Digital Oscilloscope

GDS-912/912G

PROGRAMMING MANUAL

ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

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

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COMMAND OVERVIEW

The Command overview chapter lists all GDS-912 series 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.

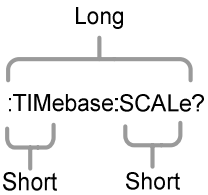
Command Syntax

Compatible standard

- USBTMC 488.2 compatible
- SCPI, 1994 (partially compatible)

Command forms

Commands and queries have two different forms, long and short. The command syntax is written with the short form of the command in capitals and the remainder (long form) in lower case.



The commands can be written in capitals or lower-case, just so long as the short or long forms are complete. An incomplete command will not be recognized.

Below are examples of correctly written commands.

LONG	:TIMebase:SCALe?	:TIMEBASE:SCALE?
	:timebase:scale?	
SHORT	:TIM:SCAL?	:TIM:SCAL?

Command format	:TIMebase:SCALe <NR3>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>	floating point	0.1, 3.14, 8.5
	<NR3>	floating point with an exponent	4.5e-1, 8.25e+1
	<NRf>	any of NR1, 2, 3	1, 1.5, 4.5e-1
Message terminator	LF	line feed code	
Note	Commands are non-case sensitive.		

List of Commands in Functional 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 page6.

Common Commands

*IDN?

→ Query

Description	Returns the manufacturer, model, serial number and version number of the unit.
Syntax	*IDN?
Example	*IDN? GW-INSTEK,GDS-912,PXXXXXX,V1.00

*LRN?

→ Query

Description	Returns the oscilloscope settings as a data string.
Syntax	*LRN?
Example	*LRN?

:DISPlay:WAVEform VECTOR;PERSistence 2.400E-01;INTensity:WAVEform 50;INTensity:GRATicule 50;GRATicule FULL;:CHANnel CH1:DISPlay ON;BWLimit FULL;COUPling DC;INVert OFF;POSition -1.600E+00;PROBe:RATio 1.000e+01;PROBe:TYPe VOLTAGE;SCALe 2.000E+01;IMPedance 1E+6;EXPand GROUND;:CHANnel CH2:DISPlay ON;BWLimit FULL;COUPling DC;INVert OFF;POSition 0.000E+00;PROBe:RATio 1.000e+01;PROBe:TYPe VOLTAGE;SCALe 2.000E+00;IMPedance 1E+6;EXPand GROUND;:MATH:TYPe FFT;DISP OFF;DUAL:SOURce1 CH1;SOURce2 CH2;OPERator MUL;POSition 0.000E+00;SCALe ?;FFT:SOURce CH1;MAG DB;WINDow HANNING;POSition 2.800E-01;SCALe 2.000E+01;MATH:ADVanced:OPERator DIFF;ADVanced:SOURce CH1;ADVanced:EDIT:SOURce1 CH1;ADVanced:EDIT:S

Acquisition Commands

:ACQuire:AVERage

Set → / → Query

Description	Selects or returns the number of waveform acquisitions that are averaged in the average acquisition mode.
Syntax	:ACQuire:AVERage {<NR1>| ?}
Related Commands	:ACQuire:MODe
Parameter	<NR1> 4, 16, 64, 128
Note	Before using this command, select the average acquisition mode. See the example below.
Example	:ACQuire:MODe AVERage :ACQuire:AVERage 4 Selects the average acquisition mode, and sets the average number to 4.

:ACQuire:MODe

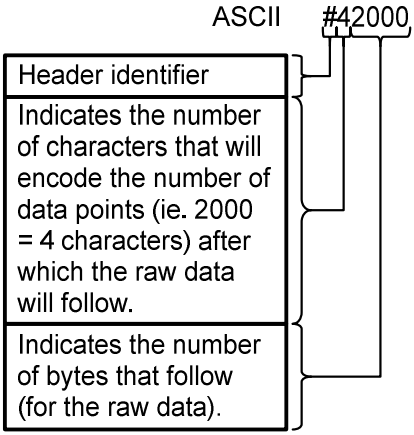
Set → / → Query

Description	Selects or returns the acquisition mode.	
Syntax	:ACQuire:MODe {SAMPle | PDETect | AVERage | ?}	
Related Commands	:ACQuire:AVERage	
Parameter	SAMPle	Sample mode sampling
	PDETect	Peak detect sampling
	AVERage	Average sampling mode

:ACQuire<X>:MEMory?

→ Query

Description	Returns the data in acquisition memory for the selected channel as a header + raw data.	
Syntax	:ACQuire<X>:MEMory?	
Parameter	<X>	Channel number (1 to 2)
Return parameter		Returns acquisition settings followed by raw waveform block data.
	<string>	<string> Returns the acquisition settings for the selected channel. Format: parameter(1),setting(1);parameter(2),setting(2)…parameter(n),setting(n);Waveform Data;

	<waveform block data>	<waveform block data> Header followed by the raw waveform data. Format: Header: The header (in ASCII) encodes the number of bytes for the header followed by the number of data points in bytes for the raw data.  Raw Data: Each two bytes (in hex) encodes the vertical data of a data point. The data is signed hex data (2's complement, -32768 to 32767). Waveform Raw Data Example: Header raw data……. Hex: 23 34 32 30 30 30 00 1C 00 1B 00 1A 00 1A 00 1B …….. ASCII/Decimal: #42000 28 27 26 26 27……. The actual value of a data point can be calculated with the following

		formula: (Decimal value of hex data/AD Factor) * vertical scale.
⚠ Note	AD Factor is fixed as 25. The vertical scale is returned with the acquisition settings that precede the raw data. For example if the raw data for a point is 001C (=28 decimal) then, (28/25) x 0.5 = 0.56 V	
Example	:ACQuire1:MEMory? Format,3.0A;Memory Length,1000;IntpDistance,0;Trigger Address,49;Trigger Level,-3.60E+00;Source,CH1;Vertical Units,V;Vertical Units Extend Div,0;Label, ;Probe Type,0;Probe Ratio,1.00E+01;Vertical Scale,5.00E+00;Vertical Position,0.00E+00;Horizontal Units,s;Horizontal Scale,1.00E-03;Horizontal Position,0.00E+00;Horizontal Mode,Main;SincET Mode,Real Time;Sampling Period,2.00E-05;Horizontal Old Scale,1.00E-03;Horizontal Old Position,0.00E+00;Firmwave,V1.16;Data Bit,8;WaveForm Data; #42000.....follows waveform block data in hex.....	

Autoscale Commands

:AUTOSet

Set →

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

Vertical Commands

:CHANnel<X>:BWLimit

Set → / → Query

Description	Sets or returns the bandwidth limit on/off.	
Syntax	:CHANnel<X>:BWLimit {FULL | <NR3> | ?}	
Parameter	<X>	Channel 1,2
	FULL	Full bandwidth
	<NR3>	Sets the bandwidth limit to a pre-defined bandwidth.
		100E+6: 100 MHz
		20E+6: 20 MHz
Return Parameter	<NR3>	Returns the bandwidth.
	Full	Full bandwidth
Example	:CHANnel1:BWLimit 2.000E+07	
	Sets the channel 1 bandwidth to 20 MHz.	

:CHANnel<X>:COUPling

Set → / → Query

Description	Selects or returns the coupling mode.	
Syntax	CHANnel<X>:COUPling {AC | DC | GND | ?}	
Parameter	<X>	Channel 1,2
	AC	AC coupling

	DC	DC coupling
	GND	Ground coupling
Return parameter	Returns the coupling mode.	
Example	:CHANnel1:COUPling DC Sets the coupling to DC for Channel 1.	

:CHANnel<X>:DISPlay

Set → / → Query

Description	Turns a channel on/off or returns its status.	
Syntax	:CHANnel<X>:DISPlay {OFF | ON | ?}	
Parameter	<X>	Channel 1,2
	OFF	Channel off
	ON	Channel on
Return Parameter	ON	Channel is on
	OFF	Channel is off
Example	:CHANnel1:DISPlay ON Turns on Channel 1	

:CHANnel<X>:INVert

Set → / → Query

Description	Inverts a channel or returns its status.	
Syntax	:CHANnel<X>:INVert {OFF | ON | ?}	
Parameter	<X>	Channel 1, 2
	OFF	Invert off
	ON	Invert on
Return parameter	ON	Invert on
	OFF	Invert off
Example	:CHANnel1:INVert ON Inverts Channel 1	

:CHANnel<X>:POSition

Set → / → Query

Description	Sets or returns the position level for a channel.	
Note	The vertical position will only be set to closest allowed value. The position level range depends on the vertical scale. The scale must first be set before the position can be set.	
Syntax	:CHANnel<X>:POSition { <NRf> | ?}	
Parameter	<X>	Channel 1, 2
	<NRf>	Position. Range depends on the vertical scale.
Return parameter	<NR3>	Returns the position value.
Example 1	:CHANnel1:POSition 2.4E–3 Sets the Channel 1 position to 2.4 mV/mA	
Example 2	:CHANnel1:POSition? 2.4E-3 Returns 2.4 mV as the vertical position.	

:CHANnel<X>:PROBe:RATio

Set → / → Query

Description	Sets or returns the probe attenuation factor.	
Syntax	:CHANnel<X>:PROBe:RATio { <NRf> | ?}	
Related Commands	:CHANnel<X>:PROBe:TYPe	
Parameter	<X>	Channel 1, 2
	<NRf>	Probe attenuation factor
Return parameter	<NR3>	Returns the probe factor
Example	:CHANnel1:PROBe:RATio 1.00E+0 Sets the Channel 1 probe attenuation factor to 1 x	

:CHANnel<X>:SCALe

Set → / → Query

Description	Sets or returns the vertical scale. The scale depends on the probe attenuation factor. Note the probe attenuation factor should be set before the scale.		
Syntax	:CHANnel<X>:SCALe { <NRf> | ?}		
Parameter	<X>	Channel 1, 2	
	<NRf>	Vertical scale	2e–3 to 1e+1 2 mV to 10 V (Probe x1)
Return parameter	<NR3>	Returns the vertical scale in volts or amps.	
Example	:CHANnel1:SCAle 2.00E–2 Sets the Channel 1 vertical scale to 20 mV/div		

Display Command

:DISPlay:OUTPut

Query

Description	Returns the screen image as a 16 bit RGB run length encoded image.
Syntax	:DISPlay:OUTPut{?}
Syntax	:RUN
Return parameter	Format: header+data+LF For example assuming the image data size is 60072 bytes then the following would be returned: #560072<[count] [color] [count] [color]..... ><LF> Where #560072 is the header, each [count] and [color] data are 2 bytes and <LF> is a line feed character.

Measure Commands

:MEASure:SOURce<X>

Set → / → Query

Description	Sets or queries the measurement source for source1 or source2.	
Syntax	:MEASure:SOURce<X> { CH1 | CH2 | MATH | ? }	
Parameter	<X>	Source1 or source2
	CH1 to CH2	Channel 1 to 2
	MATH	Math
Return parameter	Returns the source (CH1, CH2, MATH)	
Example	:MEASure:SOURce1 CH1 Sets source1 to channel 1.	

:MEASure:FALL

→ Query

Description	Returns the fall time measurement result.	
Syntax	:MEASure:FALL{?}	
Related Commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	
	Chan Off	Indicates the source channel is not activated.
Note	Before using this command, select the measurement channel. See the example below.	
Example	:MEASure:SOURce1 CH1 :MEASure:FALL? Selects Channel 1 as the source, and then measures the fall time.	

:MEASure:FOVShoot

→ Query

Description	Returns the fall overshoot amplitude.	
Syntax	:MEASure:FOVShoot{?}	
Related Commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	Returns the fall overshoot as a percentage
	Chan Off	Indicates the source channel is not activated.
Note	Before using this command, select the measurement channel. See the example below.	

Example	:MEASure:SOURce1 CH1 :MEASure:FOVShoot? 1.27E+0 Selects Channel 1, and then measures the fall overshoot.

:MEASure:FPReshoot

→Query

Description	Returns fall preshoot amplitude.	
Syntax	:MEASure:FPReshoot{?}	
Related Commands	:MEASure:SOURce<X>	
Returns	Returns the fall preshoot as <NR3>.	
Return parameter	<NR3>	Returns the fall preshoot as a percentage.
	Chan Off	Indicates the source channel is not activated.
⚠ Note	Before using this command, select the measurement channel. See the example below.	
Example	:MEASure:SOURce1 CH1 :MEASure:FPReshoot? Selects Channel 1, and then measures the fall preshoot.	

:MEASure:FREQuency

→Query

Description	Returns the frequency value.	
Syntax	:MEASure:FREQuency{?}	
Related Commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	Returns the frequency in Hz.

	Chan Off	Indicates the source channel is not activated.
Note	Before using this command, select the measurement channel. See the example below.	
Example	:MEASure:SOURce1 CH1 :MEASure:FREQuency? >1.0E+3 Selects Channel 1, and then measures the frequency.	

:MEASure:NWIDth → Query

Description	Returns the first negative pulse width timing.	
Syntax	:MEASure:NWIDth{?}	
Related Commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	Returns the negative pulse width in seconds.
	Chan Off	Indicates the source channel is not activated.
Note	Before using this command, select the measurement channel. See the example below.	
Example	:MEASure:SOURce1 CH1 :MEASure:NWIDth? 4.995E-04 Selects Channel 1, and then measures the negative pulse width.	

:MEASure:PDUTy → Query

Description	Returns the positive duty cycle ratio as percentage.

Syntax	:MEASure:PDUTy{?}	
Related commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	Returns the positive duty ratio.
	Chan Off	Indicates the source channel is not activated.
Note	Before using this command, select the measurement channel. See the example below.	
Example	:MEASure:SOURce1 CH1 :MEASure:PDUTy? 5.000E+01 Selects Channel 1, and then measures the positive duty cycle.	

:MEASure:PERiod

→ Query

Description	Returns the period.	
Syntax	:MEASure:PERiod{?}	
Related Commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	Returns the period.
	Chan Off	Indicates the source channel is not activated.
Note	Before using this command, select the measurement channel. See the example below.	
Example	:MEASure:SOURce1 CH1 :MEASure:PERiod? 1.0E-3 Selects Channel 1, and then measures the period.	

:MEASure:PWIDth

→ Query

Description	Returns the first positive pulse width.	
Syntax	:MEASure:PWIDth{?}	
Related Commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	Returns the positive pulse width.
	Chan Off	Indicates the source channel is not activated.
Note	Before using this command, select the measurement channel. See the example below.	
Example	:MEASure:SOURce1 CH1 :MEASure:PWIDth? 5.0E-6 Selects Channel 1, and then measures the positive pulse width.	

:MEASure:RISe

→ Query

Description	Returns the first pulse rise time.	
Syntax	:MEASure:RISe{?}	
Related Commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	Returns the rise time.
	Chan Off	Indicates the source channel is not activated.
Note	Before using this command, select the measurement channel. See the example below.	
Example	:MEASure:SOURce1 CH1 :MEASure:RISe? 8.5E-6	

	Selects Channel 1, and then measures the rise time.

:MEASure:AMPlitude

→Query

Description	Returns the amplitude difference between the Vhigh-Vlow.	
Syntax	:MEASure:AMPlitude{?}	
Related Commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	Returns the amplitude.
	Chan Off	Indicates the source channel is not activated.
Note	Before using this command, select the measurement channel. See the example below.	
Example	:MEASure:SOURce1 CH1 :MEASure:AMPlitude? 3.76E-3 Selects Channel 1, and then measures the amplitude.	

:MEASure:MEAN

→Query

Description	Returns the mean voltage/current of one or more full periods.	
Syntax	:MEASure:MEAN{?}	
Related Commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	Returns the mean.
	Chan Off	Indicates the source channel is not activated.
Note	Before using this command, select the measurement channel. See the example below.	

Example	:MEASure:SOURce1 CH1 :MEASure:MEAN? 1.82E-3 Selects Channel 1, and then measures the mean value.	

:MEASure:MAX → Query

Description	Returns the maximum amplitude.	
Syntax	:MEASure:MAX{?}	
Related Commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	Returns the maximum amplitude.
	Chan Off	Indicates the source channel is not activated.
Note	Before using this command, select the measurement channel. See the example below.	
Example	:MEASure:SOURce1 CH1 :MEASure:MAX? 1.90E-3 Selects Channel 1, and then measures the maximum amplitude.	

:MEASure:MIN → Query

Description	Returns the minimum amplitude.	
Syntax	:MEASure:MIN{?}	
Related Commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	Returns the minimum amplitude.
	Chan Off	Indicates the source channel is not activated.

Note	Before using this command, select the measurement channel. See the example below.
Example	:MEASure:SOURce1 CH1 :MEASure:MIN? -8.00E-3 Selects Channel 1, and then measures the minimum amplitude.

:MEASure:PK2PK

→ Query

Description	Returns the peak-to-peak amplitude (difference between maximum and minimum amplitude).	
Syntax	:MEASure:PK2Pk{?}	
Related Commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	Returns the voltage or current peak to peak measurement.
	Chan Off	Indicates the source channel is not activated.
Note	Before using this command, select the measurement channel. See the example below.	
Example	:MEASure:SOURce1 CH1 :MEASure:PK2Pk? 2.04E-1 Selects Channel 1, and then measures the peak-to-peak amplitude.	

:MEASure:CRMS

→ Query

Description	Returns the root-mean-square voltage/current of one full periods.
Syntax	:MEASure:CRMS{?}

Related Commands	:MEASure:SOURce<X>	
Return parameter	<NR3>	Returns the CRMS value.
	Chan Off	Indicates the source channel is not activated.
Note	Before using this command, select the measurement channel. See the example below.	
Example	:MEASure:SOURce1 CH1 :MEASure:CRMS? 1.31E-3 Selects Channel 1, and then measures the CRMS voltage/current.	

Run Command

:RUN

Set ⟶

Description	The run command allows the oscilloscope to continuously make acquisitions (equivalent to pressing the Run key on the front panel).
Syntax	:RUN

Stop Command

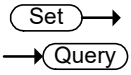
:STOP

Set ⟶

Description	The stop command stops the oscilloscope making further acquisitions (equivalent to pressing the Stop key on the front panel).
Syntax	:STOP

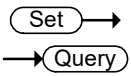
Timebase Commands

:TIMebase:POSition



Description	Sets or queries the horizontal position.	
Syntax	:TIMebase:POSition {<NRf> | ?}	
Parameter	<NRf>	Horizontal position
Return parameter	<NR3>	Returns the horizontal position
Example	:TIMebase:POSition 5.00E-4 Sets the horizontal position as 500 µs.	

:TIMebase:SCALe



Description	Sets or queries the horizontal scale.	
Syntax	:TIMebase:SCALe {<NRf> | ?}	
Parameter	<NRf>	Horizontal scale
Return parameter	<NR3>	Returns the horizontal scale.
Example	:TIMebase:SCALe 5.00E-2 Sets the horizontal scale to 50 ms/div.	

Trigger Commands

:TRIGger:TYPe

Set → / → Query

Description	Sets or queries the trigger type.	
Syntax	:TRIGger:TYPe {EDGe | DELay | PULSEWidth | VIDeo | RUNT | RISEFall | LOGic | BUS | TIMEOut | ? }	
Parameter	EDGE	Edge trigger
	DELay	Delay trigger
	PULSEWidth	Pulse width trigger
	VIDeo	Video trigger
	RUNT	Runt trigger
	RISEFall	Rise and fall trigger
	LOGic	Logic trigger
	BUS	Bus trigger
	TIMEOut	Timeout trigger
Return parameter	Returns the trigger type.	
Example	:TRIGger:TYPe EDGE Sets the trigger type to edge.	

:TRIGger:SOURce

Set → / → Query

Description	Sets or queries the trigger source.	
Syntax	:TRIGger:SOURce { CH1 | CH2 | ? }	
Parameter	CH1 to CH2	Channel 1 to channel 2
Return parameter	Returns the trigger source.	
Example	:TRIGger:SOURce CH1 Sets the trigger source to channel 1.	

:TRIGger:COUPle

Set → / → Query

Description	Sets or queries the trigger coupling.	
Syntax	:TRIGger:COUPle {AC | DC | HF | LF | ?}	
Parameter	AC	AC mode
	DC	DC mode
	HF	High frequency rejection
	LF	Low frequency rejection
Return parameter	Returns the trigger coupling.	
Example	:TRIGger:COUPle AC Sets the trigger coupling to AC.	

:TRIGger:HOLDoff

Set → / → Query

Description	Sets or queries the holdoff time.	
Syntax	:TRIGger:HOLDoff {<NRf> | ?}	
Parameter	<NRf>	Holdoff time
Return parameter	<NR3>	Returns the trigger holdoff time.
Example	:TRIGger:HOLDoff 1.00E-8 Sets the trigger holdoff time to 10 ns.	

:TRIGger:LEVel

Set → / → Query

Description	Sets or queries the level.	
Syntax	:TRIGger:LEVel {TTL | ECL | SETTO50 | <NRf> | ?}	
Related commands	:TRIGger:TYPe	
Parameter	<NRf>	Trigger level value.
	TTL	Sets the trigger level to TTL.
	ECL	Sets the trigger level to ECL.
	SETTO50	Sets the trigger level to the User level (50% by default).
Return parameter	<NR3>	Returns the trigger level.
Example1	:TRIGger:LEVel TTL Sets the trigger to TTL.	
Example2	:TRIGger:LEVel 3.30E-1 Sets the trigger level to 330 mV/mA.	

:TRIGger:EDGe:SLOP

Set → / → Query

Description	Sets or queries the trigger slope.	
Syntax	:TRIGger:EDGe:SLOP {RISe | FALL | EITher | ? }	
Related commands	:TRIGger:TYPe	
Parameter	RISe	Rising slope
	FALL	Falling slope
	EITher	Either rising or falling slope
Return parameter	Returns the trigger slope.	
Example	:TRIGger:EDGe:SLOP FALL Sets the trigger slope to falling.	

:TRIGger:VIDeo:TYPe

Set → / → Query

Description	Sets or queries the video trigger type.	
Syntax	:TRIGger:VIDeo:TYPE {NTSC | PAL | SECam | EDTV480P | EDTV576P | HDTV720P | HDTV1080I | HDTV1080P | ? }	
Related commands	:TRIGger:TYPe	
Parameter	NTSC	NTSC
	PAL	PAL
	SECam	SECAM
	EDTV480P	Extra definition TV 480P
	EDTV576P	Extra definition TV 576P
	HDTV720P	High definition TV 720P
	HDTV1080I	High definition TV 1080i
	HDTV1080P	High definition TV 1080P
Return parameter	Returns the video trigger type.	

Example	:TRIGger:VIDeo:TYPe NTSC Sets the video trigger to NTSC.

:TRIGger:VIDeo:LINe

Set → / → Query

Description	Sets or queries the video trigger line.	
Syntax	:TRIGger:VIDeo:LINe {<NR1> | ?}	
Related commands	:TRIGger:TYPe	
Parameter	<NR1>	Video line
Return parameter	<NR3>	Returns the video trigger line.
Example	:TRIGger:VIDeo:LINe 1 Sets the video trigger to line 1.	

:TRIGger:ALTernate

Set → / → Query

Description	Sets alternating between source triggers on or off or queries its state.	
Syntax	:TRIGger:ALTernate {OFF | ON |?}	
Parameter	OFF	Alternate off
	ON	Alternate on
Return parameter	Returns the Alternate trigger status (ON, OFF).	
Example	:TRIGger:ALTernate ON Turns on alternating between source triggers.	

:TRIGger:STATe

→ Query

Description	Returns the current state of the triggering system.	
Syntax	:TRIGger:STATe?	
Return parameter	*ARMED	Indicates that the oscilloscope is acquiring pretrigger information.

	*AUTO	Indicates that the oscilloscope is in the automatic mode and acquires data even in the absence of a trigger.
	*READY	Indicates that all pretrigger information has been acquired and that the oscilloscope is ready to accept a trigger.
	*SAVE	Indicates that the oscilloscope is in save mode and is not acquiring data.
	*TRIGGER	Indicates that the oscilloscope triggered and is acquiring the post trigger information.

Example

:TRIGger:STATe?

AUTO

The trigger is in auto mode.

:AWG<x>:AMPlitude

Set / Query

Description	Sets or returns the waveform amplitude.	
Syntax	:AWG<x>:AMPlitude {<NRf> | ?}	
Related command	:AWG<x>:OUTPut:LOAd:IMPEDance	
Parameter/ Return parameter	<x>	Channel number 1~2.
	<NRf>	Amplitude in Volts. (50Ω impedance 0.1 V to 2.5 V) (High Z impedance 0.2 V to 5 V)
Example	:AWG1:AMP 1 :AWG1:AMPlitude? 1.00000e+00	

:AWG<x>:FREQuency

Set / Query

Description	Sets or returns the waveform frequency.	
Syntax	:AWG<x>:FREQuency {<NRf> | ?}	
Parameter/ Return parameter	<x>	Channel number 1 or 2.
	<NRf>	Frequency in Hertz.

Example	:AWG1:FREQ 2000 :AWG1:FREQuency? 2.00000e+03

:AWG<x>:FUNCtion

Set → / → Query

Description	Sets or returns the type of waveform.	
Syntax	:AWG<x>:FUNCtion {ARBitrary | SINE | SQUAre | PULSe | RAMP | DC | NOISe | SINC | GAUSsian | LORENtz | EXPRise | EXPFall | HAVERSINe | CARDIac | ?}	
Parameter/ Return parameter	<x>	Channel number 1 or 2.
	ARBitrary	Arbitrary waveform
	SINE	Sine waveform
	SQUAre	Square waveform
	PULSe	Pulse waveform
	RAMP	Ramp waveform
	DC	DC waveform
	NOISe	Noise waveform
	SINC	Sinc waveform
	GAUSsian	Gaussian waveform
	LORENTz	Lorentz waveform
	EXPRise	Exponential rise waveform
	EXPFall	Exponential fall waveform
	HAVERSINe	Haversine waveform
	CARDIac	Cardiac waveform
Example	:AWG1:FUNC? >SINE	

:AWG<x>:OFFSet

Set → / → Query

Description	Sets or returns the waveform offset.	
Syntax	:AWG<x>:OFFSet {<NRf> | ?}	
Parameter/ Return parameter	<x>	Channel number 1 or 2.
	<NRf>	Offset in Volts.
Example	:AWG1:OFFSet?	
	0.00000e+00	
	:AWG1:OFFSet 1	
	:AWG1:OFFSet?	
	1.00000e+00	

:AWG<x>:OUTPut:LOAd:IMPEDance

Set → / → Query

Description	Sets or returns the output termination	
Syntax	:AWG<x>:OUTPut:LOAd:IMPEDance {FIFty | HIGHZ | ?}	
Parameter/ Return parameter	<x>	Channel number 1 or 2
	FIFTy	50 Ohm output termination
	HIGHZ	High Z output termination
Example	:AWG1:OUTP:LOA:IMPED HIGHZ	
	Sets the output termination of channel 1 to high impedance.	

:AWG<x>:OUTPut:STATE

Set → / → Query

Description	Sets or returns the channel output state.	
Syntax	:AWG<x>:OUTPut:STATE {OFF | ON | ?}	
Parameter/ Return parameter	<x>	Channel number 1 or 2
	OFF	Turns the channel output off
	ON	Turns the channel output on
Example	:AWG1:OUTP:STATE OFF Turns the channel 1 output off.	

:AWG<x>:PULSe:DUTYcycle

Set → / → Query

Description	Sets or returns the pulse duty cycle.	
Syntax	:AWG<x>:PULSe:DUTYcycle {<NRf> | ?}	
Parameter/ Return parameter	<x>	Channel number 1 or 2.
	<NRf>	Duty cycle in percentage 0.2 % to 99.8 %
Example	:AWG1:PULS:DUTY 50 Sets the channel 1 pulse duty cycle to 50 %.	

:AWG<x>:RAMP:SYMmetry

Set → / → Query

Description	Sets or returns the ramp symmetry.	
Syntax	:AWG<x>:RAMP:SYMmetry {<NRf> | ?}	
Parameter/ Return parameter	<x>	Channel number 1 or 2.
	<NRf>	Symmetry of the ramp waveform 0 % to 100 %
Example	:AWG1:RAMP:SYM 15 Sets the channel 1 ramp symmetry to 15 %.	

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