

# Digital Storage Oscilloscope

GBS-1000 Series

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## PROGRAMMING MANUAL

GW INSTEK PART NO. 82BS-12040M01



ISO-9001 CERTIFIED MANUFACTURER

**GW INSTEK**

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**Good Will Instrument Co., Ltd.**  
**No. 7-1, Jhongsing Rd., Tucheng City, Taipei County 236, Taiwan.**

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# C ONFIGURATION

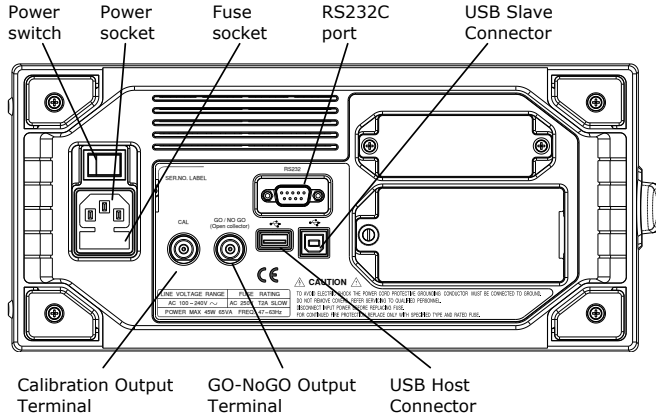
This chapter describes how to configure GBS-1000 remote control interface.



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## Interface Overview

### Rear panel



### Interface type

Terminal application  
(USB/RS-232C)

Invoke the terminal application such as MTTY (Multi-Threaded TTY).

- For USB, set the COM port to COM7. No other setting is required.
- For RS-232C, set the COM port, baud rate, stop bit, data bit, and parity accordingly.

To check the COM port No. for RS-232C, see the Device Manager in the PC. For WinXP, Control panel → System → Hardware tab.

Functionality  
check

Run this query command via the terminal.

```
*idn?
```

This should return the Manufacturer, Model number, Serial number, and Firmware version in the following format.

```
GW, GBS-1064, 000000001, V1.00
```

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PC Software  
(USB only)






The PC software, FreeWave, can be used for remote control. This mode is only available for the USB interface.

1. Activate FreeWave. For installation details, see page the FreeWave user manual.





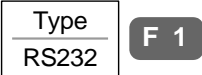


## USB interface Configuration


USB configuration	PC side connector	Type A, host
	GBS-1000 side connector	Type B, slave
	Speed	1.1/2.0 (full speed)


- Panel operation
1. Press the Utility key. 
  2. Press F2 (Interface Menu). 
  3. Press F1 (Type) repeatedly to select USB. 
  4. The interface icon at the top of the display changes into USB type. 
  5. Connect the USB cable to the rear panel slave port. 
  6. When the PC asks for the USB driver, select dso\_vpo.inf included on the User Manual CD or in the FreeWave software package downloadable from GW website, [www.gwinstek.com.tw](http://www.gwinstek.com.tw), GBS-1000 product corner.

## RS-232C Interface Configuration

RS-232C configuration	Connector	DB-9, Male
	Baud rate	2400, 4800, 9600, 19200, 38400
	Parity	None, Odd, Even
	Data bit	8 (fixed)
	Stop bit	1, 2

- Panel operation
- Press the Utility key. 
  - Press F2 (Interface Menu). 
  - Press F1 (Type) repeatedly to select RS-232C. 
  - The interface icon at the top of the display changes into RS-232C type. 
  - To change the baud rate, press F2 (Baud Rate) repeatedly. 

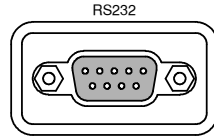
Range 2400, 4800, 9600, 19200, 38400
  - To change the stop bit, press F3 (Stop Bit) repeatedly. 

Range 1, 2
  - Data bit is fixed at 8.
  - To change the parity, press F4 (Parity) repeatedly. 

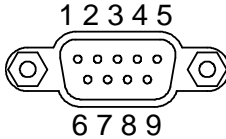


Range None, Odd, Even

9. Connect the RS-232C cable to the rear panel port: DB-9 male connector.



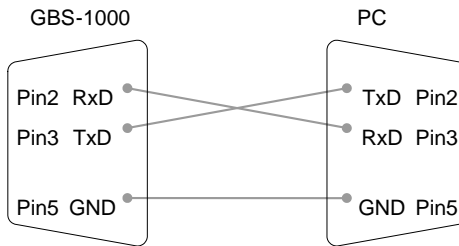
Pin assignment



- 2: RxD (Receive data)
- 3: TxD (Transmit data)
- 5: GND
- 4, 6 ~ 9: No connection

PC connection

Use the Null Modem connection as in the below diagram.





# C COMMAND SET

## Command List

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## Command Syntax

- Compatible standard
- IEEE488.2, 1992 (fully compatible)
  - SCPI, 1994 (partially compatible)

Command format `trig:del:mod <NR1>LF`

1: command header  
 2: single space  
 3: parameter  
 4: message terminator

Parameter	Type	Description	Example
	<Boolean>	boolean logic	0, 1
	<NR1>	integers	0, 1, 2, 3
	<NR2>	decimal numbers	0.1, 3.14, 8.5
	<NR3>	floating point	4.5e-1, 8.25e+1
	<NRf>	any of NR1, 2, 3	1, 1.5, 4.5e-1

Message terminator	Terminates a command line.	
	LF^END	line feed code (hexadecimal 0A) with END message
	LF	line feed code
	<dab>^END	last data byte with END message

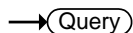
- Note
- Commands introduced here are described in abbreviated style (same functionality)
  - Commands are non-case sensitive.



## System Commands

*IDN?	17
*LRN?	17
*RCL	19
*RST	19
*SAV	19

### \*IDN?



**Description** Returns oscilloscope ID as Manufacturer, Model No, Serial No, Firmware version.

**Syntax** \*idn?

**Return parameter** <string> Scope id

**Example** \*idn?  
> GW,GBS-1062, Returns the scope id.  
ZZ1234567891,V1.00  
BXXXX\_1

### \*LRN?



**Description** Returns the oscilloscope settings as a string

**Syntax** \*lrn?

**Return parameter** <string> scope settings

**Example** \*lrn?  
  
>:SYSTem:TIMe 13 47 4;DATe 16 12  
2013;:TRIGger:TYPe 0;COUPlE 0;LEVel  
0.000E+00;MODe 1;NREJ 0;REJect 0;SLOP

```

0;SOURce 0;ADVance:DELay 1.000E-07;EVENT
3;LEVel 1.480E+00;MODE 0;TYPe 0;PULSe:TIME
1.000E+01;MODE: 1;TV:FIELD 1;LINE 1;POLarity
1;TYPe 0;ACQuire:AVERage 1;LENGth
12500;MODE 0;POINT::DISPlay:WAVEform
0;DISPCONTrast 4;GRATICule 0;CURSor:SOURce
1;X1Position ;X2Position ;Y1Position
;Y2Position ;XDELTA ;YDELTA ;X
DISPlay 2;YDISPlay 2;CHANnel1:BWLimit
0;COUpling 1;DISPlay 1;INVert 0;MATH 0;OFFSet
1.000e-01;PROBe 0;SCALe 1.000e-
01;CHANnel2:BWLimit 0;COUpling 0;DISPlay
1;INVert 0;MATH 0;OFFSet 2.080e-01;PROBe
0;SCALe 2.000e-01;MEASure:SOURce 1;FALL
1.563E-06;FREQuency 1.000E+03;NWIDth 4.999E-
04;PDUTy 50.00%;PERiod 1.000E-03;PWIDth
5.000E-04;RISe 1.030E-06;VAMPLitude 2.280E-
01;VAverage 2.370E-03;VHI 1.160E-01;VLO -
1.120E-01;VMAX 1.160E-01;VMIN -1.120E-01;VPP
2.280E-01;VRMS 1.000E-01;ROVShoot
0.00%;FOVShoot ?;RPReshoot ?;FPReshoot
0.00%;MEASure:SOURce
2;FALL ?;FREQuency ?;NWIDth ?;PDUTy ?;PERio
d ?;PWIDth ?;RISe ?;VAMPLitude 4.000E-
02;VAverage 1.720E-02;VHI 4.000E-02;VLO
0.000E+00;VMAX 4.000E-02;VMIN 0.000E+00;VPP
4.000E-02;VRMS 1.820E-
02;ROVShoot ?;FOVShoot ?;RPReshoot ?;FPReshoo
t ?;DELAY1 1;DELAY2 2;FRRDelay -1.487E-
05;FRFDelay -1.487E-05;FFRDelay -5.149E-
04;FFFDelay -5.149E-
04;LRRDelay ?;LRFDelay ?;LFRDelay ?;LFFDelay ?
;:TIMEbase:DELay 0.000e+00;SCALe 2.500e-04;
SWEep 0;:AUToset;:PRINt;:REFResh;:RUN;:STOP

```

**\*RCL**

Description	Recalls a set of panel setting from one of the twenty internal memories, S1 to S20. Same as: Save/Recall key → F5(More) → F3(Recall Setup)	
Syntax	*rcl <NR1>	
Parameter	<NR1> 1 to 20	Settings S1 to S20
Example	*rcl 1	Recalls the panel settings from S1

**\*RST**

Description	Resets the GDB-1000 (recalls the default panel settings). Same as: Save/Recall key → F1(Default Setup)	
Syntax	*rst	


**\*SAV**

Description	Saves the panel setting to one of the twenty internal memories, S1 to S20. Same as: Save/Recall key → F3(Save Setup)	
Syntax	*sav<NR1>	
Parameter	<NR1> 1 to 20	Settings S1 to S20
Example	*SAV 1	Saves the panel settings to S1.

# Acquisition Command


:ACquire:AVERage .....20  
 :ACquire:LENGth .....21  
 :ACquire:MODe .....21  
 :ACquire:MEMory .....22  
 :ACquire:HOReXpand .....22

:ACquire:AVERage (Set) →  
← (Query)

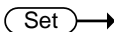
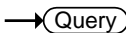

**Description**      Selects or returns the average number of waveform acquisition in average acquisition mode.  
 Same as: Acquire key → F3 

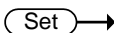
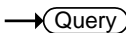
<b>Syntax</b>	< Long > :acquire:average <NR1> :acquire:average?	< Short > :acq:aver <NR1> :acq:aver?
---------------	---	--

Parameter	<NR1>	Average No	<NR1>	Average No
	1	2	5	32
	2	4	6	64
	3	8	7	128
	4	16	8	256

 **Before this command**      Before selecting the average number, select the average acquisition mode using this command.  
 :ACquire:MODe 2

**Example**      :acquire:mode 2      Set the acquisition mode to average, then set the average number to 4  
                  :acquire:average 2

		 
<b>:ACquire:LENGth</b>		
Description	Selects or returns the memory length. Same as: Acquire key → F5 	
Syntax	< Long > :acquire:length <NR1> :acquire:length?	< Short > :acq:leng <NR1> :acq:leng?
Parameter	<NR1> 0 1	Memory length 500 25000 (1 channel On) 12500 (2 channels On) 5000 (3 or 4 channels On)
Example	:acquire:length 0	Set the memory length to 500 (short)

		 
<b>:ACquire:MODE</b>		
Description	Selects or returns the acquisition mode. Same as: Acquire key → F1 ~ F3	
Syntax	< Long > :acquire:mode <NR1> :acquire:mode?	< Short > :acq:mod <NR1> :acq:mod?
Parameter	<NR1> 0 1 2	Acquisition mode Normal Peak detect Average
Example	:acquire:mode 2 :acquire:average 2	Set the acquisition mode to average, then set the average number to 4

**:ACquire:MEMory**

→ **Query**

Description	Returns the total waveform data from the acquisition memory.	
Syntax	< Long > :acquire<X>:memory?	< Short > :acq<X>:mem?
Parameter	<X> 1/2/3/4	Channel Channel1/2/3/4
Data format		

**:ACquire:HORExpand**

**Set** →

→ **Query**

Description	Sets the horizontal expansion point from the center of the screen or from the trigger point. Same as: Acquire key → F4	
Syntax	< Long > :ACquire:HORExpand {0 1} :ACquire:HORExpand?	< Short > :ACQ:HOR {0 1} :ACQ:HOR?
Parameter/ Return parameter	<NR1> 0 1	Expand function Expand from center Expand from trigger
Example	:acquire:horexpand 0	Sets the horizontal expansion as "from center".

## Auto Set Command

:AUToset



**Description**      Runs Auto Set (automatically configures horizontal scale, vertical scale, trigger according to the input signal)

Same as: Auto Set key

**Syntax**

< Long >

< Short >

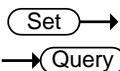
:autoset

:aut

## Channel / Math Command

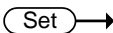

:CHANnel<X>:BWLimit.....	24
:CHANnel<X>:COUPLing.....	25
:CHANnel<X>:DISPlay .....	25
:CHANnel<X>:EXPand .....	26
:CHANnel<X>:INVert .....	26
:CHANnel<X>:MATH .....	27
:CHANnel<X>:OFFSet.....	28
:CHANnel<X>:PROBe .....	28
:CHANnel<X>:SCALE .....	29

### :CHANnel<X>:BWLimit



Description	Turns On/Off the bandwidth limit or returns the status. Same as: Channel key → F3			
Syntax	< Long >		< Short >	
	:channel<X>:bwlimit <NR1>		:chan<X>:bwl <NR1>	
	:channel<X>:bwlimit?		:chan:bwl?	
Parameter	<X>	Channel	<NR1>	Limit
	1/2/3/4	CH1/2/3/4	0	Off
			1	On
Example	:channel1:bwlimit 1		Turn On bandwidth limit for Channel 1	



**:CHANnel<X>:COUPling** 



Description	Selects or returns the coupling mode for each channel. Same as: Channel key → F1		
Syntax	< Long >	< Short >	
	:channel<X>:coupling <NR1>	:chan<X>:coup <NR1>	
	:channel<X>:coupling?	:chan:coup?	
Parameter	<X>	Channel	<NR1> Coupling mode
	1/2/3/4	CH1/2/3/4	0 AC coupling
			1 DC coupling
			2 Ground coupling
Example	:channel1:coupling 1	Select DC coupling for Channel 1	

**:CHANnel<X>:DISPlay** 



Description	Turns On/Off each channel or returns the status. Same as: Channel key		
Syntax	< Long >	< Short >	
	:channel<X>:display <NR1>	:chan<X>:disp <NR1>	
	:channel<X>:display?	:chan<X>:disp?	
Parameter	<X>	Channel	<NR1> Channel On/Off
	1/2/3/4	CH1/2/3/4	0 Off
			1 On
Example	:channel1:display 1	Turn On Channel 1	

**:CHANnel<X>:EXPand**

Set →

→ Query

**Description** Sets the expansion mode as from ground or from center for a selected channel. Queries the Expand status of a channel.

Same as: Channel key → Expand

<b>Syntax</b>	<p>&lt; Long &gt;</p> <p>:channel&lt;X&gt;:expand &lt;Boolean&gt;</p> <p>:channel&lt;X&gt;:expand?</p>	<p>&lt; Short &gt;</p> <p>:chan&lt;X&gt;:exp</p> <p>&lt;Boolean&gt;</p> <p>:chan&lt;X&gt;:exp?</p>
---------------	--	--

<b>Parameter</b>	<b>&lt;X&gt;</b>	Channel	<b>&lt;NR1&gt;</b>	Expand
	1/2/3/4	CH1/2/3/4	0	Ground
			1	Center

<b>Example</b>	<p>:channel1:expand 1</p> <p>:channel1:expand?</p> <p>1</p>	<p>Sets Channel 1 to Expand from Center.</p> <p>Returns expand from center (1) as channel 1's Expand status.</p>
----------------	---	--

**:CHANnel<X>:INVert**

Set →

→ Query

**Description** Inverts channel or returns the status.

Same as: Channel key → F2

<b>Syntax</b>	<p>&lt; Long &gt;</p> <p>:channel&lt;X&gt;:invert &lt;NR1&gt;</p> <p>:channel&lt;X&gt;:invert?</p>	<p>&lt; Short &gt;</p> <p>:chan&lt;X&gt;:inv &lt;NR1&gt;</p> <p>:chan&lt;X&gt;:inv?</p>
---------------	--	---

<b>Parameter</b>	<b>&lt;X&gt;</b>	Channel	<b>&lt;NR1&gt;</b>	Channel invert
	1/2/3/4	CH1/2/3/4	0	Invert Off
			1	Invert On

<b>Example</b>	<p>:channel1:invert 1</p>	<p>Invert Channel1</p>
----------------	---------------------------	------------------------

**:CHANnel<X>:MATH**

Set →

→ Query

Description	Selects or returns the math operation. Same as: Math key → F1		
Syntax	< Long > :channel<X>:math <NR1> :channel<X>:math?	< Short > :chan<X>:math <NR1> :chan<X>:math?	
Parameter	<X> 1/2 3/4	Channel CH1 and CH2 CH3 and CH4	<NR1> Math operation 0 Math off 1 Add 2 Subtract 3 Multiply 4 FFT 5 FFTrms
Example1	:channel1:math 1		CH1+CH2
Example2	:channel2:math 1		CH1+CH2
Example3	:channel2:math 4		Run FFT on CH2 signal

**:CHANnel<X>:OFFSet** 


Description	Sets or returns the offset level for each channel. The offset level range is dependent on the vertical scale.		
Syntax	< Long >	< Short >	
	:channel<X>:offset <NR3>	:chan<X>:offs <NR3>	
	:channel<X>:offset?	:chan<X>:offs?	
Parameter	<X>	Channel	<NR3> Offset level
	1/2/3/4	CH1/2/3/4	±0.5 -0.5V ~ +0.5V (2mV/div~50mV/div)
		4	±5.0 -5.0V ~ +5.0V (100mV/div~500mV/div)
			±50.0 -50.0V ~ +50.0V (1V/div ~ 5V/div)
Example	:channel1:scale 1.00e-2	Set CH1 scale to 10mV	
	:channel1:offset 2.00e-2	Set CH1 offset to 20mV	

**:CHANnel<X>:PROBe** 

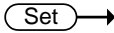
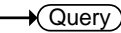

Description	Sets or returns the probe attenuation factor. Same as: Channel key → F4		
Syntax	< Long >	< Short >	
	:channel<X>:probe <NR3>	:chan<X>:prob <NR1>	
	:channel<X>:probe?	:chan<X>:prob?	
Parameter	<X>	Channel	<NR1> Probe attenuation factor
	1/2/3/4	CH1/2/3/4	0 1x
			1 10x
			2 100x
Example	:channel1:probe 1	Set CH1 probe to 10x	


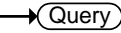
Set →  
 → Query

:CHANnel<X>:SCALE			
Description	Sets or returns the vertical scale for each channel. The scale is dependent on the probe attenuation factor. Same as: Volts/Div knob		
Syntax	< Long > :channel<X>:scale <NR3> :channel<X>:scale?		< Short > :chan<X>:scal <NR3> :chan<X>:scal?
Parameter	<X> 1/2/3/4	Channel CH1/2/3/4	<NR3> 2e-3 ~ 5e+0 2e-2 ~ 5e+1 2e-1 ~ 5e+2
			Vertical scale 2mV ~ 5V (Probe x1) 20mV ~ 50V (Probe x10) 200mV ~ 500V (Probe x100)
Example	:channel1:probe 0 :channel1:scale 2.00e-3		Set CH1 probe to x1 Set CH1 scale at 2mV

## Data Log Commands

:DATALOG:STATE .....	30
:DATALOG:SOURce .....	30
:DATALOG:SAVE .....	31
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:DATALOG:DURation.....	31

		
:DATALOG:STATE		
Description	Turns the datalogging function on/off. Same as: Utility key → More (F5) → More (F5) → Data Logging Menu(F3)→Data Logging (F1).	
Syntax	< Long >	< Short >
	:DATALOG:STATE {0 1}	:DATALOG:STATE {0 1}
	:DATALOG:STATE?	:DATALOG:STATE?
Parameter/ Return parameter	0	Off. Stop data logging function.
	1	On. Start data logging function.
Example	:DATALOG:STATE 1	Turn data logging on.

		
:DATALOG:SOURce		
Description	Sets or queries the data logging source channel.	
Syntax	< Long >	< Short >
	:DATALOG:SOURce{1 2 3 4 5}	:DATALOG:SOUR{1 2 3 4 5}
	:DATALOG:SOURce?	:DATALOG:SOUR?
Parameter/ Return parameter	1	Sets CH1 as the source channel
	2	Sets CH2 as the source channel
	3	Sets CH3 as the source channel

	4	Sets CH4 as the source channel
	5	Sets Math as the source channel

Example           :DATALOG:SOUR 1           Set source as CH1.

Set →  
 Query

**:DATALOG:SAVe**

Description       Sets the save type as waveform or image.

Syntax	< Long >	< Short >
	:DATALOG:SAVe {0 1}	:DATALOG:SAV {0 1}
	:DATALOG:SAVe?	:DATALOG:SAV?

Parameter/ Return parameter	0	Save as image
	1	Save as waveform

Example           :DATALOG:SAVe 1           Set the save type to waveform.

Set →  
 Query

**:DATALOG:INTerval**

Description       Sets or queries the interval time between each recording.

Syntax	< Long >	< Short >
	:DATALOG:INTerval <NR1>	:DATALOG:INT <NR1>
	:DATALOG:INTerval?	<NR1>
		:DATALOG:INT?

Parameter/ Return parameter	<NR1>	Discrete time intervals in seconds: {2   3   4   5   10   20   30   60   120   300   600   1200   1800}
--------------------------------	-------	--

Example           :DATALOG:INT 2           Sets the interval time to 2 seconds.

Set →  
 Query

**:DATALOG:DURation**

Description       Sets or queries the duration time of each recording.

Syntax	< Long >	< Short >
	:DATALOG:DURation <NR1>	:DATALOG:DUR
	:DATALOG:DURation?	<NR1>
		:DATALOG:DUR?
Parameter/ Return parameter	<NR1>	Discrete recording time in minutes: {5   10   15   20   25   30   60   90   120   150   180   210   240   270   300   330   360   390   420   45 0   480   510   540   570   600   1200   1800   240 0   3000   3600   4200   4800   5400   6000}
Example	:DATALOG:DUR 5	Sets the recording time to 5 minutes.



## Cursor Command

:CURSor:X<X>Position .....	33
:CURSor:Y<X>Position .....	33
:CURSor:<X>DELta .....	34
:CURSor:<X>DISplay .....	34
:CURSor:SOURce.....	35

:CURSor:X<X>Position 


Description	Selects or returns horizontal (X axis) cursor position. Same as: Cursor key →F2 (Horizontal)		
Syntax	< Long >	< Short >	
	:cursor:x<X>position<NR1>	:curs:x<X>p<NR1>	
	:cursor:x<X>position?	:curs:x<X>p?	
Parameter	<X>	Cursor 1 or 2	<NR1> Cursor position
	1	Cursor T1	1 ~ 249 When menu On
	2	Cursor T2	1 ~ 299 When menu Off
Example	:cursor:x1 position 100	Put horizontal cursor T1 on 100 point position	

:CURSor:Y<X>Position 


Description	Selects or returns vertical (Y axis) cursor position. Same as: Cursor key →F3 (Vertical)		
Syntax	< Long >	< Short >	
	:cursor:y<X>position<NR1>	:curs:y<X>p<NR1>	
	:cursor:y<X>position?	:curs:y<X>p?	



Parameter	<X>	Cursor 1 or 2	<NR1>	Cursor position
	1	Cursor V1	1 ~ 199	1 ~ 199 point
	2	Cursor V2		
Example	:cursor:y1position 100		Put vertical cursor V1 on 100 point position	

**:CURSor:<X>DELta** → **Query**

Description	Returns the distance between two horizontal (X axis) or vertical (Y axis) cursors. Same as: Cursor key → F4 (Horizontal) or F5 (Vertical)		
Syntax	< Long >	< Short >	
	:cursor:<X>delta?	:curs:<X>del?	
Parameter	<X>	Horizontal or vertical cursor	
	x	Horizontal cursor (X axis)	
	y	Vertical cursor (Y axis)	
Example	:cursor:ydelta? → 100		Ask the vertical cursors distance (Returns 100)


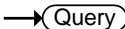
**:CURSor:<X>DISplay** **Set** →


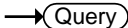
Description	Turns the horizontal or vertical cursors On/Off. Same as: Cursor key → F2 (Horizontal) or F3 (Vertical)			
Syntax	< Long >	< Short >		
	:cursor:<X>display<NR1>	:curs:<X>dis<NR1>		
Parameter	<X>	X or Y cursor	<NR1>	Cursor On/Off
	x	X (horizontal)	0	Cursor Off
	y	Y (vertical)	1	Cursor On
Example	:cursor:ydisplay 1		Turn Y cursor On	



		 → 						
<b>:CURSor:SOURce</b>								
Description	Selects or returns the cursor source channel. Same as: Cursor key →F1 (Source)							
Syntax	< Long > :cursor:source<NR1> :cursor:source?	< Short > :curs:sour<NR1> :curs:sour?						
Parameter	<table border="0"> <tr> <td style="background-color: #e0e0e0; padding-right: 10px;">&lt;NR1&gt;</td> <td>Cursor source channel</td> </tr> <tr> <td style="background-color: #e0e0e0; padding-right: 10px;">1/2/3/4</td> <td>Channel 1/2/3/4</td> </tr> <tr> <td style="background-color: #e0e0e0; padding-right: 10px;">5</td> <td>Math result</td> </tr> </table>		<NR1>	Cursor source channel	1/2/3/4	Channel 1/2/3/4	5	Math result
<NR1>	Cursor source channel							
1/2/3/4	Channel 1/2/3/4							
5	Math result							
Example	:cursor:source 2	Set Channel 2 as cursor source						

## Display Command

:DISPlay:ACCumulate .....	36
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:DISPlay:GRATicule .....	37
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:REFresh .....	38

								
:DISPlay:ACCumulate								
Description	Turns On/Off the display accumulate mode or returns the status. Same as: Display key → F2 (Accumulate)							
Syntax	< Long > :display:accumulate<NR1> :display:accumulate?	< Short > :disp:acc<NR1> :disp:acc?						
Parameter	<table border="1"> <tr> <td>&lt;NR1&gt;</td> <td>Display accumulation mode</td> </tr> <tr> <td>0</td> <td>Accumulation Off</td> </tr> <tr> <td>1</td> <td>Accumulation On</td> </tr> </table>		<NR1>	Display accumulation mode	0	Accumulation Off	1	Accumulation On
<NR1>	Display accumulation mode							
0	Accumulation Off							
1	Accumulation On							
Example	:display:accumulate 1	Turn On accumulation						

		
		
<b>:DISPlay:CONTRast</b>		
<hr/>		
Description	Sets or returns the display contrast level. Same as: Display key → F4 (Contrast)	
<hr/>		
Syntax	< Long >	< Short >
	:display:contrast<NR1>	:disp:cont<NR1>
	:display:contrast?	:disp:cont?
<hr/>		
Parameter	<NR1>	Display contrast
	-10 ~ 10	Lowest (-10) to the Highest (+10)
<hr/>		
Example	:display:contrast 0	Set display contrast to the middle range (±0)

		
		
<b>:DISPlay:GRATicule</b>		
<hr/>		
Description	Sets or returns the display grid type. Same as: Display key → F5	
<hr/>		
Syntax	< Long >	< Short >
	:display:graticule<NR1>	:disp:grat<NR1>
	:display:graticule?	:disp:grat?
<hr/>		
Parameter	<NR1>	Display grid type
	0	Full grid
	1	X and Y axis (cross type)
	2	No grid
<hr/>		
Example	:display:graticule 0	Set display full grid

**:DISPlay:WAVEform** (Set) →  
→ (Query)

Description	Sets or returns the display waveform type. Same as: Display key → F1 (Type).	
Syntax	< Long > :display:waveform<NR1> :display:waveform?	< Short > :disp:wave<NR1> :disp:wave?
Parameter	<NR1>	Display waveform type 0 Vectors 1 Dots
Example	:display:waveform 0	Set vectors waveform

**:REFresh** (Set) →

Description	Erases the existing waveform and draws a new one. Same as: Display key → F3 (Refresh).	
Syntax	< Long > :refresh	< Short > :refr

# Go-NoGo Command

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Before running any Go-NoGo command, Go-NoGo has to be activated by “:GONogo:FUNction 1” command.

## :GONogo:FUNction



Description	Turns the Go-NoGo function On/Off.	
Syntax	< Long >	< Short >
	:gonogo:function <NR1>	:gon:fun <NR1>
	:gonogo:function?	:gon:fun?
Parameter	<NR1>	Activate/Deactivate Go-NoGo
	0	Deactivate Go-NoGo
	1	Activate Go-NoGo
Example	:gonogo:function 1	Turn Go-NoGo On

**:GONogo:CLEar**



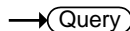
**Description**      Clears Go-No Go test total number/ failure number counter on the display.

Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F5 (Ratio)

<b>Syntax</b>	< Long >	< Short >
	:gonogo:clear	:gon:cle



**:GONogo:EXECute**



**Description**      Starts or stops Go-No Go test, or returns the status.

Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F4 (Go-NoGo On/Off)

<b>Syntax</b>	< Long >	< Short >
	:gonogo:execute <NR1>	:gon:exec <NR1>
	:gonogo:execute?	:gon:exec?

<b>Parameter</b>	<NR1>	Start or Stop Go-NoGo test
	0	Stop Go-NoGo
	1	Start Go-NoGo

<b>Example</b>	:gonogo:execute 1	Turn On Go-NoGo
----------------	-------------------	-----------------



**:GONogo:NGCount?**

→ **Query**

**Description** Returns Go-No Go test total and fail count.  
 Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F5 (Ratio)

<b>Syntax</b>	< Long >	< Short >
	:gonogo:ngcount?	:gon:ngc?

<b>Example</b>	:gonogo:ngcount? → 2, 43	Returns 43 tests, 2 failed
----------------	-----------------------------	----------------------------

**:GONogo:NGDefine**

**Set** →

→ **Query**

**Description** Sets or returns NoGo When condition.  
 Same as: Utility key → F5 (More) → F4 (NoGo when)

<b>Syntax</b>	< Long >	< Short >
	:gonogo:ngdefine <NR1>	:gon:ngd <NR1>
	:gonogo:ngdefine?	:gon:ngd?

<b>Parameter</b>	<NR1>	NoGo when condition
	0	NoGo when the waveform does not fit inside the template
	1	NoGo when the waveform fits inside the template

<b>Example</b>	:gonogo:ngdefine 1	NoGo when the waveform fits inside the template
----------------	--------------------	---

Set →  
 → Query

**:GONogo:SOURce**

---

Description	Sets or returns Go-No Go test source channel. Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F2 (Source)	
Syntax	<b>&lt; Long &gt;</b> :gonogo:source <NR1> :gonogo:source?	<b>&lt; Short &gt;</b> :gon:sour <NR1> :gon:sour?
Parameter	<NR1> Source channel 1 ~ 4 Channel 1 ~ 4	
Example	:gonogo:source 1	Select Channel 1 as Go-NoGo test source

Set →  
 → Query

**:GONogo:VIOLation**

---

Description	Sets or returns the NoGo action (stop/continue test, turn On/Off beep) Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F3 (Violating)	
Syntax	<b>&lt; Long &gt;</b> :gonogo:violation <NR1> :gonogo:violation?	<b>&lt; Short &gt;</b> :gon:viol <NR1> :gon:viol?
Parameter	<NR1> Actions when NoGo 0 Stop test, no beep 1 Stop test, beep 2 Continue test, no beep 3 Continue test, beep	
Example	:gonogo:violation 2	Continue Go-NoGo test after NoGo condition is met. No beep sounds.

Set →

→ Query

**:TEMPlate:MAX**

Description	Sets or returns Go-No Go Max template. Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F1 (Template Edit) → F1 (Template Max) → F2 (Source)	
Syntax	< Long > :template:max <NR1> :template:max?	< Short > :temp:max <NR1> :temp:max?
Parameter	<NR1> 0 1 ~ 20	Waveform used for Go-NoGo maximum template Reference waveform A Internally stored waveform W1 ~ W20
Before this command...	Go-NoGo normal template mode has to be selected prior to this command. :TEMPlate:MODE 0 (for details, see pagexx.)	
Example	:template:mode 0 :template:max 1	Select normal template mode, then select internal waveform W1 as Max template

Set →

→ Query

**:TEMPlate:MIN**



**Description**      Sets or returns Go-No Go Min template.  
 Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F1 (Template Edit) → F1 (Template Min) → F2 (Source)

<b>Syntax</b>	< Long >	< Short >
	:template:min <NR1>	:temp:min <NR1>
	:template:min?	:temp:min?

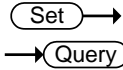
<b>Parameter</b>	<NR1>	Waveform used for Go-NoGo minimum template
	0	Reference waveform B
	1 ~ 20	Internally stored waveform W1 ~ W20

**Before this command...**      Go-NoGo normal template mode has to be selected prior to this command.  
 :TEMPlate:MODE 0 (for details, see pagexx.)



<b>Example</b>	:template:mode 0	Select normal template mode, then select internal waveform W1 as Min template
	:template:min 1	

								
								
<b>:TEMplate:MODE</b>								
Description	Sets or returns Go-No Go test template mode. Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F1 (Template Edit) → F1 (Template)							
Syntax	< Long > :template:mode <NR1> :template:mode?	< Short > :temp:mod <NR1> :temp:mod?						
Parameter	<table border="0"> <tr> <td style="padding-right: 10px;">&lt;NR1&gt;</td> <td>Waveform used for Go-NoGo minimum template</td> </tr> <tr> <td style="padding-right: 10px;">0</td> <td>Normal template (Max and Min)</td> </tr> <tr> <td style="padding-right: 10px;">1</td> <td>Auto template</td> </tr> </table>		<NR1>	Waveform used for Go-NoGo minimum template	0	Normal template (Max and Min)	1	Auto template
<NR1>	Waveform used for Go-NoGo minimum template							
0	Normal template (Max and Min)							
1	Auto template							
Example	<table border="0"> <tr> <td style="padding-right: 20px;">:template:mode 0</td> <td>Select normal template mode, then select internal waveform W1 as Min template</td> </tr> <tr> <td>:template:min 1</td> <td></td> </tr> </table>		:template:mode 0	Select normal template mode, then select internal waveform W1 as Min template	:template:min 1			
:template:mode 0	Select normal template mode, then select internal waveform W1 as Min template							
:template:min 1								

**:TEMPLate:POSition:MAX**



Description	Sets or returns Go-NoGo Max template position. Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F1 (Template Edit) → F3 (Position)	
Syntax	< Long > :template:position:max <NR2> :template:position:max?	< Short > :temp:pos:max <NR2> :temp:pos:max?
Parameter	<NR2> -12.0 ~ 12.0	Max template position -12div ~ +12 div (1 div = 25 dots)
Before this command...	Go-NoGo normal template mode has to be selected prior to this command. :TEMPLate:MODE 0 (for details, see pagexx.)	
Example	:template:mode 0 :template:position:max -10.0	Select normal template mode, then set the Max template position to -10.0div.

		 
<b>:TEMPlate:POSition:MIN</b>		
Description	Sets or returns Go-NoGo Min template position. Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F1 (Template Edit) → F3 (Position)	
Syntax	< Long > :template:position:min <NR2> :template:position:min?	< Short > :temp:pos:min <NR2> :temp:pos:min?
Parameter	<NR2> -12.0 ~ 12.0	Min template position -12div ~ +12 div (1 div = 25 dots)
Before this command...	Go-NoGo normal template mode has to be selected prior to this command. :TEMPlate:MODE 0 (for details, see pagexx.)	
Example	:template:mode 0 :template:position:min -10.0	Select normal template mode, then set the Min template position to -10.0div.

**:TEMPlate:SAVe:AUTO****Set** →

---

Description	Saves Go-NoGo test Auto template. Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F1 (Template Edit) → F4 (Save&Create)	
Syntax	< Long > :template:save:auto	< Short > :temp:sav:auto

---

**:TEMPlate:SAVe:MAXimum****Set** →

---

Description	Saves Go-NoGo test Maximum template. Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F1 (Template Edit) → F4 (Save&Create)	
Syntax	< Long > :template:save:maximum	< Short > :temp:sav:max

---


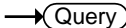
**:TEMPlate:SAVe:MINimum****Set** →

---

Description	Saves Go-NoGo test Minimum template. Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F1 (Template Edit) → F4 (Save&Create)	
Syntax	< Long > :template:save:minimum	< Short > :temp:sav:min

---



		 
<p><b>:TEMPlate:TOLerance</b></p>		
Description	<p>Sets or returns Go-NoGo Auto template tolerance.                      Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F1 (Template Edit) → F3 (Tolerance)</p>	
Syntax	<p>&lt; Long &gt;                      :template:tolerance &lt;NR2&gt;                      :template:tolerance?</p>	<p>&lt; Short &gt;                      :temp:tol &lt;NR2&gt;                      :temp:tol?</p>
Parameter	<p>&lt;NR2&gt;                      0.4 ~ 40</p>	<p>Auto template tolerance                      0.4 ~ 40%</p>
Before this command...	<p>Go-NoGo auto template mode has to be selected prior to this command.                      :TEMPlate:MODE 1 (for details, see pagexx.)</p>	
Example	<p>:template:mode 1                      :template:tolerance 10.0</p>	<p>Select auto template mode, then set the template tolerance to 10%.</p>



		(Set) →
		→ (Query)
<b>:HARDcopy:LAYOut</b>		
Description	Selects or returns printout color in Hardcopy Printer mode. Same as: Utility key → F1 (Hardcopy) → F1 (Printer) → F3 (Color/Gray Portrait)	
Syntax	< Long > :hardcopy:layout <NR1> :hardcopy:layout?	< Short > :hard:lay <NR1> :hard:lay?
Parameter	<NR1> 0 1	Color/Grayscale Grayscale (Gray portrait) Color (Color portrait)
Example	:hardcopy:mode 2 :hardcopy:layout 1	Set Printer as Hardcopy Set color printout

		(Set) →
		→ (Query)
<b>:HARDcopy:MODE</b>		
Description	Selects or returns Hardcopy key function. Same as: Utility key → F1 (Hardcopy) → F1	
Syntax	< Long > :hardcopy:mode <NR1> :hardcopy:mode?	< Short > :hard:mod <NR1> :hard:mod?
Parameter	<NR1> 0 1 2	Hardcopy key function Save image Save all Printer (USB connected)
Example	:hardcopy:mode 2	Set Printer as Hardcopy

		(Set) →
:HARDcopy:RATio		→ (Query)
Description	Selects or returns Hardcopy printout ratio relative to the paper size. Same as: Utility key → F1 (Hardcopy) → F1 (Printer) → F4 (Ratio)	
Syntax	< Long > :hardcopy:ratio <NR1> :hardcopy:ratio?	< Short > :hard:rat <NR1> :hard:rat?
Parameter	<NR1> 10 ~ 100	Printout ratio 10% ~ 100% (of the paper size)
Example	:hardcopy:ratio 50	Set printout ratio as 50%

## Measure command

---


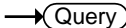
:MEASure:DELAY1 .....	54
:MEASure:DELAY2.....	55
:MEASure:FALL.....	55
:MEASure:FFFDelay.....	56
:MEASure:FFRDelay.....	56
:MEASure:FOVShoot .....	57
:MEASure:FPReshoot .....	57
:MEASure:FREQuency? .....	58
:MEASure:FRFDelay.....	58
:MEASure:FRRDelay .....	59
:MEASure:LFFDelay.....	59
:MEASure:LFRDelay.....	60
:MEASure:LRFDelay.....	60
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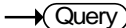
Set →

→ Query

**:MEASure:DELAY1**

Description	Sets or returns the first source channel for the delay automatic measurement. Same as: Measure key → F1~F5 → F1 (Source1)	
Syntax	< Long > :measure:delay1 <NR1> :measure:delay1?	< Short > :meas:delay1 <NR1> :meas:delay1?
Parameter	<NR1> 1 ~ 4	Channel1 ~ 4
Example	:measure:delay1 1	Select Channel1 as the first source channel.

		
		
<b>:MEASure:DELAY2</b>		
<hr/>		
Description	Sets or returns the second source channel for the delay automatic measurement. Same as: Measure key → F1~F5 → F2 (Source2)	
<hr/>		
Syntax	< Long > :measure:delay2 <NR1> :measure:delay2?	< Short > :meas:delay2 <NR1> :meas:delay2?
<hr/>		
Parameter	<NR1> 1 ~ 4      Channel1 ~ 4	
<hr/>		
Example	:measure:delay1 1	Select Channel1 as the second source channel.

		
<b>:MEASure:FALL</b>		
<hr/>		
Description	Returns the falltime measurement result. Same as: Measure key → F1~F5 → F3 (Fall Time)	
<hr/>		
Syntax	< Long > :measure:fall?	< Short > :meas:fall?
<hr/>		
Returns	<NR3>	
<hr/>		
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
<hr/>		
Example	:measure:source 1 :measure:fall?	Select channel 1, then measure fall time.

**:MEASure:FFFDelay** → **Query**

Description	Returns the delay between the first falling edge of source1 and the first falling edge of source2. Same as: Measure key → F1~F5 → F3 (DelayFFF)	
Syntax	< Long > :measure:fffdelay?	< Short > :meas:fffd?
Returns	<NR3>	
Before this command	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>. See pagexx.	
Example	:measure:delay1 1 :measure:delay2 2 :measure:fffdelay?	Select channel 1 and 2 as delay source1/2, then measure the FFF.

**:MEASure:FFRDelay** → **Query**

Description	Returns the delay between the first falling edge of source1 and the first rising edge of source2. Same as: Measure key → F1~F5 → F3 (DelayFFR)	
Syntax	< Long > :measure:ffrdelay?	< Short > :meas:ffrd?
Returns	<NR3>	
Before this command	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>. See pagexx.	
Example	:measure:delay1 1 :measure:delay2 2 :measure:fffdelay?	Select channel 1 and 2 as delay source1/2, and then measure FFF.



**:MEASure:FOVShoot**

→ Query

---

Description	Returns fall overshoot amplitude in percentage. Same as: Measure key → F1~F5 → F3 (FOVShoot)	
Syntax	< Long > :measure:fovshoot?	< Short > :meas:fovs?
Returns	<NR2> with % sign	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:fall?	Select channel 1, then measure fall overshoot.

---

**:MEASure:FPReshoot**

→ Query

---

Description	Returns fall preshoot amplitude in percentage. Same as: Measure key → F1~F5 → F3 (FPREShoot)	
Syntax	< Long > :measure:fovshoot?	< Short > :meas:fovs?
Returns	<NR2> with % sign	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:fall?	Select channel 1, then measure fall preshoot.

---

**:MEASure:FREQuency?** → **Query**

Description	Returns the frequency value. Same as: Measure key → F1~F5 → F3 (Frequency)	
Syntax	< Long > :measure:frequency?	< Short > :meas:freq?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:frequency?	Select channel 1, then measure frequency.

**:MEASure:FRFDelay** → **Query**

Description	Returns the delay between the first rising edge of source1 and the first falling edge of source2. Same as: Measure key → F1~F5 → F3 (DelayFRF)	
Syntax	< Long > :measure:frfdelay?	< Short > :meas:frfd?
Returns	<NR3>	
Before this command	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>. See pagexx.	
Example	:measure:delay1 1 :measure:delay2 2 :measure:frfdelay?	Select channel 1 and 2 as delay source1/2, and then measure FRF.

**:MEASure:FRRDelay** → 

Description	Returns the delay between the first rising edge of source1 and the first rising edge of source2. Same as: Measure key → F1~F5 → F3 (DelayFRR)	
Syntax	< Long > :measure:frrdelay?	< Short > :meas:frrd?
Returns	<NR3>	
Before this command	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>. See pagexx.	
Example	:measure:delay1 1 :measure:delay2 2 :measure:frrdelay?	Select channel 1 and 2 as delay source1/2, and then measure FRR.

**:MEASure:LFFDelay** → 

Description	Returns the delay between the first falling edge of source1 and the last falling edge of source2. Same as: Measure key → F1~F5 → F3 (DelayLFF)	
Syntax	< Long > :measure:lffdelay?	< Short > :meas:lffd?
Returns	<NR3>	
Before this command	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>. See pagexx.	
Example	:measure:delay1 1 :measure:delay2 2 :measure:lffdelay?	Select channel 1 and 2 as delay source1/2, and then measure LFF.

**:MEASure:LFRDelay** → Query

Description	Returns the delay between the first falling edge of source1 and the last rising edge of source2. Same as: Measure key → F1~F5 → F3 (DelayLFR)	
Syntax	< Long > :measure:lfrdelay?	< Short > :meas:lfrd?
Returns	<NR3>	
Before this command	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>. See pagexx.	
Example	:measure:delay1 1 :measure:delay2 2 :measure:lfrdelay?	Select channel 1 and 2 as delay source1/2, and then measure LFR.

**:MEASure:LRFDelay** → Query

Description	Returns the delay between the first rising edge of source1 and the last rising edge of source2. Same as: Measure key → F1~F5 → F3 (DelayLRF)	
Syntax	< Long > :measure:lrfdelay?	< Short > :meas:lrfd?
Returns	<NR3>	
Before this command	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>. See pagexx.	
Example	:measure:delay1 1 :measure:delay2 2 :measure:lrfdelay?	Select channel 1 and 2 as delay source1/2, and then measure LRF.

**:MEASure:LRRDelay** → Query

Description	Returns the delay between the first rising edge of source1 and the last rising edge of source2. Same as: Measure key → F1~F5 → F3 (DelayLRR)	
Syntax	< Long > :measure:lrrdelay?	< Short > :meas:lrrd?
Returns	<NR3>	
Before this command	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>. See pagexx.	
Example	:measure:delay1 1 :measure:delay2 2 :measure:lrrdelay?	Select channel 1 and 2 as delay source1/2, and then measure LRR.

**:MEASure:NWIDth** → Query

Description	Returns the first negative pulse width timing. Same as: Measure key → F1~F5 → F3 (-Width)	
Syntax	< Long > :measure:nwidth?	< Short > :meas:nwid?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:nwidth?	Select channel 1, then measure negative pulse width.

**:MEASure:PDUTy?**

→ **Query**

Description	Returns the positive duty cycle ratio. Same as: Measure key → F1~F5 → F3 (DutyCycle)	
Syntax	< Long > :measure:pduty?	< Short > :meas:pdut?
Returns	<NR2> as the percentage	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:pduty?	Select channel 1, then measure positive duty cycle.

**:MEASure:PERiod?**

→ **Query**

Description	Returns the period value. Same as: Measure key → F1~F5 → F3 (Period)	
Syntax	< Long > :measure:period?	< Short > :meas:per?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:period?	Select channel 1, then measure period.

**:MEASure:PWIDth?**

→ **Query**

Description	Returns the first positive pulse width. Same as: Measure key → F1~F5 → F3 (+Width)	
Syntax	< Long > :measure:period?	< Short > :meas:per?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:pwidth?	Select channel 1, then measure positive pulse width.

**:MEASure:RISe?**

→ **Query**

Description	Returns the first pulse rising edge timing. Same as: Measure key → F1~F5 → F3 (RiseTime)	
Syntax	< Long > :measure:rise?	< Short > :meas:ris?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:rise?	Select channel 1, then measure rising edge timing.

**:MEASure:ROVShoot**

→ **Query**

Description	Returns rise overshoot amplitude in percentage. Same as: Measure key → F1~F5 → F3 (ROVShoot)	
Syntax	< Long > :measure:rovshoot?	< Short > :meas:rovs?
Returns	<NR2> with % sign	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:rovshoot?	Select channel 1, then measure rise overshoot.

**:MEASure:RPReshoot**

→ **Query**

Description	Returns rise overshoot amplitude in percentage. Same as: Measure key → F1~F5 → F3 (RPReshoot)	
Syntax	< Long > :measure:rpreshoot?	< Short > :meas:rprs?
Returns	<NR2> with % sign	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:rprshoot?	Select channel 1, then measure rise preshoot.



**:MEASure:SOURce** 


Description	Selects the measurement channel. Same as: Measure key → F1~F5 → F1, F2	
Syntax	< Long > :measure:source <NR1> :measure:source?	< Short > :meas:sour <NR1> :meas:sour?
Parameter	<NR1> 1 ~ 4	Channel1 ~ 4
Example	:measure:source 1 :measure:rprshoot?	Select channel 1, then measure rise preshoot.

**:MEASure:VAMplitude** 


Description	Returns the voltage difference between positive and negative peak. Same as: Measure key → F1~F5 → F3 (Vamp)	
Syntax	< Long > :measure:vamplitude?	< Short > :meas:vamp?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:vamplitude?	Select channel 1, then measure rise Voltage amplitude.

**:MEASure:VAverage**

→ **Query**

Description	Returns the average voltage. Same as: Measure key → F1~F5 → F3 (Vavg)	
Syntax	< Long > :measure:vaverage?	< Short > :meas:vavg?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:vaverage?	Select channel 1, then measure average Voltage.

**:MEASure:VHI**

→ **Query**

Description	Returns the global high voltage. Same as: Measure key → F1~F5 → F3 (Vhi)	
Syntax	< Long > :measure:vhi?	< Short > :meas:vhi?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:vhi?	Select channel 1, then measure global high Voltage.

**:MEASure:VLO**

→ **Query**

Description	Returns the global low voltage. Same as: Measure key → F1~F5 → F3 (Vlo)	
Syntax	< Long > :measure:vlo?	< Short > :meas:vlo?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:vlo?	Select channel 1, then measure global low Voltage.

**:MEASure:VMAX**

→ **Query**

Description	Returns the maximum amplitude. Same as: Measure key → F1~F5 → F3 (Vmax)	
Syntax	< Long > :measure:vmax?	< Short > :meas:vmax?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:vmax?	Select channel 1, then measure maximum amplitude.

**:MEASure:VMAX**

→ **Query**

Description	Returns the maximum amplitude. Same as: Measure key → F1~F5 → F3 (Vmax)	
Syntax	< Long > :measure:vmax?	< Short > :meas:vmax?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:vmax?	Select channel 1, then measure maximum amplitude.

**:MEASure:VMIN**

→ **Query**

Description	Returns the minimum amplitude. Same as: Measure key → F1~F5 → F3 (Vmin)	
Syntax	< Long > :measure:vmin?	< Short > :meas:vmin?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:vmin?	Select channel 1, then measure minimum amplitude.

**:MEASure:VPP**→ **Query**

Description	Returns the peak-to-peak amplitude (difference between maximum and minimum amplitude) Same as: Measure key → F1~F5 → F3 (Vpp)	
Syntax	< Long > :measure:vpp?	< Short > :meas:vpp?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:vpp?	Select channel 1, then measure peak-to-peak amplitude.

**:MEASure:VRMS**→ **Query**

Description	Returns the root-mean-square voltage. Same as: Measure key → F1~F5 → F3 (Vrms)	
Syntax	< Long > :measure:vrms?	< Short > :meas:vrms?
Returns	<NR3>	
Before this command	Select the measurement channel before this command: :measure:source <NR1>. See pagexx.	
Example	:measure:source 1 :measure:vrms?	Select channel 1, then measure root mean square Voltage.

## Memory (Save/Recall) Command

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### :MEMory<X>:RECall:SETup



Description	Recalls a panel setup from the internal memory. Same as: Save/Recall key → F1 (More) → F3 (Recall Setup)	
Syntax	< Long > :memory<x>:recall:setup	< Short > :mem<x>:rec:set
Parameter	<X> 1 ~ 20	Internal memory S1 ~ S20
Example	:memory1:recall:setup	Recall the setup from internal memory S1.

:MEMory<X>:RECall:WAVEform Set →

Description	Recalls a waveform from the internal memory and saves to a reference waveform. Same as: Save/Recall key → F1 (More) → F4 (Recall Waveform)	
Syntax	< Long > :memory<x>:recall:waveform <NR1>	< Short > :mem<x>:rec:wav <NR1>
Parameter	<X> 1 ~ 20 <NR1> 1 ~ 4	Internal memory W1 ~ W20 Reference waveform RefA ~ RefD
Example	:memory1:recall:waveform 1	Recall the waveform from internal memory W1 and save it to Reference waveform A

:MEMory<X>:SAVe:SETup Set →

Description	Saves the panel setup to the internal memory. Same as: Save/Recall key → F1 (More) → F4 (Recall Waveform)	
Syntax	< Long > :memory<x>:save:setup	< Short > :mem<x>:sav:set
Parameter	<X> 1 ~ 20	Internal memory W1 ~ W20
Example	:memory1:save:setup	Save the setup to internal memory W1.

**:MEMory<X>:SAVe:WAVeform (Set) →**

Description	Saves a reference waveform to internal memory. Same as: Save/Recall key → F1 (More) → F4 (Recall Waveform)	
Syntax	< Long > :memory<x>:save:waveform <NR1>	< Short > :mem<x>:sav:wav <NR1>
Parameter	<X> 1 ~ 20 <NR1> 1 ~ 4	Internal memory W1 ~ W20 Reference waveform RefA ~ RefD
Example	:memory1:save:waveform 1	Recall the waveform from internal memory W1 and save it to Reference waveform A

**:REFresh (Set) →**

Description	Refreshes the waveform data on the LCD display and re-displays the waveform data.	
Syntax	< Long > :refresh	< Short > refr

**:REF<X>:DISPlay (Set) →  
→ (Query)**

Description	Recalls a reference waveform into the display or returns its status. Same as: Save/Recall key → F5 (More) → F5 (More) → F2 (Display Refs) → F1~F4.	
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Syntax	< Long > :ref<x>:display <Boolean> :ref<x>:display?	< Short > :ref<x>disp <Boolean> :ref<x>disp?
Parameter	<X> Reference 1 A 2 B	<Boolean> Reference on/off 0 off 1 on
Example	:ref1:display 1	Turns on the reference waveform A



**Description** Moves or returns the position of a reference waveform.  
 Same as: Save/Recall key → F5(More) → F5(More) → F2 (Display Refs) → Variable knob

Syntax	< Long > :ref<x>:locate <NR1> :ref<x>:locate?	< Short > :ref<x>:loc <NR1> :ref<x>:loc?
Parameter	<X> Reference 1 A 2 B 3 C 4 D	<NR1> Position -100 to +100

**Note** Before using this command, turn on a reference waveform. See the example below.

Example	:ref1:display 1 :ref1:locate 0	Turns on the reference waveform A and move it to ±0 position
---------	-----------------------------------	--

**:REF<X>:SAVE**



Description	Saves an input signal as a reference waveform. Same as: Save/Recall key → F4(Save waveform)→ F4(Save)			
Syntax	< Long >		< Short >	
	:ref<x>:save <NR1>		:ref<x>sav <NR1>	
Parameter	<X>	Reference	<NR1>	Source
	1	A	1	Channel 1
	2	B	2	Channel 2
	3	C	3	Channel 3
	4	D	4	Channel 4
	5	Math		
Example	:ref1:save 1		Saves the Channel 1 signal as the reference waveform A	

**:USB:RECall:SETup**



Description	Recalls the last setup that was saved to the USB flash drive. (Note: Only the last file can be recalled). Same as: Save/Recall key → F5(More) → F3 (Recall Setup)		
Syntax	< Long >		< Short >
	:usb:recall:setup		:usb:rec:set
Example	:usb:recall:setup		Recalls the setup from USB.

**:USB:RECall:WAVEform****Set** →

Description	Recalls a waveform from the USB and saves to a reference waveform. (Note: Only the last saved file on the USB flash driver can be recalled.) Same as: Save/Recall key → F5(More) → F4(Recall Waveform)	
Syntax	< Long > :usb:recall:waveform <NR1>	< Short > :usb:rec:wav <NR1>
Parameter	<NR1> 1 ~ 4	Reference waveform RefA ~ RefD
Example	:usb:recall:waveform 1	Recall the waveform from USB and save it to Reference waveform A

**:USB:SAVE:ALL****Set** →

Description	Saves the panel setups, waveforms and screen shot to the USB flash drive. Same as: Save/Recall key → F5(More) → F2(Save All)	
Syntax	< Long > :usb:save:all	< Short > :usb:sav:all

**:USB:SAVE:IMAGe****Set** →

Description	Saves a screen shot to the USB flash drive. Same as: Save/Recall key → F5(More) → F1(Save Image)	
Syntax	< Long > :usb:save:image	< Short > :usb:sav:image

**:USB:SAVe:SETup** (Set) →

Description	Saves the current setup to the USB flash drive. Same as: Save/Recall key → F3(Save Setup)	
Syntax	< Long > :usb:save:setup	< Short > :usb:sav:set

**:USB:SAVe:WAVEform** (Set) →

Description	Saves a reference waveform to the USB flash drive. Same as: Save/Recall key → F4(Save Waveform)	
Syntax	< Long > :usb:save:waveform <NR1>	< Short > :usb:sav:wav <NR1>
Parameter	<NR1> 1 ~ 4	Reference waveform RefA ~ RefD
Example	:usb:save:waveform 1	Saves reference waveform 1 to USB.

## Run/Stop Commands

:RUN.....	77
:STOP.....	77

### :RUN



Description	Controls the RUN state of the trigger system. The acquisition cycle will follow each qualified trigger in the RUN state.
-------------	--

Syntax	:run
--------	------

### :STOP

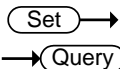


Description	Controls the STOP state of the trigger system. The acquisition cycle will only commence when the :RUN command is received.
-------------	--

Syntax	:run
--------	------

## Trigger Commands

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### :TRIGger:COUple

Description	Sets or queries the trigger coupling type. Same as: Trigger MENU key → F5(Slope/Coupling) → F2 (Coupling).	
Syntax	< Long > :trigger:couple <0   1> :trig:coup?	< Short > :trig:coup <0   1> :trig:coup?
Parameter/Return parameter	<bool> 0            AC coupling 1            DC coupling	
Example	:trigger:couple 0	Sets the trigger coupling to AC.

**:TRIGger:FREQuency** → Query

**Description** Returns the readout value of the trigger frequency counter.

<b>Syntax</b>	<b>&lt; Long &gt;</b>	<b>&lt; Short &gt;</b>
	:trigger:frequency?	:trig:freq?

<b>Return parameter</b>	<b>&lt;NR3&gt;</b>	Frequency in Hz
-------------------------	--------------------	-----------------

<b>Example</b>	:trigger:frequency? > 1.000E+03	Returns the trigger frequency (1000Hz).
----------------	------------------------------------	---

Set →

**:TRIGger:LEVel** → Query

**Description** Sets or queries the trigger level.  
Same as: Trigger level knob.

<b>Syntax</b>	<b>&lt; Long &gt;</b>	<b>&lt; Short &gt;</b>
	:trigger:level <NR3>	:trig:lev <NR3>
	:trig:level?	:trig:lev?

<b>Parameter/Return parameter</b>	<b>&lt;NR3&gt;</b>	Trigger level voltage
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<b>Example</b>	:trigger:level 0	Sets the trigger level to 0 volts.
----------------	------------------	------------------------------------

Set →

**:TRIGger:MODE** → Query

**Description** Sets or queries the trigger mode.  
Same as: Trigger MENU key → F3(Mode).

<b>Syntax</b>	<b>&lt; Long &gt;</b>	<b>&lt; Short &gt;</b>
	:trigger:mode <0   1   2   3>	:trig:mod <0   1   2   3>
	:trig:mode?	:trig:mod?

<b>Parameter/Return parameter</b>	<b>&lt;NR1&gt;</b>	0 Auto level
-----------------------------------	--------------------	--------------

1	Auto
2	Normal
3	Single

**Example**      `:trigger:mode 1`      Sets the trigger mode to AUTO.

(Set) →

→ (Query)

**:TRIGger:NREj**

**Description**      Sets or queries the state of the trigger noise rejection function.

Same as: Trigger MENU key →  
F5(Slope/Coupling) → F3(Noise rejection).

<b>Syntax</b>	< Long >	< Short >
	<code>:trigger:nrej &lt; 0   1 &gt;</code>	<code>:trig:nrej &lt;0   1 &gt;</code>
	<code>:trig:nrej?</code>	<code>:trig:nrej?</code>

<b>Parameter/Return parameter</b>	<NR1>
	0      Noise rejection off.
	1      Noise rejection on.

**Example**      `:trigger:nrej 1`      Turns noise rejection on.

(Set) →

→ (Query)

**:TRIGger:PULSe:MODE**

**Description**      Sets or queries the pulse mode trigger condition.

Same as: Trigger MENU key → F4(When).  
(When trigger mode = pulse)


<b>Syntax</b>	< Long >	< Short >
	<code>:trigger:pulse:mode &lt; 0   1   2   3 &gt;</code>	<code>:trig:puls:mod &lt;0   1   2   3 &gt;</code>
	<code>:trig:pulse:mode?</code>	<code>:trig:puls:mod?</code>


<b>Parameter/Return parameter</b>	<NR1>
	0      <



- 1 >
- 2 =
- 3 ≠

Example :trigger:pulse:mode 1 Sets the triggering condition to “>”.

 →

→ 


**:TRIGger:PULSe:TIME**


Description Select the time value for pulse width. The setting range is from 20ns to 10s.  
Same as: Trigger MENU key → F4(When) → Variable knob. (When trigger mode = pulse)

Syntax < Long > < Short >  
:trigger:pulse:time<NR3> :trig:puls:tim<NR3>  
:trig:pulse:time? :trig:puls:tim?

Parameter/Return <NR3> Pulse width in seconds  
parameter

Example :trigger:pulse:time? The pulse width is 10 seconds.  
>1.000E+01

 →

→ 

**:TRIGger:REject**

Description Sets or queries the frequency rejection mode.  
Same as: Trigger MENU key → F5(Slope/ Coupling) → F3(Rejection).

Syntax < Long > < Short >  
:trigger:reject < 0 | 1 | 2 > :trig:rej <0 | 1 | 2 >  
:trig:reject? :trig:rej?

Parameter/Return <NR1>  
parameter 0 Off  
1 Low frequency rejection

2 High frequency rejection

Example :trigger:reject 0 Turns frequency rejection off.

Set →

→ Query

**:TRIGger:SLOPe**

Description Sets or queries the trigger slope settings.

Same as: Trigger MENU key → F5(Slope/Coupling)→F1(Slope).

Syntax	< Long >	< Short >
	:trigger:slope < 0   1 >	:trig:slop < 0   1 >
	:trig:slope?	:trig:slop?

Parameter/Return <NR1>  
 parameter 0 Rising slope  
 1 Falling slope

Example :trigger:slope 0 Sets the slope to rising.

Set →

→ Query

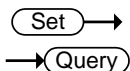
**:TRIGger:SOURce**

Description Sets or queries the trigger source.  
 Same as: Trigger MENU key → F2(Source).

Syntax	< Long >	< Short >
	:trigger:source <0 1 2 3 4>	:trig:sour <0 1 2 3 4>
	:trig:source?	:trig:sour?

Parameter/Return <NR1>  
 parameter 0 Channel 1  
 1 Channel 2  
 2 Channel 3  
 3 Channel 4  
 4 Line

Example           :trigger:source 0                               Sets the trigger source to CH1.



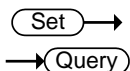
**:TRIGger:TYPe**

Description       Sets or queries the trigger type.  
Same as: Trigger MENU key → F1(Type).

Syntax            < Long >                               < Short >  
:trigger:type < 0 | 1 | 2 >                    :trig:type< 0 | 1 | 2 >  
:trig:type?                                       :trig:type?

Parameter/Return parameter	<NR1>
0	Edge
1	Video
2	Pulse

Example           :trigger:type 0                               Sets the trigger type to edge.



**:TRIGger:VIDeo:FIELD**

Description       Sets or queries which field the video trigger will trigger on.  
Same as: Trigger MENU key → F5(Field). (Note: Only when trigger = video.)

Syntax            < Long >                               < Short >  
:trigger:video:field < 0 | 1 | 2 >            :trig:vid:fiel < 0 | 1 | 2>  
:trig:video:field?                               :trig:vid:fiel?

Parameter/Return parameter	<NR1>
0	Line
1	Odd frame (field 1)
2	Even frame (field 2)

Example           :trigger:video:field 2                           Sets the video trigger to trigger on field 2.





## Time (horizontal) Commands

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:TIMEbase:WINDow:SCALE .....	88

:TIMEbase:DElay (Set) →  
→ (Query)

Description	Sets or returns the horizontal delay.	
Syntax	< Long >	< Short >
	:timebase:delay <NR3>	:tim:del <NR3>
	:timebase:delay?	:tim:del?
Parameter	<NR3> Timebase delay time in seconds	
Example	:timebase:delay?	Returns the horizontal delay time (140us)
	>-1.400E-04	

:TIMEbase:SCALE (Set) →  
→ (Query)

Description	Selects or returns the horizontal scale.					
	Same as: Time/div knob					
Syntax	< Long >		< Short >			
	:timebase:scale <NR3>		:tim:scal <NR3>			
	:timebase:scale?		:tim:scal?			
Parameter	s/div	<NR3>	s/div	<NR3>	s/div	<NR3>
	1ns	1e <sup>-9</sup>	5us	5e <sup>-6</sup>	25ms	25e <sup>-3</sup>
	2.5ns	2.5e <sup>-9</sup>	10us	10e <sup>-6</sup>	50ms	50e <sup>-3</sup>



**:TIMebase:WINDow:DELay** 


Description	Sets or returns the zoomed window horizontal position in seconds. Same as: Horizontal menu key → F2 (Window) → Horizontal Position Knob	
Syntax	< Long > :timebase>window:delay <NR3> :timebase>window:delay?	< Short > :tim:wind:del <NR3> :tim:wind:del?
Example	:timebase>window:delay 1.0e-5	Sets the zoom window position 10 us.

**:TIMebase:WINDow:SCALE** 


Description	Sets or returns the scale (length) of the zoomed window. Same as: Horizontal menu key → F3 (Window Zoom).	
Syntax	< Long > :timebase>window:scale <NR3> :timebase>window:scale?	< Short > :tim:wind:scal<NR3> :tim:wind:scal?
Example	:timebase>window:scale 1.00e-4	Sets the zoom scale to 100uS/Div.