Digital Storage Oscilloscope

GDS-1000A Series

PROGRAMMING MANUAL

GW INSTEK PART NO. 82DS-1102AI01

ISO-9001 CERTIFIED MANUFACTURER

September 2009 edition

This manual contains proprietary information which is protected by copyright. All rights are reserved. No part of this manual may be photocopied, reproduced or translated to another language without prior written consent of Good Will Corporation.

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

Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

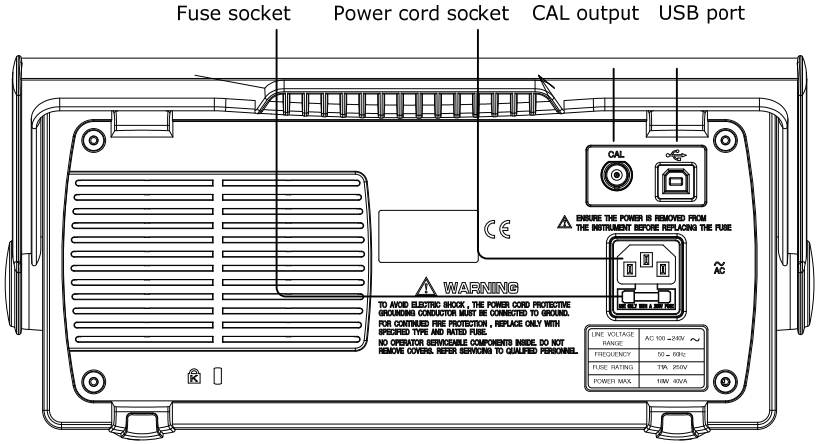
Good Will Instrument Co., Ltd.
No. 7-1, Jhongsing Rd., Tucheng City, Taipei County 236, Taiwan.

Table of Contents

INTERFACE OVERVIEW

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

Rear Panel Overview

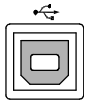


Configuring the USB Interface

USB connection	PC side connector	Type A, host
	GDS-1000A 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_1000a.inf which is downloadable from the GW Instek website, www.gwinstek.com, in the GDS-1000A downloads section.

3. On the PC, activate a terminal application such as MTTTY (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-1152A, 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
- Page13: details of each command

COMMAND OVERVIEW

The Command overview chapter lists all GDS-1000A commands in functional order as well as alphabetical 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 2 3 4	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 Command in Functional Order

(Continued on next page)

List of Command in Alphabetical Order

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 page7.

System command

*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 GDS-1102A. GW, GDS-1102A, P930116, V1.00

*LRN → Query

Description	Returns the oscilloscope settings as a data string.
Syntax	:lrn?

Example	:lrn? :DISPlay:WAVeform 0;ACCumulate 0;CONTrast 0;GRATicule 0;:CHANnel1:DISPlay 1;BWLimit 0;COUPling 0;INVert 0;OFFSet 2.000e+00;PROBe 3;SCALe 2.000e+00;:CHANnel2:DISPlay 1;BWLimit 0;COUPling 0;INVert 0;OFFSet 2.000e+00;PROBe 3;SCALe 2.000e+00;:CHANnel1:MATH 0;:TIMebase:SWEep 0;SCALe 2.500e-06;DELay 0.000e+00;WINDow:SCALe 2.50000e-07;DELay 0.00000e+00;:ACQuire:MODe 0;AVERage 0;:TRIGger:TYPe 0;SOURce 0;MODe 1;SLOP 0;COUPle 1;REJect 0;NREJ 0;LEVel 0.00000e+00;PULSe:MODe: 0;TIMe 0.00000e+00;:VIDeo:TYPe 1;POLarity 0;FIELd 0;LINe 0;:CURSor:SOURce 1;XDISPlay 0;X1Position 75;X2Position 175;YDISPlay 0;Y1Position 54;Y2Position 154;:REF1:DISPlay 0;LOCate 50;:REF2:DISPlay 0;LOCate -50;:RUN

*RST

Set →

Description	Resets the GDS-1000A (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 > :system:error?		< Short > :syst: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 > :system:version?	< Short > :syst:vers?
Note	For retrieving all system information including the firmware version, use the *idn? command.	

Acquisition Command

:ACQuire:AVERage

Set → Query

Description	Selects or returns the average number of waveform acquisition in the average acquisition mode. Same as: Acquire key → F2			
Syntax	< Long > :acquire:average <NR1> :acquire:average?		< Short > :acq:aver <NR1> :acq:aver?	
Parameter	<NR1>	Average No.	<NR1>	Average No.
	1	2	5	32
	2	4	6	64
	3	8	7	128
	4	16	8	256
Note	Before using this command, select the average acquisition mode. See the example below.			
Example	:acquire:mode 2 :acquire:average 2	Selects the average acquisition mode, and select the average number 4		

:ACQuire:HDELay

Set → Query

Description	Set or query 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.		

:ACQuire:MODe

Set → Query

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	<NR1>	Mode
	0	Normal	2	Average
	1	Peak detect		
Example	:acquire:mode 2 :acquire:average 2	Selects the average acquisition mode, and select the average number 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 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 are returned. If only CH1 is active then up to 2M points are 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

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

Set → Query

Description	Selects or returns the bandwidth limit on/off. Same as: Channel key → F3			
Syntax	< Long > :channel<X>:bwlimit <Boolean> :channel<X>:bwlimit?		< Short > :chan<X>:bwl <Boolean> :chan:bwl?	
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 > :channel<X>:coupling <NR1> :channel<X>:coupling?		< Short > :chan<X>:coup <NR1> :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 > :channel<X>:display <Boolean> :channel<X>:display?		< Short > :chan<X>:disp <Boolean> :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>:EXPand

Set → Query

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> :channel<X>:expand?		:chan<X>:exp <Boolean> :chan<X>:exp?	
Parameter	<X>	Channel	<NR1>	Expand
	1/2	CH1/2	0	Ground
			1	Center
Example	:channel1:expand 1 :channel1:expand? 1		Sets Channel 1 to Expand from Center. Returns expand from center (1) as channel 1's Expand status.	

:CHANnel<X>:INVert

Set → / → Query

Description	Inverts a channel or returns its status. Same as: Channel key → F2			
Syntax	< Long > :channel<X>:invert <Boolean> :channel<X>:invert?		< Short > :chan<X>:inv <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> :channel<X>:math?		:chan<X>:math <NR1> :chan<X>:math?	
Parameter	<X>	Channel	<NR1>	Math operation
	1/2	CH1 or CH2	0	Math off
			1	Add
			2	Subtract
			3	Multiply
			4	FFT
			5	FFTrms
Example1	:channel1:math 2		Channel 1 – Channel 2	
Example2	:channel2:math 2		Channel 2 – Channel 1	
Example3	:channel2:math 4		Runs FFT on Channel 2	

:CHANnel<X>:OFFSet

Set → / → Query

Description	Sets or returns the offset level for a channel. The offset level range depends on the vertical scale.			
Syntax	< Long > :channel<X>:offset <NR3> :channel<X>:offset?		< Short > :chan<X>:offs <NR3> :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 :channel1:offset 2.00e–2		Sets the Channel 1 scale to 10mV/div Sets the Channel 1 offset to 20mV	

:CHANnel<X>:PROBe:RATio

Set → / → Query

Description	Sets or returns the probe attenuation factor. Same as: Channel key → variable knob			
Syntax	< Long >		< Short >	
	:channel<X>:probe:ratio<NRf> <NRf>		:chan<X>:prob:rat <NRf>	
	:channel<X>:probe:ratio?		:chan<X>:prob:rat?	
Parameter	<X>	Channel	<NRf>	Probe attenuation factor
	1/2	CH1/2	0.1/0.2/0.5	0.1x/0.2x/0.5x
			1/2/5	1x/2x/5x
			10/20/50	10x/20x/50x
			100/200/500	100x/200x/500x
			1000/2000	1000x/2000x
Example	:channel1:probe:ratio 1		Sets the Channel 1 probe attenuation factor to 1x	

:CHANnel<X>:PROBe:TYPE

Set → / → Query

Description	Sets or returns the probe type (voltage/current). Same as: Channel key →F4			
Syntax	< Long >		< Short >	
	:channel<X>:probe:type <boolean>		:chan<X>:prob:type <boolean>	
	:channel<X>:probe:type?		:chan<X>:prob:type?	

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.	

:CHANnel<X>:SCALe

Set → / → Query

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 :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

Set → / → Query

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 <NR1>		:curs:x<X>p <NR1>	
	:cursor:x<X>position?		:curs:x<X>p?	
Parameter	<X>	Cursor 1 or 2	<NR1>	Cursor position
	1	Cursor 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	Puts the horizontal cursor X1 on the 100 point position		
	:channel:math 3 :cursor:xdisplay 1 :cursor:x1position? → 2.500E+03	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:y1position 100	Puts the vertical cursor Y1 on the 100 point position		
	:channel:math 3 :cursor:ydisplay 1 :cursor:y1position? → 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

Set →
→ Query

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

Display Command

:DISPlay:ACCumulate

Set → Query

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

Set → Query

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>	Display contrast
	–10 ~ 10	Lowest (–10) to the Highest (+10)

Example	:display:contrast 0	Sets the display contrast to the middle (±0)

:DISPlay:GRATicule

Set → Query

Description	Sets or returns the display grid type. Same as: Display key → F5	
Syntax	< Long > :display:graticule <NR1> :display:graticule?	< Short > :disp:grat <NR1> :disp:grat?

Parameter				
	<NR1>	Grid type	<NR1>	Grid type
	0	Full mode	2	Frame mode
	1	Cross mode		

Example	:display:graticule 0	Selects the full grid

:DISPlay:WAVeform

Set → Query

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 >	< Short >
	:refresh	:refr

Measure command

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

: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 > :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 >	< Short >

	:measure:pduty?	: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:pduty?	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 > :measure:rpreshoot?	< 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:rpreshoot?	Selects Channel 1, and then measures the rise preshoot.

:MEASure:SOURce Set → / → Query

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

Save/Recall Command

:MEMory<X>:RECall:SETup → Set

Description	Recalls a panel setting from the internal memory. Same as: Save/Recall key (recall) → F3		
Syntax	< Long > :memory<x>:recall:setup		< Short > :mem<x>:rec:set
Parameter	<X> 1 ~ 15	Internal memory 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 > :memory<x>:recall:waveform <NR1>		< Short > :mem<x>:rec:wav <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 >
	:memory<x>:save:setup		:mem<x>:sav:set
Parameter	<X>	Internal memory	
	1 ~ 15	S1 ~ S15	
Example	:memory1:save:setup	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 >
	:memory<x>:save:waveform <NR1>		:mem<x>:sav:wav <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	*rcl <NR1>	
Parameter	<NR1>	Settings
	1 to 15	S1 to S15
Example	*rcl 1	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 >	
	:ref<x>:display <Boolean>		:ref<x>disp <Boolean>	
	:ref<x>:display?		:ref<x>disp?	
Parameter	<X>	Reference	<Boolean>	Reference on/off
	1	A	0	off
	2	B	1	on

Example	:ref1:display 1	Turns on the reference waveform A

:REF<X>:LOCate

Set → / → Query

Description	Moves or returns the position of a reference waveform. Same as: Save/Recall key → F5 → 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 :ref1:locate 0	Turns on the reference waveform A and move it to ±0 position		

:REF<X>:SAVe

Set →

Description	Saves an input signal as a reference waveform. Same as: Save/Recall key (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

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

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

:FORCe

Set →

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 >	< 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 :trigger:couple 1	Selects the edge trigger 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 >	< Short >
	:trigger:mode <NR1>	:trig:mod <NR1>
	:trigger:mode?	: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

:TRIGger:NREJ

Set → Query

Description	Turns the noise rejection mode on/off. Same as: Trigger key → F4 → F4

Syntax	< Long >	< Short >
	:trigger:nrej <Boolean>	:trig:nrej <Boolean>
	:trigger:nrej?	: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

:TRIGger:PULSe:MODe

Set → Query

Description	Selects the trigger mode in the pulse trigger. Same as: Trigger key → F1(Pulse) → F3

Syntax	< Long >	< Short >
	:trigger:pulse:mode <NR1>	:trig:puls:mod <NR1>
	:trigger:pulse:mode?	: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

:TRIGger:PULSe:TIMe

Set → Query

Description	Selects the trigger time in the pulse trigger. Same as: Trigger key → F1(Pulse) → F3 → Variable knob

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

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

:TRIGger:REJect

Set → / → Query

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> Rejection filter 0 off 1 LF 2 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

Set → / → Query

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> Trigger slope 0 + (positive) 1 – (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.

:TRIGger:SOURce

Set → / → Query

Description	Selects the trigger source channel. Same as: Trigger key → F2	
Syntax	< Long >	< Short >

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

:TRIGger:TYPe

Set → Query

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

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

: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>		:trig:vid:typ <NR1>	
	:trigger:video:type?		: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		