

# Digital Storage Oscilloscope

GDS-1000A-U Series

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## PROGRAMMING MANUAL

GW INSTEK PART NO. 82DS-112AU101



ISO-9001 CERTIFIED MANUFACTURER

**GW INSTEK**

December 2011 edition

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# Table of Contents

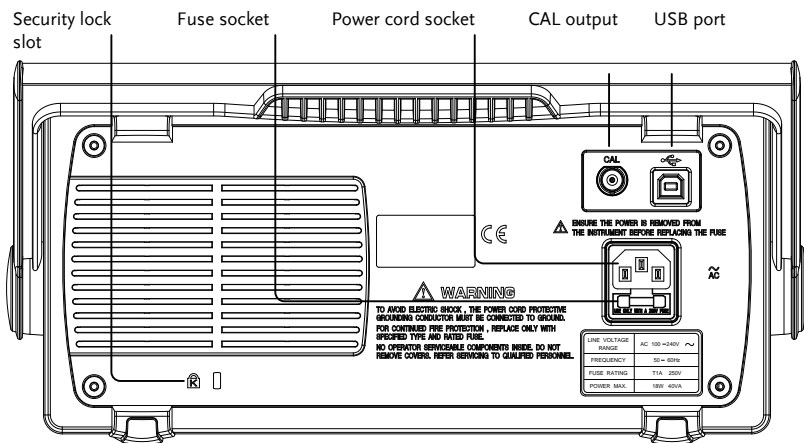
<b>I</b>	<b>INTERFACE OVERVIEW .....</b>	<b>5</b>
	Rear Panel Overview .....	5
	Configuring the USB Interface .....	6
<b>C</b>	<b>COMMAND OVERVIEW .....</b>	<b>8</b>
	Command Syntax .....	8
	List of Commands in Functional Order .....	9
<b>C</b>	<b>COMMAND DETAILS .....</b>	<b>15</b>
	System command .....	16
	Acquisition Command.....	19
	Autoset Command .....	24
	Channel Command .....	25
	Math Command .....	31
	Cursor Command.....	35
	Display Command.....	39
	Measure command .....	42
	Go No-Go Commands.....	57
	Data Log Commands .....	67
	Save/Recall Command .....	70
	Time (Horizontal) command .....	75
	Trigger command.....	78



# INTERFACE OVERVIEW

This manual describes how to use the GDS-1000A-U's remote command functionality and lists the command details. The Overview chapter describes how to configure the GDS-1000A-U USB remote control interface.

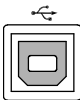
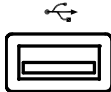


## Rear Panel Overview




## Configuring the USB Interface

This section describes how to set up the USB port for remote control. Note that printing to a PictBridge compatible printer and remote control cannot be supported at the same time as the same USB port is used.

USB connection	PC / Printer end	Type A, host
	GDS-1000A-U end	Type B, slave
	Speed	1.1/2.0 (full speed)

- Panel operation
1. Connect the USB cable to the USB slave port on the rear panel.
 
  2. Insert the other end of the USB cable into the PC USB port.
 
  3. Press the Utility key.
 
  4. Press *More* twice.
 

x2
  5. Press *USB Port* repeatedly to set the host device to PC.
 

Range      Printer, PC, Auto Detect
  6. When the PC asks for the USB driver, select `dso_cdc_1000.inf` (Windows XP) or `dso_vista_cdc.inf` (Vista 32bit) which are downloadable from the GW website, [www.gwinstek.com](http://www.gwinstek.com), GDS-1000A-U product corner.

7. On the PC, activate a terminal application such as Hyper Terminal. To check the COM port No., see the Device Manager in the PC. For WindowsXP, select Control panel → System → Hardware tab.
  
8. Run this query command via the terminal application.  
\*idn?  
This command should return the manufacturer, model number, serial number, and firmware version in the following format.  
GW, GDS-1152A-U, XXXXXXX, V1.00
  
9. Configuring the command interface is complete. Refer to the programming manual for the remote commands and other details.

# C COMMAND OVERVIEW

The Command overview chapter lists all GDS-1000A-U commands in functional order. The command syntax section shows you the basic syntax rules you have to apply when using commands.

## Command Syntax

- Compatible standard
- USB CDC\_ACM 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	LF^END	line feed code (hexadecimal 0A) with END message
	LF	line feed code
	<dab>^END	last data byte with END message

Note Commands are non-case sensitive.



## List of Commands in Functional Order

System	*IDN.....	16
	*LRN .....	16
	*RST .....	17
	:SYSTem:ERRor.....	17
	:SYSTem:VERSion.....	18
<hr/>		
Acquisition	:ACQuire:AVERage.....	19
	:ACQuire:HDELay .....	20
	:ACQuire:MODE .....	20
	:ACQuire<X>:LMEMory.....	21
	:ACQuire<X>:MEMory.....	22
<hr/>		
Autoset	:AUToset .....	24
<hr/>		
Channel	:CHANnel<X>:BWLimit .....	25
	:CHANnel<X>:COUPling.....	25
	:CHANnel<X>:DISPlay .....	26
	:CHANnel<X>:EXPand .....	26
	:CHANnel<X>:INVert .....	27
	:CHANnel<X>:MATH .....	27
	:CHANnel<X>:OFFSet.....	28
	:CHANnel<X>:PROBe:RATio .....	29
	:CHANnel<X>:PROBe:TYPE.....	29
	:CHANnel<X>:SCALE .....	30
<hr/>		
Math	:MATH:OPERator .....	31
	:MATH:POSition.....	31
	:MATH:FFT:SOURce .....	32
	:MATH:FFT:WINDow .....	32
	:MATH:FFT:SCALE.....	33
	:MATH:FFT:HORIZontal:SCALE.....	33
	:MATH:FFT:HORIZontal:POSition.....	33

Cursor	:CURSor:X<X>Position .....	35
	:CURSor:Y<X>Position .....	36
	:CURSor:<X>DELta .....	36
	:CURSor:<X>DISPlay .....	37
	:CURSor:SOURce.....	38
<hr/>		
Display	:DISPlay:ACCumulate .....	39
	:DISPlay:CONTrast .....	39
	:DISPlay:GRATicule .....	40
	:DISPlay:WAVEform.....	40
	:REFResh.....	41
<hr/>		
Measure	:MEASure:DELAY1 .....	43
	:MEASure:DELAY2 .....	43
	:MEASure:FALL.....	44
	:MEASure:FFFDelay.....	44
	:MEASure:FFRDelay .....	45
	:MEASure:FRFDelay .....	45
	:MEASure:FRRDelay .....	46
	:MEASure:LFFDelay.....	46
	:MEASure:LFRDelay.....	47
	:MEASure:LRFDelay.....	47
	:MEASure:LRRDelay .....	48
	:MEASure:FOVShoot.....	48
	:MEASure:FPReshoot .....	49
	:MEASure:FREQuency .....	49
	:MEASure:NWIDth .....	49
	:MEASure:PDUTy .....	50
	:MEASure:PERiod .....	50
	:MEASure:PWIDth .....	51
	:MEASure:RISe .....	51
	:MEASure:ROVShoot.....	52
	:MEASure:RPReshoot.....	52
	:MEASure:SOURce .....	52
	:MEASure:VAMPLitude .....	53

---

	:MEASure:VAverage .....	53
	:MEASure:VHI .....	54
	:MEASure:VLO .....	54
	:MEASure:VMAX .....	55
	:MEASure:VMIN .....	55
	:MEASure:VPP .....	55
	:MEASure:VRMS .....	56

---

Go No-Go	:GONogo:CLEar .....	57
	:GONogo:EXECute .....	58
	:GONogo:FUNcTion .....	58
	:GONogo:NGCount? .....	59
	:GONogo:NGDefine .....	59
	:GONogo:SOURce .....	59
	:GONogo:VIOLation .....	60
	:TEMPlate:MODE .....	60
	:TEMPlate:MAX .....	61
	:TEMPlate:MIN .....	62
	:TEMPlate:POSition:MAX .....	62
	:TEMPlate:POSition:MIN .....	63
	:TEMPlate:SAVe:MAXimum .....	64
	:TEMPlate:SAVe:MINimum .....	65
	:TEMPlate:TOLerance .....	65
	:TEMPlate:SAVe:AUTo .....	66

---

Data Logging	:DATALOG:STATE .....	67
	:DATALOG:SOURce .....	67
	:DATALOG:SAVe .....	68
	:DATALOG:INTerval .....	68
	:DATALOG:DURation .....	68

Save/Recall	:MEMory<X>:RECall:SETup .....	70
	:MEMory<X>:RECall:WAVEform .....	70
	:MEMory<X>:SAVe:SETup .....	71
	:MEMory<X>:SAVe:WAVEform .....	71
	*RCL.....	72
	:REF<X>:DISPlay .....	72
	:REF<X>:LOCate .....	73
	:REF<X>:SAVe.....	73
	*SAV.....	74
<hr/>		
Time	:TIMebase:DELay.....	75
(Horizontal)	:TIMebase:SCALE .....	75
	:TIMebase:SWEEP .....	76
	:TIMebase:WINDow:DELay.....	76
	:TIMebase:WINDow:SCALE .....	77
<hr/>		
Trigger	:FORCe.....	78
	:RUN .....	79
	:SINGle .....	79
	:STOP .....	79
	*TRG .....	79
	:TRIGger:COUple.....	79
	:TRIGger:FREQuency.....	80
	:TRIGger:LEVel.....	80
	:TRIGger:MODe.....	81
	:TRIGger:NREJ .....	81
	:TRIGger:PULSe:MODe.....	82
	:TRIGger:PULSe:TImE .....	82
	:TRIGger:REJect .....	83
	:TRIGger:SLOP .....	83
	:TRIGger:STATe .....	84
	:TRIGger:SOURce .....	84
	:TRIGger:TYPe .....	85
	:TRIGger:VIDeo:FIELd .....	85
	:TRIGger:VIDeo:LINE .....	86

:TRIGger:VIDeo:POLarity .....	87
:TRIGger:VIDeo:TYPe .....	87



# C COMMAND DETAILS

The Command details chapter shows the detailed syntax, equivalent panel operation, and example for each command. For the list of all commands, see page 9.

---

System command .....	16
Acquisition Command.....	19
Autoset Command .....	24
Channel Command .....	25
Math Command .....	31
Cursor Command.....	35
Display Command.....	39
Measure command .....	42
Go No-Go Commands.....	57
Data Log Commands .....	67
Save/Recall Command .....	70
Time (Horizontal) command .....	75
Trigger command.....	78

## System command

*IDN .....	16
*LRN .....	16
*RST .....	17
:SYSTem:ERRor .....	17
:SYSTem:VERSion.....	18

### \*IDN

→ **Query**

**Description** Returns the oscilloscope ID: manufacturer, model name, serial number, and firmware version.  
Same as: Utility key → F4

**Syntax** :idn?

<b>Example</b>	:idn?	Returns the ID for a GDS-1102A-U.
	GW, GDS-1152A-U, XXXXXXXX, V1.00	

### \*LRN

→ **Query**

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

**Syntax** :lrn?





**:SYSTem:VERSion**

→ **Query**

Description	Returns the SCPI version to which the oscilloscope complies to. This is returned as the SCPI version year and revision number (YYYY.V).	
Syntax	< Long >	< Short >
	:system:version?	:system:vers?
Example	:system:vers? 1992.0	Returns the SCPI version as YYYY.V.

## Acquisition Command

:ACquire:AVERage.....	19
:ACquire:HDElay.....	20
:ACquire:MODE.....	20
:ACquire<X>:LMEMory.....	21
:ACquire<X>:MEMory.....	22

:ACquire:AVERage 


**Description**      Selects or returns the average number of waveform acquisitions (samples) used in the average acquisition mode.

Same as: Acquire key → F2

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

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

**Note**      Before using this command, select the average acquisition mode. See the example below.

<b>Example</b>	:acquire:mode 2	Selects the average acquisition mode, and sets the number of samples to 4.
	:acquire:average 2	

Set →

→ Query

**:ACQUIRE:HDELAY**

Description	Sets or queries Delay On or Delay Off. Same as: Acquire key → F4	
Syntax	< Long > :acquire:hdelay <Boolean> :acquire:hdelay?	< Short > :acq:hdel <Boolean> :acq:hdel?
Parameter	<NR1> Delay 0 Off 1 On	
Example	:acquire:hdelay 1 :acquire:hdelay? 1	Turns Delay On. Returns the Delay as On.

Set →

→ Query

**:ACQUIRE:MODE**

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> Mode 0 Normal 1 Peak detect	<NR1> Mode 2 Average
Example	:acquire:mode 2 :acquire:average 2	Selects the average acquisition mode, and sets the number of samples to 4.

**:ACQuire<X>:LMEMory** → Query

**Description** Returns the total waveform data in the acquisition memory for long memory.

**Syntax** < Long > < Short >  
 :acquire<X>:lmemory? :acq<X>:lmem?

**Parameter** <X> Channel  
 1/2 Channel1/2

**Note** Please note that the number of points is limited to 4000 when the scope is running.

You can get the full memory depth when the “Single” key is pressed with a triggered signal.

You can also get the full memory depth when the “STOP” key is pressed,

However, the long memory may not fully fill up if a slow time base is used with a fast sample rate

Also note that there are several time base settings that don’t result in the use of 100% of available memory, due to a limited number of available sample rates.

**Example** :acquire1:lmemory? Returns the channel 1 long memory waveform data  
 If both channels are active, up to 1M points can be returned. If only CH1 is active then up to 2M points can be returned.

**Data format** Six data elements are concatenated to form one data string.

# A B C D E F

A: Data size digit

B: Data size

C: Time interval

D: Channel indicator

E: Reserved data

F: Waveform data

**Data size digit**

Indicates the number of digits used for the data string that follows. The data size digit is 4 for 4000 points, 7 for 1M or 2M points.

**Data size**

Indicates the data size. The data size varies from 8008 (4000 points), 2000008 (1M points) or 4000008 (2M points).

**Time interval**

Indicates the time interval between two adjacent sampling points in the floating point format, compatible with IEEE 754 standards.

Note: The data is sorted in the little-endian format.

**Channel indicator**

Indicates the channel, 1 or 2.

**Reserved data**

An unused data block, 3 bytes.

**Waveform data**

The waveform data comprised of 2M data points. Each point is made up of 2 bytes (16 bits), high byte (MSB) first.

**:ACquire<X>:MEMory**

→ **Query**

Description	Returns the total waveform data in the acquisition memory.	
-------------	--	--

Syntax	< Long >	< Short >
	:acquire<X>:memory?	:acq<X>:mem?

Parameter	<X>	Channel
	1/2	Channel1/2

Example	:acquire1:memory?	Returns the channel 1 waveform data
---------	-------------------	-------------------------------------

**Data format**

Six data elements are concatenated to form one data string.

# A B C D E F

A: Data size digit B: Data size

C: Time interval D: Channel indicator

E: Reserved data F: Waveform data

**Data size digit**

Indicates the number of digits used for the data string that follows. The data size digit is always 4.

**Data size**

Indicates the data size. The data size is always 8008 (4000 points per channel).

**Time interval**

Indicates the time interval between two adjacent sampling points in the floating point format, compatible with IEEE 754 standards.

Note: The data is sorted in the little-endian format.

**Channel indicator**

Indicates the channel, 1 or 2.

**Reserved data**

An unused data block, 3 bytes.

**Waveform data**

The waveform data comprised of 8000 data points. Each point is made up of 2 bytes (16 bits), high byte (MSB) first.

## Autoset Command

:AUToset



**Description**                 Runs the Autoset function to automatically configure the horizontal scale, vertical scale, and trigger according to the input signal.

Same as: Auto Set key

<b>Syntax</b>	< Long >	< Short >
	:autoset	:aut



## Channel Command

:CHANnel<X>:BWLimit .....	25
:CHANnel<X>:COUPling.....	25
:CHANnel<X>:DISPlay .....	26
:CHANnel<X>:EXPand .....	26
:CHANnel<X>:INVert .....	27
:CHANnel<X>:MATH .....	27
:CHANnel<X>:OFFSet.....	28
:CHANnel<X>:PROBe:RATio .....	29
:CHANnel<X>:PROBe:TYPE.....	29
:CHANnel<X>:SCALE .....	30

:CHANnel<X>:BWLimit (Set) →  
→ (Query)

**Description**      Selects or returns the bandwidth limit on/off.  
 Same as: Channel key → F3

<b>Syntax</b>	< Long >	< Short >
	:channel<X>:bwlimit <Boolean>	:chan<X>:bwlimit?
	:channel<X>:bwlimit?	:chan:bwlimit?

<b>Parameter</b>	<X>	Channel	<NR1>	Limit
	1/2	CH1/2	0	Off
			1	On

**Example**      :channel1:bwlimit 1      Turns on the bandwidth limit for Channel 1

:CHANnel<X>:COUPling (Set) →  
→ (Query)

**Description**      Selects or returns the coupling mode.  
 Same as: Channel key → F1

Syntax	< Long > :channel<X>:coupling <NR1> :channel<X>:coupling?	< Short > :chan<X>:coup <NR1> :chan:coup?
Parameter	<X> Channel 1/2 CH1/2	<NR1> Coupling mode 0 AC coupling 1 DC coupling 2 Ground coupling
Example	:channel1:coupling 1	Selects the DC coupling for Channel 1

:CHANnel<X>:DISPlay 


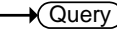


Description Turns a channel on/off or returns its status.  
Same as: Channel key

Syntax	< Long > :channel<X>:display <Boolean> :channel<X>:display?	< Short > :chan<X>:disp <Boolean> :chan<X>:disp?
--------	---	--

Parameter	<X> Channel 1/2 CH1/2	<NR1> Channel on/off 0 Off 1 On
-----------	--------------------------	---------------------------------------

Example :channel1:display 1 Turns on Channel 1

:CHANnel<X>:EXPand

Description Sets Expand from ground or from center for a channel. Queries the Expand status of a channel.  
Same as: Channel key → Expand

Syntax	< Long >	< Short >
--------	----------	-----------

```
:channel<X>:expand <Boolean> :chan<X>:exp
:channel<X>:expand?           <Boolean>
                               :chan<X>:exp?
```

Parameter	<X>	Channel	<NR1>	Expand
	1/2	CH1/2	0	Ground
			1	Center

**Example**

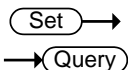
```
:channel1:expand 1
```

Sets Channel 1 to Expand from Center.

```
:channel1:expand?
```

Returns expand from center (1) as channel 1's Expand status.

```
1
```



### :CHANnel<X>:INVert

**Description** Inverts a channel or returns its status.  
Same as: Channel key → F2

**Syntax**

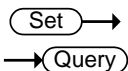
```
< Long >           < Short >
:channel<X>:invert <Boolean> :chan<X>:inv
:channel<X>:invert?           <Boolean>
                               :chan<X>:inv?
```

Parameter	<X>	Channel	<NR1>	Channel invert
	1/2	CH1/2	0	off
			1	on

**Example**

```
:channel1:invert 1
```

Inverts Channel 1



### :CHANnel<X>:MATH

**Description** Selects or returns the math operation type.  
Same as: Math key → F1

**Syntax**

```
< Long >           < Short >
```

	:channel<X>:math <NR1>		:chan<X>:math <NR1>
	:channel<X>:math?		:chan<X>:math?
Parameter	<X>	Channel	<NR1>
	1/2	CH1 or CH2	0
			1
			2
			3
			4
			5
			Math operation
			Math off
			Add
			Subtract
			Multiply
			FFT
			FFTrms

Example1 :channel1:math 2 Channel 1 - Channel 2

Example2 :channel2:math 4 Runs FFT on Channel 2

Set →

→ Query

**:CHANnel<X>:OFFSet**

**Description** Sets or returns the offset level for a channel. The offset level range depends 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	CH1/2	±0.5~ ±5	±0.5V ~ ±5V (2mV/div~50mV/div)
			±5.0~ ±50	±5.0V ~ ±50V (100mV/div~500mV/div)
			±50.0~ ±300	±50.0V ~ ±300V (1V/div ~ 10V/div)

Example :channel1:scale 1.00e-2 Sets the Channel 1 scale to 10mV/div  
:channel1:offset 2.00e-2 Sets the Channel 1 offset to 20mV



Parameter	<X>	Channel	<boolean>	Probe type
	1/2	CH1/2	0	Voltage
			1	Current

Example :channel1:probe:type 1 Sets the Channel 1 probe type to Current.

Set →

→ Query

**:CHANnel<X>:SCALE**

Description Sets or returns the vertical scale. The scale depends 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	CH1/2	2e-3 ~ 5e+0	2mV ~ 10V (Probe x1)
			2e-2 ~ 1e+2	20mV ~ 100V (Probe x10)
			2e-1 ~ 1e+3	200mV ~ 1000V (Probe x100)

Example :channel1:probe 0 Sets the Channel 1 probe attenuation factor to x1  
 :channel1:scale 2.00e-3 Sets the Channel 1 vertical scale to 2mV/div

## Math Command

:MATH:OPERator .....	31
:MATH:POSition.....	31
:MATH:FFT:SOURce .....	32
:MATH:FFT:WINDow .....	32
:MATH:FFT:SCALe.....	33
:MATH:FFT:HORIZontal:SCALe .....	33
:MATH:FFT:HORIZontal:POSition.....	33

### :MATH:OPERator

Set →

→ Query

Description	Sets the math operator.			
Syntax	< Long >		< Short >	
	:MATH:OPERator {PLUS 0 MINUS 1 MUL 2 FFT  3 FFTRMS 4}		:MATH:OPER {PLUS 0 MINUS 1 MU L 2 FFT 3 FFTRMS 4}	
	:MATH:OPERator?		:MATH:OPER?	
Parameters	PLUS 0	Addition	MINUS 1	Subtraction
	MUL 2	Multiplication	FFT 3	FFT
	FFTRMS 4	FFTRMS		
Example	:MATH:OPER PLUS		Sets the operator to addition.	

Set →

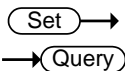
→ Query

### :MATH:POSition

Description	Sets or vertical position (in grid divisions) of the math output waveform.	
Syntax	< Long >	< Short >
	:MATH:POSition <NR3>	:MATH:POS <NR3>
	:MATH:POSition?	:MATH:POS?

Parameters	<code>&lt;NR3&gt;</code>	-12.00 ~ +12.00, with 0.00 being the center division.
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Example	<code>:MATH:POS 3.00</code>	Sets the position to the 3 <sup>rd</sup> division above the center division.
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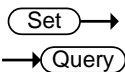


`:MATH:FFT:SOURce`

Description	Sets the source channel for FFT math.	
Syntax	<code>&lt; Long &gt;</code>	<code>&lt; Short &gt;</code>
	<code>:MATH:FFT:SOURce</code> <code>{CH1 1 CH2 2}</code>	<code>:MATH:FFT:SOUR</code> <code>{CH1 1 CH2 2}</code>
	<code>:MATH:FFT:SOURce?</code>	<code>:MATH:FFT:SOUR?</code>

Parameters	<code>CH1 1</code>	Channel 1	<code>CH2 2</code>	Channel 2
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Example	<code>:MATH:FFT:SOUR 1</code>	Sets the source to CH1
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`:MATH:FFT:WINDow`

Description	Sets FFT window type.	
Syntax	<code>&lt; Long &gt;</code>	<code>&lt; Short &gt;</code>
	<code>:MATH:FFT:WINDow</code> <code>{HANning 0 FLATtop 1 RECTa</code> <code>ngular 2 BLAckman 3}</code>	<code>:MATH:FFT:WIND</code> <code>{HAN 0 FLAT 1RECT 2</code> <code> BLA 3}</code>

Parameters	HANning 0	Hanning window
	FLATtop 1	Flattop window
	RECTangular 2	Rectangular window
	BLAckman 3	Blackman window

Example	<code>:MATH:FFT:WIND HAN</code>	Sets the window type to Hanning.
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**:MATH:FFT:SCALE** 
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Description	Sets the FFT scale in dB.			
Syntax	< Long >		< Short >	
	:MATH:FFT:SCALE {20 10 5 2 1}		:MATH:FFT:SCAL {20 10 5 2 1}	
Parameters	20	20 dB	2	2 dB
	10	10 dB	1	1 dB
	5	5 dB		
Example	:MATH:FFT:SCAL 5		Sets the vertical scale to 5 dB.	

**:MATH:FFT:HORizontal:SCALE** 
 →  
 →

Description	Sets the horizontal zoom scale.			
Syntax	< Long >		< Short >	
	:MATH:FFT:HORizontal:SCALE {20 10 5 2 1}		:MATH:FFT:HOR :SCAL {20 10 5 2 1}	
Parameters	20	20x zoom	2	2x zoom
	10	10x zoom	1	1x zoom
	5	5x zoom		
Example	:MATH:FFT:HOR:SCAL 5		Sets the zoom to 5x.	

**:MATH:FFT:HORizontal:POSITION** 
 →  
 →

Description	Sets or horizontal position (in Hz) of the FFT waveform.	
Syntax	< Long >	< Short >

:MATH:FFT:HORizontal	:MATH:FFT:HOR
:POSition? <NR2>	:POS <NR2>
:MATH:FFT:HORizontal	:MATH:FFT:HOR
:POSition?	:POS?

Parameters	<NR3>	Horizontal position in Hz.
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Example	:MATH:FFT:HOR:POS 118000000	Sets the horizontal position to 118 MHz.
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## Cursor Command

:CURSor:X<X>Position .....35  
 :CURSor:Y<X>Position .....36  
 :CURSor:<X>DELta .....36  
 :CURSor:<X>DISplay .....37  
 :CURSor:SOURce.....38

:CURSor:X<X>Position  

Description	Sets or returns the horizontal (X axis) cursor position. Same as: Cursor key → F5 (X-Y) → F2 (X1) or F3 (X2) + Variable knob		
Syntax	< Long >	< Short >	
	:cursor:x<X>position <NR3>	:curs:x<X>p <NR3>	
	:cursor:x<X>position?	:curs:x<X>p?	
Parameter	<X>	Cursor 1 or 2 <NR3>	Position in seconds
	1	Cursor X1	
	2	Cursor X2	
Note	When in the query mode, the returned data format is <NR3> as follows. CH1, CH2, Math (+, -, ×, ÷): time (s) Math (FFT, FFTrms): frequency (Hz)		
Example	:cursor:xdisplay 1 :cursor:x1position 3.000E-04	Puts the horizontal cursor X1 at the 300us position.	
	:channel:math 3 :cursor:xdisplay 1 :cursor:x1position? → 2.500E+03	Returns the X1 cursor position as 2500Hz in the Math FFT mode.	

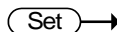


Parameter	<X>	Horizontal or vertical cursor
	x	Horizontal cursor (X axis)
	y	Vertical cursor (Y axis)

**Note** The returned data format is <NR3> as follows.  
 CH1, CH2, Math (CH1 ± CH2): time (s) for horizontal cursor, voltage (V) for vertical cursor  
 Math (FFT): frequency (Hz) for horizontal cursor, decibel (dB) for vertical cursor

<b>Example</b>	:channel:math 3 :cursor:xdisplay 1 :cursor:xdelta? → 2.500E+03	Returns the frequency (2500Hz) between the two horizontal cursors in the Math FFT mode
	:channel:math 3 :cursor:ydisplay 1 :cursor:ydelta? → 2.500E+00	Returns the decibel (2.5dB) between the two vertical cursors in the Math FFT mode

**:CURSor:<X>DISplay**



**Description** Turns the horizontal or vertical cursors on/off.  
 Same as: Cursor key

**Syntax** < Long > < Short >  
 :cursor:y<X>display <Boolean> :curs:y<X>dis <Boolean>

Parameter	<X>	X or Y cursor	<NR1>	Cursor on/off
	x	X (horizontal)	0	off
	y	Y (vertical)	1	on

**Example** :cursor:ydisplay 1 Turn Y cursor on

Set →

→ Query

:CURSor:SOURce

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	<NR1> 1 2 3	Cursor source channel Channel 1 or 2 Math result
Example	:cursor:source 2	Selects Channel 2 as the cursor source

## Display Command

:DISPlay:ACCumulate .....	39
:DISPlay:CONTRast .....	39
:DISPlay:GRATICule .....	40
:DISPlay:WAVEform .....	40
:REFResh .....	41

:DISPlay:ACCumulate 



**Description** Turns the display accumulate mode on/off or returns its status.

Same as: Display key → F2

<b>Syntax</b>	< Long >	< Short >
	:display:accumulate <Boolean>	:disp:acc <Boolean>
	:display:accumulate?	:disp:acc?

<b>Parameter</b>	<NR1>	Display accumulation
	0	off
	1	on

<b>Example</b>	:display:accumulate 1	Turns on the accumulation
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:DISPlay:CONTRast 

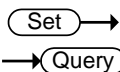


**Description** Sets or returns the display contrast level.

Same as: Display key → F4

<b>Syntax</b>	< Long >	< Short >
	:display:contrast <NR1>	:disp:cont <NR1>
	:display:contrast?	:disp:cont?

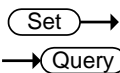
Parameter	<NR1> -10 ~ 10	Display contrast Lowest (-10) to the Highest (+10)
Example	:display:contrast 0	Sets the display contrast to the middle (±0)



**:DISPlay:GRATICule**

Description	Sets or returns the display grid type. Same as: Display key → F5		
Syntax	< Long >	< Short >	
	:display:graticule <NR1>	:disp:grat <NR1>	
	:display:graticule?	:disp:grat?	
Parameter	<NR1>	Grid type	<NR1> Grid type
	0	Full mode	2 Frame mode
	1	Cross mode	

Example	:display:graticule 0	Selects the full grid
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**:DISPlay:WAVEform**

Description	Sets or returns the display waveform type. Same as: Display key → F1		
Syntax	< Long >	< Short >	
	:display:waveform <NR1>	:disp:wav <NR1>	
	:display:waveform?	:disp:wav?	
Parameter	<NR1>	Display waveform type	
	0	Vectors	
	1	Dots	

Example	:display:waveform 0	Selects the vectors waveform
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**:REFresh****Set** →

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Description	Erases the existing waveform and draws a new one.
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Same as: Display key → F3

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Syntax	< Long >	< Short >
	:refresh	:refr

## Measure command

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:MEASure:DELAY1 .....	43
:MEASure:DELAY2 .....	43
:MEASure:FALL.....	44
:MEASure:FFFDelay.....	44
:MEASure:FFRDelay .....	45
:MEASure:FRFDelay .....	45
:MEASure:FRRDelay .....	46
:MEASure:LFFDelay.....	46
:MEASure:LFRDelay.....	47
:MEASure:LRFDelay.....	47
:MEASure:LRRDelay .....	48
:MEASure:FOVShoot.....	48
:MEASure:FPReshoot .....	49
:MEASure:FREQuency.....	49
:MEASure:NWIDth .....	49
:MEASure:PDUTy .....	50
:MEASure:PERiod .....	50
:MEASure:PWIDth .....	51
:MEASure:RISe .....	51
:MEASure:ROVShoot.....	52
:MEASure:RPReshoot.....	52
:MEASure:SOURce .....	52
:MEASure:VAMPlitude .....	53
:MEASure:VAverage .....	53
:MEASure:VHI .....	54
:MEASure:VLO.....	54
:MEASure:VMAX.....	55
:MEASure:VMIN .....	55
:MEASure:VPP .....	55
:MEASure:VRMS.....	56

Set →  
→ Query

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<b>:MEASure:DELAY1</b>		
Description	Sets or returns the first source channel for the delay automatic measurement.  Same as: Measure key → F1~F5 → F3 → Select delay measurement function → F1 (Source1)	
Syntax	< Long > :measure:delay1 <NR1> :measure:delay1?	< Short > :meas:delay1 <NR1> :meas:delay1?
Parameter	<NR1> 1 ~ 2	Channel1 ~ 2
Example	:measure:delay1 1	Select Channel1 as the first source channel.

Set →  
→ Query

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<b>:MEASure:DELAY2</b>		
Description	Sets or returns the second source channel for the delay automatic measurement.  Same as: Measure key → F1~F5 → F3 → Select delay measurement function → F2 (Source2)	
Syntax	< Long > :measure:delay2 <NR1> :measure:delay2?	< Short > :meas:delay2 <NR1> :meas:delay2?
Parameter	<NR1> 1~2	Channel1~2
Example	:measure:delay2 1	Select Channel1 as the second source channel.

**:MEASure:FALL** → Query

Description	Returns the fall time measurement result. Same as: Measure key → F1~F5 → F3 (Fall Time)	
Syntax	< Long > :measure:fall?	< Short > :meas:fall?
Returns	<NR3>	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:fall?	Selects Channel 1, and then measures the 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 → Select delay measurement function by VARIABLE knob	
Syntax	< Long > :measure:fffdelay?	< Short > :meas:fffd?
Returns	<NR3>	
Note	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>.	
Example	:measure:delay1 1 :measure:delay2 2 :measure:fffdelay?	Select channel 1 and 2 as delay source1/2, then measure the FFF.

**:MEASure:FFRDelay** 

Description	Returns the delay between the first falling edge of source1 and the first rising edge of source2. Same as: Measure key → F1~F5 →Select delay measurement function by VARIABLE knob.	
Syntax	< Long > :measure:ffrdelay?	< Short > :meas:ffrd?
Returns	<NR3>	
Note	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>.	
Example	:measure:delay1 1 :measure:delay2 2 :measure:ffrdelay?	Select channel 1 and 2 as delay source1/2, and then measure FFR.

**:MEASure:FRFDelay** 

Description	Returns the delay between the first rising edge of source1 and the first falling edge of source2. Same as: Measure key → F1~F5 →Select delay measurement function by VARIABLE knob	
Syntax	< Long > :measure:frfdelay?	< Short > :meas:frfd?
Returns	<NR3>	
Note	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>.	
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 →Select delay measurement function by VARIABLE knob	
Syntax	< Long > :measure:frrdelay?	< Short > :meas:frrd?
Returns	<NR3>	
Note	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>.	
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 →Select delay measurement function by VARIABLE knob	
Syntax	< Long > :measure:lffdelay?	< Short > :meas:lffd?
Returns	<NR3>	
Note	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>.	
Example	:measure:delay1 1 :measure:delay2 2 :measure:lffdelay?	Select channel 1 and 2 as delay source1/2, and then measure LFF.

**:MEASure:LFRDelay** 

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

**:MEASure:LRFDelay** 

Description	Returns the delay between the first rising edge of source1 and the last rising edge of source2. Same as: Measure key → F1~F5 →Select delay measurement function by VARIABLE knob	
Syntax	< Long > :measure:lrfdelay?	< Short > :meas:lrfd?
Returns	<NR3>	
Note	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>.	
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 → Select delay measurement function by VARIABLE knob	
Syntax	< Long > :measure:lrrdelay?	< Short > :meas:lrrd?
Returns	<NR3>	
Note	Select the two delay channels before entering this command: :measure:delay1 <NR1> and :measure:delay2 <NR1>.	
Example	:measure:delay1 1 :measure:delay2 2 :measure:lrrdelay?	Select channel 1 and 2 as delay source1/2, and then measure LRR.

**:MEASure:FOVShoot** → **Query**

Description	Returns the fall overshoot amplitude. Same as: Measure key → F1~F5 → F3 (FOVShoot)	
Syntax	< Long > :measure:fovshoot?	< Short > :meas:fovs?
Returns	<NR2> with % sign	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:fall?	Selects Channel 1, and then measures the fall overshoot.



**:MEASure:FPReshoot** → Query

Description	Returns fall preshoot amplitude. Same as: Measure key → F1~F5 → F3 (FPREShoot)	
Syntax	< Long > :measure:fovshoot?	< Short > :meas:fovs?
Returns	<NR2> with % sign	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:fall?	Selects Channel 1, and then measures the 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>	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:frequency?	Selects Channel 1, and then measures the frequency.

**:MEASure:NWIDth** → Query

Description	Returns the first negative pulse width timing. Same as: Measure key → F1~F5 → F3 (-Width)	
Syntax	< Long >	< Short >

	:measure:nwidth?	:meas:nwid?
Returns	<NR3>	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:nwidth?	Selects Channel 1, and then measures the negative pulse width.

**:MEASure:PDUTy** → Query

Description	Returns the positive duty cycle ratio. Same as: Measure key → F1~F5 → F3 (DutyCycle)	
Syntax	< Long > :measure:pduity?	< Short > :meas:pdut?
Returns	<NR2> as the percentage	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:pduity?	Selects Channel 1, and then measures the positive duty cycle.

**:MEASure:PERiod** → Query

Description	Returns the period. Same as: Measure key → F1~F5 → F3 (Period)	
Syntax	< Long > :measure:period?	< Short > :meas:per?
Returns	<NR3>	
Note	Before using this command, select the measurement channel. See the example below.	

Example	:measure:source 1 :measure:period?	Selects Channel 1, and then measures the period.
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### :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>	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:pwidth?	Selects Channel 1, and then measures the 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>	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:rise?	Selects Channel 1, and then measures the 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:rov?
Returns	<NR2> with % sign	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:rovshoot?	Selects Channel 1, and then measures the rise overshoot.

**:MEASure:RPReshoot** → Query

Description	Returns rise overshoot amplitude in percentage. Same as: Measure key → F1~F5 → F3 (RPReshoot)	
Syntax	< Long > :measure:rprshoot?	< Short > :meas:rpr?
Returns	<NR2> with % sign	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:rprshoot?	Selects Channel 1, and then measures the rise prshoot.

Set →

**:MEASure:SOURce** → Query

Description	Selects the measurement channel. Same as: Measure key → F1~F5 → F1, F2	
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Syntax	< Long > :measure:source <NR1> :measure:source?	< Short > :meas:sour <NR1> :meas:sour?
Parameter	<NR1> 1 ~ 2      Channel1 ~ 2	
Example	:measure:source 1 :measure:rprshoot?	Selects Channel 1, and then measures the 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>	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:vamplitude?	Selects Channel 1, and then measures the 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>	
Note	Before using this command, select the measurement channel. See the example below.	

Example	:measure:source 1 :measure:vaverage?	Selects Channel 1, and then measures the average Voltage.
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**: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>	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:vhi?	Selects Channel 1, and then measures the 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>	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:vlo?	Selects Channel 1, and then measures the 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>	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:vmax?	Selects Channel 1, and then measures the 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>	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:vmin?	Selects Channel 1, and then measures the 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)	
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Syntax	< Long > :measure:vpp?	< Short > :meas:vpp?
Returns	<NR3>	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:vpp?	Selects Channel 1, and then measures the 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>	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:vrms?	Selects Channel 1, and then measures the root mean square voltage.




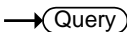
## Go No-Go Commands

:GONogo:CLEar .....	57
:GONogo:EXECute .....	58
:GONogo:FUNcTion .....	58
:GONogo:NGCount? .....	59
:GONogo:NGDefine .....	59
:GONogo:SOURce .....	59
:GONogo:VIOLation .....	60
:TEMPlate:MODE .....	60
:TEMPlate:MAX .....	61
:TEMPlate:MIN .....	62
:TEMPlate:POSition:MAX .....	62
:TEMPlate:POSition:MIN .....	63
:TEMPlate:SAVe:MAXimum .....	64
:TEMPlate:SAVe:MINimum .....	65
:TEMPlate:TOLerance .....	65
:TEMPlate:SAVe:AUTo .....	66



### :GONogo:CLEar



Description	<p>Clears the Go No-Go test result ratio. This is the equivalent to clearing the “failed” to “total tests” result ratio as shown in the Go-NoGo menu.</p> <p>Same as: Utility key → More (F4) → Go-NoGo Menu(F1) → Ratio:(F5).</p>	
Note	<p>Before any Go-NoGo command can be used, please use the :GONogo:FUNcTion 1 command to initialize the oscilloscope.</p>	
Syntax	< Long >	< Short >
	:GONogo:CLEar	:GON:CLE

<b>:GONogo:EXECute</b>		
Description	Starts or stops the Go-NoGo testing. Same as: Utility key → More (F4) → Go-NoGo Menu(F1)→Go-NoGo(F4).	
Note	Before any Go-NoGo command can be used, please use the :GONogo:FUNCTion 1 command to initialize the oscilloscope.	
Syntax	< Long >	< Short >
	:GONogo:EXECute {0 1}	:GON:EXEC {0 1}
	:GONogo:EXECute?	:GON:EXEC ?
Parameter/ Return parameter	0	Off. Stop Go-NoGo testing.
	1	On. Start Go-NoGo testing.
Example	:GON:EXEC 0	Turn Go-NoGo off.

<b>:GONogo:FUNCTion</b>		
Description	Initializes the oscilloscope for the Go-NoGo mode. This command must be used to initialize the oscilloscope for Go-NoGo mode before any Go-NoGo commands can be executed. To exit from Go-NoGo mode, use this function to un-initialize Go-NoGo mode.	
Syntax	< Long >	< Short >
	:GONogo:FUNCTion {0 1}	:GON:FUNC {0 1}
	:GONogo:FUNCTion?	:GON:FUNC ?
Parameter/ Return parameter	0	Un-initialize the oscilloscope from Go-NoGo mode.
	1	Initialize the oscilloscope for Go-NoGo mode.
Example	:GON:FUNC 1	Initialize the scope.

→ Query

**:GONogo:NGCount?**

Description	Returns the test result count ratio (failed count, total count).	
Syntax	< Long > :GON:NGC?	< Short > :GON:NGC?
Return parameter	<NR1>, <NR1>	<failed count>, <total count>
Example	:GON:NGC? >2,128	2 fails from 128 Go-NoGo tests.

Set →

**:GONogo:NGDefine**

→ Query

Description	Sets or queries the Go-NoGo boundary template conditions.	
Note	Before any Go-NoGo command can be used, please use the :GONogo:FUNCTION 1 command to initialize the oscilloscope.	
Syntax	< Long > :GONogo:NGDefine {0 1} :GONogo:NGDefine?	< Short > :GON:NGD {0 1} :GON:NGD
Parameter/ Return parameter	0	No-Go when the waveform doesn't exceed the boundary template.
	1	No-Go when the waveform exceeds the boundary template.
Example	:GON:NGD 1	NoGo conditions set to when outside template.

Set →

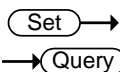
**:GONogo:SOURce**

→ Query

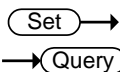
Description	Sets the Go-NoGo channel source.	
-------------	----------------------------------	--

Note	Before any Go-NoGo command can be used, please use the :GONogo:FUNCTION 1 command to initialize the oscilloscope.	
Syntax	< Long > :GONogo:SOURce {1 2} :GONogo:SOURce?	< Short > :GON:SOUR {1 2} :GON:SOUR?
Parameter/ Return parameter	1 2	Sets the source to channel 1 Sets the source to channel 2
Example	:GON:SOUR 1	Sets the source to channel 1.

**:GONogo:VIOLation**



Description	Sets or queries the Go-NoGo violation conditions.	
Note	Before any Go-NoGo command can be used, please use the :GONogo:FUNCTION 1 command to initialize the oscilloscope.	
Syntax	< Long > :GONogo:VIOLation {0 1} :GONogo:VIOLation?	< Short > :GON:VIOL {0 1} :GON:VIOL?
Parameter/ Return parameter	0 1	Violation condition = "Continue" Violation condition = "Stop"
Example	:GON:VIOL 1	Sets the violation condition to "Continue".



**:TEMPlate:MODE**

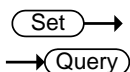
Description	Sets or queries the Go-NoGo template mode. When Auto mode is selected, CH1 or CH2 are used as the template source. When Normal mode is selected, the template source can be selected from internal memory (W1~W15, RefA or RefB).	
-------------	---	--

Note Before any Go-NoGo command can be used, please use the :GONogo:FUNCTION 1 command to initialize the oscilloscope.

Syntax	< Long >	< Short >
	:TEMPlate:MODE {0 1}	:TEMP:MOD {0 1}
	:TEMPlate:MODE?	:TEMP:MOD?

Parameter/ Return parameter	0	Select Normal template mode.
	1	Select Auto template mode.

Example :TEMP :MOD 1 Set to Auto mode.



**:TEMPlate:MAX**

Description Sets or queries the template used for the MAX boundary (W1~W15, RefA).

Note A template can only be defined for the MAX or MIN template, not both.

Before this command can be used, please set the template mode to normal using the :TEMPlate:MODE 0 command.

Before any Go-NoGo command can be used, please use the :GONogo:FUNCTION 1 command to initialize the oscilloscope.

Syntax	< Long >	< Short >
	:TEMPlate:MAX <NR1>	:TEMP:MAX <NR1>
	:TEMPlate:MAX?	:TEMP:MAX?

Parameter/ Return parameter	0	Set RefA as the MAX template.
	1~15	Set W1 ~ W15 as the MAX template

Example :TEMP :MAX ? RefA is the template.  
>1

**:TEMPlate:MIN**

Set →

→ Query

Description	Sets or queries the template used for the MIN boundary (W1~W15, RefB).	
Note	<p>A template can only be defined for the MAX or MIN template, not both.</p> <p>Before this command can be used, please set the template mode to normal using the :TEMPlate:MODE 0 command.</p> <p>Before any Go-NoGo command can be used, please use the :GONogo:FUNCTION 1 command to initialize the oscilloscope.</p>	
Syntax	<p>&lt; Long &gt;</p> <p>:TEMPlate:MIN &lt;NR1&gt;</p> <p>:TEMPlate:MIN?</p>	<p>&lt; Short &gt;</p> <p>:TEMP:MIN &lt;NR1&gt;</p> <p>:TEMP:MIN?</p>
Parameter/ Return parameter	<p>0 Set RefB as the MIN template.</p> <p>1~15 Set W1 ~ W15 as the MIN template</p>	
Example	:TEMP :MIN ? >1	RefB is the template.

Set →

→ Query

**:TEMPlate:POSition:MAX**

Description	Sets and queries the position of the MAX template in grid divisions. 1 grid division = 25 on-screen pixels.
-------------	---

**Note** This command will not alter the position of the waveform (RefA, W1~15) in memory, unless the template is saved with the :TEMPlate:SAVe :MAXimum command.

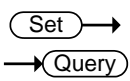
Before this command can be used, please set the template mode to normal using the :TEMPlate:MODE 0 command.

Before any Go-NoGo command can be used, please use the :GONogo:FUNcTION 1 command to initialize the oscilloscope.

<b>Syntax</b>	< Long >	< Short >
	:TEMPlate:POSition:MAX <NR2>	:TEMP:POS:MAX <NR2>
	:TEMP:POS:MAX?	:TEMP:POS:MAX?

<b>Parameter/ Return parameter</b>	<NR2>	-12.00 ~ 12.00 Div. 0 represents the center division.
--	-------	---

<b>Example</b>	:TEMP:POS:MAX 2.00	Sets the template to the 2 <sup>nd</sup> grid division above the center division.
----------------	--------------------	---



**:TEMPlate:POSition:MIN**

<b>Description</b>	Sets and queries the position of the MIN template in grid divisions. 1 grid division = 25 on-screen pixels.
--------------------	---

**Note** This command will not alter the position of the waveform (RefA, W1~15) in memory, unless the template is saved with the :TEMPlate:SAVe :MINimum command.

Before this command can be used, please set the template mode to normal using the :TEMPlate:MODE 0 command.

Before any Go-NoGo command can be used, please use the :GONogo:FUNCTion 1 command to initialize the oscilloscope.

<b>Syntax</b>	< Long >	< Short >
	:TEMPlate:POSition:MIN <NR2>	:TEMP:POS:MIN <NR2>
	:TEMP:POS:MIN?	:TEMP:POS:MIN?

<b>Parameter/ Return parameter</b>	<NR2>	-12.00 ~ 12.00 Div. 0 represents the center division.
------------------------------------	-------	---

<b>Example</b>	:TEMP:POS:MIN 2.00	Sets the template to the 2 <sup>nd</sup> grid division above the center division.
----------------	--------------------	---

**:TEMPlate:SAVe:MAXimum**



<b>Description</b>	Saves the maximum template. Same as: Utility key → More (F4) → Go-NoGo Menu(F1) → Template Edit(F1) → Save & Create(F4).
--------------------	---

**Note** Before this command can be used, please set the template mode to normal using the :TEMPlate:MODE 0 command.

Before any Go-NoGo command can be used, please use the :GONogo:FUNCTion 1 command to initialize the oscilloscope.

<b>Syntax</b>	< Long >	< Short >
	:TEMPlate:SAVe:MINimum	:TEMP:SAV:MIN



**:TEMPlate:SAVe:MINimum****Set** →

Description	Saves the minimum template. Same as: Utility key → More (F4) → Go-NoGo Menu(F1) → Template Edit(F1) → Save & Create(F4).	
Note	Before this command can be used, please set the template mode to normal using the :TEMPlate:MODE 0 command. Before any Go-NoGo command can be used, please use the :GONogo:FUNCTioN 1 command to initialize the oscilloscope.	
Syntax	< Long > :TEMPlate:SAVe:MINimum	< Short > :TEMP:SAV:MIN

**Set** →**:TEMPlate:TOLerance**→ **Query**

Description	Sets or queries the tolerance (as a percentage) of the auto template.	
Note	Before this command can be used, please set the template mode to auto using the :TEMPlate:MODE 1 command. Before any Go-NoGo command can be used, please use the :GONogo:FUNCTioN 1 command to initialize the oscilloscope.	
Syntax	< Long > :TEMPlate:TOLerance <NR2> :TEMPlate:TOLerance?	< Short > :TEMP:TOL <NR2> :TEMP:TOL?
Parameter/ Return parameter	<NR2> 4.0 ~ 40 (0.4% ~ 40%).	
Example	:TEMP:TOL 10	Sets the tolerance to 10%.

**:TEMPlate:SAVe:AUTo**

Set →

Description	Saves the auto template. Same as: Utility key → More (F4) → Go-NoGo Menu(F1)→Template Edit(F1)→Save & Create(F4).	
Note	Before this command can be used, please set the template mode to auto using the :TEMPlate:MODE 1 command. Before any Go-NoGo command can be used, please use the :GONogo:FUNCTION 1 command to initialize the oscilloscope.	
Syntax	< Long > :TEMPlate:SAVe:AUTo	< Short > :TEMP:SAV:AUT

## Data Log Commands

:DATALOG:STATE .....	67
:DATALOG:SOURce .....	67
:DATALOG:SAVe .....	68
:DATALOG:INTerval .....	68
:DATALOG:DURation .....	68

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

		Set →
		→ Query
<b>:DATALOG:SOURce</b>		
Description	Sets or queries the data logging source channel.	
Syntax	< Long > :DATALOG:SOURce{1 2} :DATALOG:SOURce?	< Short > :DATALOG:SOUR{1 2} :DATALOG:SOUR?
Parameter/ Return parameter	1 2	Sets CH1 as the source channel Sets CH2 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	<b>&lt; Long &gt;</b>	<b>&lt; Short &gt;</b>
	: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	<b>&lt; Long &gt;</b>	<b>&lt; Short &gt;</b>
	:DATALOG:INTerval <NR1>	:DATALOG:INT <NR1>
	:DATALOG:INTerval?	:DATALOG:INT?
Parameter/ Return parameter	<b>&lt;NR1&gt;</b>	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	<b>&lt; Long &gt;</b>	<b>&lt; Short &gt;</b>

```
: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.
---------	----------------	--

## Save/Recall Command

:MEMory<X>:RECall:SETup .....	70
:MEMory<X>:RECall:WAVeform .....	70
:MEMory<X>:SAVe:SETup .....	71
:MEMory<X>:SAVe:WAVeform .....	71
*RCL.....	72
:REF<X>:DISPlay .....	72
:REF<X>:LOCate.....	73
:REF<X>:SAVe.....	73
*SAV.....	74

### :MEMory<X>:RECall:SETup (Set) →

Description	Recalls a panel setting from the internal memory. Same as: Save/Recall key (recall) → F3	
Syntax	< Long >	< Short >
	:memory<x>:recall:setup	:mem<x>:rec:set
Parameter	<X>	Internal memory
	1 ~ 15	S1 ~ S15
Example	:memory1:recall:setup	Recalls the settings from the internal memory S1

### :MEMory<X>:RECall:WAVeform (Set) →

Description	Recalls a waveform from the internal memory and saves it to a reference waveform. Same as: Save/Recall key (recall) → F4	
Syntax	< Long >	< Short >
	:memory<x>:recall:waveform	:mem<x>:rec:wav
	<NR1>	<NR1>
Parameter	<X>	Internal memory



1	CH1	2	CH2
3	Math	4	RefA
5	RefB		

**Example**            `:memory1:save:waveform 1`    Saves the CH1 waveform to the internal memory W1

**\*RCL**

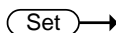


**Description**            Recalls a set of panel setting from one of the fifteen internal memories, S1 to S15.  
 Same as: Save/Recall key (recall) → F3

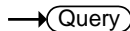
**Syntax**                `*rcl <NR1>`

<b>Parameter</b>	<code>&lt;NR1&gt;</code>	Settings
	1 to 15	S1 to S15

**Example**            `*rcl 1`                                Recalls the panel settings from S1



**:REF<X>:DISPlay**



**Description**            Recalls a reference waveform into the display or returns its status.  
 Same as: Save/Recall key (recall) → F5 → F2 or F3

<b>Syntax</b>	<code>&lt; Long &gt;</code>	<code>&lt; Short &gt;</code>
	<code>:ref&lt;x&gt;:display &lt;Boolean&gt;</code>	<code>:ref&lt;x&gt;disp &lt;Boolean&gt;</code>
	<code>:ref&lt;x&gt;:display?</code>	<code>:ref&lt;x&gt;disp?</code>

<b>Parameter</b>	<code>&lt;X&gt;</code>	Reference	<code>&lt;Boolean&gt;</code>	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 → 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		
Note	Before using this command, turn on a reference waveform. See the example below.			
Example	:ref1:display 1	Turns on the reference waveform A and move it to ±0 position		
	:ref1:locate 0			

**:REF<X>:SAVe** (Set) →

Description	Saves an input signal as a reference waveform. Same as: Save/Recall key (save) → F2 → F2 → F3			
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	Math
Example	:ref1:save 1	Saves the Channel 1 signal as the reference waveform A		

**\*SAV**



Description	Saves the current panel settings into the internal memory.	
	Same as: Save/Recall key  → F1	
Syntax	*sav	
Parameter	<NR1>	Internal memory
	1 to 15	S1 to S15
Example	*sav 1	Saves the current panel settings into S1

## Time (Horizontal) command

:TIMebase:DELay .....	75
:TIMebase:SCALe.....	75
:TIMebase:SWEEp.....	76
:TIMebase:WINDow:DELay.....	76
:TIMebase:WINDow:SCALe .....	77

:TIMebase:DELay 
 Set →  
 →  Query

Description	Sets or returns the horizontal delay.	
Syntax	< Long > :timebase:delay <NR3> :timebase:delay?	< Short > :tim:del <NR3> :tim:del?
Example	:timebase:delay 0	Sets the horizontal delay to 0 sec

:TIMebase:SCALe 
 Set →  
 →  Query

Description	Selects or returns the horizontal scale. Same as: Time/div knob					
Syntax	< Long > :timebase:scale <NR3>		< Short > :tim:scal <NR3>			
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>
	5ns	5e <sup>-9</sup>	25us	25e <sup>-6</sup>	100ms	100e <sup>-3</sup>
	10ns	10e <sup>-9</sup>	50us	50e <sup>-6</sup>	250ms	250e <sup>-3</sup>
	25ns	25e <sup>-9</sup>	100us	100e <sup>-6</sup>	500ms	500e <sup>-3</sup>
	50ns	50e <sup>-9</sup>	250us	250e <sup>-6</sup>	1s	1

100ns	100e <sup>-9</sup>	500us	500e <sup>-6</sup>	2.5s	2.5
250ns	250e <sup>-9</sup>	1ms	1e <sup>-3</sup>	5s	5
500ns	500e <sup>-9</sup>	2.5ms	2.5e <sup>-3</sup>	10s	10
1us	1e <sup>-6</sup>	5ms	5e <sup>-3</sup>	25s	25
2.5us	2.5e <sup>-6</sup>	10ms	10e <sup>-3</sup>	50s	50

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

Set →

**:TIMEbase:SWEEp**

→ 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

Set →

**:TIMEbase:WINDow:DELay**

→ Query

Description       Sets or returns the width of the zoomed window.  
Same as: Horizontal menu key → F2 (Window) → Time/div knob

Syntax	< Long >	< Short >
	:timebase>window:delay <NR3>	:tim:wind:del <NR3>



## Trigger command

:FORCe.....	78
:RUN .....	79
:SINGle .....	79
:STOP .....	79
*TRG .....	79
:TRIGger:COUPlE.....	79
:TRIGger:FREQUency.....	80
:TRIGger:LEVel.....	80
:TRIGger:MODe.....	81
:TRIGger:NREJ .....	81
:TRIGger:PULSe:MODe.....	82
:TRIGger:PULSe:TIME .....	82
:TRIGger:REJect .....	83
:TRIGger:SLOP .....	83
:TRIGger:STATe .....	84
:TRIGger:SOURce .....	84
:TRIGger:TYPe .....	85
:TRIGger:VIDeo:FIELD .....	85
:TRIGger:VIDeo:LINE .....	86
:TRIGger:VIDeo:POLarity .....	87
:TRIGger:VIDeo:TYPe .....	87

### :FORCe



Description	Manually triggers the GDS-1000A and displays the input signals.	
	Same as: (Trigger) Force key	
Syntax	<Long format>	<Short format>
	:force	:forc

**:RUN** (Set) →

Description Starts waiting for a trigger condition.  
Same as: Run key

Syntax :run

**:SINGle** (Set) →

Description Selects the single trigger mode and starts waiting for a trigger condition.  
Same as: (Trigger) Single key

Syntax <Long format> <Short format>  
:single :singl

**:STOP** (Set) →

Description Stops waiting for a trigger condition.  
Same as: Stop key

Syntax :stop

**\*TRG** (Set) →

Description Manually triggers the GDS-1000A and displays the input signals.  
Same as: (Trigger) Force key

Syntax \*trg

**:TRIGger:COUPLE** (Set) →  
→ (Query)

Description Selects or returns the trigger coupling mode.  
Same as: Trigger menu key → F4 → F2

Syntax	< Long > :trigger:couple <NR1> :trigger:couple?	< Short > :trig:coup <NR1> :trig:coup?
Parameter	<NR1> Coupling mode 1 AC 2 DC	
Note	Before using this command, select the edge or pulse trigger. See the example below.	
Example	:trigger:type: 0 :trigger:couple 1	Selects the edge trigger and AC coupling mode

**:TRIGger:FREQuency** → Query

Description	Returns the trigger frequency readout.	
Syntax	< Long > :trigger:frequency?	< Short > :trig:freq?

**:TRIGger:LEVel** Set →  
→ Query

Description	Selects or returns the trigger level. Same as: Trigger level knob	
Syntax	< Long > :trigger:level <NR3> :trigger:level?	< Short > :trig:lev <NR3> :trig:lev?
Parameter	<NR3> Trigger level in voltage	
Example	:trigger:level 0	Sets the trigger level at ±0

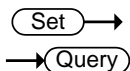






Example	:trigger:type 2 :trigger:pulse:time 1	Selects the pulse trigger and sets the trigger time as 1sec
---------	--	---

**:TRIGger:REject**



Description	Selects the trigger rejection filter. Same as: Trigger key → F4 → F3	
-------------	---	--

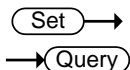
Syntax	< Long > :trigger:reject <NR1> :trigger:reject?	< Short > :trig:rej <NR1> :trig:rej?
--------	---	--

Parameter	<NR1> 0 1 2	Rejection filter off LF HF
-----------	----------------------	-------------------------------------

Note	Before using this command, select the edge or pulse trigger. See the example below.	
------	---	--

Example	:trigger:type 0 :trigger:reject 1	Selects the edge trigger and LF rejection filter
---------	--------------------------------------	--

**:TRIGger:SLOP**



Description	Selects the trigger slope. Same as: Trigger key → F4 → F1	
-------------	--	--

Syntax	< Long > :trigger:slop <NR1> :trigger:slop?	< Short > :trig:slop <NR1> :trig:slop?
--------	---	--

Parameter	<NR1> 0 1	Trigger slope + (positive) - (negative)
-----------	-----------------	---

Note Before using this command, select the edge or pulse trigger. See the example below.

Example	:trigger:type 0 :trigger:slop 1	Selects the edge trigger and negative trigger slope
---------	------------------------------------	---

**:TRIGger:STATe** → Query

Description Queries the present trigger state.

Syntax	< Long > :trigger:state?	< Short > :trig:stat?
--------	-----------------------------	--------------------------

Return Parameter	<NR1>	Trigger state
	0	Un-triggered
	1	Triggered

Note This function is designed for triggering with slow time-bases or for single shot events. This query will return 0 before the trigger point and 1 after a trigger point (if any).

However with quicker time-bases in auto mode, a periodic waveform is constantly re-sampled and thus re-triggered each time, resulting in the query returning 0 before each trigger. Therefore with quicker time bases, this will usually result in 0 being returned, even if the waveform is shown as triggered.

Example	:trigger:state? 0	Returns the current trigger state as un-triggered.
---------	----------------------	--

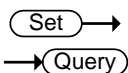
Set →

**:TRIGger:SOURce** → Query

Description Selects the trigger source channel.  
Same as: Trigger key → F2

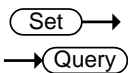
Syntax	< Long > :trigger:source <NR1> :trigger:source?	< Short > :trig:sour <NR1> :trig:sour?
Parameter	<NR1> Trigger source 0 Channel 1 1 Channel 2	<NR1> Trigger source 2 Line 3 External input
Example	:trigger:source 0	Selects Channel 1 as the trigger source

**:TRIGger:TYPe**



Description	Selects the trigger type. Same as: Trigger key → F1	
Syntax	< Long > :trigger:type <NR1> :trigger:type?	< Short > :trig:typ <NR1> :trig:typ?
Parameter	<NR1> Trigger type 0 Edge 1 Video	<NR1> Trigger type 2 Pulse
Example	:trigger:type 0	Selects the edge trigger type

**:TRIGger:VIDeo:FIELD**

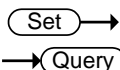


Description	Selects the trigger field in the video trigger. Same as: Trigger key → F1(Video) → F5	
Syntax	< Long > :trigger:video:field <NR1> :trigger:video:field?	< Short > :trig:vid:fiel <NR1> :trig:vid:fiel?

Parameter	<NR1> Field	<NR1> Field
	0 Line	2 even
	1 odd	

**Note** Before using this command, select the video trigger. See the example below.

**Example** :trigger:type 1 Selects the video trigger  
 :trigger:video:field 1 and odd trigger field



**:TRIGger:VIDeo:LINE**

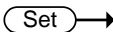
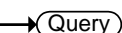
**Description** Selects the trigger field line in the video trigger.  
 Same as: Trigger key → F1(Video) → F5 → Variable knob

Syntax	< Long >	< Short >
	:trigger:video:line <NR1>	:trig:vid:lin <NR1>
	:trigger:video:line?	:trig:vid:lin?

Parameter	<NR1> Line range	<NR1> Line range
	1 ~ 263 NTSC odd	1 ~ 313 PAL/SECAM odd
	1 ~ 262 NTSC even	1 ~ 312 PAL/SECAM even

**Note** Before using this command, select the video trigger, TV standard, and odd or even trigger field. See the example below.

**Example** :trigger:type 1 Selects the video  
 :trigger:video:type 0 trigger, PAL, odd field  
 :trigger:video:field 1 triggering, and line 313  
 :trigger:video:line 313

**:TRIGger:VIDeo:POLarity** 

  


Description	Selects the video trigger polarity. Same as: Trigger key → F1(Video) → F4	
Syntax	< Long > :trigger:video:polarity <NR1> :trigger:video:polarity?	< Short > :trig:vid:pol <NR1> :trig:vid:pol?
Parameter	<NR1> Polarity 0 Positive 1 Negative	
Note	Before using this command, select the video trigger. See the example below.	
Example	:trigger:type 1 :trigger:video:polarity 0	Selects the video trigger and positive polarity

**:TRIGger:VIDeo:TYPE** 


Description	Selects the TV standard in the video trigger. Same as: Trigger key → F1(Video) → F3	
Syntax	< Long > :trigger:video:type <NR1> :trigger:video:type?	< Short > :trig:vid:typ <NR1> :trig:vid:typ?
Parameter	<NR1> Type 0 PAL 1 NTSC	<NR1> Type 2 SECAM
Note	Before using this command, select the video trigger. See the example below.	
Example	:trigger:type 1 :trigger:video:type 0	Selects the video trigger and PAL standard

