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Digital Storage Oscilloscope

GDS-1000 Series

PROGRAMMING MANUAL

GW INSTEK PART NO.

October 2007 edition

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ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

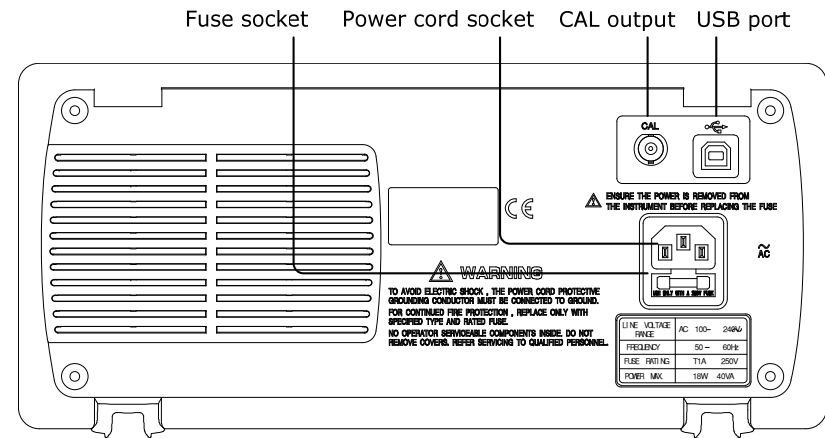
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I NTERFACE OVERVIEW


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

Rear Panel Overview



Configuring the USB Interface

USB connection	PC side connector	Type A, host
	GDS-1000 side connector	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. 
 2. When the PC asks for the USB driver, select dso_cdc_1000.inf which is downloadable from the GW website, www.gwinstek.com.tw, GDS-1000 product corner.
 3. On the PC, activate a terminal application such as MTTY (Multi-Threaded TTY). To check the COM port No., see the Device Manager in the PC. For WindowsXP, select Control panel → System → Hardware tab.
 4. 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-1022, 000000001, V1.00
 5. Configuring the command interface is completed. Refer to the other chapters for more details.
 - Page6: list of commands and command syntax
 - Page12: details of each command

COMMAND OVERVIEW

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

Command Syntax

Compatible standard	<ul style="list-style-type: none"> • IEEE488.2, 1992 (fully compatible) • SCPI, 1994 (partially compatible) 																		
Command format	<p>trig:del:mod <NR1>LF</p> <p>1: command header 2: single space 3: parameter 4: message terminator</p>																		
Parameter	<table border="1"> <thead> <tr> <th>Type</th> <th>Description</th> <th>Example</th> </tr> </thead> <tbody> <tr> <td><Boolean></td> <td>boolean logic</td> <td>0, 1</td> </tr> <tr> <td><NR1></td> <td>integers</td> <td>0, 1, 2, 3</td> </tr> <tr> <td><NR2></td> <td>decimal numbers</td> <td>0.1, 3.14, 8.5</td> </tr> <tr> <td><NR3></td> <td>floating point</td> <td>4.5e-1, 8.25e+1</td> </tr> <tr> <td><NRf></td> <td>any of NR1, 2, 3</td> <td>1, 1.5, 4.5e-1</td> </tr> </tbody> </table>	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
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	<table border="1"> <tbody> <tr> <td>LF^END</td> <td>line feed code (hexadecimal 0A) with END message</td> </tr> <tr> <td>LF</td> <td>line feed code</td> </tr> <tr> <td><dab>^END</td> <td>last data byte with END message</td> </tr> </tbody> </table>	LF^END	line feed code (hexadecimal 0A) with END message	LF	line feed code	<dab>^END	last data byte with END message												
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 Command in Functional Order

System	*IDN.....	13
	*LRN	13
	*RST	14
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	:SYSTem:VERSion.....	14
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	:ACQuire:MODE	15
	:ACQuire<X>:MEMory.....	16
Autoset	:AUToset	18
Channel / Math	:CHANnel<X>:BWLimit.....	19
	:CHANnel<X>:COUPling.....	19
	:CHANnel<X>:DISPlay	20
	:CHANnel<X>:INVert	20
	:CHANnel<X>:MATH	21
	:CHANnel<X>:OFFSet.....	21
	:CHANnel<X>:PROBe	22
	:CHANnel<X>:SCALE	23
Cursor	:CURSor:X<X>Position	24
	:CURSor:Y<X>Position	25
	:CURSor:<X>DELta	25
	:CURSor:<X>DISplay	26
	:CURSor:SOURce.....	27
Display	:DISPlay:ACCumulate	28
	:DISPlay:CONTRast	28
	:DISPlay:GRATicule.....	29
	:DISPlay:WAVEform	29
	:REFResh	30

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	:MEASure:FOVShoot.....	32
	:MEASure:FPReshoot	32
	:MEASure:FREQuency	32
	:MEASure:NWIDth	33
	:MEASure:PDUTy	33
	:MEASure:PERiod	34
	:MEASure:PWIDth	34
	:MEASure:RISe.....	35
	:MEASure:ROVShoot.....	35
	:MEASure:RPReshoot.....	35
	:MEASure:SOURce	36
	:MEASure:VAMPLitude	36
	:MEASure:VAverage	37
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	:MEMory<X>:SAVE:WAVEform	41
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	:TIMebase:SWEEp.....	46
	:TIMebase:WINDow:DELAy.....	46
	:TIMebase:WINDow:SCALE	47
Trigger	:FORCe.....	48
	:RUN.....	48
	:SINGLe.....	49
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	*TRG	49
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	:TRIGger:FREQuency.....	50
	:TRIGger:LEVel.....	50
	:TRIGger:MODE.....	50
	:TRIGger:NREJ	51
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	:TRIGger:PULSe:TIME	52
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	:TRIGger:SLOP.....	53
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	:TRIGger:TYPe.....	54
	:TRIGger:VIDeo:FIELD	55
	:TRIGger:VIDeo:LINE.....	55
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	:TRIGger:VIDeo:TYPe	56

List of Command in Alphabetical Order

Command	Page	Command	Page
A			
:ACQuire:AVERage	15	:MEASure:FPReshoot	32
:ACQuire:MODE	15	:MEASure:FREQuency	32
:ACQuire<X>:MEMory	16	:MEASure:NWIDth	33
:AUToset	18	:MEASure:PDUtY	33
C			
:CHANnel<X>:BWLimit	19	:MEASure:PERiod	34
:CHANnel<X>:COUPling	19	:MEASure:PWIDth	34
:CHANnel<X>:DISPlay	20	:MEASure:RISe	35
:CHANnel<X>:INVert	20	:MEASure:ROVShoot	35
:CHANnel<X>:MATH	21	:MEASure:RPReshoot	35
:CHANnel<X>:OFFSet	21	:MEASure:SOURce	36
:CHANnel<X>:PROBE	22	:MEASure:VAMplitude	36
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:CURSor:SOURce	27	:MEASure:VHI	37
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:CURSor:X2Position	24	:MEASure:VMAX	38
:CURSor:XDELta	25	:MEASure:VMIN	38
:CURSor:XDISPlay	26	:MEASure:VPP	39
:CURSor:Y1Position	25	:MEASure:VRMS	39
:CURSor:Y2Position	25	:MEMory<X>:RECall:SETup	40
:CURSor:YDELta	25	:MEMory<X>:RECall:WAVEform	40
:CURSor:YDISPlay	26	:MEMory<X>:SAVe:SETup	41
D			
:DISPlay:ACCumulate	28	:MEMory<X>:SAVe:WAVEform	41
:DISPlay:CONTRast	28	R	
:DISPlay:GRATICule	29	*RCL	42
:DISPlay:WAVEform	29	:REF<X>:DISPlay	42
F			
:FORCe	48	:REF<X>:LOCate	43
I			
*IDN	13	:REF<X>:SAVe	43
L			
*LRN	13	:REFresh	30
M			
:MEASure:FALL	31	*RST	14
:MEASure:FOVShoot	32	:RUN	48
S			
		*SAV	44
		:SINGLe	49
		:STOP	49
		:SYSTem:ERRor	14
		:SYSTem:VERSIon	14

Command	Page	Command	Page
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:TIMebase:DELay	45	:TRIGger:PULSe:MODE	52
:TIMebase:SCALE	45	:TRIGger:PULSe:TIME	52
:TIMebase:SWEEp	46	:TRIGger:REject	53
:TIMebase:WINDow:DELay	46	:TRIGger:SLOP	53
:TIMebase:WINDow:SCALE	47	:TRIGger:SOURce	54
*TRG	49	:TRIGger:TYPe	54
:TRIGger:COUPlE	49	:TRIGger:VIDeo:FIELD	55
:TRIGger:FREQUency	50	:TRIGger:VIDeo:LINE	55
:TRIGger:LEVel	50	:TRIGger:VIDeo:POLarity	56
:TRIGger:MODE	50	:TRIGger:VIDeo:TYPe	56

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 7.

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System command

*IDN.....	13
*LRN	13
*RST	14
:SYSTem:ERRor.....	14
:SYSTem:VERSion.....	14

*IDN → Query

Description	Returns the oscilloscope ID: manufacturer, model name, serial number, and firmware version. Same as: Utility key → F4	
Syntax	:idn?	
Example	:idn?	Returns the ID for a GW, GDS1022, P930116, V0.21 GDS-1022.

*LRN → Query

Description	Returns the oscilloscope settings as a data string.	
Syntax	:lrn?	
Example	:lrn? :DISPlay:WAVeform 0;DISPCONTrast 500;GRATicule 0;CURSor:SOURce 1;X1Position ;X2 Position ; Y1Position ;Y2Position ;XDELTA ;YDELTA ;XDISPlay 2;YDISPlay 2::CHANnel 1:BWLimit 0;COUPling 0;DISPlay 1;INVert 0;MATH 0;OFFSet 2.000e+00; PROBe 0;SCALe 2.000e+00 ;; CHANnel2:BWLimit 0;COUPling 0;DISPlay 1;INVert 0;MATH 0;OFFSet 2.000e+00;PROBe 0;SCALe 2.000e+00; CHANnel2: BWLimit 0;COUPling 0;DISPlay 1;INVert 0;MA TH 0;OFFSet 2.000e+00;PROBe 0;SCALe 2.000e+00; CHANnel2:BWLimit 0;COUPling 0;DIS Play 1;INVert 0;MATH 0;OFFSet 2.000e+00;PROBe 0;SCALe 2.000e+00;CHANnel2:BWLimit 0;COUPling 0;DISPlay 1;INVert 0;MATH 0;OFFSet 2.000e+00;PROBe 0;SCALe 2.000e+00;TIMebase:DELay 0.000e+00; SCALe 2.500e-06;SWEep0; AUToset;; REFResh;; RUN;;STOP	

*RST Set →

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

:SYSTem:ERRor → Query

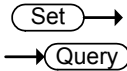
Description	Returns the oscilloscope system error message, if there is any.			
Syntax	< Long >		< Short >	
	:system:error?		:sys:err?	
Parameter	ID	Contents	ID	Contents
	-100	command error	-102	syntax error
	-220	parameter error	-221	settings conflict
	-222	data out of range	-223	too much data
	-224	illegal parameter	-232	invalid format
Example	:system:error?	-102	Indicates that the command syntax is wrong	

:SYSTem:VERSion → Query

Description	Returns the oscilloscope firmware version. Same as: Utility key → F4 (only the firmware version)	
Syntax	< Long >	< Short >
	:system:version?	:sys:vers?
Note	For retrieving all system information including the firmware version, use the *idn? command.	

Acquisition Command

:ACQuire:AVERage.....	15
:ACQuire:MODE.....	15
:ACQuire<X>:MEMory.....	16



:ACQuire:AVERage

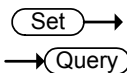
Description Selects or returns the average number of waveform acquisition in the average acquisition mode.
Same as: Acquire key → F2

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

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

Example :acquire:mode 2 Selects the average acquisition mode, and
:acquire:average 2 select the average number 4



:ACQuire:MODE

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>	Mode	<NR1>	Mode
	0	Normal	2	Average
	1	Peak detect		

Example :acquire:mode 2 Selects the average acquisition mode, and
:acquire:average 2 select the average number 4

:ACQuire<X>:MEMory



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 (MSD) first.

Autoset Command

:AUToset (Set) →

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

Syntax	< Long >	< Short >
	:autoset	:aut

Channel / Math Command

- :CHANnel<X>:BWLimit..... 19
- :CHANnel<X>:COUpling..... 19
- :CHANnel<X>:DISPlay 20
- :CHANnel<X>:INVert 20
- :CHANnel<X>:MATH 21
- :CHANnel<X>:OFFSet..... 21
- :CHANnel<X>:PROBe 22
- :CHANnel<X>:SCALE 23

:CHANnel<X>:BWLimit (Set) → → (Query)

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

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

Parameter	<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 > < Short >

:channel<X>:coupling <NR1> :chan<X>:coup <NR1>
:channel<X>:coupling? :chan:coup?

Parameter	<X>	Channel	<NR1>	Coupling mode
	1/2	CH1/2	0	AC coupling
			1	DC coupling
			2	Ground coupling

Example :channel1:coupling 1 Selects the DC coupling for Channel 1

:CHANnel<X>:DISPlay (Set) → → (Query)

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

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

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

Example :channel1:display 1 Turns on Channel 1

:CHANnel<X>:INVert (Set) → → (Query)

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

Set →
→ Query

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>	Math operation
	1/2	CH1 or CH2	0	Math off
			1	Add
			2	Subtract
			3	FFT
Example1	:channel1:math 2		Channel 1 - Channel 2	
Example2	:channel2:math 2		Channel 1 - Channel 2	
Example3	:channel2:math 2		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	-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		Sets the Channel 1 scale to 10mV/div	
	:channel1:offset 2.00e-2		Sets the Channel 1 offset to 20mV	

Set →
→ Query

:CHANnel<X>:PROBE

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

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 > :channel<X>:scale <NR3> :channel<X>:scale?	< Short > :chan<X>:scal <NR3> :chan<X>:scal?																	
Parameter	<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;"><X></td> <td style="width: 15%;">Channel</td> <td style="width: 15%; text-align: center;"><NR3></td> <td style="width: 60%;">Vertical scale</td> </tr> <tr> <td style="text-align: center;">1/2</td> <td>CH1/2</td> <td style="text-align: center;">2e-3 ~ 5e+0</td> <td>2mV ~ 5V (Probe x1)</td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">2e-2 ~ 5e+1</td> <td>20mV ~ 50V (Probe x10)</td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">2e-1 ~ 5e+2</td> <td>200mV ~ 500V (Probe x100)</td> </tr> </table>	<X>	Channel	<NR3>	Vertical scale	1/2	CH1/2	2e-3 ~ 5e+0	2mV ~ 5V (Probe x1)			2e-2 ~ 5e+1	20mV ~ 50V (Probe x10)			2e-1 ~ 5e+2	200mV ~ 500V (Probe x100)		
<X>	Channel	<NR3>	Vertical scale																
1/2	CH1/2	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 :channel1:scale 2.00e-3	Sets the Channel 1 probe attenuation factor to x1 Sets the Channel 1 vertical scale to 2mV/div																	

Cursor Command

:CURSor:X<X>Position	24
:CURSor:Y<X>Position	25
:CURSor:<X>DELta	25
:CURSor:<X>DISplay	26
:CURSor:SOURce	27

Set →
 → Query

: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 > :cursor:x<X>position <NR1> :cursor:x<X>position?	< Short > :curs:x<X>p <NR1> :curs:x<X>p?													
Parameter	<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;"><X></td> <td style="width: 15%;">Cursor 1 or 2</td> <td style="width: 15%; text-align: center;"><NR1></td> <td style="width: 60%;">Cursor position</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Cursor X1</td> <td style="text-align: center;">1 ~ 249</td> <td>1 ~ 249 point</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Cursor X2</td> <td></td> <td></td> </tr> </table>	<X>	Cursor 1 or 2	<NR1>	Cursor position	1	Cursor X1	1 ~ 249	1 ~ 249 point	2	Cursor X2				
<X>	Cursor 1 or 2	<NR1>	Cursor position												
1	Cursor X1	1 ~ 249	1 ~ 249 point												
2	Cursor X2														
Note	When in the query mode, the returned data format is <NR3> as follows. CH1, CH2, Math (CH1 ± CH2): time (s) Math (FFT): frequency (Hz)														
Example	:cursor:xdisplay 1 :cursor:x1position 100 :channel:math 3 :cursor:xdisplay 1 :cursor:x1position? → 2.500E+03	Puts the horizontal cursor X1 on the 100 point position Returns the X1 cursor position as 2500Hz in the Math FFT mode													

:CURSor:Y<X>Position (Set) →
→ (Query)

Description Selects or returns the vertical (Y axis) cursor position.
Same as: Cursor key → F5 (X-Y) → F2(Y1) or F3(Y2) + Vertical knob

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 Y1	1 ~ 199	1 ~ 199 point
	2	Cursor Y2		

Note When in the query mode, the returned data format is <NR3> as follows.
CH1, CH2, Math (CH1 ± CH2): voltage (V)
Math (FFT): decibel (dB)

Example	:cursor:ydisplay 1 :cursor:y1 position 100	Puts the vertical cursor Y1 on the 100 point position
	:channel:math 3 :cursor:ydisplay 1 :cursor:y1 position? → 2.500E+00	Returns the Y1 cursor position as 2.5dB in the Math FFT mode

:CURSor:<X>DELta → (Query)

Description Returns the distance between two horizontal (X axis) or vertical (Y axis) cursors.
Same as: Cursor key → F5 (X-Y) → F4

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)

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

Example	: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 (Set) →

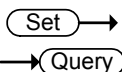
Description Turns the horizontal or vertical cursors on/off.
Same as: Cursor key

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

:CURSor:SOURce

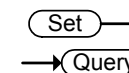


Description	Selects or returns the cursor source channel. Same as: Cursor key → F1 (Source)	
Syntax	< Long > :cursor:source <NR1> :cursor:source?	< Short > :curs:sour <NR1> :curs:sour?
Parameter	<NR1>	Cursor source channel 1/2 Channel ½ 3 Math result
Example	:cursor:source 2	Selects Channel 2 as the cursor source

Display Command

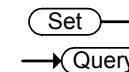
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:DISPlay:WAVEform	29
:REFresh	30

:DISPlay:ACCumulate



Description	Turns the display accumulate mode on/off or returns its status. Same as: Display key → F2	
Syntax	< Long > :display:accumulate <Boolean> :display:accumulate?	< Short > :disp:acc <Boolean> :disp:acc?
Parameter	<NR1>	Display accumulation 0 off 1 on
Example	:display:accumulate 1	Turns on the accumulation

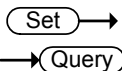
:DISPlay:CONTrast



Description	Sets or returns the display contrast level. Same as: Display key → F4	
Syntax	< Long > :display:contrast <NR1> :display:contrast?	< Short > :disp:cont <NR1> :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)



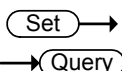
:DISPlay:GRATicule

Description Sets or returns the display grid type.
Same as: Display key → F5

Syntax	< Long > :display:graticule <NR1> :display:graticule?	< Short > :disp:grat <NR1> :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



:DISPlay:WAVEform

Description Sets or returns the display waveform type.
Same as: Display key → F1

Syntax	< Long > :display:waveform <NR1> :display:waveform?	< Short > :disp:wav <NR1> :disp:wav?
--------	---	--

Parameter	<NR1> Display waveform type
	0 Vectors
	1 Dots

Example :display:waveform 0 Selects the vectors waveform

:REFresh (Set) →

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

Syntax	< Long > :refresh	< Short > :refr
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Measure command

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:MEASure:FALL → Query

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

Example	:measure:source 1	Selects Channel 1, and then measures the fall time.
	:measure:fall?	

:MEASure:FOVShoot → Query

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

:MEASure:FPReshoot → Query

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

: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 > :measure:nwidth?	< Short > :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:pdu?y?	< 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:pdu?y?	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.

: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:rovs?
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 >	< Short >

	:measure:rpreshoot?	:meas:rpr?
Returns	<NR2> with % sign	
Note	Before using this command, select the measurement channel. See the example below.	
Example	:measure:source 1 :measure:rpreshoot?	Selects Channel 1, and then measures the rise preshoot.

(Set) →
→(Query)

:MEASure:SOURce

Description	Selects the measurement channel. Same as: Measure key → F1~F5 → F1, F2	
Syntax	< Long > :measure:source <NR1> :measure:source?	< Short > :meas:sour <NR1> :meas:sour?
Parameter	<NR1> 1 ~ 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.

: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 Selects Channel 1, and
:measure:vmin? 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)

Syntax < Long > < Short >
:measure:vpp? :meas:vpp?

Returns <NR3>

Note Before using this command, select the measurement channel. See the example below.

Example :measure:source 1 Selects Channel 1, and
:measure:vpp? 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 > < Short >
:measure:vrms? :meas:vrms?

Returns <NR3>

Note Before using this command, select the measurement channel. See the example below.

Example :measure:source 1 Selects Channel 1, and
:measure:vrms? then measures the root
mean square voltage.

Save/Recall Command

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: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 ~ 15	W1 ~ W15
<NR1>	Reference waveform
1, 2	RefA, RefB

Example `:memory1:recall:waveform 1` Recalls a waveform from the internal memory W1 and saves it to the reference waveform A

:MEMory<X>:SAVE:SETup (Set) →

Description	Saves the current panel settings to an internal memory. Same as: Save/Recall key (save) → F1	
Syntax	< Long >	< Short >
	<code>:memory<x>:save:setup</code>	<code>:mem<x>:sav:set</code>
Parameter	<X>	Internal memory
	1 ~ 15	S1 ~ S15
Example	<code>:memory1:save:setup</code>	Save the current panel settings to the memory S1

:MEMory<X>:SAVE:WAVEform (Set) →

Description	Saves a reference waveform to the internal memory. Same as: Save/Recall key (save) → F2	
Syntax	< Long >	< Short >
	<code>:memory<x>:save:waveform</code>	<code>:mem<x>:sav:wav</code>
	<NR1>	<NR1>
Parameter	<X>	Internal memory
	1 ~ 15	W1 ~ W15
	<NR1>	Reference waveform

0	CH1	1	CH2
2	Math	3	RefA
4	RefB		

Example `:memory1:save:waveform 1` Saves the reference waveform A to the internal memory W1

***RCL** (Set) →

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	<code>*rcl <NR1></code>	
Parameter	<NR1>	Settings
	1 to 15	S1 to S15
Example	<code>*rcl 1</code>	Recalls the panel settings from S1

:REF<X>:DISPlay (Set) →
→ (Query)

Description	Recalls a reference waveform into the display or returns its status. Same as: Save/Recall key (recall) → F5 → F2 or F3		
Syntax	< Long >	< Short >	
	<code>:ref<x>:display <Boolean></code>	<code>:ref<x>disp <Boolean></code>	
	<code>:ref<x>:display?</code>	<code>:ref<x>disp?</code>	
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 → 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 (Set) →

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

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:TIMebase:DELay Set →
→ Query

Description	Sets or returns the horizontal delay.	
Syntax	< Long >	< Short >
	:timebase:delay <NR3>	:tim:del <NR3>
	:timebase:delay?	: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 >		< Short >			
	:timebase:scale <NR3>		:tim:scal <NR3>			
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 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>	
Example	:timetable:window:delay 100	Sets the zoom width to 100 points

:TIMEbase:WINDow:SCALE (Set) →
→ (Query)

Description	Sets or returns the scale (length) of the zoomed window. Same as: Horizontal menu key → F3 (zoom)	
Syntax	< Long >	< Short >
	:timebase:window:scale <NR3> :tim:wind:scal<NR3>	
Example	:timetable:window:scale 100	Sets the zoom length to 100 points

Trigger command

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:FORCe (Set) →

Description	Manually triggers the GDS-1000 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-1000 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 > < Short >

:trigger:couple <NR1> :trig:coup <NR1>
:trigger:couple? :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 Selects the edge trigger
:trigger:couple 1 and AC coupling mode

:TRIGger:FREQuency → Query

Description Returns the trigger frequency readout.

Syntax < Long > < Short >
:trigger:frequency? :trig:freq?

:TRIGger:LEVel (Set) →
→ Query

Description Selects or returns the trigger level.
Same as: Trigger level knob

Syntax < Long > < Short >
:trigger:level <NR3> :trig:lev <NR3>
:trigger:level? :trig:lev?

Parameter <NR3> Trigger level in voltage

Example :trigger:level 0 Sets the trigger level at
±0

:TRIGger:MODE (Set) →
→ Query

Description	Selects or returns the trigger mode. Same as: Trigger key → F5	
Syntax	< Long > :trigger:mode <NR1> :trigger:mode?	< Short > :trig:mod <NR1> :trig:mod?
Parameter	<NR1> Trigger mode	
	1 Auto	
	2 Normal	
Note	Before using this command, select the edge or pulse trigger. See the example below.	
Example	:trigger:type 0 :trigger:mode 2	Selects the edge trigger and normal trigger mode

Set →
 → Query

:TRIGger:NREJ

Description	Turns the noise rejection mode on/off. Same as: Trigger key → F4 → F4	
Syntax	< Long > :trigger:nrej <Boolean> :trigger:nrej?	< Short > :trig:nrej <Boolean> :trig:nrej?
Parameter	<Boolean> Noise rejection mode	
	0 off	
	1 on	
Note	Before using this command, select the edge or pulse trigger. See the example below.	
Example	:trigger:type 0 :trigger:nrej 0	Selects the edge trigger and turns off the noise rejection

		Set → → Query
:TRIGger:PULSe:MODE		
Description	Selects the trigger mode in the pulse trigger. Same as: Trigger key → F1(Pulse) → F3	
Syntax	< Long > :trigger:pulse:mode <NR1> :trigger:pulse:mode?	< Short > :trig:puls:mod <NR1> :trig:puls:mod?
Parameter	<NR1> Mode	<NR1> Mode
	0 <	2 =
	1 >	3 ≠
Note	Before using this command, select the pulse trigger. See the example below.	
Example	:trigger:type 2 :trigger:pulse:mode 0	Selects the pulse trigger and < (smaller than) as the trigger mode

Set →
 → Query

:TRIGger:PULSe:TIME

Description	Selects the trigger time in the pulse trigger. Same as: Trigger key → F1(Pulse) → F3 → Variable knob	
Syntax	< Long > :trigger:pulse:time <NR3> :trigger:pulse:time?	< Short > :trig:puls:tim <NR3> :trig:puls:tim?
Parameter	<NR3> Trigger time	
	20e ⁻⁹ ~ 10	20ns ~ 10s
Note	Before using this command, select the pulse trigger. See the example below.	

Set →
 → Query

1 Video

Example :trigger:type 0 Selects the edge trigger type

:TRIGger:VIDeo:FIELD Set →
→ Query

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

Syntax < Long > < Short >
:trigger:video:field <NR1> :trig:vid:fiel <NR1>
:trigger:video:field? :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 and odd trigger field
:trigger:video:field 1

:TRIGger:VIDeo:LINE Set →
→ Query

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, PAL, odd field triggering, and line 313
:trigger:video:type 0
:trigger:video:field 1
:trigger:video:line 313

:TRIGger:VIDeo:POLarity Set →
→ Query

Description Selects the video trigger polarity.
Same as: Trigger key → F1(Video) → F4

Syntax < Long > < Short >
:trigger:video:polarity <NR1> :trig:vid:pol <NR1>
:trigger:video:polarity? :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 Selects the video trigger and positive polarity
:trigger:video:polarity 0

:TRIGger:VIDeo:TYPE Set →
→ Query

Description Selects the TV standard in the video trigger.
Same as: Trigger key → F1(Video) → F3

Syntax < Long > < Short >

	:trigger:video:type <NR1> :trigger:video:type?	:trig:vid:typ <NR1> :trig:vid:typ?
Parameter	<NR1> Type	<NR1> Type
	0 PAL	2 SECAM
	1 NTSC	
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



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