Digital Storage Oscilloscope

GBS-1000 Series

PROGRAMMING MANUAL

GW INSTEK PART NO. 82BS-12040M01

ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

The information in this manual was correct at the time of printing. However, Good Will continues to improve products and reserves the rights to change specification, equipment, and maintenance procedures at any time without notice.

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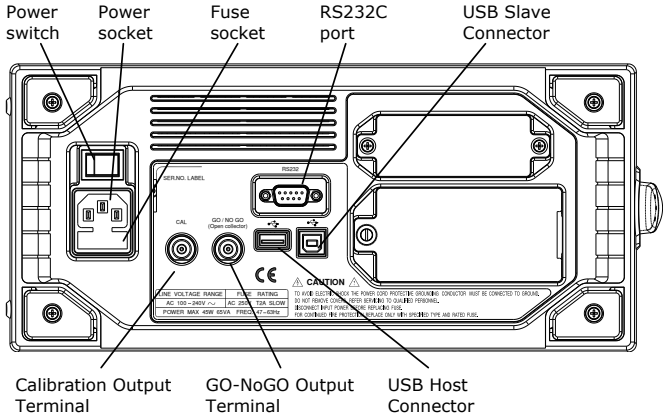
CONFIGURATION

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

GBS-1000 series overview

Interface Overview

Rear panel



Interface type

Terminal application (USB/RS-232C)

Invoke the terminal application such as MTTTY (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
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. 

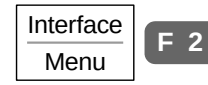
USB interface Configuration

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.

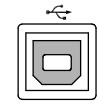
2. Press F2 (Interface Menu).



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, 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

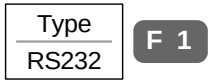
1. Press the Utility key.

2. Press F2 (Interface Menu).

3. Press F1 (Type) repeatedly to select RS-232C.

4. The interface icon at the top of the display changes into RS-232C type.

5. To change the baud rate, press F2 (Baud Rate) repeatedly.

   Range 2400, 4800, 9600, 19200, 38400

6. To change the stop bit, press F3 (Stop Bit) repeatedly.

   Range 1, 2

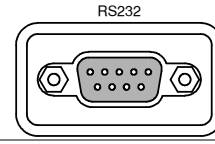
7. Data bit is fixed at 8.

8. To change the parity, press F4 (Parity) repeatedly.

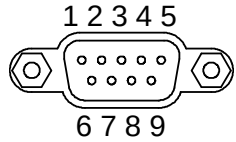
   

Range None, Odd, Even

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



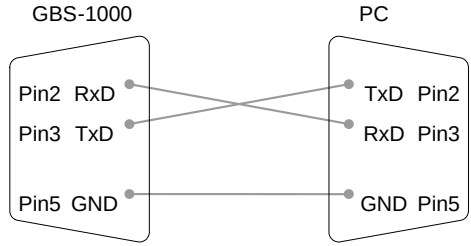
Pin assignment



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.



COMMAND SET

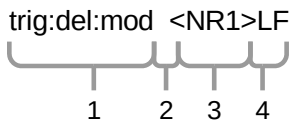
Command List

Command Syntax

Compatible standard

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

Command format



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?

→ Query

Description	Returns oscilloscope ID as Manufacturer, Model No, Serial No, Firmware version.	
Syntax	*idn?	
Return parameter	<string>	Scope id
Example	*idn? > GW,GBS-1062, ZZ1234567891,V1.00 BXXXX_1	Returns the scope id.

*LRN?

→ Query

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 ?;PERiod ?;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 ?;FPReshoot ?;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

Set →

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> Settings 1 to 20 S1 to S20	
Example	*rcl 1	Recalls the panel settings from S1

*RST

Set →

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

*SAV

Set →

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> Settings 1 to 20 S1 to S20	
Example	*SAV 1	Saves the panel settings to S1.

Acquisition Command

:ACQuire:AVERage

Set →
→ Query

Description	Selects or returns the average number of waveform acquisition in average acquisition mode. Same as: Acquire key → F3 ↵			
Syntax	< 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 :acquire:average 2		Set the acquisition mode to average, then set the average number to 4	

:ACQuire:LENGth

Set → / → Query

Description	Selects or returns the memory length. Same as: Acquire key → F5 ↵		
Syntax	< Long >		< Short >
	:acquire:length <NR1>		:acq:leng <NR1>
	:acquire:length?		:acq:leng?
Parameter	<NR1>	Memory length	
	0	500	
	1	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)

:ACQuire:MODe

Set → / → Query

Description	Selects or returns the acquisition mode. Same as: Acquire key → F1 ~ F3		
Syntax	< Long >		< Short >
	:acquire:mode <NR1>		:acq:mod <NR1>
	:acquire:mode?		:acq:mod?
Parameter	<NR1>	Acquisition mode	
	0	Normal	
	1	Peak detect	
	2	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 >		< Short >
	:acquire<X>:memory?		:acq<X>:mem?
Parameter	<X>	Channel	
	1/2/3/4	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 >		< Short >
	:ACQuire:HORexpand {0|1} :ACQuire:HORexpand?		:ACQ:HOR {0|1} :ACQ:HOR?
Parameter/ Return parameter	<NR1>	Expand function	
	0	Expand from center	
	1	Expand from trigger	
Example	:acquire:horexpand 0	Sets the horizontal expansion as "from center".	

Auto Set Command

:AUToset

Set →

Description	Runs Auto Set (automatically configures horizontal scale, vertical scale, trigger according to the input signal) Same as: Auto Set key	
Syntax	< Long > :autoset	< Short > :aut

Channel / Math Command

:CHANnel<X>:BWLimit

Set → / → Query

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

Set → / → Query

Description	Selects or returns the coupling mode for each channel. Same as: Channel key → F1			
Syntax	< Long > :channel<X>:coupling <NR1> :channel<X>:coupling?		< Short > :chan<X>:coup <NR1> :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

Set → / → Query

Description	Turns On/Off each channel or returns the status. Same as: Channel key			
Syntax	< Long > :channel<X>:display <NR1> :channel<X>:display?		< Short > :chan<X>:disp <NR1> :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			
Syntax	< Long > :channel<X>:expand <Boolean> :channel<X>:expand?		< Short > :chan<X>:exp <Boolean> :chan<X>:exp?	
Parameter	<X>	Channel	<NR1>	Expand
	1/2/3/4	CH1/2/3/4	0	Ground
			1	Center
Example	:channel1:expand 1 :channel1:expand? 1		Sets Channel 1 to Expand from Center. Returns expand from center (1) as channel 1's Expand status.	

:CHANnel<X>:INVert

Set → / → Query

Description	Inverts channel or returns the status. Same as: Channel key → F2			
Syntax	< Long > :channel<X>:invert <NR1> :channel<X>:invert?		< Short > :chan<X>:inv <NR1> :chan<X>:inv?	
Parameter	<X>	Channel	<NR1>	Channel invert
	1/2/3/4	CH1/2/3/4	0	Invert Off
			1	Invert On
Example	:channel1:invert 1		Invert Channel1	

: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>	Channel	<NR1>	Math operation
	1/2	CH1 and CH2	0	Math off
	3/4	CH3 and CH4	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

Set → / → Query

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)
			±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

Set → / → Query

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

:CHANnel<X>:SCALe

Set → / → Query

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 >		< Short >	
	:channel<X>:scale <NR3>		:chan<X>:scal <NR3>	
	:channel<X>:scale?		:chan<X>:scal?	
Parameter	<X>	Channel	<NR3>	Vertical scale
	1/2/3/4	CH1/2/3/4	2e–3 ~ 5e+0	2mV ~ 5V (Probe x1)
			2e–2 ~ 5e+1	20mV ~ 50V (Probe x10)
			2e–1 ~ 5e+2	200mV ~ 500V (Probe x100)
Example	:channel1:probe 0		Set CH1 probe to x1	
	:channel1:scale 2.00e–3		Set CH1 scale at 2mV	

Data Log Commands

:DATALOG:STATE

Set → Query

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

Set → Query

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.

:DATALOG:SAVe

Set → / → Query

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.

:DATALOG:INTerval

Set → / → Query

Description	Sets or queries the interval time between each recording.	
Syntax	< Long >	< Short >
	:DATALOG:INTerval <NR1>	:DATALOG:INT <NR1>
	:DATALOG:INTerval?	: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.

:DATALOG:DURation

Set → / → Query

Description	Sets or queries the duration time of each recording.

Syntax	< Long >		< Short >
	:DATALOG:DURation <NR1>		:DATALOG:DUR <NR1>
	:DATALOG:DURation?		: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 | 450 | 480 | 510 | 540 | 570 | 600 | 1200 | 1800 | 2400 | 3000 | 3600 | 4200 | 4800 | 5400 | 6000}	
Example	:DATALOG:DUR 5		Sets the recording time to 5 minutes.

Cursor Command

:CURSor:X<X>Position

Set → Query

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:x1position 100		Put horizontal cursor T1 on 100 point position	

:CURSor:Y<X>Position

Set → Query

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	

:CURSor:SOURce

Set → / → Query

Description	Selects or returns the cursor source channel. Same as: Cursor key →F1 (Source)		
Syntax	< Long >		< Short >
	:cursor:source<NR1>		:curs:sour<NR1>
	:cursor:source?		:curs:sour?
Parameter	<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

Set → / → Query

Description	Turns On/Off the display accumulate mode or returns the status. Same as: Display key → F2 (Accumulate)		
Syntax	< Long >		< Short >
	:display:accumulate<NR1>		:disp:acc<NR1>
	:display:accumulate?		:disp:acc?
Parameter	<NR1>	Display accumulation mode	
	0	Accumulation Off	
	1	Accumulation On	
Example	:display:accumulate 1		Turn On accumulation

:DISPlay:CONTrast

Set → / → Query

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

:DISPlay:GRATicule

Set → / → Query

Description	Sets or returns the display grid type. Same as: Display key → F5	
Syntax	< Long > :display:graticule<NR1> :display:graticule?	< Short > :disp:grat<NR1> :disp:grat?
Parameter	<NR1> Display grid type 0 Full grid 1 X and Y axis (cross type) 2 No grid	
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 >		< Short >
	:display:waveform<NR1>		:disp:wave<NR1>
	:display:waveform?		: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 >	< Short >
	:refresh	:refr

Go-NoGo Command

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

:GONogo:FUNction

Set

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

Set →

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)	
Syntax	< Long >	< Short >
	:gonogo:clear	:gon:cle

:GONogo:EXECute

Set →
→ Query

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

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

Example	: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)	
Syntax	< Long > :gonogo:ngcount?	< Short > :gon:ngc?
Example	: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)	
Syntax	< Long > :gonogo:ngdefine <NR1> :gonogo:ngdefine?	< Short > :gon:ngd <NR1> :gon:ngd?
Parameter	<NR1>	NoGo when condition
	0	NoGo when the waveform does not fit inside the template
	1	NoGo when the waveform fits inside the template
Example	:gonogo:ngdefine 1	NoGo when the waveform fits inside the template

:GONogo:SOURce

Set → / → Query

Description	Sets or returns Go-No Go test source channel. Same as: Utility key → F5 (More) → F3 (Go-NoGo Menu) → F2 (Source)	
Syntax	< Long > :gonogo:source <NR1> :gonogo:source?	< Short > :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

:GONogo:VIOLation

Set → / → Query

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	< Long > :gonogo:violation <NR1> :gonogo:violation?	< Short > :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.

:TEMPlate:MAX

Set → / → Query

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 >		< Short >
	:template:max <NR1>		:temp:max <NR1>
	:template:max?		:temp:max?
Parameter	<NR1>	Waveform used for Go-NoGo maximum template	
	0	Reference waveform A	
	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.)		
Example	:template:mode 0 :template:max 1		Select normal template mode, then select internal waveform W1 as Max template

:TEMPlate:MIN

Set → / → Query

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)		
Syntax	< Long >		< Short >
	:template:min <NR1>		:temp:min <NR1>
	:template:min?		:temp:min?
Parameter	<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.)		
Example	:template:mode 0 :template:min 1		Select normal template mode, then select internal waveform W1 as Min template

:TEMPlate:MODe

Set →
→ Query

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 >		< Short >
	:template:mode <NR1>		:temp:mod <NR1>
	:template:mode?		:temp:mod?
Parameter	<NR1>	Waveform used for Go-NoGo minimum template	
	0	Normal template (Max and Min)	
	1	Auto template	
Example	:template:mode 0 :template:min 1		Select normal template mode, then select internal waveform W1 as Min template

:TEMPlate:POSition:MAX

Set → / → Query

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> — Max template position –12.0 ~ 12.0 — –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.

:TEMPlate:POSition:MIN

Set → / → Query

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> Min template position –12.0 ~ 12.0 –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:aut

: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

:TEMPlate:TOLerance

Set → / → Query

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

Hardcopy Command

:COPY

Set →

Description	Runs Hardcopy (printout, save image, save all). Same as: Hardcopy key
Syntax	:copy

:HARDcopy:INKSaver

Set →
→ Query

Description	Selects or returns Inksaver On/Off in Hardcopy. Same as: Utility key → F1 (Hardcopy) → F2 (Ink Saver)		
Syntax	< Long >		< Short >
	:hardcopy:inksaver <Boolean>		:hard:inks <Boolean>
	:hardcopy:inksaver?		:hard:inks?
Parameter	<Boolean>	Inksaver On/Off	
	0	Inksaver Off	
	1	Inksaver On	
Example	:hardcopy:inksaver 1		Turn On inksaver

:HARDcopy:LAYout

Set → / → Query

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

:HARDcopy:MODe

Set → / → Query

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

:HARDcopy:RATio

Set → 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 >	< Short >
	:hardcopy:ratio <NR1>	:hard:rat <NR1>
	:hardcopy:ratio?	:hard:rat?
Parameter	<NR1> Printout ratio	
	10 ~ 100	10% ~ 100% (of the paper size)
Example	:hardcopy:ratio 50	Set printout ratio as 50%

Measure command

:MEASure:DELAY1

Set → / → Query

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

:MEASure:DELAY2

Set → / → Query

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

:MEASure:FALL

→ Query

Description	Returns the falltime measurement result. Same as: Measure key → F1~F5 → F3 (Fall Time)	
Syntax	< Long > :measure:fall?	< Short > :meas:fall?
Returns	<NR3>	
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 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 → Query

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 → Query

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

Set → / → Query

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

→ Query

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

:MEMory<X>:RECall:SETup

Set →

Description	Recalls a panel setup from the internal memory. Same as: Save/Recall key → F1 (More) → F3 (Recall Setup)		
Syntax	< Long >		< Short >
	:memory<x>:recall:setup		:mem<x>:rec:set
Parameter	<X>	Internal memory	
	1 ~ 20	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 >		< Short >
	:memory<x>:recall:waveform <NR1>		:mem<x>:rec:wav <NR1>
Parameter	<X>	Internal memory	
	1 ~ 20	W1 ~ W20	
	<NR1>	Reference waveform	
	1 ~ 4	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 >		< Short >
	:memory<x>:save:setup		:mem<x>:sav:set
Parameter	<X>	Internal memory	
	1 ~ 20	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 >		< Short >
	:memory<x>:save:waveform <NR1>		:mem<x>:sav:wav <NR1>
Parameter	<X>	Internal memory	
	1 ~ 20	W1 ~ W20	
	<NR1>	Reference waveform	
	1 ~ 4	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 > < Short >
	:refresh 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.

Syntax	< Long >		< Short >	
	:ref<x>:display <Boolean>		:ref<x>disp <Boolean>	
	:ref<x>:display?		:ref<x>disp?	
Parameter	<X>	Reference	<Boolean>	Reference on/off
	1	A	0	off
	2	B	1	on
Example	:ref1:display 1		Turns on the reference waveform A	

:REF<X>:LOCate

Set → / → Query

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

Set →

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

Set →

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> Reference waveform 1 ~ 4 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 >	< Short >
	:usb:save:setup	: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 >	< Short >
	:usb:save:waveform <NR1>	:usb:sav:wav <NR1>
Parameter	<NR1> Reference waveform	
	1 ~ 4 RefA ~ RefD	
Example	:usb:save:waveform 1	Saves reference waveform 1 to USB.

Run/Stop Commands

:RUN

Set →

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

:STOP

Set →

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

:TRIGger:COUPle

Set → Query

Description	Sets or queries the trigger coupling type. Same as: Trigger MENU key → F5(Slope/Coupling) → F2 (Coupling).		
Syntax	< Long >		< Short >
	:trigger:couple <0 | 1>		:trig:coup <0 | 1>
	:trig:coup?		: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.	
Syntax	< Long >	< Short >
	:trigger:frequency?	:trig:freq?
Return parameter	<NR3> Frequency in Hz	
Example	:trigger:frequency? > 1.000E+03	Returns the trigger frequency (1000Hz).

:TRIGger:LEVel

(Set)→
→(Query)

Description	Sets or queries the trigger level. Same as: Trigger level knob.	
Syntax	< Long >	< Short >
	:trigger:level <NR3>	:trig:lev <NR3>
	:trig:level?	:trig:lev?
Parameter/Return parameter	<NR3> Trigger level voltage	
Example	:trigger:level 0	Sets the trigger level to 0 volts.

:TRIGger:MODe

(Set)→
→(Query)

Description	Sets or queries the trigger mode. Same as: Trigger MENU key → F3(Mode).	
Syntax	< Long >	< Short >
	:trigger:mode <0 | 1 | 2 | 3>	:trig:mod <0 | 1 | 2 | 3>
	:trig:mode?	:trig:mod?
Parameter/Return parameter	<NR1> 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).	
Syntax	< Long >	< Short >
	:trigger:nrej < 0 | 1 >	:trig:nrej <0 | 1 >
	:trig:nrej?	:trig:nrej?
Parameter/Return parameter	<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)	
Syntax	< Long >	< Short >
	:trigger:pulse:mode < 0 | 1 | 2 | 3 >	:trig:puls:mod <0 | 1 | 2 | 3 >
	:trig:pulse:mode?	:trig:puls:mod?
Parameter/Return parameter	<NR1>	
	0	<

	1	>
	2	=
	3	≠

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

Set → Query

: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 parameter	<NR3>	Pulse width in seconds
Example	:trigger:pulse:time?	The pulse width is 10 seconds.
	>1.000E+01	

Set → Query

: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 parameter	<NR1>	
	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 > :trigger:slope < 0 | 1 > :trig:slope?	< Short > :trig:slop < 0 | 1 > :trig:slop?
Parameter/Return parameter	<NR1>	
	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 > :trigger:source <0|1|2|3|4> :trig:source?	< Short > :trig:sour <0|1|2|3|4> :trig:sour?
Parameter/Return parameter	<NR1>	
	0	Channel 1
	1	Channel 2
	2	Channel 3
	3	Channel 4
	4	Line

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

Set →
→ Query

:TRIGger:TYPe

Description	Sets or queries the trigger type. Same as: Trigger MENU key → F1(Type).	
Syntax	< Long > :trigger:type < 0 | 1 | 2 > :trig:type?	< Short > :trig:type< 0 | 1 | 2 > :trig:type?
Parameter/Return parameter	<NR1> 0 Edge 1 Video 2 Pulse	
Example	:trigger:type 0	Sets the trigger type to edge.

Set →
→ Query

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

Set → Query

:TRIGger:VIDeo:LINe

Description	Sets or queries which specific line to trigger on. Same as: Trigger MENU key → F5(Field). (Note: Only when trigger = video.)	
Syntax	< Long >	< Short >
	:trigger:video:line <NR1>	:trig:vid:lin <NR1>
	:trigger:video:line?	:trig:vid:lin?
Parameter/Return parameter	<NR1>	
	1~313	NTSC: 1~263 for Odd frame; 1-262 for even frame PAL: 1~313 for Odd frame; 1-312 for even frame.
Example	:trigger:video:line 1	Sets the video trigger to trigger on line 1.

Set → Query

:TRIGger:VIDeo:POLarity

Description	Sets or queries the video trigger polarity. Same as: Trigger MENU key → F4Field). (Note: Only when trigger = video.)	
Syntax	< Long >	< Short >
	:trigger:video:polarity < 0 | 1>	:trig:vid:pol< 0 | 1>
	:trigger:video:polarity?	:trig:vid:pol?
Parameter/Return parameter	<NR1>	
	0	Positive-going sync pulses
	1	Negative-going sync pulses
Example	:trigger:video:polarity 0	Sets the polarity to positive.

:TRIGger:VIDeo:TYPe

Set
Query

Description	Sets or queries the video trigger standard. Same as: Trigger MENU key → F3 (Standard). (Note: Only when trigger = video.)		
Syntax	< Long >		< Short >
	:trigger:video:type< 0 | 1 | 2 >		:trig:vid:typ< 0 | 1 | 2 >
	:trigger:video:type?		:trig:vid:typ?
Parameter/Return parameter	<NR1>		
	0	PAL	
	1	NTSC	
	2	SECAM	
Example	:trigger:video:type 0		Sets the video standard to PAL.

Time (horizontal) Commands

: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	$1e^{-9}$	5us	$5e^{-6}$	25ms	$25e^{-3}$
	2.5ns	$2.5e^{-9}$	10us	$10e^{-6}$	50ms	$50e^{-3}$

	5ns	$5e^{-9}$	25us	$25e^{-6}$	100ms	$100e^{-3}$
	10ns	$10e^{-9}$	50us	$50e^{-6}$	250ms	$250e^{-3}$
	25ns	$25e^{-9}$	100us	$100e^{-6}$	500ms	$500e^{-3}$
	50ns	$50e^{-9}$	250us	$250e^{-6}$	1s	1
	100ns	$100e^{-9}$	500us	$500e^{-6}$	2.5s	2.5
	250ns	$250e^{-9}$	1ms	$1e^{-3}$	5s	5
	500ns	$500e^{-9}$	2.5ms	$2.5e^{-3}$	10s	10
	1us	$1e^{-6}$	5ms	$5e^{-3}$		
	2.5us	$2.5e^{-6}$	10ms	$10e^{-3}$		

Example :timetable:scale 1 Selects 1s/div as the horizontal scale

:TIMebase:SWEep

Set → / → Query

Description Selects or returns the horizontal sweep mode.
Same as: Horizontal menu key → F1 ~ F5

Syntax

< Long >	< Short >
:timebase:sweep <NR1>	:tim:swe <NR1>
:timebase:sweep?	:tim:swe?

Parameter

<NR1>	Sweep mode	<NR1>	Sweep mode
0	Main timebase	1	Window
2	Window zoom	3	Roll mode
4	XY mode		

Example :timetable:sweep 0 Selects the main timebase as the horizontal sweep mode

:TIMebase:WINDow:DELay

Set → / → Query

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

:TIMebase:WINDow:SCALe

Set → / → Query

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