth is 24Bit = 3Byte, 54 is the size of the bitmap file header.

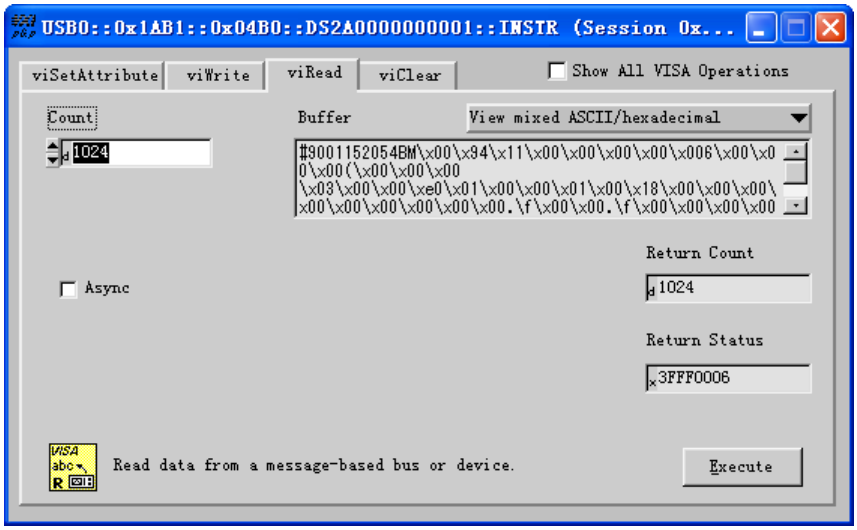
Example

1. Make sure that the buffer is large enough to receive the data stream, otherwise the program might be abnormal when reading the data stream.
2. The returned data stream contains TMC data header and you need to remove the data header to make the data stream a standard bitmap data stream.
3. When the data size is larger than 1 M and the communication speed of the interface is not fast enough, you need to set an appropriate timeout time
4. The terminator '\n'(0X0A) at the end of the data should be removed.

Sending:



Reading:


USB0::0x1AB1::0x04B0::DS2A0000000001::INSTR (Session 0x...
viSetAttribute
viWrite
viRead
viClear
Show All VISA Operations
Count
1024
Buffer
View mixed ASCII/hexadecimal
#9001152054BM\x00\x94\x11\x00\x00\x00\x00\x006\x00\x00\x00(\x00\x00\x00\x00
\x03\x00\x00\xe0\x01\x00\x00\x00\x01\x00\x18\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00.\f\x00\x00.\f\x00\x00\x00\x00
Async
Return Count
1024
Return Status
3FFF0006
Read data from a message-based bus or device.
Execute

:FUNCtion Subsystem

- :FUNCtion:WRMode
- :FUNCtion:WRECord
- :FUNCtion:WREPlay
- :FUNCtion:WANalyze

:FUNCtion:WRMode

Syntax

:FUNCtion:WRMode <mode>

:FUNCtion:WRMode?

Description

Set the mode of waveform record.

Query the current mode of waveform record.

Parameter

Name	Type	Range	Default
<mode>	Discrete	{OFF|RECord|KEEP|PLAY|ANALyze}	OFF

Return Format

The query returns OFF, REC, KEEP, PLAY or ANAL.

Example

:FUNCtion:WRMode RECord

The query returns REC.

:FUNCtion:WRECord

- :FUNCtion:WRECord:FEND
- :FUNCtion:WRECord:FMAX?
- :FUNCtion:WRECord:INTerval
- :FUNCtion:WRECord:OPERate

:FUNCtion:WRECord:FEND

Syntax

:FUNCtion:WRECord:FEND <frame>
:FUNCtion:WRECord:FEND?

Description

Set the end frame of waveform record.
Query the current end frame of waveform record.

Parameter

Name	Type	Range	Default
<frame>	Integer	1 to the maximum number of frames can be recorded currently	--

Explanation

As the capacity of the waveform memory is fixed, the more the number of points each frame of waveform has, the less waveform frames can be recorded. Thus, the maximum end frame of waveform record is decided by the memory depth currently selected.
You can use the :FUNCtion:WRECord:FMAX? command to query the mximum end frame can be set currently.

Return Format

The query returns an integer.

Example

:FUNCtion:WRECord:FEND 999
The query returns 999.

:FUNCtion:WRECord:FMAX?

Syntax

:FUNCtion:WRECord:FMAX?

Description

Query the maximum number of frames that can be recorded currently.

Explanation

Use the :FUNCtion:WRECord:FEND command to set the desired end frame.

The maximum end frame of waveform record depends on the current memory depth (refer to the :ACQuire:MDEPth command).

Memory Depth	Maximum End Frame
Auto	65000
14k points	8128
140k points	508
1.4M points	63
14M points	7
56M points	2

Return Format

The query returns the maximum number of frames that can be recorded in integer.

Example

:FUNCtion:WRECord:FMAX?

The query returns 4064.

:FUNCtion:WRECord:INTerval

Syntax

:FUNCtion:WRECord:INTerval <interval>

:FUNCtion:WRECord:INTerval?

Description

Set the time interval between frames in the waveform record and the unit is s.

Query the current time interval in waveform record.

Parameter

Name	Type	Range	Default
<interval>	Real	100ns to 10s	100ns

Return Format

The query returns the current time interval in scientific notation.

Example

:FUNCtion:WRECord:INTerval 0.0002

The query returns 2.000000e-04.

:FUNCtion:WRECord:OPERate

Syntax

:FUNCtion:WRECord:OPERate <oper>
:FUNCtion:WRECord:OPERate?

Description

Start or stop the waveform record.
Query the current status of the waveform record.

Parameter

Name	Type	Range	Default
<oper>	Discrete	{RECord|STOP}	STOP

Return Format

The query returns REC or STOP.

Example

:FUNCtion:WRECord:OPERate RECord
The query returns REC.

:FUNCtion:WREPlay

:FUNCtion:WREPlay:MODE

Syntax

:FUNCtion:WREPlay:MODE <mode>
:FUNCtion:WREPlay:MODE?

Description

Set the mode of waveform playback to cycle or single.
Query the current mode of waveform playback.

Parameter

Name	Type	Range	Default
<mode>	Discrete	{REPeat|SINGle}	SINGle

Explanation

REPeat: cycle playback. Play from the start frame to the end frame and then repeat until you stop it.
SINGle: single playback. Play from the start frame to the end frame and then stop.

Return Format

The query returns REP or SING.

Example

:FUNCtion:WREPlay:MODE REPeat
The query returns REP.

:FUNCtion:WREPlay:INTerval

Syntax

:FUNCtion:WREPlay:INTerval <interval>
:FUNCtion:WREPlay:INTerval?

Description

Set the time interval in waveform playback and the unit is s.
Query the current time interval in waveform playback.

Parameter

Name	Type	Range	Default
<interval>	Real	100ns to 10s	100ns

Return Format

The query returns the time interval set in scientific notation.

Example

:FUNCtion:WREPlay:INTerval 0.0002
The query returns 2.000000e-04.

:FUNCtion:WREPlay:FSTart

Syntax

:FUNCtion:WREPlay:FSTart <frame>
:FUNCtion:WREPlay:FSTart?

Description

Set the start frame of waveform playback.
Query the current start frame of waveform playback.

Parameter

Name	Type	Range	Default
<frame>	Integer	1 to the maximum number of frames recorded	1

Return Format

The query returns an integer.

Example

:FUNCtion:WREPlay:FSTart 10
The query returns 10.

:FUNCtion:WREPlay:FCURrent

Syntax

:FUNCtion:WREPlay:FCURrent <frame>
:FUNCtion:WREPlay:FCURrent?

Description

Set the current frame in waveform playback.
Query the current frame in waveform playback.

Parameter

Name	Type	Range	Default
<frame>	Integer	1 to the maximum number of frames recorded	--

Return Format

The query returns an integer.

Example

:FUNCtion:WREPlay:FCURrent 10
The query returns 10.

:FUNCtion:WREPlay:FEND

Syntax

:FUNCtion:WREPlay:FEND <frame>

:FUNCtion:WREPlay:FEND?

Description

Set the end frame of waveform playback.

Query the current end frame of waveform playback.

Parameter

Name	Type	Range	Default
<frame>	Integer	1 to the maximum number of frames recorded	--

Return Format

The query returns an integer.

Example

:FUNCtion:WREPlay:FEND 100

The query returns 100.

:FUNCtion:WREPlay:FMAX?

Syntax

:FUNCtion:WREPlay:FMAX?

Description

Query the maximum end frame (namely the maximum number of frames of waveform recorded) in waveform playback.

Return Format

The query returns the maximum end frame in integer.

Example

:FUNCtion:WREPlay:FMAX?
The query returns 4064.

:FUNCtion:WREPlay:OPERate

Syntax

:FUNCtion:WREPlay:OPERate <oper>

:FUNCtion:WREPlay:OPERate?

Description

Set the current waveform playback operation to play, stop or pause.

Query the current status of the waveform playback operation.

Parameter

Name	Type	Range	Default
<oper>	Discrete	{PLAY|STOP|PAUSe}	STOP

Return Format

The query returns PLAY, STOP or PAUS.

Example

:FUNCtion:WREPlay:OPERate PAUSe

The query returns PAUS.

:FUNCtion:WREPlay:TTAG

Syntax

:FUNCtion:WREPlay:TTAG <bool>

:FUNCtion:WREPlay:TTAG?

Description

Enable or disable the time tag in waveform playback.

Query the current status of the time tag in waveform playback.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:FUNCtion:WREPlay:TTAG ON

The query returns 1.

:FUNCtion:WREPlay:CTAG?

Syntax

:FUNCtion:WREPlay:CTAG?

Description

Query the record time difference of the waveform currently displayed relative to the first frame of waveform.

Return Format

The query returns the record time difference of the waveform currently displayed relative to the first frame of waveform in scientific notation.

Example

:FUNCtion:WREPlay:CTAG?

The query returns 1.062830e-01.

:FUNCtion:WANalyze

:FUNCtion:WANalyze:MODE

Syntax

:FUNCtion:WANalyze:MODE <mode>

:FUNCtion:WANalyze:MODE?

Description

Set the mode of waveform analysis.

Query the current mode of waveform analysis.

Parameter

Name	Type	Range	Default
<mode>	Discrete	{TRACe|MASK}	TRACe

Explanation

TRACe: trace mode. Analyze on the basis of the template selected by users.

MASK: pass/fail test. Analyze on the basis of the pass/fail test mask created by users.

Return Format

The query returns TRAC or MASK.

Example

:FUNCtion:WANalyze:MODE TRACe

The query returns TRAC.

:FUNCtion:WANalyze:SOURce

Syntax

:FUNCtion:WANalyze:SOURce <sour>
:FUNCtion:WANalyze:SOURce?

Description

Select the channel to be analyzed.
Query the current channel source for the waveform analysis.

Parameter

Name	Type	Range	Default
<sour>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Note: ony channel currently enabled can be selected as the channel source.

Return Format

The query returns CHAN1 or CHAN2.

Example

:FUNCtion:WANalyze:SOURce CHAN2
The query returns CHAN2.

:FUNCtion:WANalyze:FCURrent

Syntax

:FUNCtion:WANalyze:FCURrent <NR1>

:FUNCtion:WANalyze:FCURrent?

Description

Set the current frame of waveform analysis.

Query the current frame of waveform analysis.

Parameter

Name	Type	Range	Default
<NR1>	Integer	1 to the maximum number of frames recorded	1

Return Format

The query returns an integer.

Example

:FUNCtion:WANalyze:FCURrent 5

The query returns 5.

:FUNCtion:WANalyze:TDISp

Syntax

:FUNCtion:WANalyze:TDISp <bool>
:FUNCtion:WANalyze:TDISp?

Description

Enable or disable the template display.
Query the current status of template display.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:FUNCtion:WANalyze:TDISp ON
The query returns 1.

:FUNCtion:WANalyze:SETup:SSTart

Syntax

:FUNCtion:WANalyze:SETup:SSTart <NR1>
:FUNCtion:WANalyze:SETup:SSTart?

Description

Set the screen start point of waveform analysis.
Query the current screen start point of waveform analysis.

Parameter

Name	Type	Range	Default
<NR1>	Integer	5 to 685	5

Explanation

The screen start point set should be less than the “screen end-10” (refer to the :FUNCtion:WANalyze:SETup:SSENd command).

Return Format

The query returns an integer between 5 and 685.

Example

:FUNCtion:WANalyze:SETup:SSTart 15
The query returns 15.

:FUNCtion:WANalyze:SETup:SSENd

Syntax

:FUNCtion:WANalyze:SETup:SSENd <NR1>
:FUNCtion:WANalyze:SETup:SSENd?

Description

Set the screen end point of waveform analysis.
Query the current screen end point of waveform analysis.

Parameter

Name	Type	Range	Default
<NR1>	Integer	15 to 695	695

Explanation

The screen end point set should be greater than the “screen start+10” currently set (refer to the :FUNCtion:WANalyze:SETup:SSTart command).

Return Format

The query returns an integer between 15 and 695.

Example

:FUNCtion:WANalyze:SETup:SSENd 20
The query returns 20.

:FUNCtion:WANalyze:SETup:SFRame

Syntax

:FUNCtion:WANalyze:SETup:SFRame <NR1>
:FUNCtion:WANalyze:SETup:SFRame?

Description

Set the start frame number of waveform analysis.
Query the current start frame number of waveform analysis.

Parameter

Name	Type	Range	Default
<NR1>	Integer	1 to the maximum number of frames recorded	1

Return Format

The query returns an integer.

Example

:FUNCtion:WANalyze:SETup:SFRame 10
The query returns 10.

:FUNCtion:WANalyze:SETup:EFRame

Syntax

:FUNCtion:WANalyze:SETup:EFRame <NR1>
:FUNCtion:WANalyze:SETup:EFRame?

Description

Set the end frame number of waveform analysis.
Query the current end frame number of waveform analysis.

Parameter

Name	Type	Range	Default
<NR1>	Integer	1 to the maximum number of frames recorded	--

Return Format

The query returns an integer.

Example

:FUNCtion:WANalyze:SETup:EFRame 20
The query returns 20.

:FUNCtion:WANalyze:SETup:THReshold

Syntax

:FUNCtion:WANalyze:SETup:THReshold <NR1>
:FUNCtion:WANalyze:SETup:THReshold?

Description

Set the threshold of waveform analysis and the unit is %.
Query the current threshold of waveform analysis.

Parameter

Name	Type	Range	Default
<NR1>	Integer	1 to 99	70

Explanation

The threshold is used to judge whether the data frame is an error frame. The data frame will be judged as an error frame if the (relative) difference between it and the template is greater than or equal to the threshold currently set.

Return Format

The query returns an integer between 1 and 99.

Example

:FUNCtion:WANalyze:SETup:THReshold 20
The query returns 20.

:FUNCtion:WANalyze:SETup:XMASk

Syntax

:FUNCtion:WANalyze:SETup:XMASk <NR3>
:FUNCtion:WANalyze:SETup:XMASk?

Description

Set the horizontal adjustment parameter in analysis based on the pass/fail mask and the unit is div.
Query the current horizontal adjustment parameter.

Parameter

Name	Type	Range	Default
<NR3>	Real	0.02 to 4	0.24

Note: the step is 0.02 within the value range.

Return Format

The query returns the current horizontal adjustment parameter in scientific notation.

Example

:FUNCtion:WANalyze:SETup:XMASk 0.20
The query returns 2.000000e-01.

:FUNCtion:WANalyze:SETup:YMASk

Syntax

:FUNCtion:WANalyze:SETup:YMASk <NR3>
:FUNCtion:WANalyze:SETup:YMASk?

Description

Set the vertical adjustment parameter within the mask when the analysis mode is pass/fail test and the unit is div.
Query the current vertical adjustment parameter.

Parameter

Name	Type	Range	Default
<NR3>	Real	0.03 to 4	0.38

Note: the step is 0.04 within the range.

Explanation

The query returns the current vertical adjustment parameter in scientific notation.

Example

:FUNCtion:WANalyze:SETup:YMASk 0.50
The query returns 5.000000e-01.

:FUNCtion:WANalyze:STEMplate

Syntax

:FUNCtion:WANalyze:STEMplate

Description

Set the waveform analysis template when the analysis mode is trace.

Explanation

After the analysis starts, the oscilloscope compares each frame of data measured with the data in the template to determine whether error frame exists according to the threshold set.

:FUNCtion:WANalyze:CMASk

Syntax

:FUNCtion:WANalyze:CMASk

Description

Apply the mask currently created.

Explanation

For the setting of the horizontal adjustment parameter, refer to the :FUNCtion:WANalyze:SETup:XMASk command.
For the setting of the vertical adjustment parameter, refer to the :FUNCtion:WANalyze:SETup:YMASk command.

:FUNCtion:WANalyze:STARt

Syntax

:FUNCtion:WANalyze:STARt

Description

Start the waveform analysis.

Explanation

During the analysis process, the progress bar is displayed and the parameters can not be modified. After the analysis finishes, the analysis results of “Error Frames”, “Current Error” and “CurFrame Diff” are displayed; at the same time, the first error frame is located.

:FUNCtion:WANalyze:PREVious

Syntax

:FUNCtion:WANalyze:PREVious

Description

Locate the error frame previous to the current error frame.

:FUNCtion:WANalyze:NEXT

Syntax

:FUNCtion:WANalyze:NEXT

Description

Locate the error frame next to the current error frame.

:FUNCtion:WANalyze:EFCount?

Syntax

:FUNCtion:WANalyze:EFCount?

Description

Query the total number of error frames discovered in the current analysis.

Explanation

The number of error frames is related to the error frame threshold currently set.

Return Format

The query returns an integer.

Example

:FUNCtion:WANalyze:EFCount?

The query returns 1276.

:FUNCtion:WANalyze:ECURrent

Syntax

:FUNCtion:WANalyze:ECURrent <NR1>
:FUNCtion:WANalyze:ECURrent?

Description

Set the number of the current error frame.
Query the number of the current error frame.

Parameter

Name	Type	Range	Default
<NR1>	Integer	1 to the total number of error frames	--

Return Format

The query returns an integer.

Example

:FUNCtion:WANalyze:ECURrent 5
The query returns 5.

:FUNCtion:WANalyze:ECDiff?

Syntax

:FUNCtion:WANalyze:ECDiff?

Description

Query the current frame difference.

Explanation

During the analysis based on trace, the oscilloscope compares each frame with the templet to compute the difference value and normalizes each value using the maximum one; then, compares the normalized value of each frame with the threshold selected to judge whether the frame is an error frame. “CurFrame Diff” (relative difference) is the normalized value of the difference between the current frame and templet.

During the analysis based on pass/fail mask, the oscilloscope compares each frame with the mask to compute the difference value and recognizes the frame whose difference value is equal to or larger than the threshold selected as an error frame and the corresponding “CurFrame Diff” is 100%; otherwise, the frame is juged as correct and the “CurFrame Diff” is 0%. Note that there are only two “CurFrame Diff” values (100% and 0%) under the analysis based on pass/fail mask.

Example

:FUNCtion:WANalyze:ECDiff?

The query returns 100.

:LAN Subsystem

:LAN:DHCP

Syntax

:LAN:DHCP <bool>

:LAN:DHCP?

Description

Enable or disable the DHCP configuration mode.

Query the current status of the DHCP configuration mode.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	1|ON

Explanation

When the DHCP configuration mode is valid, the DHCP server in the current network will assign the network parameters (such as the IP address) for the oscilloscope.

Return Format

The query returns 0 or 1.

Example

:LAN:DHCP ON

The query returns 1.

:LAN:AUToip

Syntax

:LAN:AUToip <bool>

:LAN:AUToip?

Description

Enable or disable the Auto IP configuration mode.

Query the current status of the Auto IP configuration mode.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	1|ON

Explanation

When the Auto IP configuration mode is valid, disable DHCP manually and users can set the gateway and DNS server address of the oscilloscope.

For the setting of the gateway, refer to the :LAN:GATeway command. For the setting of the DNS server, refer to the :LAN:DNS command.

Return Format

The query returns 0 or 1.

Example

:LAN:AUToip ON

The query returns 1.

:LAN:GATeway

Syntax

:LAN:GATeway <string>

:LAN:GATeway?

Description

Assign a gateway for the instrument.

Query the current gateway of the instrument.

Parameter

Name	Type	Range	Default
<string>	ASCII character string	nnn,nnn,nnn,nnn	--

Explanation

When setting the <string>, the range of the first nnn is from 0 to 223 (except 127) and the ranges of the other three nnn are from 0 to 255.

When using this command, the IP configuration mode should be Auto IP (refer to the :LAN:AUToip command) or Static IP (refer to the :LAN:MANual command) mode.

Return Format

The query returns the current gateway in character string.

Example

:LAN:GATeway 172,16,3,1

The query returns 172.16.3.1.

:LAN:DNS

Syntax

:LAN:DNS <string>

:LAN:DNS?

Description

Set the DNS address.

Query the current DNS address.

Parameter

Name	Type	Range	Default
<string>	ASCII character string	nnn,nnn,nnn,nnn	--

Explanation

When setting the <string>, the range of the first nnn is from 0 to 223 (except 127) and the ranges of the other three nnn are from 0 to 255.

When using this command, the IP configuration mode should be Auto IP (refer to the :LAN:AUToip command) or Static IP (refer to the :LAN:MANual command) mode.

Return Format

The query returns the current DNS address in character string.

Example

:LAN:DNS 172,16,3,119

The query returns 172.16.3.119.

:LAN:MAC?

Syntax

:LAN:MAC?

Description

Query the MAC address of the instrument. This address is displayed on the oscilloscope in “00-19-AF-30-00-00” format.

Return Format

The query returns the MAC address in character string.

Example

:LAN:MAC?

The query returns 0019af300000.

:LAN:MANual

Syntax

:LAN:MANual <bool>

:LAN:MANual?

Description

Enable or disable the static IP configuration mode.

Query the current status of the static IP configuration mode.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Explanation

When the static IP configuration mode is valid, disable DHCP and Auto IP manually and users can set the network parameters such as the IP address, subnet mask, gateway and DNS.

For the setting of the IP address, refer to the :LAN:IPADdress command.

For the setting of the subnet mask, refer to the :LAN:SMASk command.

For the setting of the gateway, refer to the :LAN:GATeway command.

For the setting of DNS, refer to the :LAN:DNS command.

Return Format

The query returns 0 or 1.

Example

:LAN:MANual ON

The query returns 1.

:LAN:INITiate

Syntax

:LAN:INITiate

Description

Initialize the network parameters. Before using this command, make sure that the oscilloscope has been connected to the network correctly.

:LAN:IPADdress

Syntax

:LAN:IPADdress <string>

:LAN:IPADdress?

Description

Set the IP address of the instrument.

Query the current IP address of the instrument.

Parameter

Name	Type	Range	Default
<string>	ASCII character string	nnn,nnn,nnn,nnn	--

Explanation

When setting the <string>, the range of the first nnn is from 0 to 223 (except 127) and the ranges of the other three nnn are from 0 to 255.

When using this command, the IP configuration mode should be Static IP mode (refer to the :LAN:MANual command) and DHCP and Auto IP are disabled.

Return Format

The query returns the current IP address in character string.

Example

:LAN:IPADdress 172,16,3,119

The query returns 172.16.3.119.

:LAN:SMASk

Syntax

:LAN:SMASk <string>

:LAN:SMASk?

Description

Distribute a subnet mask for the instrument.

Query the current subnet mask of the instrument.

Parameter

Name	Type	Range	Default
<string>	ASCII character string	nnn,nnn,nnn,nnn	--

Explanation

When setting the <string>, the range of the nnn is from 0 to 255.

When using this command, the IP configuration mode should be Static IP (refer to the :LAN:MANual command) and the DHCP and Auto IP are disabled.

Return Format

The query returns the current subnet mask in character string.

Example

:LAN:SMASk 255,255,255,0

The query returns 255.255.255.0.

:LAN:STATus?

Syntax

:LAN:STATus?

Description

Query the current status of the network configuration.

Return Format

The query returns UNLINK, INIT, IPCONFLICT, CONFIGURED or DHCPFAILED.

:LAN:VISA?

Syntax

:LAN:VISA?

Description

Query the VISA address of the instrument.

Return Format

The query returns the VISA address in character string.

Example

:LAN:VISA?

The query returns TCPIP::172.16.3.119::INSTR.

:LAN:APPLy

Syntax

:LAN:APPLy

Description

Apply the network configuration.

:MASK Subsystem

:MASK:ENABle

Syntax

:MASK:ENABle <bool>

:MASK:ENABle?

Description

Enable or disable the pass/fail test function.

Query the current status of the pass/fail test function.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:MASK:ENABle ON

The query returns 1.

:MASK:SOURce

Syntax

:MASK:SOURce <source>

:MASK:SOURce?

Description

Select the measurement source of the pass/fail test.

Query the current measurement source of the pass/fail test.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Note: this command can only be used to set the channel enabled.

Return Format

The query returns CHAN1 or CHAN2.

Example

:MASK:SOURce CHANnel2

The query returns CHAN2.

:MASK:OPERate

Syntax

:MASK:OPERate <oper>

:MASK:OPERate?

Description

Set the operation of the pass/fail test to run or stop.

Query the current operation status of the pass/fail test.

Parameter

Name	Type	Range	Default
<oper>	Discrete	{RUN|STOP}	STOP

Explanation

Before executing this command, use the :MASK:ENABle command to enable the pass/fail test.

Return Format

The query returns RUN or STOP.

Example

:MASK:OPERate RUN

The query returns RUN.

:MASK:MDISplay

Syntax

:MASK:MDISplay <bool>

:MASK:MDISplay?

Description

When the pass/fail test is enabled, enable or disable the message display.

Query the current status of the message display.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Explanation

To enable the message display, first use the :MASK:ENABle command to enable the pass/fail test.

Return Format

The query returns 0 or 1.

Example

:MASK:MDISplay ON

The query returns 1.

:MASK:SOOutput

Syntax

:MASK:SOOutput <bool>
:MASK:SOOutput?

Description

Enable or disable the Stop On Outp.
Query the current status of the Stop On Outp.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Explanation

On: when failed waveform is detected, the oscilloscope stops the test and enters the "STOP" state. At this point, the results of the test remain the same on the screen (if display is enabled) and only one pulse is output from the **[Trigger Out]** (if enabled) at the rear panel.
Off: the oscilloscope continues with the test even when failed waveform is detected. The test results on the screen will update continuously and a pulse is output from **[Trigger Out]** at the rear panel each time a failed waveform is detected.

Return Format

The query returns 0 or 1.

Example

:MASK:SOOutput ON
The query returns 1.

:MASK:OUTPut

Syntax

:MASK:OUTPut <type>

:MASK:OUTPut?

Description

Set the output mode when the test fails.

Query the current output mode when the test fails.

Parameter

Name	Type	Range	Default
<type>	Discrete	{FAIL|FSOund}	FAIL

Explanation

FAIL: there are display and output when failed waveform is detected but the beeper does not sound.

FSOund: there are display and output when failed waveform is detected and the beeper sounds at the same time (not related to the on/off of the sound).

Return Format

The query returns FAIL or FSO.

Example

:MASK:OUTPut FAIL

The query returns FAIL.

:MASK:X

Syntax

:MASK:X <x>

:MASK:X?

Description

Set the horizontal adjustment parameter of the pass/fail test mask.

Query the current horizontal adjustment parameter of the pass/fail test mask.

Parameter

Name	Type	Range	Default
<x>	Real	0.02 to 4	0.24

Note: the step is 0.02 within the value range.

Return Format

The query returns the current horizontal adjustment parameter in scientific notation.

Example

:MASK:X 0.28

The query returns 2.800000e-01.

:MASK:Y

Syntax

:MASK:Y <y>

:MASK:Y?

Description

Set the vertical adjustment parameter of the pass/fail test mask.

Query the current vertical adjustment parameter of the pass/fail test mask.

Parameter

Name	Type	Range	Default
<y>	Real	0.03 to 4	0.38

Note: the step is 0.04 within the value range.

Return Format

The query returns the current vertical adjustment parameter in scientific notation.

Example

:MASK:Y 0.50

The query returns 5.000000e-01.

:MASK:CREate

Syntax

:MASK:CREate

Description

Create the mask of the pass/fail test using the horizontal adjustment parameter and the vertical adjustment parameter currently set.

Explanation

For the setting of the horizontal adjustment parameter, refer to the :MASK:X command.

For the setting of the vertical adjustment parameter, refer to the :MASK:Y command.

:MASK:PASSed?

Syntax

:MASK:PASSed?

Description

Query the number of frames that pass the pass/fail test.

Return Format

The query returns an integer.

:MASK:FAILed?

Syntax

:MASK:FAILed?

Description

Query the number of failed frames in the pass/fail test.

Return Format

The query returns an integer.

:MASK:TOTal?

Syntax

:MASK:TOTal?

Description

Query the total number of frames of the pass/fail test.

Return Format

The query returns an integer.

Example

:MASK:TOTal?

The query returns 810.

:MASK:RESet

Syntax

:MASK:RESet

Description

Reset the number of the passed frames, the number of failed frames and the total number of frames.

Explanation

To query the number of passed frames, refer to the :MASK:PASSed? command.
To query the number of failed frames, refer to the :MASK:FAILed? command.
To query the total number of frames of the test, refer to the :MASK:TOTal? command.

:MASK:DATA

Syntax

:MASK:DATA <mask>
:MASK:DATA?

Description

Send or read the mask of the pass/fail test. <mask> is binary data block.

Explanation

When sending the command, directly place the data stream behind the command string to finish the sending in one operation.
When reading (:MASK:DATA?), the data read consists of two parts (the TMC data description header and the MASK data). The format of the TMC data description header is #NXXXXXX; wherein, # is the denoter, N is less than or equal to 9 and the N figures following it denotes the length of the data stream in bytes. For example, #9000001408; wherein, N is 9 and 000001408 denotes that the data strem contains 1408 bytes of effective data. The MASK data is denoted in ASCII format.
Make sure that the buffer is large enough to receive the data stream, otherwise the program might be abnormal during the reading.

:MEASure Subsystem

- :MEASure:VAVG?
- :MEASure:VBASe?
- :MEASure:VMAX?
- :MEASure:VMIN?
- :MEASure:VPP?
- :MEASure:VRMS?
- :MEASure:VTOP?

Note: the command will enable the corresponding measurement item automatically.

:MEASure:SOURce

Syntax

:MEASure:SOURce <sour>

:MEASure:SOURce?

Description

Select the signal source of the current measurement parameter.

Query the signal source of the current measurement parameter.

Parameter

Name	Type	Range	Default
<sour>	Discrete	{CHANnel1|CHANnel2|MATH}	CHANnel1

Return Format

The query returns CHAN1, CHAN2 or MATH.

Example

:MEASure:SOURce CHANnel2

The query returns CHAN2.

:MEASure:COUNter:SOURce

Syntax

:MEASure:COUNter:SOURce <sour>

:MEASure:COUNter:SOURce?

Description

Set the measurement source of the frequency counter or disable the frequency counter measurement.

Query the current measurement source of the frequency counter.

Parameter

Name	Type	Range	Default
<sour>	Discrete	{CHANnel1|CHANnel2|OFF}	OFF

Return Format

The query returns CHAN1, CHAN2 or OFF.

Example

:MEASure:COUNter:SOURce CHANnel2

The query returns CHAN2.

:MEASure:COUNter:VALue?

Syntax

:MEASure:COUNter:VALue?

Description

Query the measuremenmt result (frequency value, the unit is Hz) of the frequency counter.

Explanation

Before using this command, enable the frequency counter (refer to the MEASure:COUNter:SOURce command).

Return Format

The query returns the current measurement value in scientific notation.

Example

:MEASure:COUNter:VALue?

The query returns 1.000004e+03.

:MEASure:CLEar

Syntax

:MEASure:CLEar <item>

Description

Clear any or all of the five measurement items that are enabled first.

Parameter

Name	Type	Range	Default
<item>	Discrete	{ITEM1|ITEM2|ITEM3|ITEM4|ITEM5|ALL}	--

Explanation

The five parameters ahead are derermined according to the order in which they are enabled and they will not change as you delete one or more measurement items. You can also use the :MEASure:RECover command to recover one or more measurement items that you have cleared.

:MEASure:RECover

Syntax

:MEASure:RECover <item>

Description

Recover the measurement items that have been cleared.

Parameter

Name	Type	Range	Default
<item>	Discrete	{ITEM1|ITEM2|ITEM3|ITEM4|ITEM5|ALL}	--

Explanation

The five parameters ahead are derermined according to the order in which they are enabled and they will not change as you clear one or more measurement items.

You can also use the :MEASure:CLEar command to clear one or more measurement items that you have recovered.

:MEASure:ADISplay

Syntax

:MEASure:ADISplay <bool>
:MEASure:ADISplay?

Description

Enable or disable all measurement.
Query the current status of all measurement.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Explanation

All measurement can measure all the time and voltage parameters of the current measurement source. Each measurement source has 20 kinds of measurement parameters and you can measure the three measurement sources (CH1, CH2 and MATH) at the same time.

10 kinds of voltage measurement items: maximum, minimum, peak-peak, top, bottom, amplitude, average, RMS, overshoot and preshoot.
8 kinds of time measurement items: period, frequency, rise time, fall time, positive pulse width, negative pulse width, positive duty cycle and negative duty cycle.
2 kinds of other measurement items: area and period area.

Return Format

The query returns 0 or 1.

Example

:MEASure:ADISplay ON
The query returns 1.

:MEASure:AMSource

Syntax

:MEASure:AMSource <chan>[,<chan>]

:MEASure:AMSource?

Description

Select the signal source of all measurement parameters.

Query the current signal source of all measurement.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2|MATH}	CHANnel1

Return Format

The query returns CHAN1, CHAN2 or MATH.

Example

:MEASure:AMSource CHANnel1,CHANnel2

The query returns CHAN1,CHAN2.

:MEASure:STATistic:DISPlay

Syntax

:MEASure:STATistic:DISPlay <bool>
:MEASure:STATistic:DISPlay?

Description

Enable or disable the statistic function.
The query returns the current status of the statistic function.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Explanation

When the statistic function is enabled, the system will make statistics and display the current value, average, minimum (or standard deviation) and maximum (or count) of at most five measurement items that are enabled last.

Return Format

The query returns 0 or 1.

Example

:MEASure:STATistic:DISPlay ON
The query returns 1.

:MEASure:STATistic:MODE

Syntax

:MEASure:STATistic:MODE <mode>

:MEASure:STATistic:MODE?

Description

Set the statistic selection to Extremum or Difference.

Query the current statistic selection type.

Parameter

Name	Type	Range	Default
<mode>	Discrete	{DIFFerence|EXTRemum}	EXTRemum

Explanation

When “Extremum” is selected, minimum and maximum values are displayed. When “Difference” is selected, standard deviation and count values are displayed.

Before using thoes command, enable the statistic function (refer to the :MEASure:STATistic:DISPlay command).

Return Format

The query returns DIFF or EXTR.

Example

:MEASure:STATistic:MODE EXTRemum

The query returns EXTR.

:MEASure:STATistic:RESet

Syntax

:MEASure:STATistic:RESet

Description

Clear the history statistic data and make statistic again.

:MEASure:SETup:TYPE

Syntax

:MEASure:SETup:TYPE <type>
:MEASure:SETup:TYPE?

Description

Set the type of measurement setting to phase, delay or threshold.
Query the type of current measurement setting.

Parameter

Name	Type	Range	Default
<type>	Discrete	{DELay|PHASe|THReshold}	DELay

Return Format

The query returns DEL, PHAS or THR.

Example

:MEASure:SETup:TYPE PHASe
The query returns PHAS.

:MEASure:SETup:MAX

Syntax

:MEASure:SETup:MAX <value>
:MEASure:SETup:MAX?

Description

Set the upper limit of threshold measurement and the unit is %.
Query the current upper limit of threshold measurement.

Parameter

Name	Type	Range	Default
<value>	Integer	7 to 95	90

Explanation

The threshold is the vertical level (in percentage) being measured in the analog channel. Setting the threshold will affect all the time, delay and phase parameters. You can also use the :MEASure:SETup:TYPE command to select the threshold measurement setting.

Return Format

The query returns an integer between 7 and 95.

Example

:MEASure:SETup:MAX 95
The query returns 95.

:MEASure:SETup:MID

Syntax

:MEASure:SETup:MID <value>
:MEASure:SETup:MID?

Description

Set the middle value of threshold measurement and the unit is %.
Query the current middle value of threshold measurement.

Parameter

Name	Type	Range	Default
<value>	Integer	6 to 94	50

Explanation

The threshold is the vertical level (in percentage) being measured in the analog channel. Setting the threshold will affect all the time, delay and phase measurement parameters.
You can use the :MEASure:SETup:TYPE command to select the threshold measurement setting.
The middle value set must be lower than the upper limit currently set (refer to the MEASure:SETup:MAX command) and greater than the lower limit currently set (refer to the MEASure:SETup:MIN command).

Return Format

The query returns an integer between 6 and 94.

Example

:MEASure:SETup:MID 94
The query returns 94.

:MEASure:SETup:MIN

Syntax

:MEASure:SETup:MIN <value>

:MEASure:SETup:MIN?

Description

Set the lower limit of threshold measurement and the unit is %.

Query the current lower limit of threshold measurement.

Parameter

Name	Type	Range	Default
<value>	Integer	5 to 93	10

Explanation

The threshold is the vertical level (in percentage) being measured in the analog channel. Setting the threshold will affect all the time, delay and phase parameters. You can also use the :MEASure:SETup:TYPE command to select the threshold measurement setting.

Return Format

The query returns an integer.

Example

:MEASure:SETup:MIN 93

The query returns 93.

:MEASure:AREA

Syntax

:MEASure:AREA <area>

:MEASure:AREA?

Description

Set the measurement range to the screen region or the cursor region.

Query the current type of the measurement range.

Parameter

Name	Type	Range	Default
<area>	Discrete	{SCReen|CREGion}	SCReen

Explanation

SCReen: waveforms within the screen region.

CREGion: region specified by cursor A (refer to the :MEASure:CREGion:CAX command) and cursor B (refer to the :MEASure:CREGion:CBX command).

Return Format

The query returns SCR or CREG.

Example

:MEASure:AREA CREGion

The query returns CREG.

:MEASure:CREGion:CAX

Syntax

:MEASure:CREGion:CAX <val>

:MEASure:CREGion:CAX?

Description

When the measurement range is set to the cursor region, use this command to set the position of cursor A.

Query the current position of cursor A.

Parameter

Name	Type	Range	Default
<val>	Integer	0 to (the current position of cursor B - 6)	300

Explanation

You can use the MEASure:AREA command to set the measurement range to the cursor region.

For the position of cursor B, refer to the :MEASure:CREGion:CBX command.

Return Format

The query returns an integer.

Example

:MEASure:CREGion:CAX 20

The query returns 20.

:MEASure:CREGion:CBX

Syntax

:MEASure:CREGion:CBX <val>

:MEASure:CREGion:CBX?

Description

When the measurement range is set to the cursor region, use this command to set the position of cursor B.

Query the current position of cursor B.

Parameter

Name	Type	Range	Default
<val>	Integer	(The current position of cursor A + 6) to 697	400

Explanation

You can use the MEASure:AREA command to set the measurement range to the cursor region.

For the position of cursor A, refer to the :MEASure:CREGion:CAX command.

Return Format

The query returns an integer.

Example

:MEASure:CREGion:CBX 600

The query returns 600.

:MEASure:HISTory:DISPlay

Syntax

:MEASure:HISTory:DISPlay <bool>

:MEASure:HISTory:DISPlay?

Description

Enable or disable the measurement history.

Query the current status of the measurement history.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:MEASure:HISTory:DISPlay ON

The query returns 1.

:MEASure:HISTory:DMODe

Syntax

:MEASure:HISTory:DMODe <mod>
:MEASure:HISTory:DMODe?

Description

Set the display mode of the history measurement data to table or graph.
Query the current display mode of the history measurement data.

Parameter

Name	Type	Range	Default
<mod>	Discrete	{TABLe|GRAPh}	GRAPh

Explanation

Before using this command, enable the measurement history (refer to the :MEASure:HISTory:DISPlay command).
TABLe: display the measurement results of the last 10 measurements of at most 5 measurement items that are enabled last in table mode.
GRAPh: display the measurement results of the last 10 measurements of at most 5 measurement items that are enabled last in graph mode. The measurement points are connected using linear interpolation.

Return Format

The query returns TABL or GRAP.

Example

:MEASure:HISTory:DMODe TABLe
The query returns TABL.

:MEASure:FDELay?

Syntax

:MEASure:FDELay? <chanA>,<chanB>

Description

Query the measurement result of the delay between channels (relative to the falling edge) and the unit is s.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FDELay? CHANnel1,CHANnel2

The query returns 2.800000e-04.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the delay measurement (relative to the falling edge) results. Sending the following commands will enable the statistic function automatically.

- :MEASure:FDELay:SMAXimum?
- :MEASure:FDELay:SMINimum?
- :MEASure:FDELay:SCURrent?
- :MEASure:FDELay:SAVerage?
- :MEASure:FDELay:SDEViation?

:MEASure:FDELay:SMAXimum?

Syntax

:MEASure:FDELay:SMAXimum? <chanA>,<chanB>

Description

Query the statistic maximum of the measurement results of the delay between channels (relative to the falling edge) and the unit is s.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FDELay:SMAXimum? CHANnel1,CHANnel2

The query returns 9.200000e-05.

:MEASure:FDELay:SMINimum?

Syntax

:MEASure:FDELay:SMINimum? <chanA>,<chanB>

Description

Query the statistic minimum of the measurement results of the delay between channels (relative to the falling edge) and the unit is s.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FDELay:SMINimum? CHANnel1,CHANnel2

The query returns 8.400000e-05.

:MEASure:FDELay:SCURrent?

Syntax

:MEASure:FDELay:SCURrent? <chanA>,<chanB>

Description

Query the statistic current value of the measurement results of the delay between channels (relative to the falling edge) and the unit is s.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FDELay:SCURrent? CHANnel1,CHANnel2

The query returns 8.400000e-05.

:MEASure:FDELay:SAVerage?

Syntax

:MEASure:FDELay:SAVerage? <chanA>,<chanB>

Description

Query the statistic average of the measurement results of the delay between channels (relative to the falling edge) and the unit is s.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FDELay:SAVerage? CHANnel1,CHANnel2

The query returns 8.400000e-05.

:MEASure:FDELay:SDEViation?

Syntax

:MEASure:FDELay:SDEViation? <chanA>,<chanB>

Description

Query the statistic standard deviation of the measurement results of the delay between channels (relative to the falling edge) and the unit is s.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FDELay:SDEViation? CHANnel1,CHANnel2

The query returns 5.351000e-06.

:MEASure:FPHase?

Syntax

:MEASure:FPHase? <chanA>,<chanB>

Description

Query the measurement result of the phase deviation between channels (relative to the falling edge) and the unit is °.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FPHase? CHANnel1,CHANnel2

The query returns 1.800000e+02.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the phase deviation measurement (relative to the falling edge) results. Sending the following commands will enable the statistic function automatically.

- :MEASure:FPHase:SMAXimum?
- :MEASure:FPHase:SMINimum?
- :MEASure:FPHase:SCURrent?
- :MEASure:FPHase:SAVerage?
- :MEASure:FPHase:SDEViation?

:MEASure:FPHase:SMAXimum?

Syntax

:MEASure:FPHase:SMAXimum? <chanA>,<chanB>

Description

Query the statistic maximum of the measurement results of the phase deviation between channels (relative to the falling edge) and the unit is °.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FPHase:SMAXimum? CHANnel1,CHANnel2

The query returns 1.800000e+02.

:MEASure:FPHase:SMINimum?

Syntax

:MEASure:FPHase:SMINimum? <chanA>,<chanB>

Description

Query the statistic minimum of the measurement results of the phase deviation between channels (relative to the falling edge) and the unit is °.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FPHase:SMINimum? CHANnel1,CHANnel2

The query returns -1.792829e+02.

:MEASure:FPHase:SCURrent?

Syntax

:MEASure:FPHase:SCURrent? <chanA>,<chanB>

Description

Query the statistic current value of the measurement results of the phase deviation between channels (relative to the falling edge) and the unit is °.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FPHase:SCURrent? CHANnel1,CHANnel2

The query returns 1.771200e+02.

:MEASure:FPHase:SAVerage?

Syntax

:MEASure:FPHase:SAVerage? <chanA>,<chanB>

Description

Query the statistic average of the measurement results of the phase deviation between channels (relative to the falling edge) and the unit is °.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FPHase:SAVerage? CHANnel1,CHANnel2

The query returns 4.138179e+01.

:MEASure:FPHase:SDEViation?

Syntax

:MEASure:FPHase:SDEViation? <chanA>,<chanB>

Description

Query the statistic standard deviation of the measurement results of the phase deviation between channels (relative to the falling edge) and the unit is °.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FPHase:SDEViation? CHANnel1,CHANnel2

The query returns 4.719000e+00.

:MEASure:FREQuency?

Syntax

:MEASure:FREQuency? <chan>

Description

Query the frequency measurement value of the selected waveform and the unit is Hz.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FREQuency? CHANnel1
The query returns 9.999999e+02.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the frequency measurement values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:FREQuency:SMAXimum?
- :MEASure:FREQuency:SMINimum?
- :MEASure:FREQuency:SCURrent?
- :MEASure:FREQuency:SAVerage?
- :MEASure:FREQuence:SDEViation?

:MEASure:FREQuency:SMAXimum?

Syntax

:MEASure:FREQuency:SMAXimum? <chan>

Description

Query the statistic maximum of the frequency measurement of the selected waveform and the unit is Hz.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FREQuency:SMAXimum? CHANnel1

The query returns 1.012146e+03.

:MEASure:FREQuency:SMINimum?

Syntax

:MEASure:FREQuency:SMINimum? <chan>

Description

Query the statistic minimum of the frequency measurement of the selected waveform and the unit is Hz.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FREQuency:SMINimum? CHANnel1

The query returns 9.842519e+02.

:MEASure:FREQuency:SCURrent?

Syntax

:MEASure:FREQuency:SCURrent? <chan>

Description

Query the statistic current value of the frequency measurement of the selected waveform and the unit is Hz.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FREQuency:SCURrent? CHANnel1

The query returns 9.999999e+02.

:MEASure:FREQuency:SAVerage?

Syntax

:MEASure:FREQuency:SAVerage? <chan>

Description

Query the statistic average of the frequency measurement of the selected waveform and the unit is Hz.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FREQuency:SAVerage? CHANnel1

The query returns 1.000251e+03.

:MEASure:FREQuency:SDEViation?

Syntax

:MEASure:FREQuency:SDEViation? <chan>

Description

Query the statistic standard deviation of the frequency measurement of the selected waveform and the unit is Hz.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FREQuency:SDEViation? CHANnel1

The query returns 4.222331e+00.

:MEASure:FTIMe?

Syntax

:MEASure:FTIMe? <chan>

Description

Query the measurement value of the fall time of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FTIMe? CHANnel1
The query returns 3.080000e-04.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the fall time measurement values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:FTIMe:SMAXimum?
- :MEASure:FTIMe:SMINimum?
- :MEASure:FTIMe:SCURrent?
- :MEASure:FTIMe:SAVerage?
- :MEASure:FTIMe:SDEViation?

:MEASure:FTIMe:SMAXimum?

Syntax

:MEASure:FTIMe:SMAXimum? <chan>

Description

Query the statistic maximum of the fall time measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHAnnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FTIMe:SMAXimum? CHANnel1

The query returns 3.160000e-04.

:MEASure:FTIMe:SMINimum?

Syntax

:MEASure:FTIMe:SMINimum? <chan>

Description

Query the statistic maximum of the fall time measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHAnnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FTIMe:SMINimum? CHANnel1

The query returns 2.720000e-04.

:MEASure:FTIMe:SCURrent?

Syntax

:MEASure:FTIMe:SCURrent? <chan>

Description

Query the statistic current value of the fall time measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHAnnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FTIMe:SCURrent? CHANnel1

The query returns 3.000000e-04.

:MEASure:FTIMe:SAVerage?

Syntax

:MEASure:FTIMe:SAVerage? <chan>

Description

Query the statistic average of the fall time measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHAnnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FTIMe:SAVerage? CHANnel1

The query returns 2.951760e-04.

:MEASure:FTIMe:SDEViation?

Syntax

:MEASure:FTIMe:SDEViation? <chan>

Description

Query the statistic standard deviation of the fall time measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHAnnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:FTIMe:SDEViation? CHANnel1

The query returns 1.347744e-05.

:MEASure:NDUTy?

Syntax

:MEASure:NDUTy? <chan>

Description

Query the measurement value of the negative duty cycle of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:NDUTy? CHANnel1

The query returns 5.000000e-01.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the negative duty cycle measurement values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:NDUTy:SMAXimum?
- :MEASure:NDUTy:SMINimum?
- :MEASure:NDUTy:SCURrent?
- :MEASure:NDUTy:SAVerage?
- :MEASure:NDUTy:SDEViation?

:MEASure:NDUTy:SMAXimum?

Syntax

:MEASure:NDUTy:SMAXimum? <chan>

Description

Query the statistic maximum of the negative duty cycle measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:NDUTy:SMAXimum? CHANnel1

The query returns 5.060241e-01.

:MEASure:NDUTy:SMINimum?

Syntax

:MEASure:NDUTy:SMINimum? <chan>

Description

Query the statistic minimum of the negative duty cycle measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:NDUTy:SMINimum? CHANnel1

The query returns 4.979919e-01.

:MEASure:NDUTy:CURrent?

Syntax

:MEASure:NDUTy:SCURrent? <chan>

Description

Query the statistic current value of the negative duty cycle measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:NDUTy:SCURrent? CHANnel1

The query returns 5.000000e-01.

:MEASure:NDUTy:SAVerage?

Syntax

:MEASure:NDUTy:SAVerage? <chan>

Description

Query the statistic average of the negative duty cycle measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:NDUTy:SAVerage? CHANnel1

The query returns 5.003887e-01.

:MEASure:NDUTy:SDEViation?

Syntax

:MEASure:NDUTy:SDEViation? <chan>

Description

Query the statistic standard deviation of the negative duty cycle measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:NDUTy:SDEViation? CHANnel1

The query returns 1.771634e-03.

:MEASure:NWIDth?

Syntax

:MEASure:NWIDth? <chan>

Description

Query the measurement value of the negative pulse width of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:NWIDth? CHANnel1
The query returns 5.000000e-04.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the negative pulse width measurement values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:NWIDth:SMAXimum?
- :MEASure:NWIDth:SMINimum?
- :MEASure:NWIDth:SCURrent?
- :MEASure:NWIDth:SAVerage?
- :MEASure:NWIDth:SDEViation?

:MEASure:NWIDth:SMAXimum?

Syntax

:MEASure:NWIDth:SMAXimum? <chan>

Description

Query the statistic maximum of the negative pulse width measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:NWIDth:SMAXimum? CHANnel1

The query returns 5.040000e-04.

:MEASure:NWIDth:SMINimum?

Syntax

:MEASure:NWIDth:SMAXimum? <chan>

Description

Query the statistic minimum of the negative pulse width measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:NWIDth:SMINimum? CHANnel1

The query returns 4.960000e-04.

:MEASure:NWIDth:SCURrent?

Syntax

:MEASure:NWIDth:SCURrent? <chan>

Description

Query the statistic current value of the negative pulse width measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:NWIDth:SCURrent? CHANnel1

The query returns 5.000000e-04.

:MEASure:NWIDth:SAVerage?

Syntax

:MEASure:NWIDth:SAVerage? <chan>

Description

Query the statistic average of the negative pulse width measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:NWIDth:SAVerage? CHANnel1

The query returns 5.003581e-04.

:MEASure:NWIDth:SDEViation?

Syntax

:MEASure:NWIDth:SDEViation? <chan>

Description

Query the statistic standard deviation of the negative pulse width measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:NWIDth:SDEViation? CHANnel1

The query returns 1.960044e-06.

:MEASure:OVERshoot?

Syntax

:MEASure:OVERshoot? <chan>

Description

Query the measurement value of the overshoot of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:OVERshoot? CHANnel1

The query returns 9.803922e-03.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the overshoot measurement values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:OVERshoot:SMAXimum?
- :MEASure:OVERshoot:SMINimum?
- :MEASure:OVERshoot:SCURrent?
- :MEASure:OVERshoot:SAVerage?
- :MEASure:OVERshoot:SDEViation?

:MEASure:OVERshoot:SMAXimum?

Syntax

:MEASure:OVERshoot:SMAXimum? <chan>

Description

Query the statistic maximum of the overshoot measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:OVERshoot:SMAXimum? CHANnel1

The query returns 2.000000e-02.

:MEASure:OVERshoot:SMINimum?

Syntax

:MEASure:OVERshoot:SMINimum? <chan>

Description

Query the statistic minimum of the overshoot measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:OVERshoot:SMINimum? CHANnel1

The query returns 9.803922e-03.

:MEASure:OVERshoot:SCURrent?

Syntax

:MEASure:OVERshoot:SCURrent? <chan>

Description

Query the statistic current value of the overshoot measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:OVERshoot:SCURrent? CHANnel1

The query returns 9.803922e-03.

:MEASure:OVERshoot:SAVerage?

Syntax

:MEASure:OVERshoot:SAVerage? <chan>

Description

Query the statistic average of the overshoot measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:OVERshoot:SAVerage? CHANnel1

The query returns 1.013721e-02.

:MEASure:OVERshoot:SDEViation?

Syntax

:MEASure:OVERshoot:SDEViation? <chan>

Description

Query the statistic standard deviation of the overshoot measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:OVERshoot:SDEViation? CHANnel1

The query returns 1.855691e-03.

:MEASure:PDUTy?

Syntax

:MEASure:PDUTy? <chan>

Description

Query the measurement value of the positive duty cycle of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PDUTy? CHANnel1

The query returns 5.000000e-01.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the positive duty cycle measurement values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:PDUTy:SMAXimum?
- :MEASure:PDUTy:SMINimum?
- :MEASure:PDUTy:SCURrent?
- :MEASure:PDUTy:SAVerage?
- :MEASure:PDUTy:SDEViation?

:MEASure:PDUTy:SMAXimum?

Syntax

:MEASure:PDUTy:SMAXimum? <chan>

Description

Query the statistic maximum of the positive duty cycle measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PDUTy:SMAXimum? CHANnel1

The query returns 5.080000e-01.

:MEASure:PDUTy:SMINimum?

Syntax

:MEASure:PDUTy:SMINimum? <chan>

Description

Query the statistic minimum of the positive duty cycle measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PDUTy:SMINimum? CHANnel1

The query returns 4.758065e-01.

:MEASure:PDUTy:SCURrent?

Syntax

:MEASure:PDUTy:SCURrent? <chan>

Description

Query the statistic current value of the positive duty cycle measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PDUTy:SCURrent? CHANnel1

The query returns 4.898786e-01.

:MEASure:PDUTy:SAVerage?

Syntax

:MEASure:PDUTy:SAVerage? <chan>

Description

Query the statistic average of the positive duty cycle measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PDUTy:SAVerage? CHANnel1

The query returns 4.968382e-01.

:MEASure:PDUTy:SDEViation?

Syntax

:MEASure:PDUTy:SDEViation? <chan>

Description

Query the statistic standard deviation of the positive duty cycle measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PDUTy:SDEViation? CHANnel1

The query returns 8.351262e-03.

:MEASure:PERiod?

Syntax

:MEASure:PERiod? <chan>

Description

Query the measurement value of the period of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PERiod? CHANnel1
The query returns 1.004000e-03.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the period measurement values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:PERiod:SMAXimum?
- :MEASure:PERiod:SMINimum?
- :MEASure:PERiod:SCURrent?
- :MEASure:PERiod:SAVerage?
- :MEASure:PERiod:SDEViation?

:MEASure:PERiod:SMAXimum?

Syntax

:MEASure:PERiod:SMAXimum? <chan>

Description

Query the statistic maximum of the period measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PERiod:SMAXimum? CHANnel1

The query returns 1.012000e-03.

:MEASure:PERiod:SMINimum?

Syntax

:MEASure:PERiod:SMINimum? <chan>

Description

Query the statistic minimum of the period measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PERiod:SMINimum? CHANnel1

The query returns 9.840000e-04.

:MEASure:PERiod:SCURrent?

Syntax

:MEASure:PERiod:SCURrent? <chan>

Description

Query the statistic current value of the period measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PERiod:SCURrent? CHANnel1

The query returns 1.000000e-03.

:MEASure:PERiod:SAVerage?

Syntax

:MEASure:PERiod:SAVerage? <chan>

Description

Query the statistic average of the period measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PERiod:SAVerage? CHANnel1

The query returns 9.999089e-04.

:MEASure:PERiod:SDEViation?

Syntax

:MEASure:PERiod:SDEViation? <chan>

Description

Query the statistic standard deviation of the period measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PERiod:SDEViation? CHANnel1

The query returns 6.138527e-06.

:MEASure:PREShoot?

Syntax

:MEASure:PREShoot? <chan>

Description

Query the measurement value of the preshoot of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PREShoot? CHANnel1

The query returns 4.255319e-02.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the preshoot measurement values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:PREShoot:SMAXimum?
- :MEASure:PREShoot:SMINimum?
- :MEASure:PREShoot:SCURrent?
- :MEASure:PREShoot:SAVerage?
- :MEASure:PREShoot:SDEViation?

:MEASure:PREShoot:SMAXimum?

Syntax

:MEASure:PREShoot:SMAXimum? <chan>

Description

Query the statistic maximum of the preshoot measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PREShoot:SMAXimum? CHANnel1

The query returns 6.382979e-02.

:MEASure:PREShoot:SMINimum?

Syntax

:MEASure:PREShoot:SMINimum? <chan>

Description

Query the statistic minimum of the preshoot measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PREShoot:SMINimum? CHANnel1

The query returns 6.382979e-02.

:MEASure:PREShoot:SCURrent?

Syntax

:MEASure:PREShoot:SCURrent? <chan>

Description

Query the statistic current value of the preshoot measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PREShoot:SCURrent? CHANnel1

The query returns 4.255319e-02.

:MEASure:PREShoot:SAVerage?

Syntax

:MEASure:PREShoot:SAVerage? <chan>

Description

Query the statistic average of the preshoot measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PREShoot:SAVerage? CHANnel1

The query returns 4.390216e-02.

:MEASure:PREShoot:SDEViation?

Syntax

:MEASure:PREShoot:SDEViation? <chan>

Description

Query the statistic standard deviation of the preshoot measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PREShoot:SDEViation? CHANnel1

The query returns 5.489243e-03.

:MEASure:PWIDth?

Syntax

:MEASure:PWIDth? <chan>

Description

Query the measurement value of the positive pulse width of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PWIDth? CHANnel1
The query returns 4.800000e-04.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the positive pulse width measurement values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:PWIDth:SMAXimum?
- :MEASure:PWIDth:SMINimum?
- :MEASure:PWIDth:SCURrent?
- :MEASure:PWIDth:SAVerage?
- :MEASure:PWIDth:SDEViation?

:MEASure:PWIDth:SMAXimum?

Syntax

:MEASure:PWIDth:SMAXimum? <chan>

Description

Query the statistic maximum of the positive pulse width measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PWIDth:SMAXimum? CHANnel1

The query returns 4.920000e-04.

:MEASure:PWIDth:SMINimum?

Syntax

:MEASure:PWIDth:SMINimum? <chan>

Description

Query the statistic minimum of the positive pulse width measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PWIDth:SMINimum? CHANnel1

The query returns 4.720000e-04.

:MEASure:PWIDth:SCURrent?

Syntax

:MEASure:PWIDth:SCURrent? <chan>

Description

Query the statistic current value of the positive pulse width measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PWIDth:SCURrent? CHANnel1

The query returns 5.000000e-04.

:MEASure:PWIDth:SAVerage?

Syntax

:MEASure:PWIDth:SAVerage? <chan>

Description

Query the statistic average of the positive pulse width measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PWIDth:SAVerage? CHANnel1

The query returns 4.982125e-04.

:MEASure:PWIDth:SDEViation?

Syntax

:MEASure:PWIDth:SDEViation? <chan>

Description

Query the statistic standard deviation of the positive pulse width measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:PWIDth:SDEViation? CHANnel1

The query returns 8.243160e-06.

:MEASure:RTIMe?

Syntax

:MEASure:RTIMe? <chan>

Description

Query the measurement value of the rise time of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RTIMe? CHANnel1
The query returns 3.080000e-04.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the rise time measurement values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:RTIMe:SMAXimum?
- :MEASure:RTIMe:SMINimum?
- :MEASure:RTIMe:SCURrent?
- :MEASure:RTIMe:SAVerage?
- :MEASure:RTIMe:SDEViation?

:MEASure:RTIMe:SMAXimum?

Syntax

:MEASure:RTIMe:SMAXimum? <chan>

Description

Query the statistic maximum of the rise time measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RTIMe:SMAXimum? CHANnel1

The query returns 3.040000e-04.

:MEASure:RTIMe:SMINimum?

Syntax

:MEASure:RTIMe:SMINimum? <chan>

Description

Query the statistic minimum of the rise time measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RTIMe:SMINimum? CHANnel1

The query returns 2.680000e-04.

:MEASure:RTIMe:SCURrent?

Syntax

:MEASure:RTIMe:SCURrent? <chan>

Description

Query the statistic current value of the rise time measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RTIMe:SCURrent? CHANnel1

The query returns 3.120000e-04.

:MEASure:RTIMe:SAVerage?

Syntax

:MEASure:RTIMe:SAVerage? <chan>

Description

Query the statistic average of the rise time measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RTIMe:SAVerage? CHANnel1

The query returns 3.043005e-04.

:MEASure:RTIMe:SDEViation?

Syntax

:MEASure:RTIMe:SDEViation? <chan>

Description

Query the statistic standard deviation of the rise time measurement of the selected waveform and the unit is s.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RTIMe:SDEViation? CHANnel1

The query returns 9.767748e-06.

:MEASure:RDELay?

Syntax

:MEASure:RDELay? <chanA>,<chanB>

Description

Query the measurement result of the delay between channels (relative to the rising edge) and the unit is s.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RDELay? CHANnel1,CHANnel2

The query returns -4.400000e-04.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the delay measurement (relative to the rising edge) results. Sending the following commands will enable the statistic function automatically.

- :MEASure:RDELay:SMAXimum?
- :MEASure:RDELay:SMINimum?
- :MEASure:RDELay:SCURrent?
- :MEASure:RDELay:SAVerage?
- :MEASure:RDELay:SDEViation?

:MEASure:RDELay:SMAXimum?

Syntax

:MEASure:RDELay:SMAXimum? <chanA>,<chanB>

Description

Query the statistic maximum of the measurement results of the delay between channels (relative to the rising edge) and the unit is s.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RDELay:SMAXimum? CHANnel1,CHANnel2

The query returns -4.160000e-04.

:MEASure:RDELay:SMINimum?

Syntax

:MEASure:RDELay:SMINimum? <chanA>,<chanB>

Description

Query the statistic minimum of the measurement results of the delay between channels (relative to the rising edge) and the unit is s.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RDELay:SMINimum? CHANnel1,CHANnel2

The query returns -4.520000e-04.

:MEASure:RDELay:SCURrent?

Syntax

:MEASure:RDELay:SCURrent? <chanA>,<chanB>

Description

Query the statistic current value of the measurement results of the delay between channels (relative to the rising edge) and the unit is s.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RDELay:SCURrent? CHANnel1,CHANnel2

The query returns -4.320000e-04.

:MEASure:RDELay:SAVerage?

Syntax

:MEASure:RDELay:SAVerage? <chanA>,<chanB>

Description

Query the statistic average of the measurement results of the delay between channels (relative to the rising edge) and the unit is s.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RDELay:SAVerage? CHANnel1,CHANnel2

The query returns -4.273246e-04.

:MEASure:RDELay:SDEViation?

Syntax

:MEASure:RDELay:SDEViation? <chanA>,<chanB>

Description

Query the statistic standard deviation of the measurement results of the delay between channels (relative to the rising edge) and the unit is s.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RDELay:SDEViation? CHANnel1,CHANnel2

The query returns 1.244000e-05.

:MEASure:RPHase?

Syntax

:MEASure:RPHase? <chanA>,<chanB>

Description

Query the measurement result of the phase deviation between channels (relative to the rising edge) and the unit is °.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RPHase? CHANnel1,CHANnel2

The query returns -1.526400e+02.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the phase deviation measurement (relative to the rising edge) results. Sending the following commands will enable the statistic function automatically.

- :MEASure:RPHase:SMAXimum?
- :MEASure:RPHase:SMINimum?
- :MEASure:RPHase:SCURrent?
- :MEASure:RPHase:SAVerage?
- :MEASure:RPHase:SDEViation?

:MEASure:RPHase:SMAXimum?

Syntax

:MEASure:RPHase:SMAXimum? <chanA>,<chanB>

Description

Query the statistic maximum of the measurement results of the phase deviation between channels (relative to the rising edge) and the unit is °.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RPHase:SMAXimum? CHANnel1,CHANnel2

The query returns -1.462948e+02.

:MEASure:RPHase:SMINimum?

Syntax

:MEASure:RPHase:SMINimum? <chanA>,<chanB>

Description

Query the statistic minimum of the measurement results of the phase deviation between channels (relative to the rising edge) and the unit is °.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RPHase:SMINimum? CHANnel1,CHANnel2

The query returns -1.627200e+02.

:MEASure:RPHase:SCURrent?

Syntax

:MEASure:RPHase:SCURrent? <chanA>,<chanB>

Description

Query the statistic current value of the measurement results of the phase deviation between channels (relative to the rising edge) and the unit is °.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RPHase:SCURrent? CHANnel1,CHANnel2

The query returns -1.526400e+02.

:MEASure:RPHase:SAVerage?

Syntax

:MEASure:RPHase:SAVerage? <chanA>,<chanB>

Description

Query the statistic average of the measurement results of the phase deviation between channels (relative to the rising edge) and the unit is °.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RPHase:SAVerage? CHANnel1,CHANnel2

The query returns -1.527491e+02.

:MEASure:RPHase:SDEViation?

Syntax

:MEASure:RPHase:SDEViation? <chanA>,<chanB>

Description

Query the statistic standard deviation of the measurement results of the phase deviation between channels (relative to the rising edge) and the unit is °.

Parameter

Name	Type	Range	Default
<chanA>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<chanB>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:RPHase:SDEViation? CHANnel1,CHANnel2

The query returns 4.858000e+00.

:MEASure:VAMP?

Syntax

:MEASure:VAMP? <chan>

Description

Query the measurement value of the amplitude of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VAMP? CHANnel1

The query returns 3.920000e+00.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the amplitude measurement (relative to the rising edge) values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:VAMP:SMAXimum?
- :MEASure:VAMP:SMINimum?
- :MEASure:VAMP:SCURrent?
- :MEASure:VAMP:SAVerage?
- :MEASure:VAMP:SDEViation?

:MEASure:VAMP:SMAXimum?

Syntax

:MEASure:VAMP:SMAXimum? <chan>

Description

Query the statistic maximum of the amplitude measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VAMP:SMAXimum? CHANnel1

The query returns 4.000000e+00.

:MEASure:VAMP:SMINimum?

Syntax

:MEASure:VAMP:SMINimum? <chan>

Description

Query the statistic minimum of the amplitude measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VAMP:SMINimum? CHANnel1

The query returns 3.760000e+00.

:MEASure:VAMP:SCURrent?

Syntax

:MEASure:VAMP:SCURrent? <chan>

Description

Query the statistic current value of the amplitude measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VAMP:SCURrent? CHANnel1

The query returns 3.920000e+00.

:MEASure:VAMP:SAVerage?

Syntax

:MEASure:VAMP:SAVerage? <chan>

Description

Query the statistic average of the amplitude measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VAMP:SAVerage? CHANnel1

The query returns 3.862639e+00.

:MEASure:VAMP:SDEViation?

Syntax

:MEASure:VAMP:SDEViation? <chan>

Description

Query the statistic standard deviation of the amplitude measurement of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VAMP:SDEViation? CHANnel1

The query returns 7.897453e-02.

:MEASure:VAVG?

Syntax

:MEASure:VAVG? <chan>

Description

Query the average of the amplitude of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VAVG? CHANnel1

The query returns -8.331421e-02.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the amplitude averages of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:VAVG:SMAXimum?
- :MEASure:VAVG:SMINimum?
- :MEASure:VAVG:SCURrent?
- :MEASure:VAVG:SAVerage?
- :MEASure:VAVG:SDEViation?

:MEASure:VAVG:SMAXimum?

Syntax

:MEASure:VAVG:SMAXimum? <chan>

Description

Query the statistic maximum of the amplitude averages of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VAVG:SMAXimum? CHANnel1

The query returns -3.908569e-02.

:MEASure:VAVG:SMINimum?

Syntax

:MEASure:VAVG:SMINimum? <chan>

Description

Query the statistic minimum of the amplitude averages of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VAVG:SMINimum? CHANnel1

The query returns -4.971435e-02.

:MEASure:VAVG:SCURrent?

Syntax

:MEASure:VAVG:SCURrent? <chan>

Description

Query the statistic current value of the amplitude averages of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VAVG:SCURrent? CHANnel1

The query returns -4.057129e-02.

:MEASure:VAVG:SAVerage?

Syntax

:MEASure:VAVG:SAVerage? <chan>

Description

Query the statistic average of the amplitude averages of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VAVG:SAVerage? CHANnel1

The query returns -4.414342e-02.

:MEASure:VAVG:SDEViation?

Syntax

:MEASure:VAVG:SDEViation? <chan>

Description

Query the statistic standard deviation of the amplitude averages of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VAVG:SDEViation? CHANnel1

The query returns 2.315023e-03.

:MEASure:VBASe?

Syntax

:MEASure:VBASe? <chan>

Description

Query the base value of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VBASe? CHANnel1

The query returns -1.840000e+00.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the base values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:VBASe:SMAXimum?
- :MEASure:VBASe:SMINimum?
- :MEASure:VBASe:SCURrent?
- :MEASure:VBASe:SAVerage?
- :MEASure:VBASe:SDEViation?

:MEASure:VBASe:SMAXimum?

Syntax

:MEASure:VBASe:SMAXimum? <chan>

Description

Query the statistic maximum of the base values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VBASe:SMAXimum? CHANnel1

The query returns -1.840000e+00.

:MEASure:VBASe:SMINimum?

Syntax

:MEASure:VBASe:SMINimum? <chan>

Description

Query the statistic minimum of the base values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VBASe:SMINimum? CHANnel1

The query returns -2.080000e+00.

:MEASure:VBASe:SCURrent?

Syntax

:MEASure:VBASe:SCURrent? <chan>

Description

Query the statistic current value of the base values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VBASe:SCURrent? CHANnel1

The query returns -1.840000e+00.

:MEASure:VBASe:SAVerage?

Syntax

:MEASure:VBASe:SAVerage? <chan>

Description

Query the statistic average of the base values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VBASe:SAVerage? CHANnel1

The query returns -1.890865e+00.

:MEASure:VBASe:SDEViation?

Syntax

:MEASure:VBASe:SDEViation? <chan>

Description

Query the statistic standard deviation of the base values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VBASe:SDEViation? CHANnel1

The query returns 9.970691e-02.

:MEASure:VMAX?

Syntax

:MEASure:VMAX? <chan>

Description

Query the maximum of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VMAX? CHANnel1

The query returns 2.080000e+00.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the maximum of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:VMAX:SMAXimum?
- :MEASure:VMAX:SMINimum?
- :MEASure:VMAX:SCURrent?
- :MEASure:VMAX:SAVerage?
- :MEASure:VMAX:SDEViation?

:MEASure:VMAX:SMAXimum?

Syntax

:MEASure:VMAX:SMAXimum? <chan>

Description

Query the statistic maximum of the maximum of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VMAX:SMAXimum? CHANnel1

The query returns 2.160000e+00.

:MEASure:VMAX:SMINimum?

Syntax

:MEASure:VMAX:SMINimum? <chan>

Description

Query the statistic minimum of the maximum of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VMAX:SMINimum? CHANnel1

The query returns 2.080000e+00.

:MEASure:VMAX:SCURrent?

Syntax

:MEASure:VMAX:SCURrent? <chan>

Description

Query the statistic current value of the maximum of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VMAX:SCURrent? CHANnel1

The query returns 2.080000e+00.

:MEASure:VMAX:SAVerage?

Syntax

:MEASure:VMAX:SMAXimum? <chan>

Description

Query the statistic average of the maximum of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VMAX:SAVerage? CHANnel1

The query returns 2.086383e+00.

:MEASure:VMAX:SDEViation?

Syntax

:MEASure:VMAX:SDEViation? <chan>

Description

Query the statistic standard deviation of the maximum of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VMAX:SDEviation? CHANnel1

The query returns 2.126487e-02.

:MEASure:VMIN?

Syntax

:MEASure:VMIN? <chan>

Description

Query the minimum of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VMIN? CHANnel1

The query returns -2.080000e+00.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the minimum of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:VMIN:SMAXimum?
- :MEASure:VMIN:SMINimum?
- :MEASure:VMIN:SCURrent?
- :MEASure:VMIN:SAVerage?
- :MEASure:VMIN:SDEViation?

:MEASure:VMIN:SMAXimum?

Syntax

:MEASure:VMIN:SMAXimum? <chan>

Description

Query the statistic maximum of the minimum of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VMIN:SMAXimum? CHANnel1

The query returns -2.080000e+00.

:MEASure:VMIN:SMINimum?

Syntax

:MEASure:VMIN:SMINimum? <chan>

Description

Query the statistic minimum of the minimum of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VMIN:SMINimum? CHANnel1

The query returns -2.080000e+00.

:MEASure:VMIN:SCURrent?

Syntax

:MEASure:VMIN:SCURrent? <chan>

Description

Query the statistic current value of the minimum of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VMIN:SCURrent? CHANnel1

The query returns -2.080000e+00.

:MEASure:VMIN:SAVerage?

Syntax

:MEASure:VMIN:SAVerage? <chan>

Description

Query the statistic average of the minimum of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VMIN:SAVerage? CHANnel1

The query returns -2.080000e+00.

:MEASure:VMIN:SDEviation?

Syntax

:MEASure:VMIN:SDEViation? <chan>

Description

Query the statistic standard deviation of the minimum of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VMIN:SDEViation? CHANnel1

The query returns 0.000000e+00.

:MEASure:VPP?

Syntax

:MEASure:VPP? <chan>

Description

Query the peak-peak value of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VPP? CHANnel1

The query returns 4.080000e+00.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the peak-peak values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:VPP:SMAXimum?
- :MEASure:VPP:SMINimum?
- :MEASure:VPP:SCURrent?
- :MEASure:VPP:SAVerage?
- :MEASure:VPP:SDEViation?

:MEASure:VPP:SMAXimum?

Syntax

:MEASure:VPP:SMAXimum? <chan>

Description

Query the statistic maximum of the peak-peak values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VPP:SMAXimum? CHANnel1

The query returns 4.240000e+00.

:MEASure:VPP:SMINimum?

Syntax

:MEASure:VPP:SMINimum? <chan>

Description

Query the statistic minimum of the peak-peak values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VPP:SMINimum? CHANnel1

The query returns 4.080000e+00.

:MEASure:VPP:SCURrent?

Syntax

:MEASure:VPP:SCURrent? <chan>

Description

Query the statistic current value of the peak-peak values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VPP:SCURrent? CHANnel1

The query returns 4.160000e+00.

:MEASure:VPP:SAVerage?

Syntax

:MEASure:VPP:SAVerage? <chan>

Description

Query the statistic average of the peak-peak values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VPP:SAVerage? CHANnel1

The query returns 4.135026e+00.

:MEASure:VPP:SDEViation?

Syntax

:MEASure:VPP:SDEViation? <chan>

Description

Query the statistic standard deviation of the peak-peak values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VPP:SDEViation? CHANnel1

The query returns 4.117828e-02.

:MEASure:VRMS?

Syntax

:MEASure:VRMS? <chan>

Description

Query the RMS value of the amplitude of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VRMS? CHANnel1

The query returns 1.385354e+00.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the RMS values of the amplitude of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:VRMS:SMAXimum?
- :MEASure:VRMS:SMINimum?
- :MEASure:VRMS:SCURrent?
- :MEASure:VRMS:SAVerage?
- :MEASure:VRMS:SDEViation?

:MEASure:VRMS:SMAXimum?

Syntax

:MEASure:VRMS:SMAXimum? <chan>

Description

Query the statistic maximum of the RMS values of the amplitude of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VRMS:SMAXimum? CHANnel1

The query returns 1.387022e+00.

:MEASure:VRMS:SMINimum?

Syntax

:MEASure:VRMS:SMINimum? <chan>

Description

Query the statistic minimum of the RMS values of the amplitude of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VRMS:SMINimum? CHANnel1

The query returns 1.382670e+00.

:MEASure:VRMS:SCURrent?

Syntax

:MEASure:VRMS:SCURrent? <chan>

Description

Query the statistic current value of the RMS values of the amplitude of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VRMS:SCURrent? CHANnel1

The query returns 1.384690e+00.

:MEASure:VRMS:SAVerage?

Syntax

:MEASure:VRMS:SAVerage? <chan>

Description

Query the statistic average of the RMS values of the amplitude of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VRMS:SAVerage? CHANnel1

The query returns 1.384909e+00.

:MEASure:VRMS:SDEViation?

Syntax

:MEASure:VRMS:SDEViation? <chan>

Description

Query the statistic standard deviation of the RMS values of the amplitude of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VRMS:SDEViation? CHANnel1

The query returns 0.000000e+00.

:MEASure:VTOP?

Syntax

:MEASure:VTOP? <chan>

Description

Query the top value of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VTOP? CHANnel1

The query returns 1.920000e+00.

You can use the following commands to query the statistic maximum, minimum, current value, average and standard deviation of the top values of the selected waveform. Sending the following commands will enable the statistic function automatically.

- :MEASure:VTOP:SMAXimum?
- :MEASure:VTOP:SMINimum?
- :MEASure:VTOP:SCURrent?
- :MEASure:VTOP:SAVerage?
- :MEASure:VTOP:SDEViation?

:MEASure:VTOP:SMAXimum?

Syntax

:MEASure:VTOP:SMAXimum? <chan>

Description

Query the statistic maximum of the top values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VTOP:SMAXimum? CHANnel1

The query returns 2.160000e+00.

:MEASure:VTOP:SMINimum?

Syntax

:MEASure:VTOP:SMINimum? <chan>

Description

Query the statistic minimum of the top values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VTOP:SMINimum? CHANnel1

The query returns 1.920000e+00.

:MEASure:VTOP:SCURrent?

Syntax

:MEASure:VTOP:SCURrent? <chan>

Description

Query the statistic current value of the top values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VTOP:SCURrent? CHANnel1

The query returns 2.080000e+00.

:MEASure:VTOP:SAVerage?

Syntax

:MEASure:VTOP:SAVerage? <chan>

Description

Query the statistic average of the top values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VTOP:SAVerage? CHANnel1

The query returns 2.027293e+00.

:MEASure:VTOP:SDEViation?

Syntax

:MEASure:VTOP:SDEViation? <chan>

Description

Query the statistic standard deviation of the top values of the selected waveform.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Explanation

The unit depends on the unit of the source channel (refer to the :CHANnel<n>:UNITs command).

Return Format

The query returns the measurement result in scientific notation.

Example

:MEASure:VTOP:SDEviation? CHANnel1

The query returns 7.844453e-02.

:SYSTem Subsystem

:SYSTem:BEEPer

Syntax

:SYSTem:BEEPer <bool>

:SYSTem:BEEPer?

Description

Enable or disable the beeper.

Query the current status of the beeper.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:SYSTem:BEEPer ON

The query returns 1.

:SYSTem:DATE

Syntax

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

:SYSTem:DATE?

Description

Set the system date.

Query the current system date.

Parameter

Name	Type	Range	Default
<year>	Integer	2011 to 2099	--
<month>	Integer	01 to 12	--
<day>	Integer	01 to 31 (28, 29 or 30)	--

Return Format

The query returns the current date in character string.

Example

:SYSTem:DATE 2012,4,23

The query returns 2012, 4,23.

:SYSTem:TIME

Syntax

:SYSTem:TIME <hours>,<minutes>,<seconds>
:SYSTem:TIME?

Description

Set the system time.
Query the current system time.

Parameter

Name	Type	Range	Default
<hours>	Integer	0 to 23	--
<minutes>	Integer	0 to 59	--
<seconds>	Integer	0 to 59	--

Return Format

The query returns the current time in character string. Note that there is a delay between the return time and the set time because of the command response time and other consideration.

Example

:SYSTem:TIME 16,05,15
The query returns the current time. For example, 16, 5,18, namely 16:5:18.

:SYSTem:ERRor[:NEXT]?

Syntax

:SYSTem:ERRor[:NEXT]?

Description

Query and delete the last system error message.

Return Format

The query returns a character string containing the message number and message content. Wherein, the message number is an integer and the message content is a ASCII character string.

Example

:SYSTem:ERRor:NEXT?

The query returns -113,"Undefined header; keyword cannot be found".

:SYSTem:EXPand

Syntax

:SYSTem:EXPand <exp>

:SYSTem:EXPand?

Description

Set the expanding or compressing mode of the vertical scale to the center of the screen (CENTer) or the ground level (GROund).

Query the current expanding or compressing mode of the vertical scale.

Parameter

Name	Type	Range	Default
<exp>	Discrete	{CENTer|GROund}	GROund

Return Format

The query returns CENT or GRO.

Example

:SYSTem:EXPand CENTer

The query returns CENT.

:SYSTem:LANGuage

Syntax

:SYSTem:LANGuage <lang>

:SYSTem:LANGuage?

Description

Set the language of the system to simplified Chinese, traditional Chinese or English. Query the current language of the system.

Parameter

Name	Type	Range	Default
<lang>	Discrete	{SCHinese|TCHinese|ENGLish}	ENGLish

Return Format

The query returns SCH, TCH or ENG.

Example

:SYSTem:LANGuage SCHinese

The query returns SCH.

:SYSTem:PON

Syntax

:SYSTem:PON <power_on>
:SYSTem:PON?

Description

Set the type of configuration that the oscilloscope recalls when it is powered on again. It can be set to Last or Default.
Query the current type of configuration that the oscilloscope recalls when it is powered on again.

Parameter

Name	Type	Range	Default
<power_on>	Discrete	{LATest|DEFault}	--

Return Format

The query returns LAT or DEF.

Example

:SYSTem:PON LATest
The query returns LAT.

:SYSTem:SSAVer:TIME

Syntax

:SYSTem:SSAVer:TIME <time>

:SYSTem:SSAVer:TIME?

Description

Set the screen saver time.

Query the current screen saver time.

Parameter

Name	Type	Range	Default
<time>	Discrete	{1MIN|2MIN|5MIN|15MIN|30MIN|45MIN|60MIN|2HOur|5HOur|OFF}	OFF

Explanation

When the oscilloscope enters the idle state and holds for a certain period of time, the screen saver program will be enabled. When OFF is selected, the screen saver program will not be used.

Return Format

The query returns the current screen saver time or OFF.

Example

:SYSTem:SSAVer:TIME 2MIN

The query returns 2MIN.

:SYSTem:SETup

Syntax

:SYSTem:SETup <setup_data>
:SYSTem:SETup?

Description

Send the file data of the system setup.
Read the file data of the system setup.

Explanation

When sending, the format of the data stream:
The Stream Block Header (::= #NXXXXXX) is used to describe the length of the data stream. Wherein, # is the start denoter of the data stream; N is less than or equal to 9; the N figures following N represents the length of the data stream in bytes. For example, #9000002493, wherein, N is 9 and 000002493 represents that the data stream contains 2493 bytes effective data.
When reading, directly put the data stream at the end of the character string to finish the sending with one operation.
<setup_data> is binary data block.
Make sure that the buffer is large enough to receive the data stream, otherwise the program might be abnormal during the reading.

:SYSTem:VERSion?

Syntax

:SYSTem:VERSion?

Description

Query the version number of the SCPI the system used.

Return Format

The query always returns 1999.0.

:SYSTem:AOUTput

Syntax

:SYSTem:AOUTput <aux output>
:SYSTem:AOUTput?

Description

Set the output signal type of the **[Trigger Out]** connector at the rear panel.
Query the current output signal type of the **[Trigger Out]** connector at the rear panel.

Parameter

Name	Type	Range	Default
<aux output>	Discrete	{TOUT|PFAil}	TOUT

Explanation

TOUT: when this type is selected, the oscilloscope outputs a signal that can reflect the current capture rate of the oscilloscope at each trigger.
PFAil: when this type is selected, the oscilloscope outputs a pulse signal when failed waveforms are detected. Connect this signal to other control systems to conveniently view the test result.

Return Format

The query returns TOUT or PFA.

Example

:SYSTem:AOUTput PFA
The query returns PFA.

:SYSTem:RESet

Syntax

:SYSTem:RESet

Description

Power on the system again.

Explanation

The command is applicable to instruments with hardware version 1.0 or higher.

:SYSTem:OPTion:INSTall

Syntax

:SYSTem:OPTion:INSTall <license>

Description

Install the option.

Explanation

<license> represents the serial number of the option (do not add space between characters).

Example

:SYSTem:OPTion:INSTall PDUY9N9QTS9PQSWPLAETRD3UJHYA

:SYSTem:OPTion:UNINSTall

Syntax

:SYSTem:OPTion:UNINSTall

Description

Unload the option installed.

:SYSTem:UDEVice

Syntax

:SYSTem:UDEVice <udv>
:SYSTem:UDEVice?

Description

Set the oscilloscope to make it match with different types of devices.
Query the type of the device currently connected to the oscilloscope.

Parameter

Name	Type	Range	Default
<udv>	Discrete	{COMPuter|PICTbridge}	COMPuter

Explanation

The oscilloscope can communicate with the PC or PictBridge printer via the USB Device interface at the rear panel.

Return Format

The query returns COMP or PICT.

Example

:SYSTem:UDEVice PICTbridge
The query returns PICT.

:SYSTem:GPIB

Syntax

:SYSTem:GPIB <adr>

:SYSTem:GPIB?

Description

Set the GPIB address.

Query the current GPIB address.

Parameter

Name	Type	Range	Default
<adr>	Integer	1 to 30	1

Return Format

The query returns an integer between 1 and 30.

Example

:SYSTem:GPIB 5

The query returns 5.

:SYSTem:GAMount?

Syntax

:SYSTem:GAMount?

Description

Query the number of grids on the screen horizontally.

Return Format

The query returns the number of grids on the screen horizontally in integer.

Example

:SYSTem:GAMount?

The query returns 14.

:SYSTem:RAMount?

Syntax

:SYSTem:RAMount?

Description

Query the number of channels of the current instrument.

Return Format

The query returns the number of channels of the current instrument in integer.

Example

:SYSTem:RAMount?

The query returns 2.

:TIMebase Subsystem

:TIMebase:DELay:ENABle

Syntax

:TIMebase:DELay:ENABle <bool>

:TIMebase:DELay:ENABle?

Description

Enable or disable the delayed sweep.

Query the current status of the delayed sweep.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:TIMebase:DELay:ENABle ON

The query returns 1.

:TIMebase:DELay:OFFSet

Syntax

:TIMebase:DELay:OFFSet <offset>

:TIMebase:DELay:OFFSet?

Description

Set the offset of the delayed time base and the unit is s.

Query the current offset of the delayed time base.

Parameter

Name	Type	Range	Default
<offset>	Real	-(LeftTime - DelayRange/2) to (RightTime - DelayRange/2)	0

Note:

LeftTime = 7×MainScale – MainOffset. For the MainScale, refer to the :TIMebase[:MAIN]:SCALe command.

RightTime = 7×MainScale + MainOffset. For the MainOffset, refer to the :TIMebase[:MAIN]:OFFSet command.

DelayRange = 14×DelayScale. For the DelayScale, refer to the :TIMebase:DELay:SCALe command.

Return Format

The query returns the offset in scientific notation.

Example

:TIMebase:DELay:OFFSet 0.000002

The query returns 2.000000e-06.

:TIMebase:DELay:SCALe

Syntax

:TIMebase:DELay:SCALe <scale_value>

:TIMebase:DELay:SCALe?

Description

Set the scale of the delayed time base and the unit is s/div.

Query the current scale of the delayed time base.

Parameter

Name	Type	Range	Default
<scale_value>	Real	(1×50/real-time sample rate)×1/40 to the current MAIN SCALe	500ns

Note: for the MAIN SCALe, refer to the :TIMebase[:MAIN]:SCALe command.

Return Format

The query returns the horizontal scale in scientific notation.

Example

:TIMebase:DELay:SCALe 0.00000005

The query returns 5.000000e-08.

:TIMebase[:MAIN]:OFFSet

Syntax

:TIMebase[:MAIN]:OFFSet <offset>

:TIMebase[:MAIN]:OFFSet?

Description

Set the offset of the main time base and the unit is s.

Query the current offset of the main time base.

Parameter

Name	Type	Range	Default
<offset>	Real	RUN: -MemDepth/SamplingRate to 1s (when the TimeScale is less than 20ms) -MemDepth/SamplingRate to 10×TimeScale (when the TimeScale is greater than or equal to 20ms) STOP: -7000s to 7000s ROLL RUN: not avaliable ROLL STOP: -7000s to 0	0

Note:

For the MemDepth, refer to the :ACQuire:MDEPth command.

For the SamplingRate, refer to the :ACQuire:SRATe? command.

For the TimeScale, refer to the :TIMebase[:MAIN]:SCALe command.

Return Format

The query returns the offset in the scientific notation.

Example

:TIMebase:MAIN:OFFSet 0.0002

The query returns 2.000000e-04.

:TIMebase[:MAIN]:SCALe

Syntax

:TIMebase[:MAIN]:SCALe <scale_value>

:TIMebase[:MAIN]:SCALe?

Description

Set the scale of the main time base and the unit is s/div.

Query the current scale of the main time base.

Parameter

Name	Type	Range	Default
<scale_value>	Real	Depend on the time base mode [1]: Normal: 2ns[2] to 1ks ROLL: 200ms to 1ks	1μs

Note[1]: refer to the :TIMebase:MODE command.

Note[2]: this value is different for different model. For DS2072 and DS2012, the value is 5 ns.

Return Format

The query returns the current scale of the main time base in scientific notation.

Example

:TIMebase:MAIN:SCALe 0.0002

The query returns 2.000000e-04.

:TIMebase:MODE

Syntax

:TIMebase:MODE <mode>

:TIMebase:MODE?

Description

Set the horizontal time base mode.

Query the current horizontal time base mode.

Parameter

Name	Type	Range	Default
<mode>	Discrete	{MAIN|XY|ROLL}	MAIN

Return Format

The query returns MAIN, XY or ROLL.

Example

:TIMebase:MODE MAIN

The query returns MAIN.

:TIMebase:HREF:MODE

Syntax

:TIMebase:HREF:MODE <href>

:TIMebase:HREF:MODE?

Description

Set the horizontal reference mode namely the reference position according to which the waveform expands and compresses horizontally.

Query the current horizontal reference mode.

Parameter

Name	Type	Range	Default
<href>	Discrete	{CENTer|TPOSition|USER}	CENTer

Explanation

CENTer: the waveform expands or compresses horizontally around the center of the screen.

TPOSition: the waveform expands or compresses horizontally around the trigger position.

USER: the waveform expands or compresses horizontally around the user-defined reference position. Refer to the :TIMebase:HREF:POSition command.

Return Format

The query returns CENT, TPOS or USER.

Example

:TIMebase:HREF:MODE TPOSition

The query returns TPOS.

:TIMebase:HREF:POSition

Syntax

:TIMebase:HREF:POSition <pos>
:TIMebase:HREF:POSition?

Description

Set the user-defined reference position around which the waveform expands or compresses horizontally.
Query the current user-defined reference position around which the waveform expands or compresses horizontally.

Parameter

Name	Type	Range	Default
<pos>	Integer	-350 to 350	0

Return Format

The query returns an integer.

Example

:TIMebase:HREF:POSition 150
The query returns 150.

:TIMebase:VERNier

Syntax

:TIMebase:VERNier <bool>

:TIMebase:VERNier?

Description

Enable or disable the fine adjustment of the horizontal scale.

Query the current status of the fine adjustment of the horizontal scale.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:TIMebase:VERNier ON

The query returns 1.

:TRIGger Subsystem

:TRIGger:MODE

Syntax

:TRIGger:MODE <mode>
:TRIGger:MODE?

Description

Select the trigger type.
Query the current trigger type.

Parameter

Name	Type	Range	Default
<mode>	Discrete	{EDGE|PULSe|RUNT|WIND|NEDG|SLOPe|VIDeo|PATTern|DELay|TIMeout|DURATion|SHOLd|RS232|IIC|SPI|USB}	EDGE

Return Format

The query returns the current trigger type.

Example

:TRIGger:MODE SLOPe
The query returns SLOP.

:TRIGger:COUPling

Syntax

:TRIGger:COUPling <couple>

:TRIGger:COUPling?

Description

Select the desired trigger coupling mode.

Query the current trigger coupling mode.

Parameter

Name	Type	Range	Default
<couple>	Discrete	{AC|DC|LFReject|HFReject}	DC

Explanation

It is only available in edge trigger.

Return Format

The query returns AC, DC, LFR or HFR.

Example

:TRIGger:COUPling LFReject

The query returns LFR.

:TRIGger:STATus?

Syntax

:TRIGger:STATus?

Description

Query the current trigger status.

Return Format

The query returns TD, WAIT, RUN, AUTO or STOP.

:TRIGger:SWEep

Syntax

:TRIGger:SWEep <sweep>

:TRIGger:SWEep?

Description

Set the trigger mode to auto, normal or single.

Query the current trigger mode.

Parameter

Name	Type	Range	Default
<sweep>	Discrete	{AUTO|NORMal|SINGle}	AUTO

Return Format

The query returns AUTO, NORM or SING.

Example

:TRIGger:SWEep SINGle

The query returns SING.

:TRIGger:HOLDoff

Syntax

:TRIGger:HOLDoff <value>

:TRIGger:HOLDoff?

Description

Set the trigger holdoff time and the unit is s.

Query the current trigger holdoff time.

Parameter

Name	Type	Range	Default
<value>	Real	100ns to 10s	100ns

Explanation

This setting is not available for the Nth edge trigger, video trigger, RS232 trigger, IIC trigger, SPI trigger and USB trigger.

Return Format

The query returns the trigger holdoff time in scientific notation.

Example

:TRIGger:HOLDoff 0.0000002

The query returns 2.000000e-07.

:TRIGger:NREJect

Syntax

:TRIGger:NREJect <bool>

:TRIGger:NREJect?

Description

Enable or disable noise reject.

Query the current status of noise reject.

Parameter

Name	Type	Range	Default
<bool>	Bool	{{0|OFF}|{1|ON}}	0|OFF

Return Format

The query returns 0 or 1.

Example

:TRIGger:NREJect ON

The query returns 1.

:TRIGger:EDGe

:TRIGger:EDGe:SOURce

Syntax

:TRIGger:EDGe:SOURce <source>

:TRIGger:EDGe:SOURce?

Description

Select the trigger source of edge trigger.

Query the current trigger source of edge trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2|EXT|ACLine}	CHANnel1

Return Format

The query returns CHAN1, CHAN2, EXT or ACL.

Example

:TRIGger:EDGe:SOURce CHANnel2

The query returns CHAN2.

:TRIGger:EDGe:SLOPe

Syntax

:TRIGger:EDGe:SLOPe <slope>

:TRIGger:EDGe:SLOPe?

Description

Select the edge type of edge trigger.

Query the current edge type of edge trigger.

Parameter

Name	Type	Range	Default
<slope>	Discrete	{POSitive|NEGative|RFALl}	POSitive

Return Format

The query returns POS, NEG or RFAL.

Example

:TRIGger:EDGe:SLOPe NEGative

The query returns NEG.

:TRIGger:EDGe:LEVel

Syntax

:TRIGger:EDGe:LEVel <level>

:TRIGger:EDGe:LEVel?

Description

Set the trigger level of edge trigger and the unit is the same with the current amplitude unit.

Query the current trigger level of edge trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the trigger level in scientific notation.

Example

:TRIGger:EDGe:LEVel 0.16

The query returns 1.600000e-01.

:TRIGger:PULSe

:TRIGger:PULSe:SOURce

Syntax

:TRIGger:PULSe:SOURce <source>

:TRIGger:PULSe:SOURce?

Description

Select the trigger source in pulse trigger.

Query the current trigger source in pulse trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:PULSe:SOURce CHANnel2

The query returns CHAN2.

:TRIGger:PULSe:WHEN

Syntax

:TRIGger:PULSe:WHEN <when>
:TRIGger:PULSe:WHEN?

Description

Select the trigger condition of pulse trigger.
Query the current trigger condition of pulse trigger.

Parameter

Name	Type	Range	Default
<when>	Discrete	{PGReater|PLESs|NGReater|NLESs|PGLess|NGLess}	PGReater

Explanation

PGReater: you need to specify a pulse width (refer to the :TRIGger:PULSe:LWIDth command). The oscilloscope triggers when the positive pulse width of the input signal is greater than the specified Pulse Width.
PLESs: you need to specify a pulse width (refer to the :TRIGger:PULSe:UWIDth command). The oscilloscope triggers when the positive pulse width of the input signal is lower than the specified Pulse Width.
NGReater: you need to specify a pulse width (refer to the :TRIGger:PULSe:LWIDth command). The oscilloscope triggers when the negative pulse width of the input signal is greater than the specified Pulse Width.
NLESs: you need to specify a pulse width (refer to the :TRIGger:PULSe:UWIDth command). The oscilloscope triggers when the negative pulse width of the input signal is lower than the specified Pulse Width.
PGLess: you need to specify an upper (refer to the :TRIGger:PULSe:UWIDth command) and a lower (refer to the :TRIGger:PULSe:LWIDth command) pulse width. The oscilloscope triggers when the positive pulse width of the input signal is greater than the specified lower pulse width and lower than the upper pulse width.
NGLess: you need to specify an upper (refer to the :TRIGger:PULSe:UWIDth command) and a lower (refer to the :TRIGger:PULSe:LWIDth command) pulse width. The oscilloscope triggers when the negative pulse width of the input signal is greater than the specified lower pulse width and lower than the upper pulse width.

Return Format

The query returns PGR, PLES, NGR, NLES, PGL or NGL.

Example

:TRIGger:PULSe:WHEN PGReater

The query returns PGR.

:TRIGger:PULSe:UWIDth

Syntax

:TRIGger:PULSe:UWIDth <width>
:TRIGger:PULSe:UWIDth?

Description

Set the upper limit of the pulse width in pulse trigger and the unit is s.
Query the current upper limit of the pulse width in pulse trigger.

Parameter

Name	Type	Range	Default
<width>	Real	2ns to 4s	2μs

Note: when the trigger condition is PGLess or NGLess, the range is from 10ns to 4s.

Explanation

This command is available when the trigger condition (refer to the :TRIGger:PULSe:WHEN command) is PLESs, NLESs, PGLess or NGLess.

Return Format

The query returns the upper limit of the pulse width in scientific notation.

Example

:TRIGger:PULSe:UWIDth 0.000003
The query returns 3.000000e-06.

:TRIGger:PULSe:LWIDth

Syntax

:TRIGger:PULSe:LWIDth <width>

:TRIGger:PULSe:LWIDth?

Description

Set the lower limit of the pulse width in pulse trigger and the unit is s.

Query the current lower limit of the pulse width in pulse trigger

Parameter

Name	Type	Range	Default
<width>	Real	2ns to 4s	1μs

Note: when the trigger condition is PGLess or NGLess, the range is from 2ns to 3.99s.

Explanation

This command is available when the trigger condition (refer to the :TRIGger:PULSe:WHEN command) is PGReater, NGReater, PGLess or NGLess.

Return Format

The query returns the lower limit of the pulse width in scientific notation.

Example

:TRIGger:PULSe:LWIDth 0.000003

The query returns 3.000000e-06.

:TRIGger:PULSe:LEVel

Syntax

:TRIGger:PULSe:LEVel <level>

:TRIGger:PULSe:LEVel?

Description

Set the trigger level in pulse trigger and the unit is the same with the current amplitude unit.

Query the current trigger level in pulse trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the trigger level in scientific notation.

Example

:TRIGger:PULSe:LEVel 0.16

The query returns 1.600000e-01.

:TRIGger:RUNT

- :TRIGger:RUNT:SOURce
- :TRIGger:RUNT:POLarity
- :TRIGger:RUNT:WHEN
- :TRIGger:RUNT:WLOWer
- :TRIGger:RUNT:WUPPer
- :TRIGger:RUNT ALEVel
- :TRIGger:RUNT:BLEVel

:TRIGger:RUNT:SOURce

Syntax

:TRIGger:RUNT:SOURce <source>

:TRIGger:RUNT:SOURce?

Description

Select the trigger source of runt trigger.

Query the current trigger source of runt trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:RUNT:SOURce CHANnel2

The query returns CHAN2.

:TRIGger:RUNT:POLarity

Syntax

:TRIGger:RUNT:POLarity <polarity>

:TRIGger:RUNT:POLarity?

Description

Select the pulse polarity of runt trigger.

Query the current pulse polarity of runt trigger.

Parameter

Name	Type	Range	Default
<polarity>	Discrete	{POSitive|NEGative}	POSitive

Return Format

The query returns POS or NEG.

Example

:TRIGger:RUNT:POLarity NEGative

The query returns NEG.

:TRIGger:RUNT:WHEN

Syntax

:TRIGger:RUNT:WHEN <when>
:TRIGger:RUNT:WHEN?

Description

Select the qualifier of runt trigger.
Query the current qualifier of runt trigger.

Parameter

Name	Type	Range	Default
<when>	Discrete	{NONE|GREater|LESS|GLESs}	NONE

Explanation

NONE: do not set the trigger condition of runt trigger.
GREater: trigger when the runt pulse width is greater than the lower limit of pulse width (refer to the :TRIGger:RUNT:WLOWer command).
LESS: trigger when the runt pulse width is lower than the upper limit of pulse width (refer to the :TRIGger:RUNT:WUPPer command).
GLESs: trigger when the runt pulse width is greater than the lower limit (refer to the :TRIGger:RUNT:WLOWer command) and lower than the upper limit (refer to the :TRIGger:RUNT:WUPPer command) of pulse width. Note: the lower limit of the pulse width must be lower than the upper limit.

Return Format

The query returns NONE, GRE, LESS or GLES.

Example

:TRIGger:RUNT:WHEN LESS
The query returns LESS.

:TRIGger:RUNT:WLOWer

Syntax

:TRIGger:RUNT:WLOWer <NR3>

:TRIGger:RUNT:WLOWer?

Description

Set the lower limit of the pulse width in runt trigger.

Query the current lower limit of the pulse width in runt trigger.

Parameter

Name	Type	Range	Default
<NR3>	Discrete	2ns to 4s	1μs

Note: when the qualifier is GLESs, the range of the lower limit of the pulse width is from 2ns to 3.99s.

Explanation

This command is available when the qualifier (refer to the :TRIGger:RUNT:WHEN command) is set to GREater or GLESs.

Return Format

The query returns the lower limit of the pulse width in scientific notation.

Example

:TRIGger:RUNT:WLOWer 0.02

The query returns 2.000000e-02.

:TRIGger:RUNT:WUPPer

Syntax

:TRIGger:RUNT:WUPPer <NR3>

:TRIGger:RUNT:WUPPer?

Description

Set the upper limit of the pulse width in runt trigger.

Query the current upper limit of the pulse width in runt trigger.

Parameter

Name	Type	Range	Default
<NR3>	Discrete	2ns to 4s	2μs

Note: when the qualifier is GLESs, the range of the upper limit of the pulse width is from 10ns to 4s.

Explanation

This command is available when the qualifier (refer to the :TRIGger:RUNT:WHEN command) is set to LESS or GLESs.

Return Format

The query returns the upper limit of the pulse width in scientific notation.

Example

:TRIGger:RUNT:WUPPer 0.02

The query returns 2.000000e-02.

:TRIGger:RUNT:ALEVel

Syntax

:TRIGger:RUNT:ALEVel <level>

:TRIGger:RUNT:ALEVel?

Description

Set the upper limit of the trigger level in runt trigger and the unit is the same with the current amplitude unit.

Query the current upper limit of the trigger level in runt trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the upper limit of the trigger level in scientific notation.

Example

:TRIGger:RUNT:ALEVel 0.16

The query returns 1.600000e-01.

:TRIGger:RUNT:BLEVel

Syntax

:TRIGger:RUNT:BLEVel <level>

:TRIGger:RUNT:BLEVel?

Description

Set the lower limit of the trigger level in runt trigger and the unit is the same with the current amplitude unit.

Query the current lower limit of the trigger level in runt trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the lower limit of the trigger level in scientific notation.

Example

:TRIGger:RUNT:BLEVel 0.16

The query returns 1.600000e-01.

:TRIGger:WINDows

- :TRIGger:WINDows:SOURce
- :TRIGger:WINDows:SLOPe
- :TRIGger:WINDows:POSition
- :TRIGger:RUNT:TIMe

:TRIGger:WINDows:SOURce

Syntax

:TRIGger:WINDows:SOURce <source>

:TRIGger:WINDows:SOURce?

Description

Select the trigger source of windows trigger.

Query the current trigger source of windows trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:WINDows:SOURce CHANnel2

The query returns CHAN2.

:TRIGger:WINDows:SLOPe

Syntax

:TRIGger:WINDows:SLOPe <type>
:TRIGger:RUNT:SLOPe?

Description

Select the windows type of windows trigger.
Query the current windows type of windows trigger.

Parameter

Name	Type	Range	Default
<type>	Discrete	{POSitive|NEGative|RFALl}	POSitive

Return Format

The query returns POSitive, NEGative or RFALl.

Example

:TRIGger:WINDows:SLOPe NEGative
The query returns NEG.

:TRIGger:WINDows:POSition

Syntax

:TRIGger:WINDows:POSition <pos>
:TRIGger:RUNT:POSition?

Description

Select the trigger position of windows trigger.
Query the current trigger position of windows trigger.

Parameter

Name	Type	Range	Default
<type>	Discrete	{EXIT|ENTER|TIMe}	ENTER

Return Format

The query returns EXIT, ENTER or TIM.

Example

:TRIGger:WINDows:POSition ENTER
The query returns ENTER.

:TRIGger:WINDows:TIMe

Syntax

:TRIGger:WINDows:TIMe <NR3>
:TRIGger:RUNT:TIMe?

Description

Select the windows time of windows trigger.
Query the current windows time of windows trigger.

Parameter

Name	Type	Range	Default
<NR3>	Real	16ns to 4s	1μs

Explanation

This command is only available when the trigger position of windows trigger (refer to the :TRIGger:Windows:POSition command) is set to TIMe.

Return Format

The query returns the windows time in scientific notation.

Example

:TRIGger:WINDows:TIMe 0.002
The query returns 2.000000e-03.

:TRIGger:NEDGe

:TRIGger:NEDGe:SOURce

Syntax

:TRIGger:NEDGe:SOURce <source>

:TRIGger:NEDGe:SOURce?

Description

Select the trigger source of Nth egde trigger.

Query the current trigger source of Nth edge trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:NEDGe:SOURce CHANnel2

The query returns CHAN2.

:TRIGger:NEDGe:SLOPe

Syntax

:TRIGger:NEDGe:SLOPe <slope>

:TRIGger:NEDGe:SLOPe?

Description

Select the edge type of Nth edge trigger.

Query the current edge type of Nth edge trigger.

Parameter

Name	Type	Range	Default
<slope>	Discrete	{POSitive|NEGative}	POSitive

Return Format

The query returns POSitive or NEGative.

Example

:TRIGger:NEDGe:SLOPe NEGative

The query returns NEG.

:TRIGger:NEDGe:IDLE

Syntax

:TRIGger:NEDGe:IDLE <NR3>
:TRIGger:NEDGe:IDLE?

Description

Set the idle time of Nth edge trigger.
Query the current idle time of Nth edge trigger.

Parameter

Name	Type	Range	Default
<NR3>	Real	16ns to 4s	1μs

Return Format

The query returns the idle time value in scientific notation.

Example

:TRIGger:NEDGe:IDLE 0.002
The query returns 2.000000e-03.

:TRIGger:NEDGe:EDGE

Syntax

:TRIGger:NEDGe:EDGE <NR1>

:TRIGger:NEDGe:EDGE?

Description

Set the edge number of Nth edge trigger.

Query the current edge number of Nth edge trigger.

Parameter

Name	Type	Range	Default
<NR1>	Integer	1 to 65535	2

Return Format

The query returns an integer between 1 and 65535.

Example

:TRIGger:NEDGe:EDGE 20

The query returns 20.

:TRIGger:NEDGe:LEVel

Syntax

:TRIGger:NEDGe:LEVel <level>

:TRIGger:NEDGe:LEVel?

Description

Set the trigger level in Nth edge trigger and the unit is the same with the current amplitude unit.

Query the current trigger level in Nth edge trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the trigger level in scientific notation.

Example

:TRIGger:NEDGe:LEVel 0.16

The query returns 1.600000e-01.

:TRIGger:SLOPe

:TRIGger:SLOPe:SOURce

Syntax

:TRIGger:SLOPe:SOURce <source>

:TRIGger:SLOPe:SOURce?

Description

Select the trigger source of slope trigger.

Query the current trigger source of slope trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:SLOPe:SOURce CHANnel2

The query returns CHAN2.

:TRIGger:SLOPe:WHEN

Syntax

:TRIGger:SLOPe:WHEN <when>
:TRIGger:SLOPe:WHEN?

Description

Select the trigger condition of slope trigger.
Query the current trigger condition of slope trigger.

Parameter

Name	Type	Range	Default
<when>	Discrete	{PGReater|PLESs|NGReater|NLESs|PGLess|NGLess}	PGReater

Explanation

PGReater: you need to specify a time value (refer to the :TRIGger:SLOPe:TLOWer command). The oscilloscope triggers when the positive slope time of the input signal is greater than the specified time.
PLESs: you need to specify a time value (refer to the :TRIGger:SLOPe:TUPPer command). The oscilloscope triggers when the positive slope time of the input signal is lower than the specified time.
NGReater: you need to specify a time value (refer to the :TRIGger:SLOPe:TLOWer command). The oscilloscope triggers when the negative slope time of the input signal is greater than the specified time.
NLESs: you need to specify a time value (refer to the :TRIGger:SLOPe:TUPPer command). The oscilloscope triggers when the negative slope time of the input signal is lower than the specified time.
PGLess: you need to specify an upper limit (refer to the :TRIGger:SLOPe:TUPPer command) and a lower limit (refer to the :TRIGger:SLOPe:TLOWer command) of time. The oscilloscope triggers when the positive slope time of the input signal is greater than the specified lower limit and lower than the specified upper limit.
NGLess: you need to specify an upper limit (refer to the :TRIGger:SLOPe:TUPPer command) and a lower limit (refer to the :TRIGger:SLOPe:TLOWercommand) of time. The oscilloscope triggers when the negative slope time of the input signal is greater than the specified lower limit and lower than the specified upper limit.

Return Format

The query returns PGR, PLES, NGR, NLES, PGL or NGL.

Example

:TRIGger:SLOPe:WHEN PGReater

The query returns PGR.

:TRIGger:SLOPe:TUPPer

Syntax

:TRIGger:SLOPe:TUPPer <time>

:TRIGger:SLOPe:TUPPer?

Description

Set the upper limit of time in slope trigger and the unit is s.

Query the current upper limit of time in slope trigger.

Parameter

Name	Type	Range	Default
<time>	Real	10ns to 1s	2μs

Note: when the trigger condition is PGLess or NGLess, the range is from 20ns to 1s.

Explanation

This command is only available when the trigger condition (refer to the :TRIGger:SLOPe:WHEN command) is PLESs, NLESs, PGLess or NGLess.

Return Format

The query returns the upper limit of time in scientific notation.

Example

:TRIGger:SLOPe:TUPPer 0.000003

The query returns 3.000000e-06.

:TRIGger:SLOPe:TLOWer

Syntax

:TRIGger:SLOPe:TLOWer <time>

:TRIGger:SLOPe:TLOWer?

Description

Set the lower limit of time in slope trigger and the unit is s.

Query the current lower limit of time in slope trigger.

Parameter

Name	Type	Range	Default
<time>	Real	10ns to 1s	1μs

Note: when the trigger condition is PGLess or NGLess, the range is from 10ns to 999ms.

Explanation

This command is only available when the trigger condition (refer to the :TRIGger:SLOPe:WHEN command) is PGReater, NGReater, PGLess or NGLess.

Return Format

The query returns the lower limit of time in scientific notation.

Example

:TRIGger:SLOPe:TLOWer 0.000003

The query returns 3.000000e-06.

:TRIGger:SLOPe:WINDow

Syntax

:TRIGger:SLOPe:WINDow <window>
:TRIGger:SLOPe:WINDow?

Description

Set the type of the vertical window in slope trigger.
Query the current type of the vertical window in slope trigger.

Parameter

Name	Type	Range	Default
<window>	Discrete	{TA|TB|TAB}	TA

Explanation

Different vertical windows correspond to different trigger level adjustment modes.
TA: only adjust the upper limit of the trigger level. Refer to the :TRIGger:SLOPe:ALEVel command.
TB: only adjust the lower limit of the trigger level. Refer to the :TRIGger:SLOPe:BLEVel command.
TAB: adjust the upper and lower limits of the trigger level at the same time. Refer to the :TRIGger:SLOPe:ALEVel and :TRIGger:SLOPe:BLEVel commands.

Return Format

The query returns TA, TB or TAB.

Example

:TRIGger:SLOPe:WINDow TB
The query returns TB.

:TRIGger:SLOPe:ALEVel

Syntax

:TRIGger:SLOPe:ALEVel <level>

:TRIGger:SLOPe:ALEVel?

Description

Set the upper limit of the trigger level in slope trigger and the unit is the same with the current amplitude unit.

Query the current upper limit of the trigger level in slope trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the upper limit of the trigger level in scientific notation.

Example

:TRIGger:SLOPe:ALEVel 0.16

The query returns 1.600000e-01.

:TRIGger:SLOPe:BLEVel

Syntax

:TRIGger:SLOPe:BLEVel <level>

:TRIGger:SLOPe:BLEVel?

Description

Set the lower limit of the trigger level in slope trigger and the unit is the same with the current amplitude unit.

Query the current lower limit of the trigger level in slope trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the lower limit of the trigger level in scientific notation.

Example

:TRIGger:SLOPe:BLEVel 0.16

The query returns 1.600000e-01.

:TRIGger:VIDeo

:TRIGger:VIDeo:SOURce

Syntax

:TRIGger:VIDeo:SOURce <source>

:TRIGger:VIDeo:SOURce?

Description

Select the trigger source of video trigger.

Query the current trigger source of video trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:VIDeo:SOURce CHANnel2

The query returns CHAN2.

:TRIGger:VIDeo:POLarity

Syntax

:TRIGger:VIDeo:POLarity <polarity>
:TRIGger:VIDeo:POLarity?

Description

Set the video polarity in video trigger.
Query the current video polarity in video trigger.

Parameter

Name	Type	Range	Default
<polarity>	Discrete	{POSitive|NEGative}	POSitive

Return Format

The query returns POS or NEG.

Example

:TRIGger:VIDeo:POLarity POSitive
The query returns POS.

:TRIGger:VIDeo:MODE

Syntax

:TRIGger:VIDeo:MODE <mode>

:TRIGger:VIDeo:MODE?

Description

Set the sync type in video trigger to AllLine, Line Number, Odd Field or Even Field.

Query the current sync type in video trigger.

Parameter

Name	Type	Range	Default
<mode>	Discrete	{ODDField|EVENfield|LINE|ALINes}	ALINes

Note: when the video standard is HDTV, the sync type could only be set to AllLine or Line Number. For the video standard, refer to the :TRIGger:VIDeo:STANdard command.

Explanation

ODDField: trigger on the rising edge of the first ramp waveform pulse in the odd field.

EVENfield: trigger on the rising edge of the first ramp waveform pulse in the even field.

LINE for NTSC and PAL/SECAM video standards, trigger on the specified line in the odd or even field; for HDTV video standard, trigger on the specified line. Note that when this sync trigger mode is selected, you can modify the line number using  in the “Line Num” menu with a step of 1. The range of the line number is from 1 to 525 (NTSC), 1 to 625 (PAL/SECAM), 1 to 525 (480P), 1 to 625 (576P), 1 to 750 (720P), 1 to 1125 (1080P) or 1 to 1125 (1080I).

ALINes: trigger on all the horizontal sync pulses.

Return Format

The query returns ODDF, EVEN, LINE or ALIN.

Example

:TRIGger:VIDeo:MODE ODDField

The query returns ODDF.

:TRIGger:VIDeo:LINE

Syntax

:TRIGger:VIDeo:LINE <line>

:TRIGger:VIDeo:LINE?

Description

Set the line number in video trigger when the sync type is Line Number (refer to the :TRIGger:VIDeo:MODE command).

Query the current line number of the specified line.

Parameter

Name	Type	Range	Default
<line>	Integer	NTSC：1 to 525 PAL：1 to 625 480P：1 to 525 576P：1 to 625 720P60HZ：1 to 750 720P50HZ：1 to 750 720P30HZ：1 to 750 720P25HZ：1 to 750 720P24HZ：1 to 750 1080P60HZ：1 to 1125 1080P50HZ：1 to 1125 1080P30HZ：1 to 1125 1080P25HZ：1 to 1125 1080P24HZ：1 to 1125 1080I30HZ：1 to 1125 1080I25HZ：1 to 1125 1080I24HZ：1 to 1125	1

Return Format

The query returns an integer.

Example

:TRIGger:VIDeo:LINE 100

The query returns 100.

:TRIGger:VIDeo:STANdard

Syntax

:TRIGger:VIDeo:STANdard <standard>
:TRIGger:VIDeo:STANdard?

Description

Select the video standard in video trigger.
Query the current video standard in video trigger.

Parameter

Name	Type	Range	Default
<standard>	Discrete	{PALSecam|NTSC|480P|576P|720P60HZ|720P50HZ|720P30HZ|720P25HZ|720P24HZ|1080P60HZ|1080P50HZ|1080P30HZ|1080P25HZ|1080P24HZ|1080I30HZ|1080I25HZ|1080I24HZ}	NTSC

Return Format

The query returns the video standard selected.

Example

:TRIGger:VIDeo:STANdard NTSC
The query returns NTSC.

:TRIGger:VIDeo:LEVel

Syntax

:TRIGger:VIDeo:LEVel <level>

:TRIGger:VIDeo:LEVel?

Description

Set the trigger level in video trigger and the unit is the same with the current amplitude unit.

Query the current trigger level in video trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the trigger level in scientific notation.

Example

:TRIGger:VIDeo:LEVel 0.16

The query returns 1.600000e-01.

:TRIGger:PATTern

- :TRIGger:PATTern:PATTern
- :TRIGger:PATTern:LEVel

:TRIGger:PATTern:PATTern

Syntax

:TRIGger:PATTern:PATTern <pattern>

:TRIGger:PATTern:PATTern?

Description

Set the pattern code of each channel in pattern trigger.

Query the current pattern code of each channel in pattern trigger.

Parameter

Name	Type	Range	Default
<pattern>	Discrete	{H,L,X,R,F}	H,L

Note: they are the default pattern codes for CH1 and CH2 from the left to the right.

Explanation

In the pattern, you can only specify one rising edge or falling edge. If one edge item is currently defined and then another edge item is defined in the other channel in the pattern, the former edge item defined will be replaced by X.

Return Format

The query returns the current pattern codes of both the channels.

Example

:TRIGger:PATTern:PATTern H,R

The query returns H,R.

:TRIGger:PATTern:LEVel

Syntax

:TRIGger:PATTern:LEVel <chan>,<level>

:TRIGger:PATTern:LEVel? <chan>

Description

Set the trigger level of each channel in pattern trigger and the unit is the same with the current amplitude unit.

Query the current trigger level of each channel in pattern trigger.

Parameter

Name	Type	Range	Default
<chan>	Discrete	{CHANnel1|CHANnel2}	CHANnel1
<level>	Real	± 5 × VerticalScale from the screen - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the trigger level in scientific notation.

Example

:TRIGger:PATTern:LEVel CHANnel2,0.16

The query returns 1.600000e-01.

:TRIGger:DELay

- :TRIGger:DELay:SA
- :TRIGger:DELay:SLOPA
- :TRIGger:DELay:SB
- :TRIGger:DELay:SLOPB
- :TRIGger:DELay:TYPe
- :TRIGger:DELay:TUPPer
- :TRIGger:DELay:TLOWer

:TRIGger:DELay:SA

Syntax

:TRIGger:DELay:SA <Source>

:TRIGger:DELay:SA?

Description

Select the trigger source of signal source A in delay trigger.

Query the current trigger source of signal source A in delay trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:DELay:SA CHANnel2

The query returns CHAN2.

:TRIGger:DELay:SLOPA

Syntax

:TRIGger:DELay:SLOPA <slope>

:TRIGger:DELay:SLOPA?

Description

Set the edge type of edge A of delay trigger.

Query the current edge type of edge A of delay trigger.

Parameter

Name	Type	Range	Default
<slope>	Discrete	{POSitive|NEGative}	POSitive

Return Format

The query returns POS or NEG.

Example

:TRIGger:DELay:SLOPA NEGative

The query returns NEG.

:TRIGger:DELay:SB

Syntax

:TRIGger:DELay:SB <Source>

:TRIGger:DELay:SB?

Description

Select the trigger source of signal source B in delay trigger.

Query the current trigger source of signal source B in delay trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:DELay:SB CHANnel2

The query returns CHAN2.

:TRIGger:DELay:SLOPB

Syntax

:TRIGger:DELay:SLOPB <slope>

:TRIGger:DELay:SLOPB?

Description

Set the edge type of edge B of delay trigger.

Query the current edge type of edge B of delay trigger.

Parameter

Name	Type	Range	Default
<slope>	Discrete	{POSitive|NEGative}	POSitive

Return Format

The query returns POS or NEG.

Example

:TRIGger:DELay:SLOPB NEGative

The query returns NEG.

:TRIGger:DELay:TYPe

Syntax

:TRIGger:DELay:TYPe <type>
:TRIGger:DELay:TYPe?

Description

Set the delay type of delay trigger.
Query the current delay type of delay trigger.

Parameter

Name	Type	Range	Default
<type>	Discrete	{ GREater|LESS|GLESs |GOUT}	GREater

Explanation

GREater: trigger when the time difference (ΔT) between the specified edges of source A and source B is greater than the preset time limit (refer to the :TRIGger:DELay:TLOWer command).
LESS: trigger when the time difference (ΔT) between the specified edges of source A and source B is lower than the preset time limit (refer to the :TRIGger:DELay:TUPPer command).
GLESs: trigger when the time difference (ΔT) between the specified edges of source A and source B is greater than the lower limit of the preset time (refer to the :TRIGger:DELay:TLOWer command) and lower than the upper limit of the preset time (refer to the :TRIGger:DELay:TUPPer command). Note that the time lower limit must be lower than the time upper limit.
GOUT: trigger when the time difference (ΔT) between the specified edges of source A and source B is lower than the lower limit of the preset time (refer to the :TRIGger:DELay:TLOWer command) or greater than the upper limit of the preset time (refer to the :TRIGger:DELay:TUPPer command). Note that the time lower limit must be lower than the time upper limit.

Return Format

The query returns GOUT, GRE, LESS or GLES.

Example

:TRIGger:DELay:TYPe GOUT

The query returns GOUT.

:TRIGger:DELay:TUPPer

Syntax

:TRIGger:DELay:TUPPer <NR3>

:TRIGger:DELay:TUPPer?

Description

Set the upper limit of the delay time in delay trigger.

Query the current upper limit of the delay time in delay trigger.

Parameter

Name	Type	Range	Default
<NR3>	Real	2ns to 4s	2μs

Note: when the delay type is GLESs or GOUT, the range is from 12ns to 4s.

Explanation

This command is available when the delay type (refer to the :TRIGger:DELay:TYPe command) is LESS, GOUT or GLESs.

Return Format

The query returns the upper limit of the delay time in scientific notation.

Example

:TRIGger:DELay:TUPPer 0.002

The query returns 2.000000e-03.

:TRIGger:DELay:TLOWer

Syntax

:TRIGger:DELay:TLOWer <NR3>

:TRIGger:DELay:TLOWer?

Description

Set the lower limit of the delay time in delay trigger.

Query the current lower limit of the delay time in delay trigger.

Parameter

Name	Type	Range	Default
<NR3>	Real	2ns to 3.99s	1μs

Note: when the delay type is GLESs or GOUT, the range is from 2ns to 3.99s.

Explanation

This command is available when the delay type (refer to the :TRIGger:DELay:TYPe command) is LESS, GOUT or GLESs.

Return Format

The query returns the lower limit of the delay time in scientific notation.

Example

:TRIGger:DELay:TLOWer 0.002

The query returns 2.000000e-03.

:TRIGger:TIMeout

- :TRIGger:TIMeout:SOURce
- :TRIGger:TIMeout:SLOPe
- :TRIGger:TIMeout:TIMe

:TRIGger:TIMeout:SOURce

Syntax

:TRIGger:TIMeout:SOURce <source>
:TRIGger:TIMeout:SOURce?

Description

Select the trigger source of timeout trigger.
Query the current trigger source of timeout trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:TIMeout:SOURce CHANnel2
The query returns CHAN2.

:TRIGger:TIMeout:SLOPe

Syntax

:TRIGger:TIMeout:SLOPe <slope>

:TRIGger:TIMeout:SLOPe?

Description

Set the edge type of timeout trigger.

Query the current edge type of timeout trigger.

Parameter

Name	Type	Range	Default
<slope>	Discrete	{POSitive|NEGative|RFALl}	POSitive

Return Format

The query returns POS, NEG or RFAL.

Example

:TRIGger:TIMeout:SLOPe NEGative

The query returns NEG.

:TRIGger:TIMeout:TIMe

Syntax

:TRIGger:TIMeout:TIMe <NR3>

:TRIGger:TIMeout:TIMe?

Description

Set the timeout time of timeout trigger.

Query the current timeout time of timeout trigger.

Parameter

Name	Type	Range	Default
<NR3>	Real	16ns to 4s	1μs

Return Format

The query returns the timeout time in scientific notation.

Example

:TRIGger:TIMeout:TIMe 0.002

The query returns 2.000000e+06.

:TRIGger:DURATion

- :TRIGger:DURATion:SOURce
- :TRIGger:DURATion:TYPe
- :TRIGger:DURATion:WHEN
- :TRIGger:DURATion:TUPPer
- :TRIGger:DURATion:TLOWer

:TRIGger:DURATion:SOURce

Syntax

:TRIGger:DURATion:SOURce <source>

:TRIGger:DURATion:SOURce?

Description

Select the trigger source of duration trigger.

Query the current trigger source of duration trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:DURATion:SOURce CHANnel2

The query returns CHAN2.

:TRIGger:DURATion:TYPe

Syntax

:TRIGger:DURATion:TYPe <type>

:TRIGger:DURATion:TYPe?

Description

Set the current patterns of the channels.

Query the current patterns of the channels.

Parameter

Name	Type	Range	Default
<type>	Discrete	{H,L,X}	H,L

Note: the default patterns of CH1 and CH2 from the left to right.

Return Format

The query returns the current patterns of the two channels.

Example

:TRIGger:DURATion:TYPe L,X

The query returns L,X.

:TRIGger:DURAtion:WHEN

Syntax

:TRIGger:DURATion:WHEN <when>
:TRIGger:DURATion:WHEN?

Description

Select the trigger condition of duration trigger.
Query the current trigger condition of duration trigger.

Parameter

Name	Type	Range	Default
<when>	Discrete	{GREater|LESS|GLESs}	PGReater

Explanation

GREater: you need to specify a time (refer to the :TRIGger:DURATion:TLOWer command). The oscilloscope triggers when the duration of the pattern is greater than the preset time.
LESS: you need to specify a time (refer to the :TRIGger:DURATion:TUPPer command). The oscilloscope triggers when the duration of the pattern is lower than the preset time.
GLESs: you need to specify a upper limit of time (refer to the :TRIGger:DURATion:TUPPer command) and lower limit of time (refer to the :TRIGger:DURATion:TLOWer command). The oscilloscope triggers when the duration of the pattern is lower than the preset upper limit of time and greater than the preset lower limit of time.

Return Format

The query returns GRE, LESS or GLES.

Example

:TRIGger:DURATion:WHEN LESS
The query returns LESS.

:TRIGger:DURATion:TUPPer

Syntax

:TRIGger:DURATion:TUPPer <NR3>

:TRIGger:DURATion:TUPPer?

Description

Set the upper limit of the duration in duration trigger and the unit is s.

Query the current upper limit of the duration in duration trigger.

Parameter

Name	Type	Range	Default
<NR3>	Real	2ns to 4s	2μs

Note: when the trigger condition is GLESs, the range is from 12ns to 4s.

Explanation

This command is available when the trigger condition (refer to the :TRIGger:DURATion:WHEN command) is set to LESS or GLESs.

Return Format

The query returns the upper limit of the duration in scientific notation.

Example

:TRIGger:DURATion:TUPPer 0.000003

The query returns 3.000000e-06.

:TRIGger:DURATion:TLOWer

Syntax

:TRIGger:DURATion:TLOWer <NR3>

:TRIGger:DURATion:TLOWer?

Description

Set the lower limit of the duration in duration trigger and the unit is s.

Query the current lower limit of the duration in duration trigger.

Parameter

Name	Type	Range	Default
<NR3>	Real	2ns to 4s	1μs

Note: when the trigger condition is GLESs, the range is from 2ns to 3.99s.

Explanation

This command is available when the trigger condition (refer to the :TRIGger:DURATion:WHEN command) is set to GREater or GLESs.

Return Format

The query returns the lower limit of the duration in scientific notation.

Example

:TRIGger:DURATion:TLOWer 0.000003

The query returns 3.000000e-06.

:TRIGger:SHOLd

:TRIGger:SHOLd:DSrc

Syntax

:TRIGger:SHOLd:DSrc <source>

:TRIGger:SHOLd:DSrc?

Description

Set the data source of setup/hold trigger.

Query the current data source of setup/hold trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:SHOLd:DSrc CHANnel1

The query returns CHAN2.

:TRIGger:SHOLd:CSrc

Syntax

:TRIGger:SHOLd:CSrc <source>

:TRIGger:SHOLd:CSrc?

Description

Set the clock source of setup/hold trigger.

Query the current clock source of setup/hold trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:SHOLd:CSrc CHANnel2

The query returns CHAN2.

:TRIGger:SHOLd:SLOPe

Syntax

:TRIGger:SHOLd:SLOPe <slope>

:TRIGger:SHOLd:SLOPe?

Description

Set the edge type of setup/hold trigger to the rising edge or falling edge.

Query the current edge type of setup/hold trigger.

Parameter

Name	Type	Range	Default
<slope>	Discrete	{POSitive|NEGative}	POSitive

Return Format

The query returns POS or NEG.

Example

:TRIGger:SHOLd:SLOPe NEGative

The query returns NEG.

:TRIGger:SHOLd:PATTern

Syntax

:TRIGger:SHOLd:PATTern <pattern>

:TRIGger:SHOLd:PATTern?

Description

Set the data type of setup/hold trigger.

Query the current data type of setup/hold trigger.

Parameter

Name	Type	Range	Default
<pattern>	Discrete	{H|L}	H

Return Format

The query returns the pattern currently set for each channel.

Example

:TRIGger:SHOLd:PATTern L

The query returns L.

:TRIGger:SHOLd:TYPe

Syntax

:TRIGger:SHOLd:TYPe <type>
:TRIGger:SHOLd:TYPe?

Description

Set the hold type of setup/hold trigger.
Query the current hold type of setup/hold trigger.

Parameter

Name	Type	Range	Default
<type>	Discrete	{SETup|HOLd|SETHOLd}	SETup

Explanation

SETup: set the time (refer to the :TRIGger:SHOLd:STIMe command) that the data stays stable and constant before the clock edge appears.
HOLd: set the time (refer to the :TRIGger:SHOLd:HTIMe command) that the data stays stable and constant after the clock edge appears.
SETHOLd: set the time (refer to the :TRIGger:SHOLd:STIMe and :TRIGger:SHOLd:HTIMe commands) that the data stays stable and constant before and after the clock edge appears.

Return Format

The query returns SETup, HOL or SETHOL.

Example

:TRIGger:SHOLd:TYPe SETHOLd
The query returns SETHOL.

:TRIGger:SHOLd:STIMe

Syntax

:TRIGger:SHOLd:STIMe <NR3>

:TRIGger:SHOLd:STIMe?

Description

Set the setup time of setup/hold trigger.

Query the current setup time of setup/hold trigger.

Parameter

Name	Type	Range	Default
<NR3>	Real	2ns to 1s	50ns

Explanation

This command is available when the hold type (refer to the :TRIGger:SHOLd:TYPe command) is set to SETup or SETHOLd.

Reuturn Format

The query returns the setup time in scientific notation.

Example

:TRIGger:SHOLd:STIMe 0.002

The query returns 2.000000e-03.

:TRIGger:SHOLd:HTIMe

Syntax

:TRIGger:SHOLd:HTIMe <NR3>
:TRIGger:SHOLd:HTIMe?

Description

Set the hold time of setup/hold trigger.
Query the current hold time of setup/hold trigger.

Parameter

Name	Type	Range	Default
<NR3>	Real	2ns to 1s	50ns

Explanation

This command is available when the hold type (refer to the :TRIGger:SHOLd:TYPe command) is set to HOLd or SETHOLd.

Reuturn Format

The query returns the hold time in scientific notation.

Example

:TRIGger:SHOLd:HTIMe 0.002
The query returns 2.000000e-03.

:TRIGger:RS232

:TRIGger:RS232:SOURce

Syntax

:TRIGger:RS232:SOURce <source>

:TRIGger:RS232:SOURce?

Description

Select the trigger source of RS232 trigger.

Query the current trigger source of RS232 trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Reuturn Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:RS232:SOURce CHANnel2

The query returns CHAN2.

:TRIGger:RS232:WHEN

Syntax

:TRIGger:RS232:WHEN <when>

:TRIGger:RS232:WHEN?

Description

Set the trigger condition of RS232 trigger to Start, Error, Check Error or Data.

Query the current trigger condition of RS232 trigger.

Parameter

Name	Type	Range	Default
<when>	Discrete	{STARt|ERRor|PARity|DATA}	STARt

Explanation

STARt: trigger on the start frame position.

ERRor: trigger when error frame is detected.

PARity: trigger when check error is detected.

DATA: trigger on the last bit of the preset data bits and even-odd check bits.

Return Format

The query returns STAR, ERR, PAR or DATA.

Example

:TRIGger:RS232:WHEN ERRor

The query returns ERR.

:TRIGger:RS232:PARity

Syntax

:TRIGger:RS232:PARity <parity>

:TRIGger:RS232:PARity?

Description

Set the even-odd check mode in RS232 trigger when the trigger condition is Error or Check Error.

Query the current even-odd check mode in RS232 trigger when the trigger condition is Error or Check Error.

Parameter

Name	Type	Range	Default
<parity>	Discrete	{EVEN|ODD|NONE}	NONE

Note: the even-odd check mode can not be set to NONE when the trigger condition is Check Error.

Explanation

To set the trigger condition, refer to the :TRIGger:RS232:WHEN command.

Return Format

The query returns EVEN, ODD or NONE.

Example

:TRIGger:RS232:PARity EVEN

The query returns EVEN.

:TRIGger:RS232:STOP

Syntax

:TRIGger:RS232:STOP <bit>

:TRIGger:RS232:STOP?

Description

Set the stop bit in RS232 trigger when the trigger condition is Error.

Query the current stop bit in RS232 trigger when the trigger condition is Error.

Parameter

Name	Type	Range	Default
<bit>	Discrete	{1|2}	1

Explanation

To set the trigger condition, refer to the :TRIGger:RS232:WHEN command.

Return Format

The query returns 1 or 2.

Example

:TRIGger:RS232:STOP 2

The query returns 2.

:TRIGger:RS232:DATA

Syntax

:TRIGger:RS232:DATA <data>

:TRIGger:RS232:DATA?

Description

Set the data value in RS232 trigger when the trigger condition is Data.

Query the current data value in RS232 trigger when the trigger condition is Data.

Parameter

Name	Type	Range	Default
<data>	Integer	0 to 2^n-1	70

Note: in the expression 2^n - 1, n is the current data bits (refer to the :TRIGger:RS232:WIDTh command).

Explanation

To set the trigger condition, refer to the :TRIGger:RS232:WHEN command.

Return Format

The query returns an integer.

Example

:TRIGger:RS232:DATA 10

The query returns 10.

:TRIGger:RS232:WIDTh

Syntax

:TRIGger:RS232:WIDTh <width>

:TRIGger:RS232:WIDTh?

Description

Set the data bits in RS232 trigger when the trigger condition is Data.

Query the current data bits in RS232 trigger when the trigger condition is Data.

Parameter

Name	Type	Range	Default
<width>	Discrete	{5|6|7|8}	8

Explanation

To set the trigger condition, refer to the :TRIGger:RS232:WHEN command.

Return Format

The query returns 5, 6, 7 or 8.

Example

:TRIGger:RS232:WIDTh 6

The query returns 6.

:TRIGger:RS232:BAUD

Syntax

:TRIGger:RS232:BAUD <baud_rate>

:TRIGger:RS232:BAUD?

Description

Set the baud rate in RS232 trigger and the unit is bps.

Query the current baud rate in RS232 trigger.

Parameter

Name	Type	Range	Default
<baud_rate>	Discrete	{2400|4800|9600|19200|38400|57600|115200|USER}	9600

Note: for USER, refer to the :TRIGger:RS232:BUSer command.

Return Format

The query returns the baud rate currently set.

Example

:TRIGger:RS232:BAUD 4800

The query returns 4800.

:TRIGger:RS232:BUSer

Syntax

:TRIGger:RS232:BUSer <user baud>

:TRIGger:RS232:BUSer?

Description

Set the user-defined baud rate in RS232 trigger and the unit is bps.

Query the current user-defined baud rate in RS232 trigger.

Parameter

Name	Type	Range	Default
<user baud>	Integer	1 to 900000	9600

Return Format

The query returns the current baud rate.

Example

:TRIGger:RS232:BUSer 50000

The query returns 50000.

:TRIGger:RS232:LEVel

Syntax

:TRIGger:RS232:LEVel <level>

:TRIGger:RS232:LEVel?

Description

Set the trigger level in RS232 trigger and the unit is the same with the current amplitude unit.

Query the current trigger level in RS232 trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the trigger level in scientific notation.

Example

:TRIGger:RS232:LEVel 0.16

The query returns 1.600000e-01.

:TRIGger:IIC

:TRIGger:IIC:SCL

Syntax

:TRIGger:IIC:SCL <source>

:TRIGger:IIC:SCL?

Description

Select the SCL channel source in IIC trigger.

Query the current SCL channel source in IIC trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:IIC:SCL CHANnel2

The query returns CHAN2.

:TRIGger:IIC:SDA

Syntax

:TRIGger:IIC:SDA <source>

:TRIGger:IIC:SDA?

Description

Select the SDA channel source in IIC trigger.

Query the current SDA channel source in IIC trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:IIC:SDA CHANnel2

The query returns CHAN2.

:TRIGger:IIC:WHEN

Syntax

:TRIGger:IIC:WHEN <trig_type>
:TRIGger:IIC:WHEN?

Description

Set the trigger condition of IIC trigger.
Query the current trigger condition of IIC trigger.

Parameter

Name	Type	Range	Default
<trig_type>	Discrete	{STARt|RESTart|STOP|NACKnowledge |ADDRess|DATA|ADATa}	STARt

Explanation

STARt: trigger when SDA data transitions from high to low while SCL is high.
RESTart: trigger when another start condition occurs before a stop condition.
STOP: trigger when SDA data transitions from low to high while SCL is high.
NACKnowledge: trigger when the SDA data is high during any acknowledgement of SCL clock position.
ADDRess: trigger on the clock (SCL) edge corresponding to the byte of data (SDA) behind the preset address (Write, Read or R/W direction).
DATA: the trigger searches for the control byte value on the data line (SDA) following which there is a reading bit and an acknowledgement bit and then searches for the specified data value.
ADATa: trigger when the “Address” and “Data” conditions are met at the same time.

Return Format

The query returns STAR, STOP, NACK, REST, ADDR, DATA or ADAT.

Example

:TRIGger:IIC:WHEN RESTart
The query returns REST.

:TRIGger:IIC:AWIDth

Syntax

:TRIGger:IIC:AWIDth <bits>

:TRIGger:IIC:AWIDth?

Description

Set the address bits in IIC trigger when the trigger condition is Address or A&D.

Query the current address bits in IIC trigger when the trigger condition is Address or A&D.

Parameter

Name	Type	Range	Default
<bits>	Discrete	{7|8|10}	7

Explanation

To set the IIC trigger condition, refer to the :TRIGger:IIC:WHEN command.

Return Format

The query returns 7, 8 or 10.

Example

:TRIGger:IIC:AWIDth 10

The query returns 10.

:TRIGger:IIC:ADDRess

Syntax

:TRIGger:IIC:ADDRess <adr>

:TRIGger:IIC:ADDRess?

Description

Set the address value in IIC trigger when the trigger condition is Address or A&D. Query the current address value in IIC trigger when the trigger condition is Address or A&D.

Parameter

Name	Type	Range	Default
<adr>	Integer	0 to 2^n – 1: 0 to 127 , 0 to 255 or 0 to 1023	1

Note: in the expression 2^n - 1, n is the current address bits (refer to the :TRIGger:IIC:AWIDth command).

Explanation

To set the IIC trigger condition, refer to the :TRIGger:IIC:WHEN command.

Return Format

The query returns an integer.

Example

:TRIGger:IIC:ADDRess 100

The query returns 100.

:TRIGger:IIC:DIRection

Syntax

:TRIGger:IIC:DIRection <dir>

:TRIGger:IIC:DIRection?

Description

Set the data direction in IIC trigger when the trigger condition is Address or A&D. Query the current data direction in IIC trigger when the trigger condition is Address or A&D.

Parameter

Name	Type	Range	Default
<dir>	Discrete	{READ|WRITe|RWRite}	READ

Explanation

To set the IIC trigger condition, refer to the :TRIGger:IIC:WHEN command.

Return Format

The query returns READ, WRIT or RWR.

Example

:TRIGger:IIC:DIRection RWRite

The query returns RWR.

:TRIGger:IIC:DATA

Syntax

:TRIGger:IIC:DATA <dat>

:TRIGger:IIC:DATA?

Description

Set the data value in IIC trigger when the trigger condition is Data or A&D.

Query the current data value in IIC trigger when the trigger condition is Data or A&D.

Parameter

Name	Type	Range	Default
<dat>	Integer	0 to 2^{40} - 1	0

Explanation

To set the IIC trigger condition, refer to the :TRIGger:IIC:WHEN command.

Return Format

The query returns an integer.

Example

:TRIGger:IIC:DATA 64

The query returns 64.

:TRIGger:IIC:CLEVel

Syntax

:TRIGger:IIC:CLEVel <level>

:TRIGger:IIC:CLEVel?

Description

Set the trigger level of SCL in IIC trigger and the unit is the same with the current amplitude unit.

Query the current trigger level of SCL in IIC trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the trigger level in scientific notation.

Example

:TRIGger:IIC:CLEVel 0.16

The query returns 1.600000e-01.

:TRIGger:IIC:DLEVel

Syntax

:TRIGger:IIC:DLEVel <level>

:TRIGger:IIC:DLEVel?

Description

Set the trigger level of SDA in IIC trigger and the unit is the same with the current amplitude unit.

Query the current trigger level of SDA in IIC trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the trigger level in scientific notation.

Example

:TRIGger:IIC:DLEVel 0.16

The query returns 1.600000e-01.

:TRIGger:SPI

:TRIGger:SPI:SCL

Syntax

:TRIGger:SPI:SCL <source>

:TRIGger:SPI:SCL?

Description

Select the SCL channel source in SPI trigger.

Query the current SCL channel source in SPI trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:SPI:SCL CHANnel2

The query returns CHAN2.

:TRIGger:SPI:SDA

Syntax

:TRIGger:SPI:SDA <source>

:TRIGger:SPI:SDA?

Description

Select the SDA channel source in SPI trigger.

Query the current SDA channel source in SPI trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:SPI:SDA CHANnel2

The query returns CHAN2.

:TRIGger:SPI:WIDTh

Syntax

:TRIGger:SPI:WIDTh <width>

:TRIGger:SPI:WIDTh?

Description

Set the bits of SDA in SPI trigger.

Query the current bits of SDA in SPI trigger.

Parameter

Name	Type	Range	Default
<width>	Integer	4 to 32	8

Return Format

The query returns an integer.

Example

:TRIGger:SPI:WIDTh 10

The query returns 10.

:TRIGger:SPI:DATA

Syntax

:TRIGger:SPI:DATA <data>

:TRIGger:SPI:DATA?

Description

Set the data value in SPI trigger.

Query the current data value in SPI trigger.

Parameter

Name	Type	Range	Default
<data>	Integer	0 to 2^n-1	0

Note: in the expression 2^n-1, n is the current data bits (refer to the :TRIGger:SPI:WIDTh command).

Return Format

The query returns an integer.

Example

:TRIGger:SPI:DATA 5

The query returns 5.

:TRIGger:SPI:TIMeout

Syntax

:TRIGger:SPI:TIMeout <time_value>

:TRIGger:SPI:TIMeout?

Description

Set the timeout time in SPI trigger when the trigger condition is Timeout and the unit is s.

Query the current timeout time in SPI trigger when the trigger condition is Timeout.

Parameter

Name	Type	Range	Default
<time_value>	Real	100ns to 1s	1us

Return Format

The query returns the timeout time in scientific notation.

Example

:TRIGger:SPI:TIMeout 0.000002

The query returns 2.000000e-06.

:TRIGger:SPI:SLOPe

Syntax

:TRIGger:SPI:SLOPe <slope>

:TRIGger:SPI:SLOPe?

Description

Set the trigger edge of the clock signal in SPI trigger.

Query the current trigger edge of the clock signal in SPI trigger.

Parameter

Name	Type	Range	Default
<slope>	Discrete	{POSitive|NEGative}	POSitive

Return Format

The query returns POS or NEG.

Example

:TRIGger:SPI:SLOPe POSitive

The query returns POS.

:TRIGger:SPI:CLEVel

Syntax

:TRIGger:SPI:CLEVel <level>

:TRIGger:SPI:CLEVel?

Description

Set the trigger level of SCL in SPI trigger and the unit is the same with the current amplitude unit.

Query the current trigger level of SCL in SPI trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the trigger level in scientific notation.

Example

:TRIGger:SPI:CLEVel 0.16

The query returns 1.600000e-01.

:TRIGger:SPI:DLEVel

Syntax

:TRIGger:SPI:DLEVel <level>

:TRIGger:SPI:DLEVel?

Description

Set the trigger level of SDA in SPI trigger and the unit is the same with the current amplitude unit.

Query the current trigger level of SDA in SPI trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the trigger level in scientific notation.

Example

:TRIGger:SPI:DLEVel 0.16

The query returns 1.600000e-01.

:TRIGger:USB

:TRIGger:USB:DPLus

Syntax

:TRIGger:USB:DPLus <source>

:TRIGger:USB:DPLus?

Description

Select the D+ data channel source in USB trigger.

Query the current D+ data channel source in USB trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:USB:DPLus CHANnel2

The query returns CHAN2.

:TRIGger:USB:DMINus

Syntax

:TRIGger:USB:DMINus <source>

:TRIGger:USB:DMINus?

Description

Select the D- data channel source in USB trigger.

Query the current D- data channel source in USB trigger.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel2

Return Format

The query returns CHAN1 or CHAN2.

Example

:TRIGger:USB:DMINus CHANnel2

The query returns CHAN2.

:TRIGger:USB:SPEed

Syntax

:TRIGger:USB:SPEed <value>

:TRIGger:USB:SPEed?

Description

Set the signal speed in USB trigger to Low Speed or Full Speed.

Query the current signal speed in USB trigger.

Parameter

Name	Type	Range	Default
<value>	Discrete	{LOW|FULL}	LOW

Return Format

The query returns LOW or FULL.

Example

:TRIGger:USB:SPEed FULL

The query returns FULL.

:TRIGger:USB:WHEN

Syntax

:TRIGger:USB:WHEN <condition>

:TRIGger:USB:WHEN?

Description

Set the trigger condition of USB trigger.

Query the current trigger condition of USB trigger.

Parameter

Name	Type	Range	Default
<condition>	Discrete	{SOP|EOP|RC|SUSPend|EXITsuspend}	SOP

Explanation

SOP: trigger at the sync bit at the start of the data packet (SOP).

EOP: trigger at the end of the SEO portion of the EOP of the data packet.

RC: trigger when SEO is greater than 10 ms.

SUSPend: trigger when the idle time of the bus is greater than 3 ms.

EXITsuspend: trigger when the bus exits from idle state for more than 10 ms.

Return Format

The query returns SOP, EOP, RC, SUSP or EXIT.

Example

:TRIGger:USB:WHEN RC

The query returns RC.

:TRIGger:USB:PLEVel

Syntax

:TRIGger:USB:PLEVel <level>

:TRIGger:USB:PLEVel?

Description

Set the trigger level of the D+ data line in USB trigger and the unit is the same with the current amplitude unit.

Query the current trigger level of the D+ data line in USB trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5× VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the trigger level in scientific notation.

Example

:TRIGger:USB:PLEVel 0.16

The query returns 1.600000e-01.

:TRIGger:USB:MLEVel

Syntax

:TRIGger:USB:MLEVel <level>

:TRIGger:USB:MLEVel?

Description

Set the trigger level of the D- data line in USB trigger and the unit is the same with the current amplitude unit.

Query the current trigger level of the D- data line in USB trigger.

Parameter

Name	Type	Range	Default
<level>	Real	± 5 × VerticalScale from the screen center - OFFSet	0

Note:

For the VerticalScale, refer to the :CHANnel<n>:SCALe command.

For the OFFSet, refer to the :CHANNel<n>:OFFSet command.

Return Format

The query returns the trigger level in scientific notation.

Example

:TRIGger:USB:MLEVel 0.16

The query returns 1.600000e-01.

:WAVeform Subsystem

:WAVeform:SOURce

Syntax

:WAVeform:SOURce <source>
:WAVeform:SOURce?

Description

Set the channel source of waveform reading.
Query the current channel source of waveform reading.

Parameter

Name	Type	Range	Default
<source>	Discrete	{CHANnel1|CHANnel2}	CHANnel1

Return Format

The query returns CHAN1 or CHAN2。

Example

:WAVeform:SOURce CHANnel2
The query returns CHAN2.

:WAVeform:MODE

Syntax

:WAVeform:MODE <mode>
:WAVeform:MODE?

Description

Set the reading mode of waveform.
Query the current reading mode of waveform.

Parameter

Name	Type	Range	Default
<mode>	Discrete	{NORMal|MAXimum|RAW}	NORMal

Explanation

In different modes, the :WAVeform:POINts command returns different numbers of waveform points.
NORMal : return the number of waveform points currently displayed.
MAXimum : return the maximum number of effective data points under the current state. Return the number of data points displayed on the screen when the instrument is in run state and the number of data points in the internal memory in stop state.
RAW : It is only available when the instrument is in stop state. You can use the :WAVeform:POINts command to set the desired number of data points in the internal memory.

Return Format

The query returns NORM, MAX or RAW.

Example

:WAVeform:MODE RAW
The query returns RAW.

:WAVeform:FORMat

Syntax

:WAVeform:FORMat <format>
:WAVeform:FORMat?

Description

Set the return format of the waveform data.
Query the current return format of the waveform data.

Parameter

Name	Type	Range	Default
<format>	Discrete	{WORD|BYTE|ASCii}	BYTE

Return Format

The query returns WORD, BYTE or ASC.

Example

:WAVeform:FORMat WORD
The query returns WORD.

:WAVeform:POINts

Syntax

:WAVeform:POINts <point>
:WAVeform:POINts?

Description

Set the number of waveform points to be read.
Query the current number of waveform points to be read.

Parameter

Name	Type	Range	Default
<point>	Integer	NORMal: 1 to 1400 MAX: 1 to the number of effective points currently on the screen RAW: 1 to the current maximum memory depth	--

Explanation

The number of waveform points is limited by the current reading mode of waveform (refer to the :WAVeform:MODE command).

Return Format

The query returns an integer.

Example

:WAVeform:POINts 600
The query returns 600.

:WAVeform:DATA?

Syntax

:WAVeform:DATA?

Description

Read the waveform data.

Explanation

This command is affected by the :WAVeform:FORMat, :WAVeform:MODE, :WAVeform:POINts, :WAVeform:SOURce and related commands.

Procedures of the screen waveform data reading:

S1. :WAV:SOURce CHAN1	Set the channel source to be read
S2. :WAV:MODE NORM	Set the waveform mode to NORM
S3. :WAV:DATA?	Obtain data from buffer

Procedures of the internal memory waveform data reading:

S1. :STOP	The internal memory waveform data can only be read in STOP state
S2. :WAV:SOURce CHAN1	Set the channel source to be read
S3. :WAV:MODE RAW	Set the waveform mode to RAW
S4. :WAV:RESet	Reset the waveform reading
S5. :WAV:BEGin	Start the waveform reading
S6. :WAV:STATus?	Get the state
1) IDLE	Waveform reading thread finishes
:WAV:DATA?	Get data in buffer
:WAV: END	Waveform reading finishes
2) READ	Waveform reading thread is running
:WAV:DATA?	Get data in buffer
Repeat S6	Continue to read waveform data

See the example below.

```
visa32.viPrintf(viSession, ":STOP\n");
visa32.viPrintf(viSession, ":WAV:MODE RAW\n");
visa32.viPrintf(viSession, ":WAV:SOURce %s\n", strChan );
```

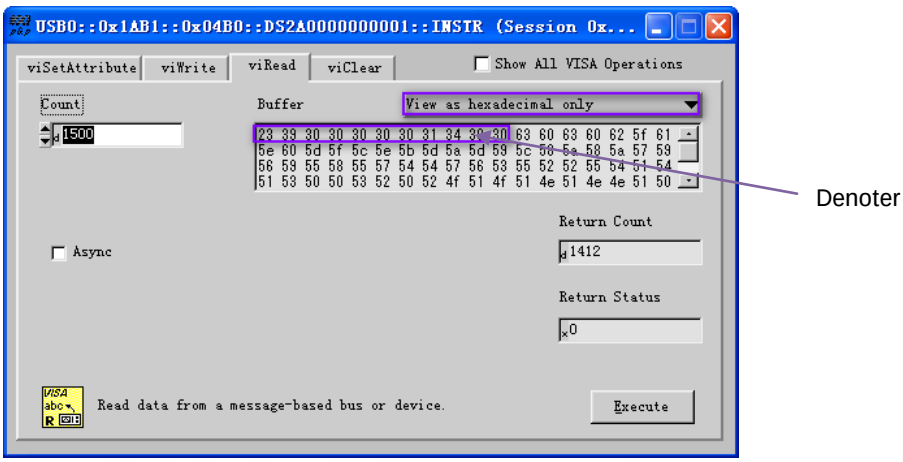
```
visa32.viPrintf(viSession, ":WAV:RESet\n");
visa32.viPrintf(viSession, ":WAV:BEGin\n");
 while (true)
                {
                    Thread.Sleep( 100 );
                    visa32.viPrintf(viSession, ":WAV:STATus?\n");
                    visa32.viScanf(viSession, "%s", strBuild);
                    if (strBuild[0] == 'I')        //IDLE
                    {
                        visa32.viPrintf(viSession, ":WAV:DATA?\n");
                        visa32.viRead(viSession, wfmBuf, wfmBuf.Length, out
readCnt);
                        readSum += ( readCnt -12);
                        readTim++;
                        Console.WriteLine("{0}: Read {1} Sum {2}" , readTim,
readCnt, readSum);
                        return readSum;
                    }
                    else
                    {
                        visa32.viPrintf(viSession, ":WAV:DATA?\n");
                        visa32.viRead(viSession, wfmBuf, wfmBuf.Length, out
readCnt);
                        readSum += (readCnt -12);
                        readTim++;
                        Console.WriteLine("{0}: Read {1} Sum {2}" , readTim,
readCnt, readSum);
                        Console.WriteLine("Press any key to read next data." );
                        //Console.ReadKey();
                        Console.WriteLine("Reading..." );
                        }

                }
```

Return Format

The data returned contains 2 parts: the TMC data description header and the waveform data.
#900000ddddXXXX...
Wherein, dddd denotes the number of the effective waveform points in the data stream.
When reading the internal memory data, the waveform data returned each time might be the data block in one area of the buffer. Each data block has a TMC description header similar to #9XXXXXXXXX, wherein XXXXXXXXX denotes the number of the waveform points in this data block. Waveform data in two adjacent data blocks are consecutive.

The waveform data read can be converted to the voltage of each point of the waveform on the screen according to the method below.

The figure below shows the waveform data read. First, select "View as hexadecimal only" from the dropdown list at the right of Buffer; at this point, the waveform data read is displayed in hexadecimal format; the first 11 figures denote the number of bytes that the "Denoter" holds in the internal memory; the figures following are the waveform data on the screen and users can convert the waveform data read to the voltage of each point of the waveform on the screen using the formula (ox63 - vertical reference position in Y direction) × VerticalScale-OFFSet. For the vertical reference position in Y direction, refer to the :WAVeform:YREFerence? command, for the VerticalScale, refer to the :CHANnel<n>:SCALe command and for the OFFSet, refer to the:CHANNel<n>:OFFSet command.



Note: when the return format of the waveform data is set to ASCii (refer to the :WAVeform:FORMat command), the query returns the actual voltage of each point of the waveform on the screen in scientific notation.

C# Test Program

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Diagnostics;
using System.Threading;
using System.IO;
namespace FalconWavQuery
{
    class Program
    {
        static void Main(string[] args)
        {
            Int32 viDef = 0;
            Int32 viSession = 0;
            Int32 s32ReadByte;
            if (args.Length < 2)
            {
                Console.WriteLine( "Invalid Input! FalconWavQuery CHAN1
fileName" );
                return;
            }
            Stopwatch stpWatch = new Stopwatch();
            InitVisa( out viDef );
            if (ConnectDevice(viDef, out viSession) == true)
            {
            }
            else
            {
                Console.WriteLine( "Connect fail!" );
                return;
```

```
            }
            stpWatch.Start();
            s32ReadByte = TestReadWfm(viSession, args[0], args[1] );
            stpWatch.Stop();
            Console.WriteLine( "Speed is {0} KB/s",
s32ReadByte/stpWatch.ElapsedMilliseconds );
            DeInitVisa(viDef, viSession);
            Console.WriteLine( "Press any key to continue.");
            Console.ReadKey();
        }
        static Int32 TestReadWfm(Int32 viSession, string strChan, string strFile )
        {
            byte []wfmBuf;
            Int32 readCnt = 0;
            Int32 readSum = 0;
            Int32 readTim = 0;
            Int32 maxPacket=0;
            StringBuilder strBuild;
            Stream streamOut;
            BinaryWriter wfmStream;
            wfmBuf = new byte[1024*1024*10];
            strBuild = new StringBuilder(256);

            visa32.viPrintf(viSession, ":STOP\n");
            visa32.viPrintf(viSession, ":WAV:MODE RAW\n");
            visa32.viPrintf(viSession, ":WAV:SOURce %s\n", strChan );
            visa32.viPrintf(viSession, ":WAV:RESet\n");
            visa32.viPrintf(viSession, ":WAV:BEGin\n");
                                                //read buffer to WFM
            streamOut = File.Create( strFile , 10000000);
            wfmStream = new BinaryWriter(streamOut);

            while (true)
            {
                //Thread.Sleep( 10000 );
                visa32.viPrintf(viSession, ":WAV:STATus?\n");
                visa32.viScanf(viSession, "%s", strBuild);
```

```
                if (strBuild[0] == 'I')        //IDLE
                {
                    visa32.viPrintf(viSession, ":WAV:DATA?\n");
                    visa32.viRead(viSession, wfmBuf, wfmBuf.Length, out
readCnt);
                                                    //data header #9XXXX... plus end
mark   \n
                    readCnt -=12;
                    readSum += (readCnt);
                    if (readCnt > maxPacket)
                    {
                        maxPacket = readCnt;
                    }
                    //readTim++;
                                                     //skip data header #9XXXX...
                    if (readCnt > 0)
                    {
                        wfmStream.Write( wfmBuf, 11, readCnt);
                    }
                    wfmStream.Close();
                    Console.WriteLine("{0}: Read {1} Sum {2} Max {3}",
readTim, readCnt, readSum, maxPacket );
                    return readSum;
                }
                else
                {
                                                     //READ
                    visa32.viPrintf(viSession, ":WAV:DATA?\n");
                    visa32.viRead(viSession, wfmBuf, wfmBuf.Length, out
readCnt);
                                                    //data header #9XXXX... plus end
mark   \n
                    readCnt -= 12;
                    readSum += (readCnt);
                    if (readCnt > maxPacket)
                    {
                        maxPacket = readCnt;
```

```
                }
                Console.WriteLine("{0}: Read {1} ", readTim, readCnt );
                readTim++;
                                        //skip data header #9XXXX...
                if (readCnt > 0)
                {
                    wfmStream.Write( wfmBuf ,11, readCnt);
                }
            }
        }
        return readSum;
    }
    //initialize VISA
    static bool InitVisa( out Int32 viDef )
    {
        Int32 viError;
        viError = visa32.viOpenDefaultRM( out viDef );
        if( viError!=visa32.VI_SUCCESS )
        {
            return false;
        }
        else
        {
            return true;
        }
    }
    //to initialize VISA
    static void DeInitVisa(Int32 viDef, Int32 viSession )
    {
        visa32.viClose(viSession);
        visa32.viClose(viDef );
    }
    //connect devices
    static bool ConnectDevice(Int32 viDef, out Int32 viSession)
    {
        Int32 viError;
        Int32 viFindList;
```

```
                Int32 viRetCount;
                StringBuilder strRsrc = new StringBuilder(256);
                viError = visa32.viFindRsrc(viDef, "USB?*", out viFindList, out
viRetCount, strRsrc);
                if (viRetCount > 0)
                {
                    viError = visa32.viOpen(viDef, strRsrc.ToString(), 0, 0, out
viSession);
                    if (viError != visa32.VI_SUCCESS)
                    {
                        visa32.viClose(viDef);
                        return false;
                    }
                    return true;
                }
                else
                {
                    viSession = 0;
                    return false;
                }
            }
        }
}
```

:WAVeform:XINCrement?

Syntax

:WAVeform:XINCrement?

Description

Query the time difference between two neighboring points of the specified source (refer to the :WAVeform:SOURce command) in X direction and the unit is s.

Return Format

The query returns the time difference in scientific notation.

Example

:WAVeform:XINCrement?

The query returns 1.000000e-08.

:WAVeform:XORigin?

Syntax

:WAVeform:XORigin?

Description

Query the time from the trigger point to the reference time (refer to the :WAVeform:SOURce command) of the specified source (refer to the :WAVeform:XREFerence? command) in X direction and the unit is s.

Return Format

The query returns the time value in scientific notation.

Example

:WAVeform:XORigin?

The query returns -7.000000e-06.

:WAVeform:XREFerence?

Syntax

:WAVeform:XREFerence?

Description

Query the reference time of the specified source (refer to the :WAVeform:SOURce command) in X direction and the unit is s.

Return Format

The query returns the reference time in integer.

Example

:WAVeform:XREFerence?

The query returns 0.

:WAVeform:YINCrement?

Syntax

:WAVeform:YINCrement?

Description

Query the voltage value per unit of the specified source (refer to the :WAVeform:SOURce command) in Y direction and the unit is the same with the unit of the signal source.

Return Format

The query returns the voltage value in scientific notation.

Example

:WAVeform:YINCrement?

The query returns 4.000000e-02.

:WAVeform:YORigin?

Syntax

:WAVeform:YORigin?

Description

Query the vertical offset relative to the vertical reference position (refer to the :WAVeform:SOURce command) of the specified source (refer to the :WAVeform:YREFerence? command) in Y direction and the unit is the same with the unit of the signal source.

Return Format

The query returns the offset value in scientific notation.

Example

:WAVeform:YORigin?

The query returns 2.000000e+00.

:WAVeform:YREFerence?

Syntax

:WAVeform:YREFerence?

Description

Query the vertical reference position of the specified source (refer to the :WAVeform:SOURce command) in Y direction and the unit is the same with the unit of the signal source.

Return Format

The query returns the reference position in integer.

Example

:WAVeform:YREFerence?

The query returns 127.

:WAVeform:STARt

Syntax

:WAVeform:STARt <sta>
:WAVeform:STARt?

Description

Set the start position of internal memory waveform reading.
Query the current start position of internal memory waveform reading.

Parameter

Name	Type	Range	Default
<sta>	Integer	NORMal: 1 to 1400 MAX: 1 to the number of effective point currently on the screen RAW: 1 to the current maximum memory depth	--

Explanation

For the memory depth, refer to the :ACQuire:MDEPth command.
The setting of the start position is limited by the current reading mode of the waveform (refer to the :WAVeform:MODE command).

Return Format

The query returns an integer.

Example

:WAVeform:STARt 100
The query returns 100.

:WAVeform:STOP

Syntax

:WAVeform:STOP <sta>
:WAVeform:STOP?

Description

Set the stop position of internal memory waveform reading.
Query the current stop position of internal memory waveform reading.

Parameter

Name	Type	Range	Default
<sta>	Integer	NORMal: 1 to 1400 MAX: 1 to the number of effective point currently on the screen RAW: 1 to the current maximum memory depth	--

Explanation

For the memory depth, refer to the :ACQuire:MDEPth command.
The setting of the stop position is limited by the current reading mode of the waveform (refer to the :WAVeform:MODE command).

Return Format

The query returns an integer.

Example

:WAVeform:STOP 200
The query returns 200.

:WAVeform:BEGin

Syntax

:WAVeform:BEGin

Description

Enable the waveform reading.

:WAVeform:END

Syntax

:WAVeform:END

Description

Stop the waveform reading.

:WAVeform:RESet

Syntax

:WAVeform:RESet

Description

Reset the waveform reading.

:WAVeform:PREamble?

Syntax

:WAVeform:PREamble?

Description

Query and return all the waveform parameters.

Return Format

The query returns 10 waveform parameters separated by ",":
<format>,<type>,<points>,<count>,<xincrement>,<xorigin>,<xreference>,<yincrement>,<yorigin>,<yreference>
<format>: 0 (WORD), 1 (BYTE) or 2 (ASC). Refer to the :WAVeform:FORMat command.
<type>: 0 (NORMal), 1 (MAXimum) or 2 (RAW). Refer to the :WAVeform:MODE command.
<points>: integer between 1 and 56000000. Refer to the :WAVeform:POINts command.
<count>: the number of averages in average sample mode (refer to the :ACQuire:AVERages command) and 1 in other modes.
<xincrement>: the time difference between two neighboring points in X direction. Refer to the :WAVeform:XINCrement? command.
<xorigin>: the time from the trigger point to the "Reference Time" in X direction. Refer to the :WAVeform:XORigin? command.
<xreference>: the reference time of the data point in X direction. Refer to the :WAVeform:XREFerence? command.
<yincrement>: the voltage value per unit in Y direction. Refer to the :WAVeform:YINCrement? command.
<yorigin> the vertical offset relative to the "Vertical Reference Position" in Y direction. Refer to the :WAVeform:YORigin? command.
<yreference>: the vertical reference position in Y direction. Refer to the :WAVeform:YREFerence? command.

Example

:WAVeform:PREamble?
The query returns 0,0,1400,1,0.000000,-0.000007,0,0.040000,2.000000,127.

:WAVeform:STATus?

Syntax

:WAV:STATus?

Description

Query and return the current waveform reading state.

Explanation

IDLE: the waveform reading thread finishes.
READ: the waveform reading thread is running.
n: the current number of waveform points to be read.

Return Format

The query returns IDLE,n or READ,n.

3 Programming Demos

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

VISA is an API (Application Programming Interface) for controlling instruments. It is convenient for users to develop testing applications which are independent of the types of the instrument and interface. Note the "VISA" mentioned here is NI (National Instrument)-VISA. NI-VISA is an API written by NI based on VISA standards. You can use NI-VISA to realize the communication between the oscilloscope and the PC via instrument buses such as USB and LAN. 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 the NI-VISA Help.

A typical VISA application contains the following steps:

1. Build up communication for sources that already exist.
2. Configure the sources (for example the baud rate).
3. Turn the communication resource off.

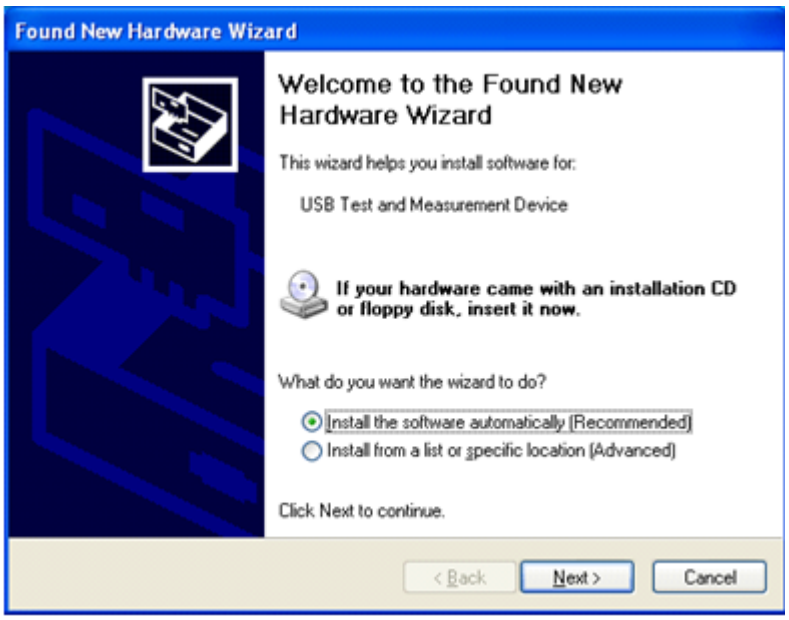
The main topics of this chapter:

Note: the "Device Source Descriptor" in the above programming demos should match with the instrument.

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 interface of the oscilloscope 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 oscilloscope 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".



By now, the programming preparations are finished. In the following part, detailed introductions are given about the programming demos in the C#, Excel, Labview, Matlab, Visual Basic 6.0 and Visual C++ 6.0 development environments.

C# Programming Demo

The function of the program: read the device information.

1. Build a project. Find **visa32.cs** in the installation directory of VISA and add it to the project. After that, **visa32.cs** is added to the **Solution Explorer** and the **type visa32** is introduced in.

2. Open the resource manager and then turn on the instrument (you need to set the descriptor).

```
Const string
Cdevice_INSTR=@"USB0::0x1AB1::0x04B0::DS2A0000000001::INSTR"

viError=visa32.viOpenDefaultRM(out viDefRm);
viError=visa32.viOpen(viDefRm,cDEVICE_INSTR,0,5000,out viSession);
```

3. Send the request and read the data.

```
visa32.viPrintf(viSession,"*IND?\n");
byteReadBuf = new byte[128];
visa32.viRead(viSession,byteReadBuf,128,outretCnt);

The data read (in byte format) needs to be converted to string.
StrIdn="";
For(i=0;i<retCnt;i++);
{
    strIdn=strIdn+Convert.ToChar(byteReadBuf[i]);
}
```

4. After the communication finishes, turn off the instrument and the resource manager.

```
visa32.viClose( viSession );
visa32.viClose( viDefRm );
```

5. C# program

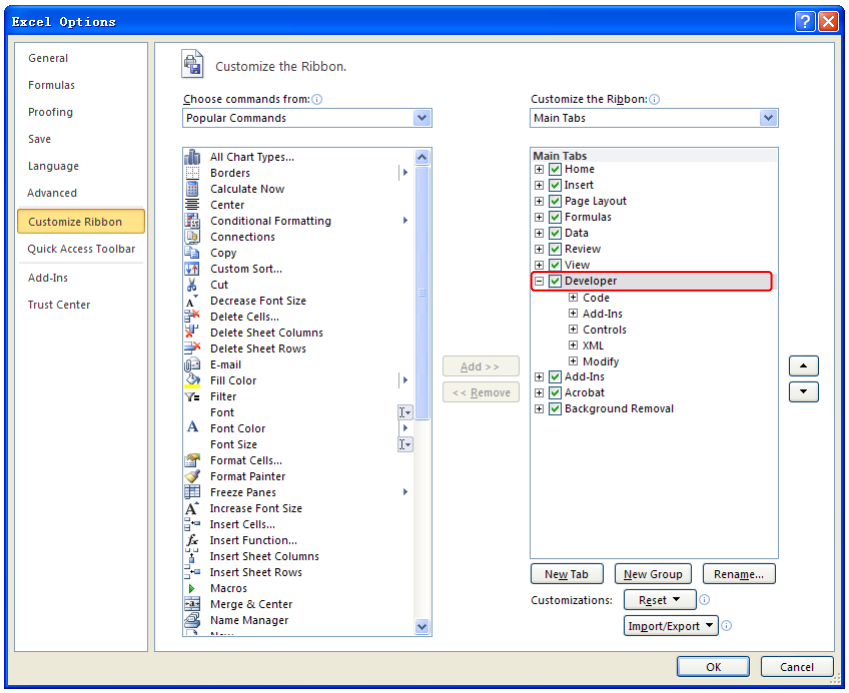
```
    using System.Collections.Generic;
  using System.Linq;
  using System.Text;

  namespace IDN
  {
     class Program
         {
              const string cDEVICE_INSTR =
  @"USB0::0x1AB1::0x04B0::DS2A0000000001::INSTR";
         static void Main(string[] args)
         {
             Int32 viError;
             Int32 viDefRm;
             Int32 viSession;
             Int32 retCnt;
             Int32 i;
             String strIdn;
             byte [] byteReadBuf;
             viError = visa32.viOpenDefaultRM(out viDefRm);
                  viError = visa32.viOpen(viDefRm, cDEVICE_INSTR, 0, 5000, out
  viSession);
             visa32.viPrintf(viSession, "*IDN?\n");
             byteReadBuf = new byte[128];
             visa32.viRead(viSession, byteReadBuf, 128, out retCnt);
              strIdn = "";
             for ( i = 0; i < retCnt; i++ )
             {
                strIdn = strIdn + Convert.ToChar( byteReadBuf[i] );
             }
             Console.WriteLine(strIdn);
             Console.ReadKey();
             visa32.viClose( viSession );
             visa32.viClose( viDefRm );
         }
```

```
    }
}
```

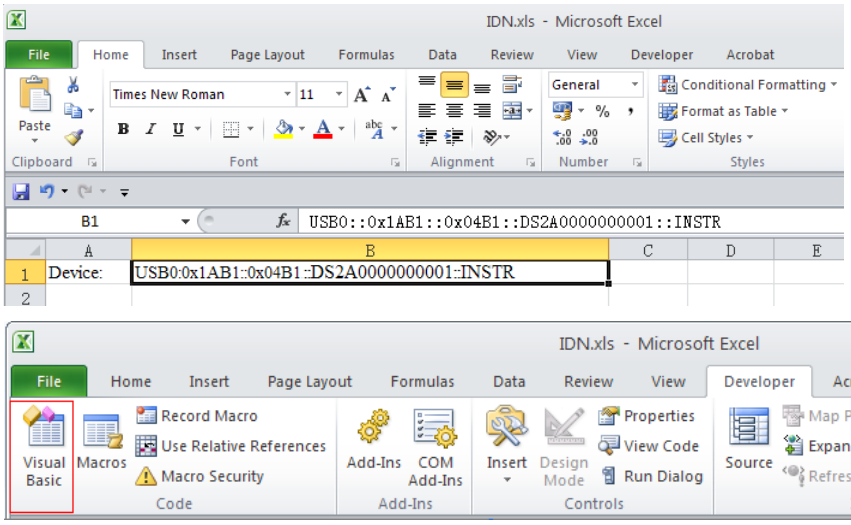
Excel Programming Demo

The function of the program: read the device information. Use the VBA function in the Excel to operate the instrument. You need to install the Excel 2010 and Visual Basic.

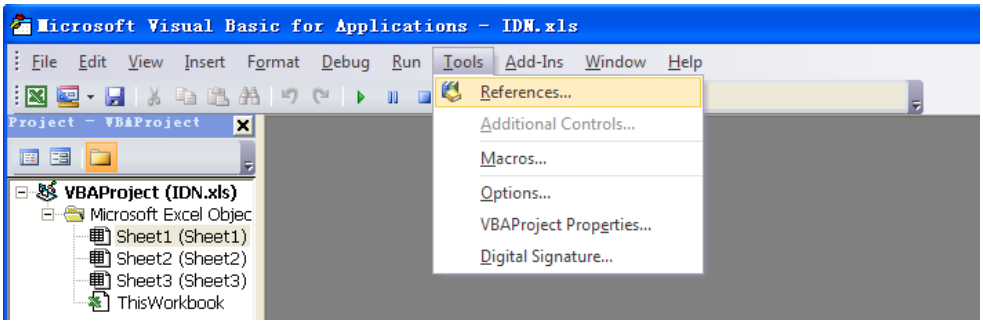
1. Add the **Developer** to the menu bar. Click **File** and open the **Excel Options** dialog box as shown in the figure below. Click **Customize Ribbon** and then select the **Developer** in the right-hand box.

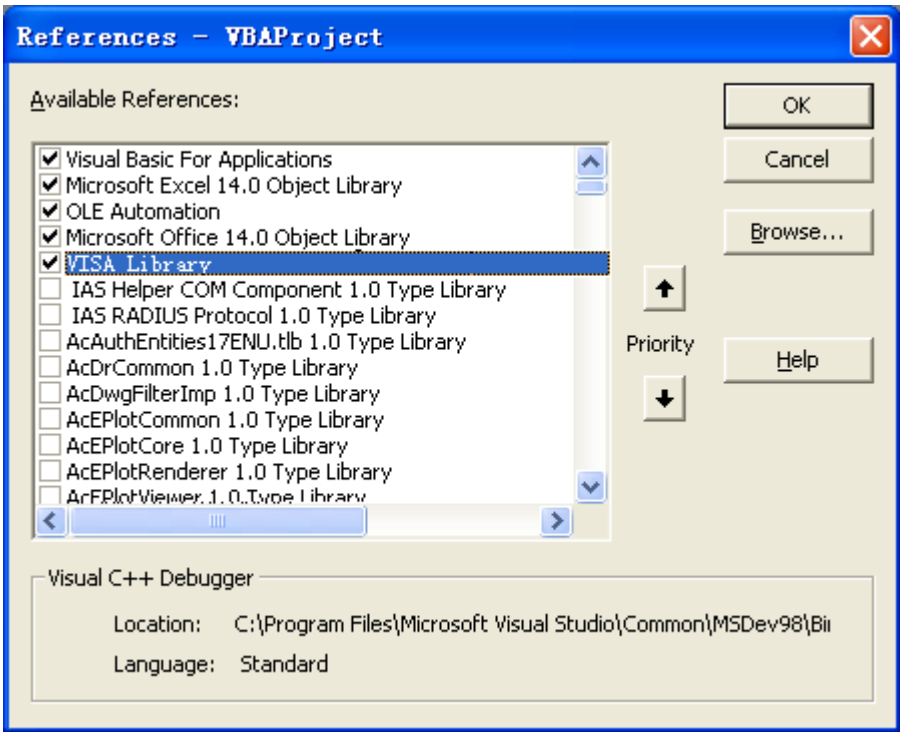


2. Input the device resource descriptor in a cell in the Excel. Click **Developer** in the menu bar and select **Visual Basic** as shown in the figures below.



3. Select **Tools** in the menu bar in the **Visual Basic** page and click **References...**. Then, select **VISA Library** in the pop-up dialog box and click **OK** to quote the **VISA Library** as shown in the figure below.





4. Turn on the device and the device descriptor is in CELLS(1,2) of SHEET1.

```
viErr = visa.viOpenDefaultRM(viDefRm)
viErr = visa.viOpen(viDefRm, Sheet1.Cells(1, 2), 0, 5000, viDevice)
```

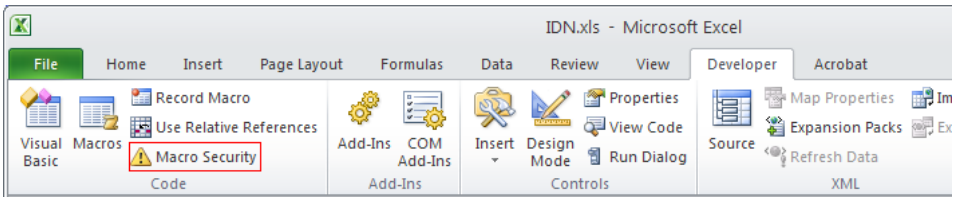
5. Send request and read data.

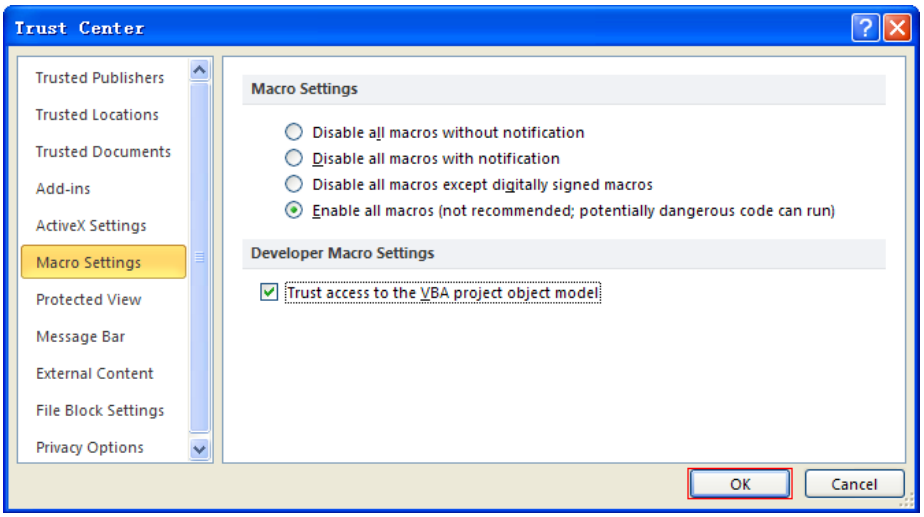
```
cmdStr = "*IDN?"
viErr = visa.viWrite(viDevice, cmdStr, Len(cmdStr), ret)
viErr = visa.viRead(viDevice, idnStr, 128, ret)
Sheet1.Cells(2, 2) = idnStr
```

6. Turn off the device.

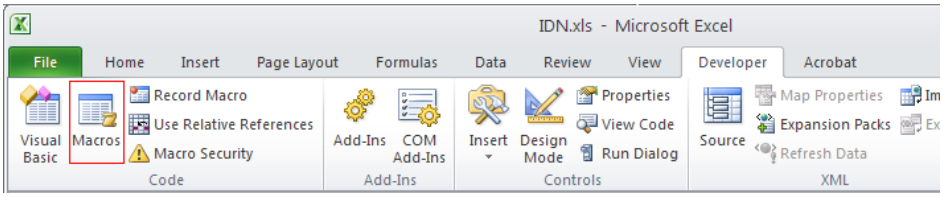
```
visa.viClose (viDevice)
visa.viClose (viDefRm)
```

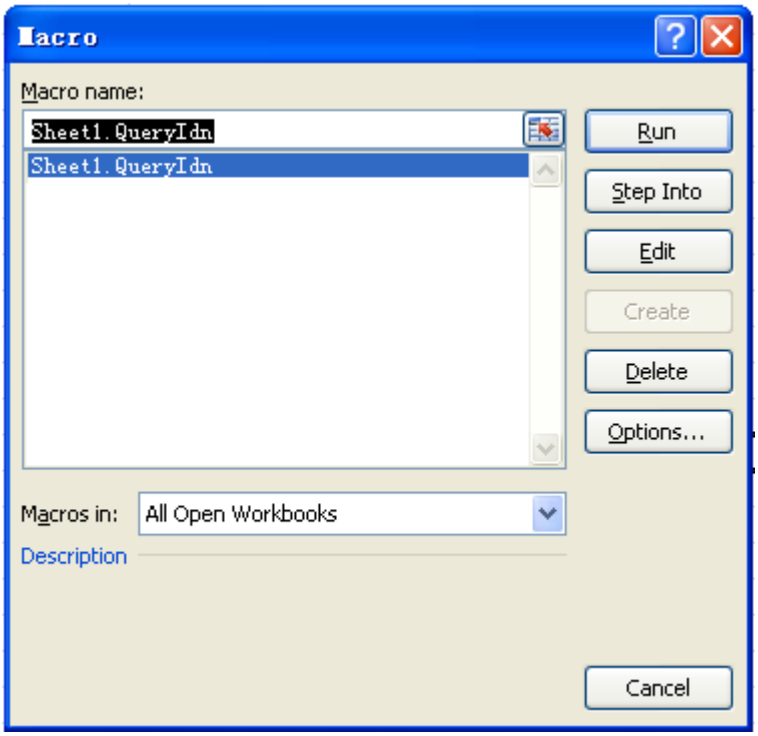
7. Set the macro security. Click **Macro Security** under the **Developer** menu. Select **Enable all macros (not recommended; potential dangerous code can run)** in the **Trust Center** dialog box and click **OK** as shown in the figures below.



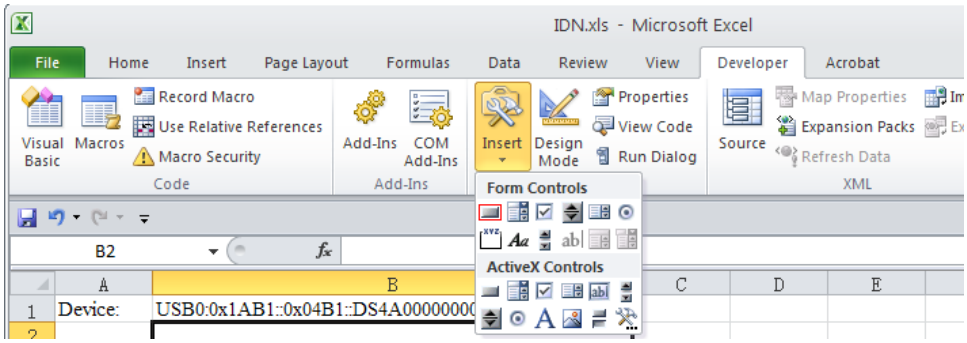


8. Click **Macros** and click **Run** in the pop-up dialog box as shown in the figures below.

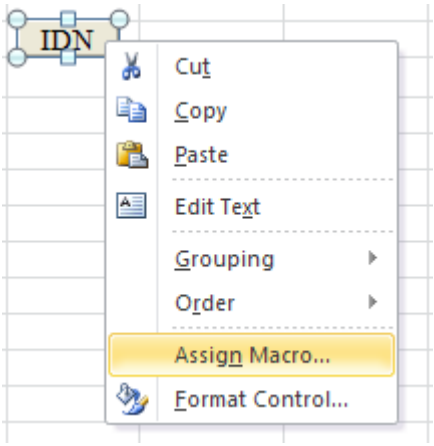


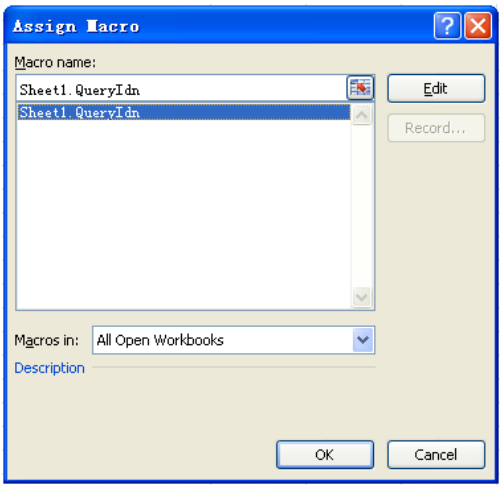


9. Add the button control. Click **Insert** and select button in the **Form Controls** as shown in the figures below.



10. Right-click the button and select **Assign Macro...**. Then, click **OK** in the **Assign Macro** dialog box to run the program as shown in the figures below.





Run the program

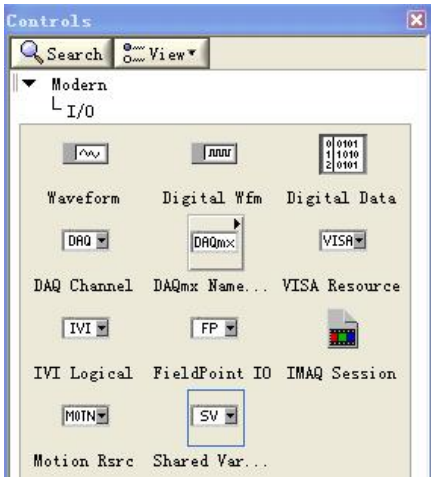
A	B	C
Device:	USB0::0x1AB1::0x04B1::DS2A0000000001::INSTR	
	RIGOL TECHNOLOGIES,DS2202,DS2A0000000001,00.00.01	IDN

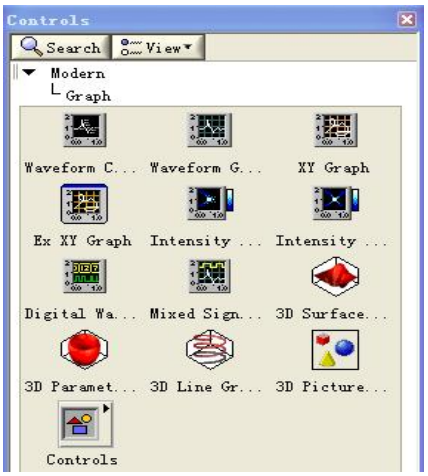
Labview Programming Demo

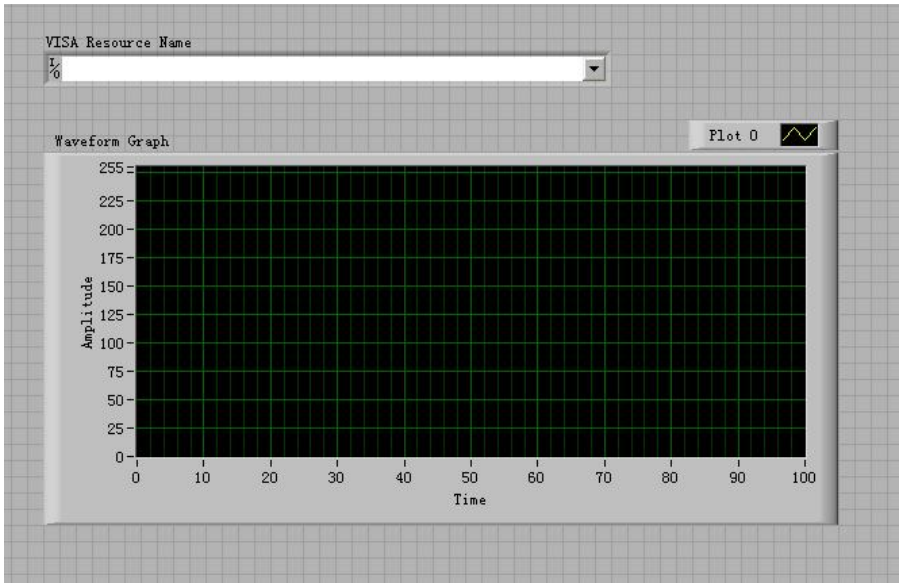
The function of the program: read the screen waveform data of CH1.

Enter the Labview programming environment and follow the steps below.

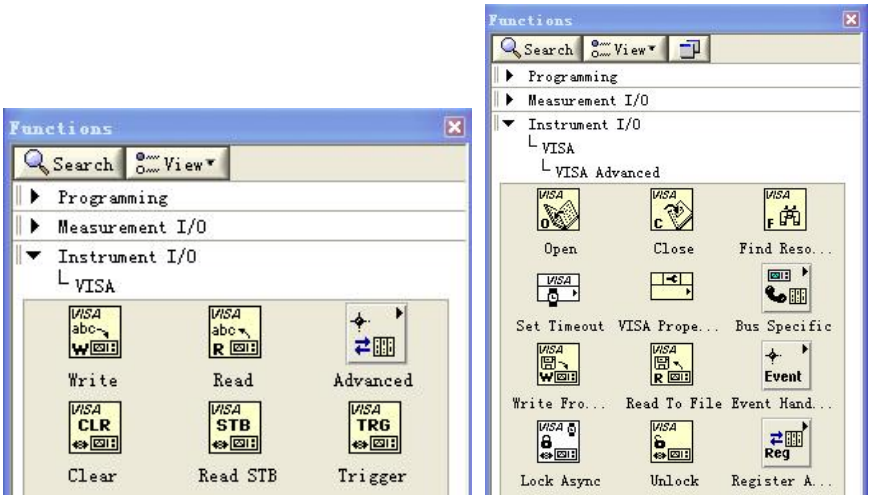
1. Add the **VISA Resource** and **Waveform Graph** controls respectively as shown in the figure below.



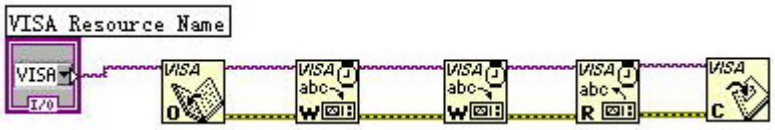




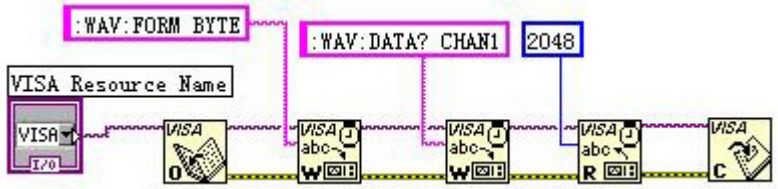
2. Open the program block diagram panel. Select **Instrument I/O→VISA** and add the **VISA Write**, **VISA Read**, **VISA Open** and **VISA Close** functions respectively.



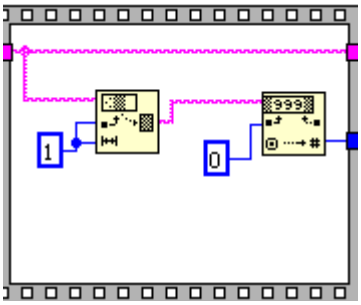
3. Connect the **VISA Resource** with the **VISA Open**. Then, connect the VISA resource name outputs of all the functions with the **VISA Resource** and connect the error output with the error input as shown in the figure below.

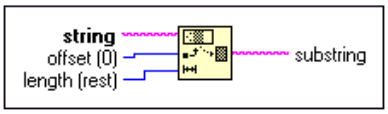


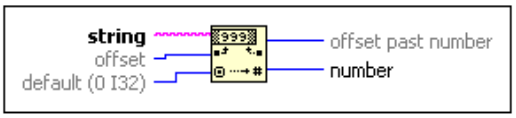
4. Add text boxes in the write buffer areas of the **VISA Write** control and input ":WAV:FORM BYTE" and ":WAV:DATA CHAN1" respectively. The former is used to set the waveform reading format to BYTE and the latter is used to read the screen waveform data. Waveform data is read through the **VISA Read** function which requires to input the total number of bytes to read. In this example, the total number of bytes of waveform data to read is less than 2048. Close the VISA resource after the VISA operation is finished.



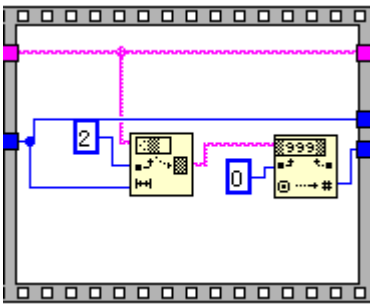
5. The data format is TMC header + waveform data points + terminator. The TMC header is in #NXXXXXX format, wherein, # is the TMC header denoter, N represents that there are N bytes following which describes the length of the waveform data points in ASCII character, and the terminator represents the ending of the communication. For example, for #9000001400XXXX, 9 bytes are used to describe the length of the data, 000001400 represents the length of the waveform data (namely 1400 bytes). Use the **String Subset** and **Decimal String To Number** functions to get the value of N.



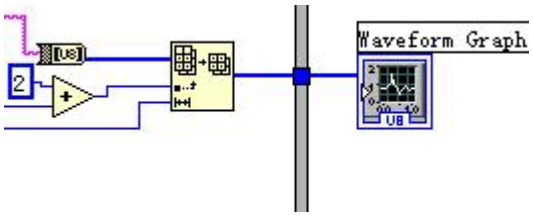


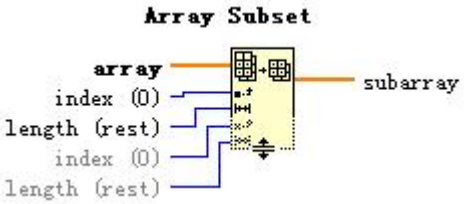


To get the length of the effective waveform data.

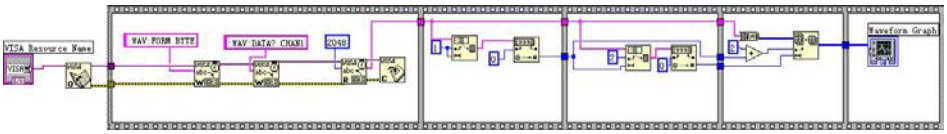


6. Convert the character data into array format using the **String To Byte Array**, namely displaying the waveform data on the **Waveform Graph** control and then remove the TMC data header using the **Array Subset** function.

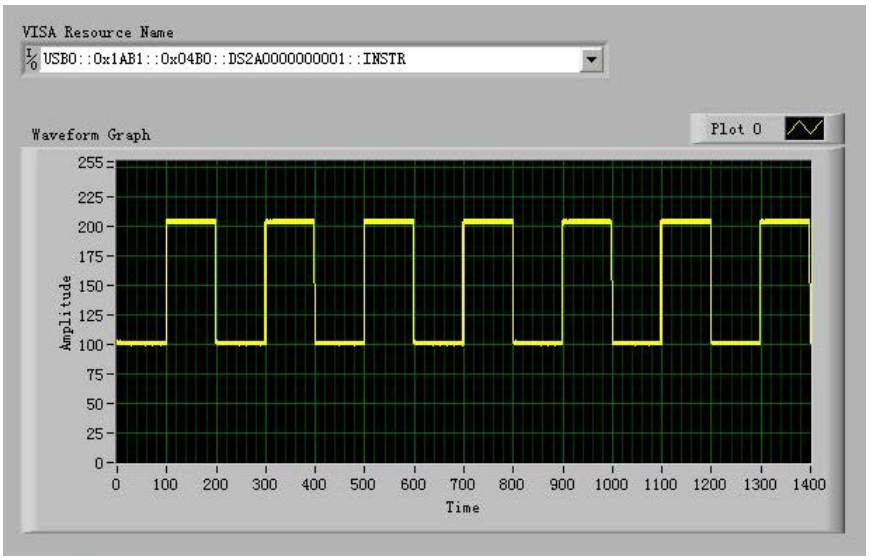




7. The complete program block diagram is as shown in the figure below.



8. Select the device resource from the **VISA Resource Name** list box and start the run.



Matlab Programming Demo

The function of the program: make FFT operation on the waveform data and draw the waveform. You need to install the Matlab.

1. Create the **WaveData.m** file under the user-defined directory.

2. Create the device. The first parameter is the distributor and can be **Agilent**, **NI** or **Tek**. The second parameter is the resource descriptor. You need to set the properties of the device after creating the device. In this demo, the length of the input buffer is set to 2048.

   a) ds2000 = visa('ni','USB0::0x1AB1::0x04B0::DS2A0000000001::INSTR');
   ds2000.InputBufferSize = 2048;

3. Turn on the device.

   fopen(ds2000);

4. Request data.

   [data,len]= fread(ds2000, 2048);

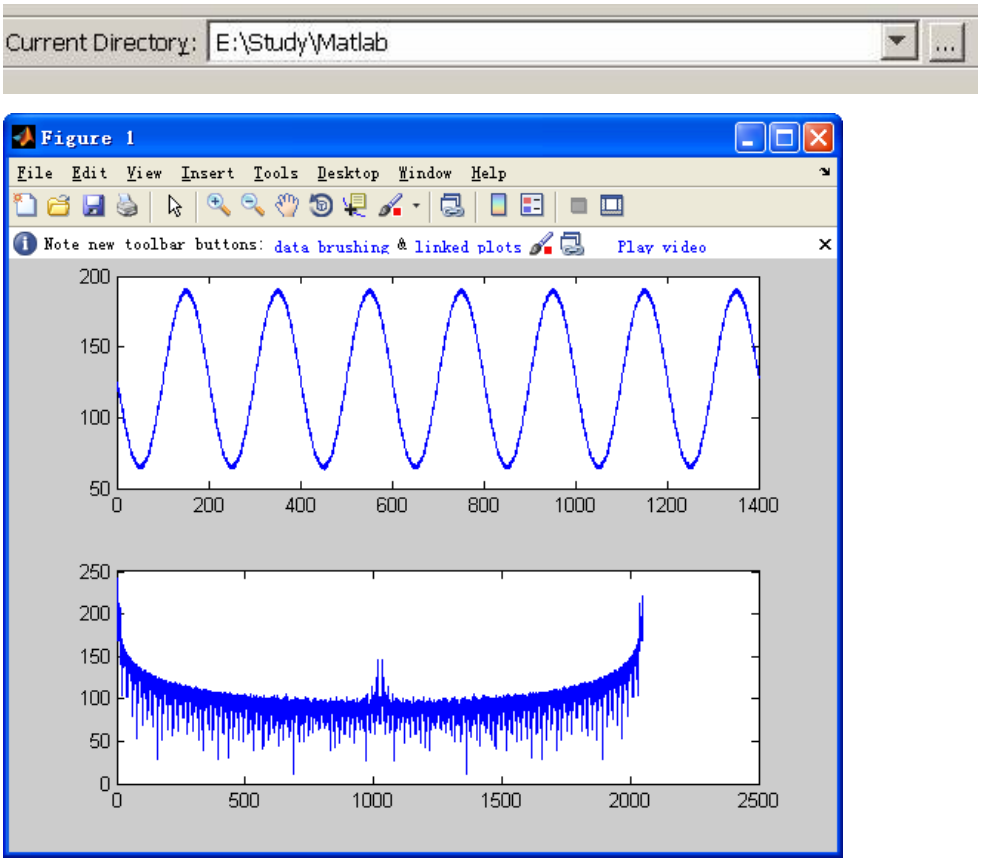
5. Turn off the device.

   fclose(ds2000);
   delete(ds2000);
   clear ds2000;

6. Data processing. The waveform data read contains TMC header. The length of the header is 11 bytes, wherein, the first 2 bytes are the TMC header denoter (#) and the width descriptor (9) respectively, the 9 bytes following are the length of the data, then the waveform data and the last byte is the terminator (0x0A). Therefore, the effective waveform points read is from the 12nd to the next to last.

```
wave = data(12:len-1);
wave = wave';

subplot(211);
plot(wave);
fftSpec = fft(wave',2048);
fftRms = abs( fftSpec');
fftLg = 20*log(fftRms);
subplot(212);
plot(fftLg);
```

7. Run the program. Make sure that the **WaveData.m** file can be found under the current directory setting. Input **WaveData** in the Command Window and then click Enter as shown in the figure below.

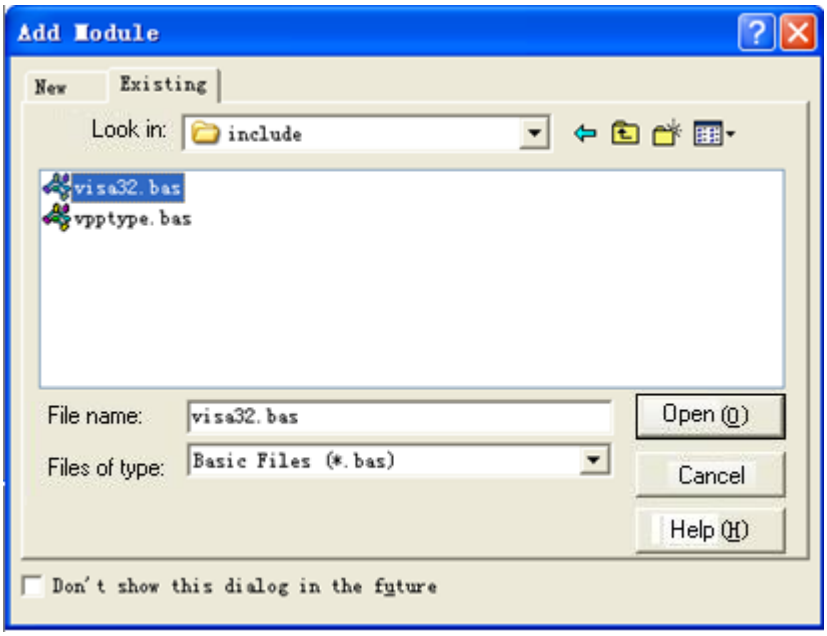


Visual Basic 6.0 Programming Demo

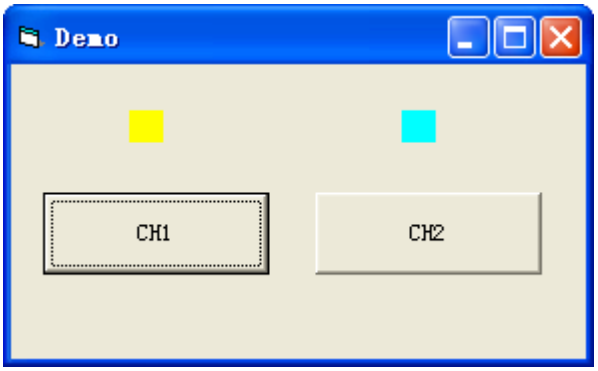
Enter the Visual Basic 6.0 programming environment and follow the steps below.

1. Build a standard application program project (Standard EXE).

2. Open the **Existing** tab in **Project→Add Module**, find and add the **visa32.bas** file in the **include** folder under the **NI-VISA** installation path.



3. Add two buttons as shown in the figure below in **Demo** to represent CH1 and CH2 respectively. Add two Labels: Label1(0) and Label1(1) to display the states of CH1 and CH2 respectively (when the corresponding channel is on, the label displays the color of the channel and when the corresponding channel is off, the label is grey) as shown in the figure below.



4. Open the **General** tab in **Project→Project1 Properties** and select **Form1** in the **Startup Object** dropdown box.

5. Double-click **CH1** to enter the programming environment and add the following codes to realize the control of CH1 and CH2. Below are the codes of CH1 and the codes of CH2 are similar.

```
Dim defrm As Long
Dim vi As Long
Dim strRes As String * 200
Dim list As Long
Dim nmatches As Long
Dim matches As String * 200 ' keep the acquisition device number
Dim s32Disp As Integer
' acquire the usb source of visa
Call viOpenDefaultRM(defrm)
Call viFindRsrc(defrm, "USB?*", list, nmatches, matches)
' turn the device on
Call viOpen(defrm, matches, 0, 0, vi)
' send command to query the state of CH1
Call viVPrintf(vi, ":CHAN1:DISP?" + Chr$(10), 0)
' acquire the CH1 state
Call viVScanf(vi, "%t", strRes)
s32Disp = CInt(strRes)
If (s32Disp = 1) Then
' send the setting command
Call viVPrintf(vi, ":CHAN1:DISP 0" + Chr$(10), 0)
```

```
Label1(0).ForeColor = &H808080 'grey
Else
Call viVPrintf(vi, ":CHAN1:DISP 1" + Chr$(10), 0)
Label1(0).ForeColor = &HFFFF& 'yellow
End If
' turn off the source
Call viClose(vi)
Call viClose(defrm)
```

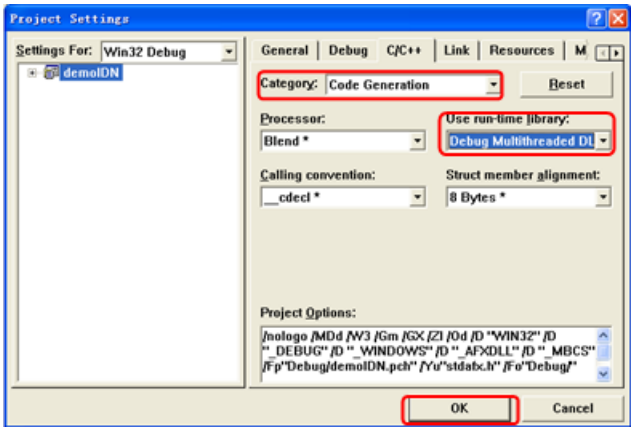
6. You can get a single executable program of **demo** by saving and running the whole project. When the oscilloscope is correctly connected to the PC, the ON/OFF control of any channel can be realized.

Visual C++ 6.0 Programming Demo

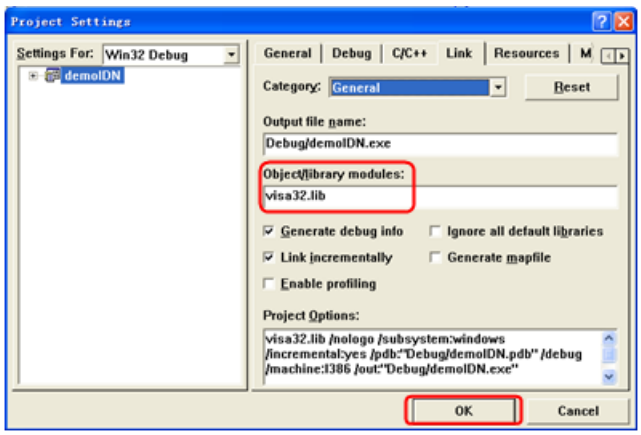
Enter the Visual C++6.0 programming environment and follow the steps below.

1. Build a MFC project based on dialog box.

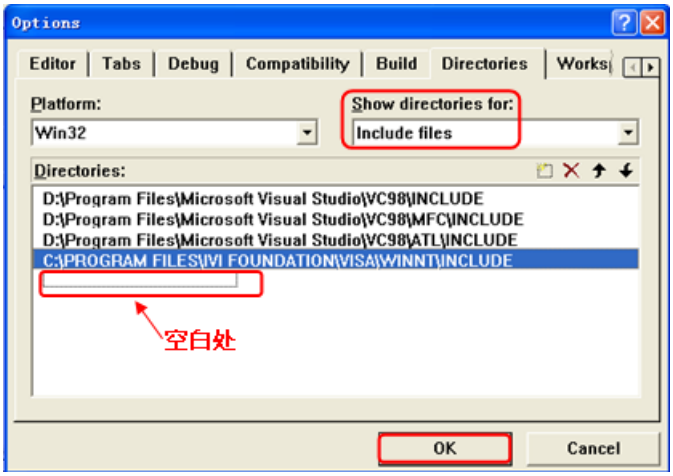
2. Open the **C/C++** tab in **Project→Settings**, select **Code Generation** in **Category** and **Debug Multithreaded DLL** in **Use run-time library**. Then click **OK** to close the dialog box.



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

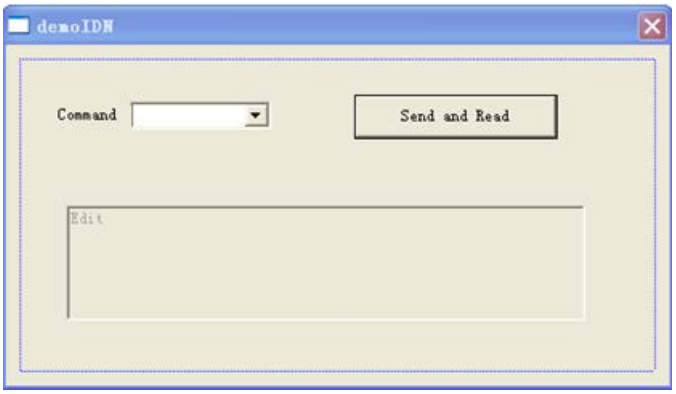


4. Open the **Directories** tab in **Tools→Options**.
   Select **Include files** in **Show directories for** and double-click the blank in **Directories** to add the path of **Include**: C:\Program Files\IVI Foundation\VISA\WinNT\include.
   Select **Library files** in **Show directories for** and double-click the blank 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.

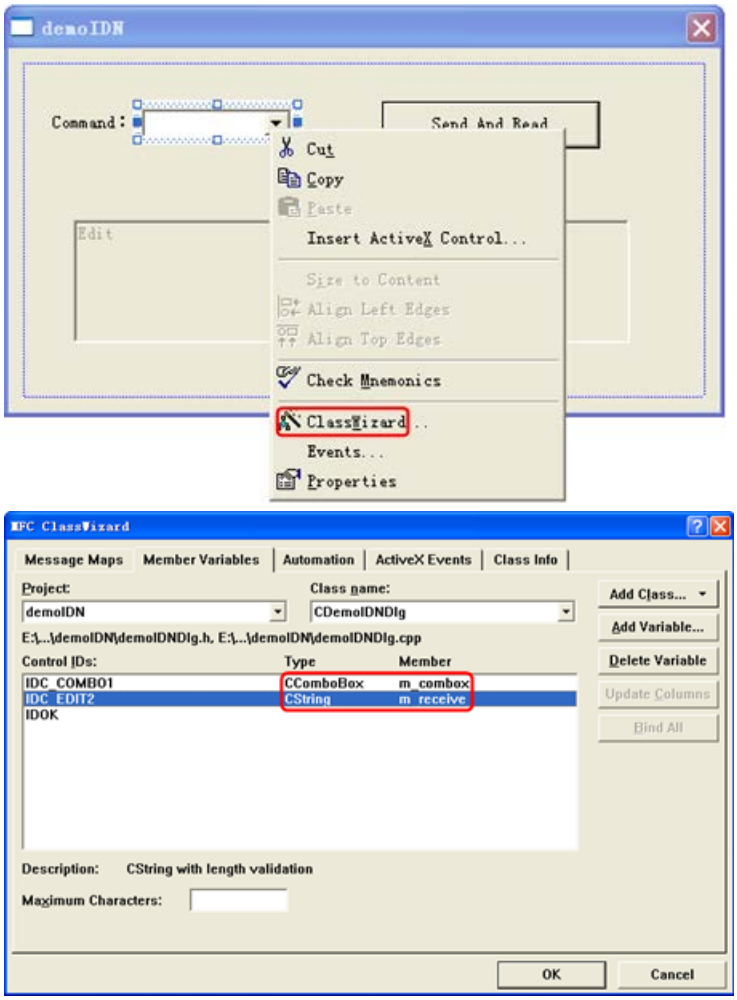
5. Add the **Text**, **Com box**, **Button** and **Edit** controls as shown in the figure below.



6. Modify the control attribute.
   1) Name **Text** as "Command".
   2) Open the **Data** item in **Com box** attribute and input the following three commands manually:

   *IDN?
   :CHAN1:DISP 1
   :CHAN1:DISP 0
   3) Open the **General** item in **Edit** attribute and select **Disable**.
   4) Name **Button** as **Send and Read**.

7. Add the variables **m_combox** and **m_receive** for the **Com box** and **Edit** controls respectively.



8. Add codes.
   Double-click **Send and Read** to enter the programming environment. Declare the **#include <visa.h>** of the visa library in the header file and then add the following codes.

```
ViSession defaultRM, vi;
char buf [256] = {0};
CString s,strTemp;
char* stringTemp;
ViChar buffer [VI_FIND_BUFLEN];
ViRsrc matches=buffer;
ViUInt32 nmatches;
ViFindList list;
viOpenDefaultRM (&defaultRM);
// acquire the USB source of visa
viFindRsrc(defaultRM, "USB?*", &list,&nmatches, matches);
viOpen (defaultRM,matches,VI_NULL,VI_NULL,&vi);
viPrintf (vi, "*RST\n");
// send the command received
m_combox.GetLBText(m_combox.GetCurSel(),strTemp);
strTemp = strTemp + "\n";
stringTemp = (char *)(LPCTSTR)strTemp;
viPrintf (vi,stringTemp);
// read the result
viScanf (vi, "%t\n", &buf);
// display the result
UpdateData (TRUE);
m_receive = buf;
UpdateData (FALSE);
viClose (vi);
viClose (defaultRM);
```

9. You can get a single executable file by saving, compiling and running the project. When the oscilloscope is correctly connected to the PC, you can select a command (e.g. *IDN?) and click **Send and Read** to display the return result of the oscilloscope.