

# Digital Storage Oscilloscope

GDS-3000 Series

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## PROGRAMMING MANUAL

GW INSTEK PART NO. 82DS-33040101



ISO-9001 CERTIFIED MANUFACTURER

**GW INSTEK**

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# Table of Contents

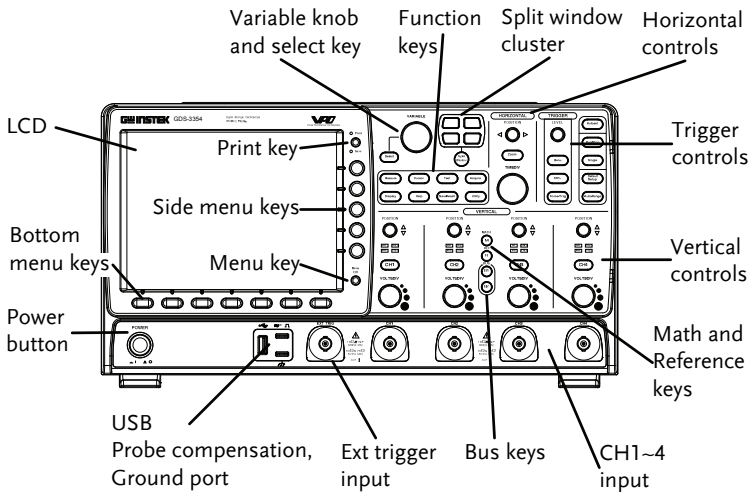
<b>INTERFACE OVERVIEW .....</b>	<b>5</b>
Front Panel Overview .....	5
Interface Configuration .....	6
<b>COMMAND OVERVIEW .....</b>	<b>13</b>
Command Syntax .....	13
List of Commands in Functional Order ....	15
<b>COMMAND DETAILS .....</b>	<b>20</b>
Common Commands .....	21
Acquisition Commands .....	22
Autoscale Commands .....	25
Vertical Commands .....	25
Math Commands .....	30
Cursor Commands .....	36
Display Commands .....	43
Hardcopy Commands .....	45
Measure Commands .....	47
Reference Commands .....	61
Run Command .....	64
Stop Command .....	64
Single Command .....	64
Force Command .....	65
Split Window Command .....	65
Timebase Commands .....	66
Trigger Commands .....	69
System Commands .....	79
Save/Recall Commands .....	80



# INTERFACE OVERVIEW

This manual describes how to use the GDS-3000's remote command functionality and lists the command details. The Overview chapter describes how to configure the GDS-3000 USB remote control interface, Ethernet interface, GPIB interface (using the optional GPIB to USB adapter) and RS-232 interface.




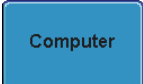

## Front Panel Overview



## Interface Configuration


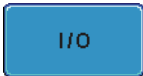

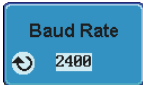
### Configure USB Interface


USB configuration	PC side connector	Type A, host
	GDS-3000 side connector	Type B, slave
	Speed	1.1/2.0 (Full speed)
	USB Class	CDC (communications device class)


- Panel operation
1. Press the Utility key.
 
  2. Press I/O from the bottom menu.
 
  3. Press USB Device Port from the side menu and choose Computer.
 
  4. Press Computer from the side menu.
 
  5. Connect the USB cable to the rear panel slave port.
 
  6. When the PC asks for the USB driver, select dso\_vpo.inf downloadable from GW website, [www.gwinstek.com](http://www.gwinstek.com), the GDS-3000 product corner. The driver file automatically sets the GDS-3000 as a serial COM port.

### Configure RS-232C Interface

RS-232C configuration	Connector	DB-9, Male
	Baud rate	2400, 4800, 9600, 19200, 38400, 57600, 115200
	Parity	None, Odd, Even
	Data bit	8 (fixed)
	Stop bit	1, 2

- Panel operation
1. Press the *Utility* key.
 
  2. Press *I/O* from the bottom menu.
 
  3. Press *RS-232C* from the side menu.
 
  4. Use the side menu to set the Baud Rate.
 

Baud Rate 2400, 4800, 9600, 19200, 38400, 57600, 115200
  5. Press *Stop Bit* to toggle the number of stop bits.
 

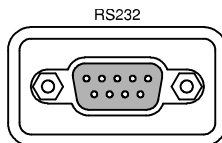
Stop Bits 1, 2
  6. Press *Parity* to toggle the parity.
 

Parity Odd, Even, None

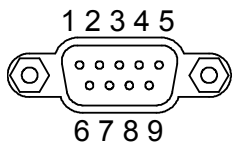
7. Press *Save Now* to save the settings.



8. Connect the RS-232C cable to the rear panel port: DB-9 male connector. For a functionality check, see page 12.



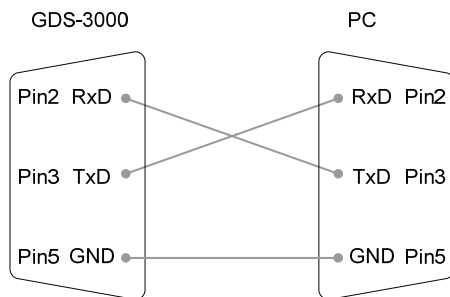
Pin assignment



- 2: RxD (Receive data)
- 3: TxD (Transmit data)
- 5: GND
- 4, 6 ~ 9: No connection

PC connection

Use the Null Modem connection as in the below diagram.




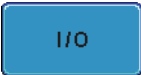

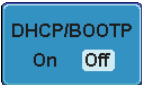
## Configure the Ethernet Interface

Ethernet configuration

- |                       |                      |
|-----------------------|----------------------|
| MAC Address           | Domain Name          |
| Instrument Name       | DNS IP Address       |
| User Password         | Gateway IP Address   |
| Instrument IP Address | Subnet Mask          |
|                       | HTTP Port 80 (fixed) |



**Background** The Ethernet interface is used remote control over a network and retrieve scope's screen shot, system information etc,. Please note that the all GDS-3000 series were designed with a build-in web server.

- Panel operation**
1. Press the *Utility* key. 
  2. Press *I/O* from the bottom menu. 
  3. Press *Ethernet* from the side menu. 
  4. Set *DHCP/BOOTP* to *On* or *Off* from the side menu. 



Note

IP addresses will automatically be assigned with DHCP/BOOTP set to on. For Static IP Addresses, DHCP/BOOTP should be set to off.

```

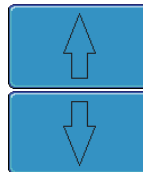
MAC Address :          02:11:55:77:88:11
Instrument Name :      GDS3304
User Password :       admin
Instrument IP Address : 172.16.5.176
Domain Name :         [ ]
DNS IP Address :      [ ]
Gateway IP Address :  172.16.0.254
Subnet Mask :         255.255.128.0
HTTP Port :          80
    
```

```

ABCDEF GHIJKL MNOPQRSTU VWXYZ
abcdefghijklmnopqrstuvwxyz
.0123456789_-
    
```

1. Use Variable Knob to select the character.
2. Press Select to enter the character.

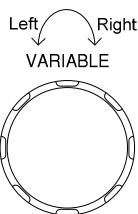
- Use the *Up* and *Down* arrows on the side menu to navigate each Ethernet configuration item.



Items      MAC Address, Instrument Name, User Password, Instrument IP Address, Domain Name, DNS IP Address, Gateway IP Address, Subnet Mask

Note: HTTP Port is fixed at 80.

- Use the Variable knob to highlight a character and use the Select key to choose a character.



Press *Backspace* to delete a character.






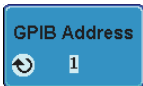


- Connect the Ethernet cable to the rear panel of the GDS-3000.



## Configure GPIB Interface

To use GPIB, the optional GPIB to USB (GUG-001) adapter must be used. The GPIB address can be configured for the GUG-001 from the utility menu. See the GUG-001 user manual for more information.

- |                |  |   |
|----------------|--|---|
| Configure GPIB | <ol style="list-style-type: none"> <li>1. Insert the GUG-001 USB 2.0 A-B type cable into the rear panel USB device port.</li> <li>2. Press the <i>Utility</i> key.</li> <li>3. Press <i>I/O</i> from the bottom menu.</li> <li>4. Press USB Device Port from the side menu and choose Computer.</li> <li>5. Press <i>GPIB</i> from the side menu.</li> <li>6. Use the variable knob to set the GPIB Address from the side menu.</li> </ol> | <div style="text-align: center; margin-bottom: 10px;">  <p style="font-size: small;">Device</p> </div> <div style="text-align: center; margin-bottom: 10px;">  </div> <div style="text-align: center; margin-bottom: 10px;">  </div> <div style="text-align: center; margin-bottom: 10px;">  </div> <div style="text-align: center; margin-bottom: 10px;">  </div> <div style="text-align: center;">  </div> |
|                | <p>Range    1 ~ 30</p>   |   |

- GPIB constraints
- Maximum 15 devices altogether, 20m cable length, 2m between each device
  - Unique address assigned to each device
  - At least 2/3 of the devices turned On
  - No loop or parallel connection

## USB/RS-232C Remote Control Software

---

Terminal application (USB/RS-232C)	<p>Invoke the terminal application such as hyper terminal program. For RS-232C, set the COM port, baud rate, stop bit, data bit, and parity accordingly.</p> <p>To check the COM port No, see the Device Manager in the PC. For WinXP, Control panel → System → Hardware tab.</p>
Functionality check	<p>Run this query command via the terminal.</p> <p>*idn? (use line feed character as the message terminator)</p> <p>This should return the Manufacturer, Model number, Serial number, and Firmware version in the following format.</p> <p>GW, GDS-3354, EK200001, V1.08</p>
PC Software (USB only)	<p>The proprietary PC software FreeWave is downloadable from the GWInstek website for remote control.</p>

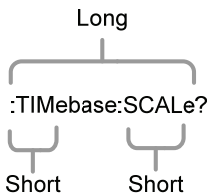
# COMMAND OVERVIEW

The Command overview chapter lists all GDS-3000 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 | <ul style="list-style-type: none"> <li>• USB CDC_ACM compatible</li> <li>• SCPI, 1994 (partially compatible)</li> </ul>  |
| 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

Common	*IDN?	21
	*LRN?	21
	*RCL	22
	*RST	22
	*SAV	22
<hr/>		
Acquisition	:ACQuire:AVERage	22
	:ACQuire:MODE	23
	:ACQuire<x>:MEMory?	23
	:ACQuire<x>:STATe?	24
<hr/>		
Autoscale	:AUTOSet	25
	:AUTORange	25
<hr/>		
Vertical Scale	:CHANnel<x>:BWLimit	26
	:CHANnel<x>:COUPling	26
	:CHANnel<x>:DESKew	26
	:CHANnel<x>:DISPlay	27
	:CHANnel<x>:EXPand	27
	:CHANnel<x>:IMPedance	28
	:CHANnel<x>:INVert	28
	:CHANnel<x>:POSition	28
	:CHANnel<x>:PROBe:RATio	29
	:CHANnel<x>:PROBe:TYPe	29
:CHANnel<x>:SCALE	30	

Math	:MATH:DISP .....	31
	:MATH:TYPE .....	31
	:MATH:DUAL:SOURce<x> .....	31
	:MATH:DUAL:OPERator .....	32
	:MATH:DUAL:POSition .....	32
	:MATH:DUAL:SCALE .....	33
	:MATH:FFT:SOURce .....	33
	:MATH:FFT:MAG .....	34
	:MATH:FFT:WINDow .....	34
	:MATH:FFT:POSition .....	35
	:MATH:FFT:SCALE .....	35
<hr/>		
Cursor	:CURSor:MODE .....	36
	:CURSor:SOURce .....	37
	:CURSor:H1Position .....	37
	:CURSor:H2Position .....	37
	:CURSor:HDELta .....	38
	:CURSor:V1Position .....	38
	:CURSor:V2Position .....	38
	:CURSor:VDELta .....	39
	:CURSor:XY:RECTangular:X:POSition<x> .....	39
	:CURSor:XY:RECTangular:X:DELta .....	39
	:CURSor:XY:POLar:RADIUS:POSition<x> .....	40
	:CURSor:XY:POLar:RADIUS:DELta .....	40
	:CURSor:XY:POLar:THETA:POSition<x> .....	41
	:CURSor:XY:POLar:THETA:DELta .....	41
	:CURSor:XY:PRODUct:POSition<x> .....	41
	CURSor:XY:PRODUct:DELta .....	42
	:CURSor:XY:RATio:POSition<x> .....	42
	:CURSor:XY:RATio:DELta .....	42



---

Display	:DISPlay:INTensity:WAVEform.....	43
	:DISPlay:INTensity:GRATicule.....	43
	:DISPlay:PERStence .....	44
	:DISPlay:GRATicule .....	44
	:DISPlay:WAVEform.....	45
<hr/>		
Hardcopy	:HARDcopy:START .....	45
	:HARDcopy:MODE .....	45
	:HARDcopy:PRINTINKSaver .....	46
	:HARDcopy:SAVEINKSaver .....	46
	:HARDcopy:SAVEFORMat .....	46
<hr/>		
Measure	:MEASure:GATing.....	48
	:MEASure:SOURce<x> .....	48
	:MEASure:FALL.....	48
	:MEASure:FOVShoot .....	49
	:MEASure:FPReshoot .....	49
	:MEASure:FREQuency .....	50
	:MEASure:NWIDth .....	50
	:MEASure:PDUTy.....	50
	:MEASure:PERiod .....	51
	:MEASure:PWIDth .....	51
	:MEASure:RISe.....	52
	:MEASure:ROVShoot.....	52
	:MEASure:RPReshoot .....	52
	:MEASure:AMPlitude.....	53
	:MEASure:AVERage .....	53
	:MEASure:HIGH .....	54
	:MEASure:LOW .....	54
	:MEASure: MAX .....	55
	:MEASure:MIN .....	55
	:MEASure:PK2PK .....	55
:MEASure: RMS .....	56	
:MEASure:FRRDelay .....	56	
:MEASure:FRFDelay.....	57	
:MEASure:FFRDelay.....	57	

---

	:MEASure:FFDelay.....	58
	:MEASure:LRRDelay .....	58
	:MEASure:LRFDelay.....	59
	:MEASure:LFRDelay.....	59
	:MEASure:LFFDelay.....	60
	:MEASure:PHase.....	60
<hr/>		
Reference	:REF<x>:DISPlay .....	61
	:REF<x>:TIMebase:POSition.....	62
	:REF<x>:TIMebase:SCALe.....	62
	:REF<x>:OFFSet.....	63
	:REF<x>:SCALe .....	63
<hr/>		
Run	:RUN .....	64
<hr/>		
Stop	:STOP .....	64
<hr/>		
Single	:SINGle.....	64
<hr/>		
Force	:FORCe.....	65
<hr/>		
Split window	:WINDow:SOURce .....	65
<hr/>		
Time base	:TIMebase:POSition .....	66
	:TIMebase:SCALe .....	66
	:TIMebase:MODE .....	66
	:TIMebase:WINDow:POSition .....	67
	:TIMebase:WINDow:SCALe .....	68
<hr/>		
Trigger	:TRIGger:FREQuency.....	70
	:TRIGger:TYPe .....	70
	:TRIGger:SOURce.....	70
	:TRIGger:COUple.....	71
	:TRIGger:NREJ .....	71
	:TRIGger:REject .....	71
	:TRIGger:MODE.....	72

	:TRIGger:HOLDoff.....	72
	:TRIGger:HLEVel.....	72
	:TRIGger:LLEVel.....	73
	:TRIGger:EDGe:SLOP.....	73
	:TRIGger:DELaY:TYPe.....	73
	:TRIGger:DELaY:TI梅.....	74
	:TRIGger:DELaY:EVENt.....	74
	:TRIGger:DELaY:LEVel.....	74
	:TRIGger:PULSEWidth:POLarity.....	75
	:TRIGger:RUNT:POLarity.....	75
	:TRIGger:RISEFall :SLOP.....	76
	:TRIGger:VIDeo:TYPe.....	76
	:TRIGger:VIDeo:FIELD.....	77
	:TRIGger:VIDeo:LINE.....	77
	:TRIGger:VIDeo:POLarity.....	77
	:TRIGger:PULSE:WHEN.....	78
	:TRIGger:PULSE:TI梅.....	78
	:TRIGger:ALTErnate.....	79
	:TRIGger:LEVel.....	79
System commands	:SYSTem:LOCK {OFF ON ?}.....	79
Save/Recall	:RECALL:SETUp.....	80
	:RECALL:WAVEform W<n>,REF<x>.....	81
	:SAVE:IMAGe.....	81
	:SAVE:IMAGe:FILEFormat.....	82
	:SAVE:IMAGe:INKSaver.....	82
	:SAVE:SETUp.....	82
	:SAVE:WAVEform.....	83
	:SAVE:WAVEform:FILEFormat.....	84

# 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 page15.

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Common Commands .....	21
Acquisition Commands .....	22
Autoscale Commands .....	25
Vertical Commands .....	25
Math Commands .....	30
Cursor Commands .....	36
Display Commands .....	43
Hardcopy Commands.....	45
Measure Commands .....	47
Reference Commands .....	61
Run Command .....	64
Stop Command .....	64
Single Command.....	64
Force Command.....	65
Split Window Command.....	65
Timebase Commands.....	66
Trigger Commands.....	69
System Commands .....	79
Save/Recall Commands.....	80

# Common Commands

*IDN?	21
*LRN?	21
*RCL	22
*RST	22
*SAV	22

**\*IDN?** → Query

**Description** Returns the manufacturer, model, serial number and version number of the unit.

**Syntax** \*IDN?

**Example** \*IDN?  
GW,GDS-3354,EK200001,V1.08

**\*LRN?** → Query

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

**Syntax** \*LRN?

**Example** \*LRN?

```
:DISPlay:WAVEform VECTOR;PERSistence OFF;INTensity:WAVEform 70;INTensity:GRATICle 50;GRATICule FULL;:CHANnel CH1:DISPlay ON;BWLimit FULL;COUPLing DC;INVert OFF;Position -1.460E+00;PROBE:RATIO 1.000E+00;PROBE:TVPe VOLTAGE;SCALE 5.000E-01;IPedance 1E+6;EXPand GROUND;:CHANnel CH2:DISPlay ON;BWLimit FULL;COUPLing DC;INVert OFF;Position -6.000E-02;PROBE:RATIO 1.000E+00;PROBE:TVPe VOLTAGE;SCALE 2.000E-02;IMPedance 1E+6;EXPand GROUND;MATH:TVPe DUAL;DISP OFF;DUAL:SOURce1 CH1:SOURce2 CH2;OPERator PLUS;Position 0.000E+00;SCALE 1.000E+00;FFT:SOURce CH1:MAG DB;kNDow HANNING;Position 0.000E+00;SCALE ?;MEASure:CATing OFF;SOURce1 CH1;SOURce2 CH2;:TIMebase:MODE MAIN;SCALE 5.000E-04;Position 0.000E+00;WINDow:SCALE 1.000E-5;:ACQuire:MODE HIREs;AVERage 32;:CURSor:SOURce CH2;MODE OFF;H1Position ;H2Position ;V1Position ;V2Position ;:HARDcopy:MODE SAVE;PRINTInkSaver ON;SAVEInkSaverN;SAVEFORMat BMP;:TRIGger:FREQuency 1.000E+03;TVPe EDGE;SOURce CH1;COUPLe DC;NAJ OFF;REject OFF;MODE AUTO;HOLDoff 1.000E-03;LEVelH 1.000E+00;LEVelL ?;FDBe:SLC POSITIVE;DElay:TVPe TIME;DElay:TIME 0.000;DElay:EVENT 1;DElay:LEVel ?;PULSEwidh;POLarity POSITIVE;RUNT;POLarity POSITIVE;RISEfall;SLOP POSITIVE;VIDeo:TVPe NTC;VIDeo:FIELD FIELD1;VIDeo:LINE 1;VIDeo:POLarity NEGATIVE;PULSe:WHEn THAN;PULSe TIME 0.000;REF1:DISPlay OFF;TIMebase:Position 0.000E+00;SCALE 5.000E-04;OFFSet -1.000E+00;SCALE 5.000E-01;:REF2:DISPlay OFF;TIMebase:Position 0.000E+00;SCALE .000E-04;OFFSet -1.000E+00;SCALE 5.000E-01;:REF3:DISPlay OFF;TIMebase:Position .000E+00;SCALE 2.000E-04;OFFSet 0.000E+00;SCALE 5.000E-01;:REF4:DISPlay OFF;TIMebase:Position 0.000E+00;SCALE 2.000E-04;OFFSet 0.000E+00;SCALE 5.000E-01
```

**\*RCL** (Set) →

Description	Recalls a set of panel setting.
Syntax	*RCL {1   2   3  ...   20}
Example	*RCL 1 Recalls setup from set 1.

**\*RST** (Set) →

Description	Resets the GDS-3000 (recalls the default panel settings).
Syntax	*RST

**\*SAV** (Set) →

Description	Saves the current setup to setup file number 1~20.
Syntax	*SAV {1   2   3  ...   20}
Example	*SAV 1 Sets current setup to set 1.

## Acquisition Commands

:ACQuire:AVERage .....	22
:ACQuire:MODE .....	23
:ACQuire<x>:MEMory?.....	23
:ACQuire<x>:STATe? .....	24

**:ACQuire:AVERage** (Set) →  
→ (Query)

Description	Selects or returns the number of waveform acquisitions that are averaged in the average acquisition mode.
-------------	---

Syntax :ACQuire:AVERAge {2 | 4 | 8 | 16 | 32 | 64 | 128 | 256 | ?}

Parameter 2, 4, 8, 16, 32, 64, 128, 256

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

Example :ACQuire:MODE AVERAge  
:ACQuire:AVERAge 2  
Selects the average acquisition mode, and sets the average number to 2.

**:ACQuire:MODE**

Set →

→ Query

Description Selects or returns the acquisition mode.

Syntax :ACQuire:MODE {SAMPlE | PDETECT | HIRes | AVERAge | ?}

Parameter	SAMPlE	Sample mode sampling	PDETECT	Peak detect sampling
	HIRes	Hi resolution sampling	AVERAge	Average sampling mode

Example :ACQuire:MODE PDETECT  
Sets the sampling mode to peak detection.

**:ACQuire<x>:MEMory?**

→ Query

Description Returns the data in acquisition memory for the selected channel as a single string.

Syntax :ACQuire<x>:MEMory?

Parameter	<x>	Channel
	1/2/3/4	Channel 1/2/3/4

```
Example      :ACQUIRE1:MEMory?
              Memory Length,25000;IntpDistance,0;Trigger
              Address,12499;Trigger Level,1.00V;Sou
              rce,CH1;Vertical Units,V;Vertical Scale,5.000e-
              01;Probe,1.000e+00;Vertical Posit
              ion,-1.460e+00;Horizontal Units,S;Horizontal
              Scale,5.000E-04;Horizontal Position
              ,0.000E+00;Horizontal Mode,Main;SincET Mode,Real
              Time;Sampling Period,2.000e-07;
              Horizontal Old Scale,5.000E-04;Horizontal Old
              Position,0.000E+00;Firmware,V1.08;
              Time,07-Feb-11 15:35:17;Waveform Data;#550000<50000
              bytes binary data><LF>
```

**:ACQUIRE<x>:STATE?** → Query

Description	Returns the status of waveform data.	
Syntax	:ACQUIRE<x>:STATE?	
Parameter	<x>	Channel
	1/2/3/4	Channel 1/2/3/4
Return parameter	0	Raw data is not ready
	1	Raw data is ready

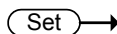
```
Example      :ACQUIRE1:STATE?
              0
              Returns 0. The channel 1's raw data is not ready.
              Note: If the oscilloscope changes the acquisition status
              from STOP to RUN, the status will be reset as zero.
```



## Autoscale Commands

:AUTOSet .....	25
:AUTORange .....	25

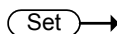
### :AUTOSet



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

**Syntax**            :AUTOSet

### :AUTORange



**Description**      Runs the Autorange function to automatically continuously configure the horizontal and vertical scale according to the input signal.

**Syntax**            :AUTORange

## Vertical Commands

:CHANnel<x>:BWLimit.....	26
:CHANnel<x>:COUPling .....	26
:CHANnel<x>:DESKew .....	26
:CHANnel<x>:DISPlay .....	27
:CHANnel<x>:EXPand .....	27
:CHANnel<x>:IMPedance .....	28
:CHANnel<x>:INVert.....	28
:CHANnel<x>:POSition.....	28
:CHANnel<x>:PROBE:RATio .....	29
:CHANnel<x>:PROBE:TYPE.....	29
:CHANnel<x>:SCALE .....	30

Set →

:CHANnel<x>:BWLimit

→ Query

Description	Selects or returns the bandwidth limit on/off.			
Syntax	:CHANnel<x>:BWLimit {FULL   <NR3>   ?}			
Parameter	<x>	Channel	<NR3>	Limit
	1/2/3/4	CH1/2/3/4	20E+6	20MHz
	FULL	Full bandwidth	100E+6	100MHz
			200E+6	200MHz
Return Parameter	<NR3>	Returns the bandwidth.		
	Full	Full bandwidth for the oscilloscope.		

Example :CHANnel1:BWLimit 2.000E+07  
Sets the channel 1 bandwidth 20MHz

Set →

:CHANnel<x>:COUpling

→ Query

Description	Selects or returns the coupling mode.			
Syntax	CHANnel<x>:COUpling {AC   DC   GND   ?}			
Parameter	<x>	Channel		Coupling mode
	1/2/3/4	CH1/2/3/4	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.

Set →

:CHANnel<x>:DESKew

→ Query

Description	Sets the deskew time in seconds.		
Syntax	:CHANnel<x>:DESKew { <NR3>   ?}		

Parameter	<x> 1/2/3/4	Channel CH1/2/3/4	<NR3> -5.00E -11 -5.00E -11	Deskew time -50ns to 50 ns.
-----------	----------------	----------------------	-----------------------------------	--------------------------------

Return parameter <NR3> Returns the deskew time.

Example :CHANnel1:DESKew 1.300E-9  
Sets the deskew time to 1.3 nano seconds.

Set →

→ Query

**:CHANnel<x>:DISPlay**

Description Turns a channel on/off or returns its status.

Syntax :CHANnel<x>:DISPlay {OFF | ON | ?}

Parameter	<x> 1/2/3/4	Channel CH1/2/3/4	Channel on/off OFF ON	Channel on/off Off On
-----------	----------------	----------------------	-----------------------------	-----------------------------

Return Parameter ON Channel is on. OFF Channel is off

Example :CHANnel1:DISPlay ON  
Turns on Channel 1

Set →

→ Query

**:CHANnel<x>:EXPand**

Description Sets Expand from ground or from center for a channel. Queries the Expand status of a channel.

Syntax :CHANnel<x>:EXPand {GND | CENTER | ?}

Parameter	<x> 1/2/3/4	Channel CH1/2/3/4	Ground CENTER	Ground Center
-----------	----------------	----------------------	------------------	------------------

Return parameter GND Expand by ground CENTER Expand by center

Example :CHANnel1:EXPand GND  
Sets Channel 1 to Expand by ground.

Set →  
 → Query

**:CHANnel<x>:IMPedance**

Description	Sets the impedance of the oscilloscope.			
Syntax	:CHANnel<x>:IMPedance {<NRf>   ?}			
Parameter	<x> 1/2/3/4	Channel CH1/2/3/4	<NRf>	Impedance impedance in ohms.
Return parameter	<NR3>	Returns the impedance value.		
Example	:CHANnel1:IMPedance 5.0E+1 Sets the impedance to 50 ohms.			

Set →  
 → Query

**:CHANnel<x>:INVert**

Description	Inverts a channel or returns its status.			
Syntax	:CHANnel<x>:INVert {OFF   ON   ?}			
Parameter	<x> 1/2/3/4	Channel CH1/2/3/4	OFF ON	Channel invert off on
Return parameter	ON	Invert on	OFF	Invert off
Example	:CHANnel1:INVert ON Inverts Channel 1			

Set →  
 → Query

**:CHANnel<x>:POSition**

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.  Note: the scale must first be set before the position can be set.			
Syntax	:CHANnel<x>:POSition { <NRf>   ?}			

Parameter	<x>	Channel	<NRf>	Position
	1/2/3/4	CH1/2/3/4		Range depends on the vertical scale.

Return parameter Returns the position value as <NR3>

Example :CHANnel1:POSition 2.4E-3  
 Sets the Channel 1 position to 2.4mV/mA  
 :CHANnel1:POSition?  
 2.4E-3  
 Returns 2.4mV as the vertical position.

→  
 →

Description Sets or returns the probe attenuation factor.  
 Same as: Channel key → variable knob

Syntax :CHANnel<x>:PROBe:RATio { <NRf> | ? }

Parameter	<x>	Channel	<NRf>	Probe attenuation factor
	1/2/3/4	CH1/2/3/4	0.1e+2	10x

Return parameter <NR3> Returns the probe factor for the selected channel

Example :CHANnel1:PROBe:RATio 1.00E+0  
 Sets the Channel 1 probe attenuation factor to 1x

→  
 →

Description Sets or returns the probe type (voltage/ current).

Syntax :CHANnel<x>:PROBe:TYPe { VOLTage | CURRent | ? }

Parameter	<x>	Channel		Probe type
	1/2/3/4	CH1/2/3/4	VOLTage	Voltage
			CURRent	Current

Return parameter Returns the probe type.

Example :CHANnel1:PROBe:TYPe VOLTage  
Sets the Channel 1 probe type to voltage.

Set →

→ Query

:CHANnel<x>:SCALe

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	<NRf>	Vertical scale
	1/2/3/4	CH1/2/3/4	2e-3 ~ 1e+1	2mV ~ 10V (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 20mV/div

## Math Commands

:MATH:DISP .....	31
:MATH:TYPe .....	31
:MATH:DUAL:SOURce<x>.....	31
:MATH:DUAL:OPERator .....	32
:MATH:DUAL:POSition.....	32
:MATH:DUAL:SCALe.....	33
:MATH:FFT:SOURce .....	33
:MATH:FFT:MAG .....	34
:MATH:FFT:WINDow.....	34
:MATH:FFT:POSition .....	35
:MATH:FFT:SCALe .....	35

**:MATH:DISP** 


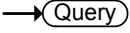


Description	Turns the math display on or off on the screen. Note: Math display cannot be used when split screen is on.		
Syntax	:MATH:DISP {OFF ON ?}		
Parameter	OFF	Math is not displayed on screen	
	ON	Math is displayed on screen	
Return parameter	ON	Display on	OFF Display off
Example	:MATH:DISP OFF Math is off.		

**:MATH:TYPE** 



Description	Queries or sets the Math type to FFT or to dual channel math operations		
Syntax	:MATH:TYPE {DUAL FFT ?}		
Parameter	DUAL	Dual channel operations	
	FFT	FFT operations	
Return parameter	Returns the math type.		
Example	:MATH:TYPE DUAL Sets the Math type to dual channel math operation.		

**:MATH:DUAL:SOURce<x>** 



Description	Sets the math source for source 1 or 2.		
Syntax	:MATH:DUAL:SOURce<x> {CH1 CH2 CH3 CH4 REF1 REF2 REF3 REF4 ?}		

Parameter	<x>	Source number: 1/2/3/4
	CH1~4	Channel 1 to 4
	REF1~4	Reference waveforms 1 to 4

Return parameter Returns the source for the source 1 or 2.

Example :MATH:DUAL:SOURce1 CH1  
Sets source1 as channel 1.

Set →

→ Query

### :MATH:DUAL:OPERator

Description Sets the math operator for dual sourced math operations.

Syntax :MATH:DUAL:OPERator {PLUS | MINUS | MUL | DIV|?}

Parameter	PLUS	+ operator	MINUS	- operator
	MUL	× operator	DIV	÷ operator

Return parameter Returns operator type.

Example :MATH:DUAL:OPERator PLUS  
Sets the math operator as plus (+).

Set →

→ Query

### :MATH:DUAL:POSition

Description Sets the vertical position of the displayed math result expressed by division.

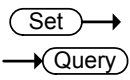
Syntax :MATH:DUAL:POSition <NRf?>

Parameter	<NRf>	Vertical position
		Depends on the vertical scale (Unit/Div)

Return parameter Returns the position as <NR3>.



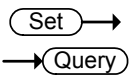
Example :MATH:DUAL:POSition 1.0E+0  
 Sets the vertical position to 1.00 unit/div.  
 :Math:DUAL:POSition?  
 1.0E+0  
 Returns the position as 1.00 unit/div.



**:MATH:DUAL:SCALE**

Description	Sets the vertical scale of the displayed math result.	
Syntax	:MATH:DUAL:SCALE {<NRf> ?}	
Parameter	<NRf>	Vertical scale Depends on the vertical scale
Return parameter	Returns the scale as <NR3>	

Example :MATH:DUAL:SCALE 2.0E-3  
 Sets the vertical scale to 2mV/2mA.  
 :MATH:DUAL:SCALE?  
 2.0E-3  
 Returns the unit/div scale (2mA).



**:MATH:FFT:SOURce**

Description	Sets and queries the FFT source.	
Syntax	:MATH:FFT:SOURce {CH1 CH2 CH3 CH4 REF1 REF2 REF3 REF4 ?}	
Parameter	CH1~4	Channel 1 to 4
	REF1~4	Reference waveform 1 to 4
Return parameter	Returns the FFT source.	

Example :MATH:FFT:SOURce CH1  
 Sets the FFT math source as channel 1.  
 :MATH:FFT:SOURce?  
 CH1  
 Return the FFT math source as channel 1.

Set →

→ Query

:MATH:FFT:MAG

Description Sets FFT vertical units as linear or decibels.

Syntax :MATH:FFT:MAG {LINEAR|DB|?}

Parameter	LINEAR	Linear units (Vrms)
	DB	Logarithmic units (dB)

Return parameter Returns the FFT vertical units.

Example :MATH:FFT:MAG DB  
 Sets FFT vertical units are dB.

Set →

→ Query

:MATH:FFT:WINDow

Description Sets the windowing filter used for the FFT function.

Syntax :MATH:FFT:WINDow {RECTangular|HAMming|HANning|BLAckman|?}

Parameter	RECTangular	Rectangular window
	HAMming	Hamming window
	HANning	Hanning window
	BLAckman	Blackman window

Return parameter Returns the FFT window.

Example :MATH:FFT:WINDow HAMming  
 Sets the FFT window filter to hamming.

**:MATH:FFT:POSition** 
 →  
 →

Description	Sets the vertical position of the displayed FFT result.	
Syntax	MATH:FFT:POSition { <NRf>   ? }	
Parameter	<NRf> -12e+0 - +12e+0	Vertical position -12 units/division to +12 units/division.
Return parameter	Returns the vertical position as <NR3>.	
Example	:MATH:FFT:POSition -2e-1 Sets the FFT position to -0.2 divisions.	

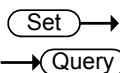
**:MATH:FFT:SCALE** 
 →  
 →

Description	Sets the vertical scale of the displayed FFT result.	
Syntax	:MATH:FFT:SCALE {<NRf> ?}	
Parameter	<NRf> 2e-3 ~ 1e+3 1e+0 ~ 2e+1	Vertical scale 2mV~1kV 1~20dB
Return parameter	Returns vertical scale as <NR3>.	
Example	:MATH:FFT:SCALE 1.0e+0 Sets the scale to 1dB.	

## Cursor Commands

:CURSor:MODE	36
:CURSor:SOURce	37
:CURSor:H1Position	37
:CURSor:H2Position	37
:CURSor:HDELta	38
:CURSor:V1Position	38
:CURSor:V2Position	38
:CURSor:VDELta	39
:CURSor:XY:RECTangular:X:POSition<x>	39
:CURSor:XY:RECTangular:X:DELta	39
:CURSor:XY:POLar:RADIUS:POSition<x>	40
:CURSor:XY:POLar:RADIUS:DELta	40
:CURSor:XY:POLar:THETA:POSition<x>	41
:CURSor:XY:POLar:THETA:DELta	41
:CURSor:XY:PRODuct:POSition<x>	41
:CURSor:XY:PRODuct:DELta	42
:CURSor:XY:RATio:POSition<x>	42
:CURSor:XY:RATio:DELta	42

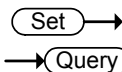
### :CURSor:MODE



Description	Sets cursor mode to horizontal (H) or horizontal and vertical (HV).	
Syntax	:CURSor:MODE {OFF   H   HV   ? }	
Parameter	OFF	Turns the cursors off.
	H	Turns the horizontal cursors on.
	HV	Turns horizontal and vertical cursors on.
Return parameter	HV	Horizontal and vertical cursors are on.
	H	Horizontal cursors are on.

Example :CURSor:MODE OFF  
Turns the cursors off.

:CURSor:SOURce



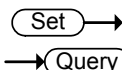
Description Sets or queries the cursor source.

Syntax :CURSor:SOURce {CH1 | CH2 | CH3 | CH4 | REF1 | REF2 | REF3 | REF4 | ?}

Parameter CH1~CH4 Channel 1 to 4  
REF1~4 Reference waveform 1 to 4

Return parameter Returns the cursor source.

Example :CURSor:SOURce CH1  
Turns the cursors source as channel 1.



:CURSor:H1Position

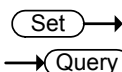
Description Sets the first horizontal cursor (H1) position.

Syntax :CURSor:H1Position {<NRf> | ?}

Parameter <NRf> Horizontal position

Return parameter Returns the cursor position.

Example :CURSor:H1Position?  
-1.34E-3  
Returns the H1 cursor position as -1.34ms.



:CURSor:H2Position

Description Sets the second horizontal cursor (H2) position.

Syntax :CURSor:H2Position {<NRf> | ?}

Parameter <NRf> Horizontal Position

Return parameter Returns the cursor position.

Example :CURSor:H2Position 1.5E-3  
Sets the H2 cursor position to 1.5ms.

:CURSor:HDELta → Query

Description Returns the delta of H1 and H2.

Syntax :CURSor:HDELta {?}

Return Parameter <NR3> Returns the distance between two horizontal cursors.

Example :CURSor:HDELta?  
5.0E-9  
Returns the horizontal delta as 5ns.

Set →

:CURSor:V1Position → Query

Description Sets the first vertical cursor (V1) position.

Syntax :CURSor:V1Position {<NRf> | ?}

Parameter <NRf> Position  
Depends on the vertical scale

Return parameter Returns the cursor position.

Example :CURSor:V1Position 1.6E -1  
Sets the V1 cursor position to 160mA.

Set →

:CURSor:V2Position → Query

Description Sets the first vertical cursor (V2) position.

Syntax :CURSor:V2Position {<NRf> | ?}

Parameter <NRf> Position  
Depends on the vertical scale

Return parameter Returns the cursor position.

Example :CURSor:V2Position 1.1E-1  
Sets the V2 cursor position to 110mA.

**:CURSor:VDELta** → **Query**

Description Returns the delta of V1 and V2.

Syntax :CURSor:VDELta {?}

Return Parameter <NR3> Returns the difference between two vertical cursors as <NR3>.

Example :CURSor:VDELta?  
4.00E+0  
Returns the vertical delta as 4 volts.

**:CURSor:XY:RECTangular:X:POSition<x>** → **Set** →  
→ **Query**

Description Sets or queries the horizontal position in XY mode for the x rectangular coordinates for cursor 1 or 2.

Syntax :CURSor:XY:RECTangular:X:POSition<x> {NRf?}

Parameter	<b>&lt;x&gt;</b>	Cursor	<b>&lt;NRf&gt;</b>	Position
	1, 2			Horizontal co-ordinates

Return parameter Returns the cursor position.

Example :CURSor:XY:RECTangular:X:POSition1 4.0E-3  
Sets the X-coordinate cursor 1 position to 40mV/mA.

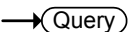
**:CURSor:XY:RECTangular:X:DELta** → **Query**

Description Returns the delta value of cursor 1 and 2 on the X coordinate.

Syntax :CURSor:XY:RECTangular:X:DELta {?}

Return Parameter	<code>&lt;NR3&gt;</code>	Returns the delta value of cursor 1 and 2 as <code>&lt;NR3&gt;</code> .
------------------	--------------------------	---

Example           :CURSor:XY:RECTangular:X:DELta?  
                   80.0E-3  
                   Returns the horizontal delta as 80mA.

`:CURSor:XY:POLar:RADIUS:POSITION<x>`      

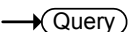
Description	Queries the polar radius in XY mode for the specified cursor, where X can be either 1 or 2.
-------------	---

Syntax	:CURSor:XY:POLar:RADIUS:POSITION <x>{?}
--------	---

Parameter	<code>&lt;x&gt;</code>	
	1, 2	X1, X2

Return parameter	Returns the product as <code>&lt;NR3&gt;</code> .
------------------	---

Example           :CURSor:XY:POLar:RADIUS:POSITION?  
                   80.0E-3  
                   Returns the polar radius as 80.0mV.

`:CURSor:XY:POLar:RADIUS:DELta`              

Description	Queries the difference between X and Y in XY mode for the specified cursor, where X can be either 1 or 2.
-------------	---

Syntax	:CURSor:XY:POLar:RADIUS:DELta {?}
--------	-----------------------------------

Return parameter	Returns the difference between the cursors X radius and the cursor Y radius as <code>&lt;NR3&gt;</code> .
------------------	---

Example           :CURSor:XY:POLar:RADIUS:DELta?  
                   31.4E-3  
                   Returns the radius as 31.4mV.



:CURSor:XY:POLar:THETA:POSition<x> → Query

Description Queries the theta in XY mode for the specified cursor, where X can be either 1 or 2.

Syntax :CURSor:XY:POLar:THETA:POSition<x> {?}

Parameter	<x>	Cursor
	1, 2	Cursor1, cursor2

Return parameter Returns the polar angle as <NR3>.

Example :CURSor:XY:POLAR:RADIUS:POSITION1?  
8.91E+1  
Returns the polar angle for cursor1 as 89.1°.

:CURSor:XY:POLar:THETA:DELta → Query

Description Queries the polar angle delta between cursor1 and cursor2.

Syntax :CURSor:XY:POLar:THETA:DELta {?}

Return parameter Returns the theta delta between cursor1 and cursor2 as <NR3>.

Example :CURSor:XY:POLar:THETA:DELta?  
9.10E+0  
Returns the delta as 9.1 degrees.

:CURSor:XY:PRODuct:POSition<x> → Query

Description Queries the product in XY mode for the specified cursor, where x can be either 1 or 2.

Syntax :CURSor:XY:PRODuct:POSition<x> {?}

Parameter	<x>	Cursor
	1, 2	Cursor1, Cursor2

Return parameter Returns the product value of the Cursor1 or Cursor2 as <NR3>.

Example :CURSor:XY:PRODuct:POSition1?  
 9.44E-5  
 Returns the product of cursor1 as 94.4u.

**CURSor:XY:PRODuct:DELta** → Query

Description Queries the product delta in XY mode.

Syntax :CURSor:XY:PRODuct:DELta {?}

Return parameter Returns the product delta as <NR3>.

Example :CURSor:XY:PRODuct:DELta?  
 1.22E-5  
 Returns the product delta as 12.2uVA.

**:CURSor:XY:RATio:POSition<x>** → Query

Description Queries the ratio in XY mode for the specified cursor, where x can be either 1 or 2.

Syntax :CURSor:XY:RATio:POSition<x> {?}

Parameter	<x>	Cursor
	1, 2	Cursor1, cursor2

Return parameter Returns the ratio as <NR3>.

Example :CURSor:XY:RATio:POSition?  
 6.717E+1  
 Returns the ratio value.

**:CURSor:XY:RATio:DELta** → Query

Description Queries the ratio delta in XY mode.

Syntax :CURSor:XY:RATio:DELta {?}

Return parameter Returns the ratio delta as <NR3> V/A| V/V|A/A

Example :CURSor:XY:RATio:DELta?  
5.39E+1  
Returns the ratio delta as 53.9.

## Display Commands

:DISPlay:INTensity:WAVEform.....	43
:DISPlay:INTensity:GRATICule.....	43
:DISPlay:PERsistence .....	44
:DISPlay:GRATICule .....	44
:DISPlay:WAVEform.....	45

:DISPlay:INTensity:WAVEform (Set) →  
→ (Query)

Description Sets or queries the waveform intensity level.

Syntax :DISPlay:INTensity:WAVEform {<NRF> | ?}

Parameter	<NRF>	Range
	0.0E+0~1.0E+2	0~100%

Return parameter Returns the intensity as <NR3>

Example :DISPlay:INTensity:WAVEform 5.0E+1  
Sets the waveform intensity to 50%.

:DISPlay:INTensity:GRATICule (Set) →  
→ (Query)

Description Sets or queries the graticule intensity level.

Syntax :DISPlay:INTensity:GRATICule {<NRF> | ?}

Parameter	<NRF>	Range
	1.0E+0~1.0E+2	10~100%

Return parameter Returns the intensity as <NR3>

Example :DISPlay:INTensity:GRATicule 5.0E+1  
Sets the graticule intensity to 50%.

Set →

:DISPlay:PERsistence

→ Query

Description Sets or queries the waveform persistence level.

Syntax :DISPlay:PERsistence {AUTO| INFINite |OFF|<NRf> | ?}

Parameter	<NRf>	Range
	1.0E-3~1.0E+1, 0.0E+0	100ms~10s, infinite, off

Return parameter Returns the persistence as {AUTO| INFINITE |OFF|<NR3>}

Example :DISPlay:PERsistence 2.0E+0  
Sets the persistence to 2 seconds.





Set →

:DISPlay:GRATicule



→ Query


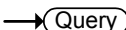
Description Sets or queries graticule display type.

Syntax :DISPlay:GRATicule {FULL | GRID|CROsSs | FRAMe | ?}

Parameter	FULL		CROsSs	
	FRAMe		GRID	

Return parameter Returns the graticule type.

Example :DISPlay:GRATicule FULL  
Sets the graticule to .  
:DISPlay:GRATicule?  
FULL  
 is the current graticule type.

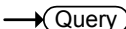
		
:DISPlay:WAVEform		
Description	Sets or queries whether the waveforms are drawn as vectors or dots.	
Syntax	:DISPlay:WAVEform {VECTor   DOT   ?}	
Parameter	VECTor	Vectors
	DOT	Dots
Return parameter	Returns VECT or DOT.	
Example	:DISPlay:WAVEform VECTor Sets the waveform to vectors.	

## Hardcopy Commands

:HARDcopy:START .....	45
:HARDcopy:MODE .....	45
:HARDcopy:PRINTINKSaver .....	46
:HARDcopy:SAVEINKSaver .....	46
:HARDcopy:SAVEFORMat .....	46

:HARDcopy:START 

Description	Hardcopy start is the equivalent of pressing the Print key on the front panel.
Syntax	:HARDcopy:START

:HARDcopy:MODE   


Description	Sets or queries whether hardcopy is set to print or save.	
Syntax	:HARDcopy:MODE {PRINT SAVE ?}	
Parameter	PRINT	Print mode
	SAVE	Save mode
Return parameter	Returns the mode .(PRINT/SAVE)	

Example :HARDcopy:MODE PRINT  
Sets hardcopy to print.

:HARDcopy:PRINTINKSaver (Set) →  
→ (Query)

Description Sets Inksaver On or Off for printing.

Syntax :HARDcopy:PRINTINKSaver {OFF|ON|?}

Parameter	ON	Inksaver ON	OFF	Inksaver OFF
-----------	----	-------------	-----	--------------

Return parameter Returns the print Inksaver mode .(ON/OFF)

Example :HARDcopy:PRINTINKSaver ON  
Sets Inksaver to ON for printing.

:HARDcopy:SAVEINKSaver (Set) →  
→ (Query)

Description Sets Inksaver On or Off for saving screen images.

Syntax :HARDcopy:SAVEINKSaver {OFF|ON|?}

Parameter	ON	Inksaver ON	OFF	Inksaver OFF
-----------	----	-------------	-----	--------------

Return parameter Returns the screen image Inksaver mode .(ON/OFF)

Example :HARDcopy:SAVEINKSaver ON  
Sets Inksaver to ON for saving screen images.

:HARDcopy:SAVEFORMat (Set) →  
→ (Query)

Description Sets or queries the image save file type.

Syntax :HARDcopy:SAVEFORMat {PNG|BMP|?}

Parameter	PNG	PNG file format	BMP	BMP file format
-----------	-----	-----------------	-----	-----------------

Return parameter Returns the image file format. (PNG/BMP)

Example :HARDcopy:SAVEFORMat PNG  
Sets the file format to PNG.

## Measure Commands

---

:MEASure:GATing.....	48
:MEASure:SOURce<x> .....	48
:MEASure:FALL.....	48
:MEASure:FOVShoot.....	49
:MEASure:FPReshoot .....	49
:MEASure:FREQuency .....	50
:MEASure:NWIDth .....	50
:MEASure:PDUTy.....	50
:MEASure:PERiod .....	51
:MEASure:PWIDth .....	51
:MEASure:RISe.....	52
:MEASure:ROVShoot.....	52
:MEASure:RPReshoot .....	52
:MEASure:AMPlitude.....	53
:MEASure:AVERAge .....	53
:MEASure:HIGH.....	54
:MEASure:LOW.....	54
:MEASure: MAX .....	55
:MEASure:MIN .....	55
:MEASure:PK2PK .....	55
:MEASure: RMS .....	56
:MEASure:FRRDelay .....	56
:MEASure:FRFDelay.....	57
:MEASure:FFRDelay.....	57
:MEASure:FFFDelay.....	58
:MEASure:LRRDelay .....	58
:MEASure:LRFDelay.....	59
:MEASure:LFRDelay.....	59
:MEASure:LFFDelay.....	60
:MEASure:PHAsE.....	60

---

:MEASure:GATing (Set) →  
→ (Query)

Description	Sets or queries the measurement gating.			
Syntax	:MEASure:GATing {OFF SCREEn CURSor ?}			
Parameter	OFF SCREEn	Full record Gating set to screen width	CURSor	Gating between cursors
Return parameter	Returns the gating. (OFF, SCREEN, CURSOR)			
Example	:MEASure:GATing OFF Turns gating off (full record).			

:MEASure:SOURce<x> (Set) →  
→ (Query)

Description	Sets or queries the measurement source for source1 or source2.			
Syntax	:MEASure:SOURce<x> {CH1 CH2 CH3 CH4?}			
Parameter	<x> 1,2	Source1 or source2	CH1~CH4	Channel 1 to 4
Return parameter	Returns the source (CH1, CH2, CH3,CH4)			
Example	:MEASure:SOURce1 CH1 Sets source1 to channel 1.			

:MEASure:FALL → (Query)

Description	Returns the fall time measurement result.		
Syntax	:MEASure:FALL{?}		
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:SOURce CH1 :MEASure:FALL? Selects Channel 1, and then measures the fall time.

### :MEASure:FOVShoot

Description	Returns the fall overshoot amplitude.
Syntax	:MEASure:FOVShoot{?}
Return parameter	Returns the fall overshoot as a percentage, <NR3>
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

Description	Returns fall preshoot amplitude.
Syntax	:MEASure:FPReshoot{?}
Returns	Returns the fall preshoot as <NR3>.
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{?}
Return parameter	Returns the frequency as <NR3>.
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{?}
Return parameter	Returns the negative pulse width as <NR3>
Note	Before using this command, select the measurement channel. See the example below.
Example	:MEASure:SOURce1 CH 1 :MEASure:NWIDth? 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{?}
Return parameter	<NR3>

Note	Before using this command, select the measurement channel. See the example below.
Example	:MEASure:SOURce1 CH 1 :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{?}
Return parameter	Returns the period as <NR3>
Note	Before using this command, select the measurement channel. See the example below.
Example	:MEASure:SOURce1 CH 1 :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{?}
Return parameter	Returns the first positive pulse width as <NR3>
Note	Before using this command, select the measurement channel. See the example below.
Example	:MEASure:SOURce1 CH 1 :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{?}
Return parameter	Returns the rise time as <NR3>
Note	Before using this command, select the measurement channel. See the example below.
Example	:MEASure:SOURce1 CH 1 :MEASure:RISe? 8.5E-6 Selects Channel 1, and then measures the rise time.

**:MEASure:ROVShoot** → Query

Description	Returns the rising overshoot over entire waveform in percentage.
Syntax	:MEASure:ROVShoot{?}
Return parameter	Returns the overshoot as <NR3>
Note	Before using this command, select the measurement channel. See the example below.
Example	:MEASure:SOURce1 CH 1 :MEASure:ROVShoot? 5.00E+00 Selects Channel 1, and then measures the rise overshoot.

**:MEASure:RPReshoot** → Query

Description	Returns rising preshoot over entire waveform in percentage.
Syntax	:MEASure:RPReshoot{?}

Return parameter	Returns the riser overshoot as <NR3>
Note	Before using this command, select the measurement channel. See the example below.
Example	:MEASure:SOURce1 CH 1 :MEASure:RPReshoot? 2.13E-2 Selects Channel 1, and then measures the rise preshoot.

### :MEASure:AMPLitude → Query

Description	Returns the amplitude difference between the Vhigh-Vlow.
Syntax	:MEASure:AMPLitude{?}
Return parameter	Returns the amplitude as <NR3>
Note	Before using this command, select the measurement channel. See the example below.
Example	:MEASure:SOURce1 CH 1 :MEASure:AMPLitude? 3.76E-3 Selects Channel 1, and then measures the amplitude.

### :MEASure:AVERage → Query

Description	Returns the average voltage/current of one or more fully period.
Syntax	:MEASure:AVERage{?}
Return parameter	Returns the average as <NR3>
Note	Before using this command, select the measurement channel. See the example below.

Example :MEASure:SOURce1 CH 1  
 :MEASure:AVERage?  
 1.82E-3  
 Selects Channel 1, and then measures the average value.

**:MEASure:HIGh** → Query

Description Returns the high voltage/current.

---

Syntax :MEASure:HIGh{?}

---

Return parameter Returns the high value as <NR3>

---

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

---

Example :MEASure:SOURce1 CH 1  
 :MEASure:HIGh?  
 3.68E-3  
 Selects Channel 1, and then measures the high voltage/current.

**:MEASure:LOW** → Query

Description Returns the low voltage/current.

---

Syntax :MEASure:LOW{?}

---

Return parameter Returns the global low value as <NR3>

---

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

---

Example :MEASure:SOURce1 CH 1      Selects Channel 1, and  
 :MEASure:LOW?                      then measures the low  
 1.00E-0                                  current.

**:MEASure:MAX**

→ Query

---

Description	Returns the maximum amplitude.
Syntax	:MEASure:MAX{?}
Return parameter	Returns the maximum amplitude as <NR3>
Note	Before using this command, select the measurement channel. See the example below.
Example	:MEASure:SOURce1 CH 1 :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{?}
Return parameter	Returns the minimum amplitude as <NR3>.
Note	Before using this command, select the measurement channel. See the example below.
Example	:MEASure:SOURce1 CH 1 :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{?}

Return parameter	Returns the voltage or current peak to peak measurement as <NR3>.
Note	Before using this command, select the measurement channel. See the example below.
Example	:MEASure:SOURce1 CH 1 :MEASure:PK2Pk? 2.04E-1 Selects Channel 1, and then measures the peak-to-peak amplitude as 204mA.

**:MEASure: RMS → Query**

Description	Returns the root-mean-square voltage/current.
Syntax	:MEASure:RMS{?}
Return parameter	Returns the RMS value as <NR3>.
Note	Before using this command, select the measurement channel. See the example below.
Example	:MEASure:SOURce1 CH 1 :MEASure:RMS? 1.31E-3 Selects Channel 1, and then measures the root mean square voltage.

**:MEASure:FRRDelay → Query**

Description	Returns the delay between the first rising edge of source1 and the first rising edge of source2.
Syntax	:MEASure:FRRDelay{?}
Return parameter	Returns the delay as <NR3>
Note	Select the two source channels before entering this command.



Example :MEASure:SOURce1 CH 1  
 :MEASure:SOURce2 CH 2  
 :MEASure:FRRDelay?  
 -4.68E-6  
 Select channel 1 and 2 as source1/2, and then measure FRR.

**:MEASure:FRFDelay** → Query

Description Returns the delay between the first rising edge of source1 and the first falling edge of source2.

Syntax :MEASure:FRFDelay{?}

Return parameter Returns the delay as <NR3>

Note Select the two source channels before entering this command.

Example :MEASure:SOURce1 CH 1  
 :MEASure:SOURce2 CH 2  
 :MEASure:FRFDelay?  
 3.43E-6  
 Select channel 1 and 2 as source1/2, and then measure FRF.

**:MEASure:FFRDelay** → Query

Description Returns the delay between the first falling edge of source1 and the first rising edge of source2.

Syntax :MEASure:FFRDelay {?}

Return parameter Returns the FFR delay as <NR3>

Note Select the two source channels before entering this command.

Example :MEASure:SOURce1 CH 1  
 :MEASure:SOURce2 CH 2  
 :MEASure:FRRDelay?  
 -8.56E-6  
 Select channel 1 and 2 as delay source1/2, and then measure FFR.

**:MEASure:FFFDelay** → Query

Description Returns the delay between the first falling edge of source1 and the first falling edge of source2.

Syntax :MEASure:FFFDelay{?}

Return parameter Returns the FFF delay as <NR3>

Note Select the two source channels before entering this command.

Example :MEASure:SOURce1 CH 1  
 :MEASure:SOURce2 CH 2  
 :MEASure:FFFDelay?  
 -8.89E-6  
 Select channel 1 and 2 as delay source1/2, and then measure FFF.

**:MEASure:LRRDelay** → Query

Description Returns the delay between the first rising edge of source1 and the last rising edge of source2.

Syntax :MEASure:LRRDelay{?}

Return parameter Returns the LRR delay as <NR3>

Note Select the two source channels before entering this command.

Example :MEASure:SOURce1 CH 1  
 :MEASure:SOURce2 CH 2  
 : MEASure:LRRDelay?  
 -8.89E-6  
 Select channel 1 and 2 as delay source1/2, and then measure LRR.

**:MEASure:LRFDelay** → Query

Description Returns the delay between the first rising edge of source1 and the last rising edge of source2.

Syntax :MEASure:LRFDelay{?}

Return parameter Returns the LRF delay as <NR3>

Note Select the two source channels before entering this command.

Example :MEASure:SOURce1 CH 1  
 :MEASure:SOURce2 CH 2  
 :MEASure:LRFDelay?  
 -4.99E-6  
 Select channel 1 and 2 as delay source1/2, and then measure LRF.

**:MEASure:LFRDelay** → Query

Description Returns the delay between the first falling edge of source1 and the last rising edge of source2.  
 Same as: Measure key → F1~F5 →Select delay measurement function by VARIABLE knob

Syntax :MEASure:LFRDelay{?}

Return parameter Returns the LFR delay as <NR3>

Note Select the two source channels before entering this command.

Example :MEASure:SOURce1 CH 1  
 :MEASure:SOURce2 CH 2  
 :MEASure:LFRDelay?  
 -9.99E-6  
 Select channel 1 and 2 as delay source1/2, and then measure LFR.

**:MEASure:LFFDelay** → Query

Description Returns the delay between the first falling edge of source1 and the last falling edge of source2.

Syntax :MEASure:LFFDelay{?}

Return parameter Returns the LFF delay as <NR3>

Note Select the two source channels before entering this command.

Example :MEASure:SOURce1 CH 1  
 :MEASure:SOURce2 CH 2  
 :MEASure:LFFDelay?  
 -9.99E-6  
 Select channel 1 and 2 as delay source1/2, and then measure LFF.

**:MEASure:PHase** → Query

Description Returns the phase between source 1 and source 2.

Syntax :MEASure:PHase{?}

Return parameter Returns the phase as <NR3>

Note Select the two source channels before entering this command.

Example           :MEASure:SOURce1 CH 1  
                   :MEASure:SOURce2 CH 2  
                   :MEASure:PHAsE?  
                   4.50E+01  
                   Select channel 1 and 2 as phase source1/2, and  
                   then measure the phase in degrees.

## Reference Commands

:REF<x>:DISPlay .....	61
:REF<x>:TIMebase:POSition .....	62
:REF<x>:TIMebase:SCALe .....	62
:REF<x>:OFFSet.....	63
:REF<x>:SCALE .....	63

:REF<x>:DISPlay 
 Set →  
 →  Query

Description       Sets or queries a reference waveform to be shown on the display.

Syntax            :REF<x>:DISPlay {OFF| ON| ?}

Parameter	<x>	Reference number
	1,2,3,4	REF1~REF4
	OFF	Turns the selected reference waveform off
	ON	Turns the selected reference waveform on

Return parameter Returns the status of the selected reference waveform. (OFF, ON)

Example           :REF1:DISPlay ON  
                   Turns on reference1 (REF 1) on the display.

:REF<x>:TIMEbase:POSition (Set) →  
→ (Query)

Description	Sets or returns the selected reference waveform time base position.		
Syntax	:REF<x>:TIMEbase:POSition { <NRf>   ?}		
Parameter	<x> 1,2,3,4	Reference waveform REF1~REF4	<NRf>  Horizontal coordinates
Return parameter	Returns the reference waveform position as <NR3>.		
Example	:REF1:TIMEbase:POSition -5.000E-5 Selects reference 1, and then sets the horizontal position to -50us.		

:REF<x>:TIMEbase:SCALE (Set) →  
→ (Query)

Description	Sets or returns the selected reference waveform time base scale.		
Syntax	:REF<x>:TIMEbase:SCALE { <NRf>   ?}		
Parameter	<x> 1,2,3,4	Reference waveform REF1~REF4	<NRf>  Horizontal scale
Return parameter	Returns the reference waveform scale as <NR3>.		
Example	:REF1:TIMEbase:SCALE 5.00E-4 Selects reference 1, and then sets the horizontal scale to 500us/div.		

**:REF<x>:OFFSet** 


Description	Sets or returns the selected reference waveform vertical position (offset).		
Syntax	:REF<x>:OFFSet { <NRf>   ?}		
Parameter	<x>	Reference waveform	<NRf>
	1,2,3,4	REF1~REF4	Vertical offset
Return parameter	Returns the reference waveform vertical position as <NR3>.		
Example	:REF1:OFFSet -5.000E-2 Selects reference 1, and then sets the vertical position to -50mV/mA.		

**:REF<x>:SCALE** 

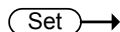
  


Description	Sets or returns the selected reference waveform vertical scale.		
Syntax	:REF<x>:SCALE { <NRf>   ?}		
Parameter	<x>	Reference waveform	<NRf>
	1,2,3,4	REF1~REF4	Vertical scale
Return parameter	Returns the reference waveform vertical scale as <NR3>.		
Example	:REF1:SCALE 5.000E-2 Selects reference 1, and then sets the vertical scale to 50mV   mA/div.		

## Run Command

---

:RUN



---

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



---

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

---

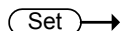
Syntax	:STOP
--------	-------

---

## Single Command

---

:SINGle



---

Description	The single command allows the oscilloscope to capture a single acquisition when trigger conditions have been fulfilled. (equivalent to pressing the Single key on the front panel).
-------------	---

---

Syntax	:SINGle
--------	---------

---



## Force Command

:FORCe

Set →

Description      The Force command forces an acquisition. (equivalent to pressing the Force key on the front panel).

Syntax             :FORCe

## Split Window Command

:WINDow:SOURce

Set →

→ Query

Description      Sets or queries which window is the active window in split screen mode.

Syntax             :WINDow:SOURce {WIN1| WIN2| WIN3| WIN4 | ?}

Parameter	WIN1	Sets window1 active
	WIN2	Sets window2 active
	WIN3	Sets window3 active
	WIN4	Sets window4 active

Return parameter Returns the active window for split-screen mode.

Example            :WINDow:SOURce WIN1  
Sets window1 as the active window.

## Timebase Commands

:TIMEbase:POSition .....	66
:TIMEbase:SCALE .....	66
:TIMEbase:MODE .....	66
:TIMEbase:WINDow:POSition .....	67
:TIMEbase:WINDow:SCALE .....	68

:TIMEbase:POSition (Set) →  
→ (Query)

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

:TIMEbase:SCALE (Set) →  
→ (Query)

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

:TIMEbase:MODE (Set) →  
→ (Query)

Description	Sets or queries the time base mode. The time base mode determines the display view window on the scope.
-------------	---

Syntax :TIMebase:MODE {MAIN | WINDow | SPLIT | XY | ?}

Parameter	MAIN	Sets the time base mode to main screen.
	WINDow	Sets the time base mode to zoom window.
	SPLIT	Sets the time base mode to split screen. The split windows opening numbers are depended on the channels turned on numbers.  For example, if CH1 & CH4 turned on, press the "SPLIT WINDOW" key will open two split windows; if CH1, CH2, CH4 turned on, four split windows will be appeared on the screen.
	XY	Sets the time base mode to XY display.

Return parameter Returns the time base mode (MAIN, WINDOW, SPLIT, XY)

Example :TIMebase:MODE SPLIT  
Sets the time base mode to split- screen mode.

:TIMebase:WINDow:POSition 


Description Sets or queries the zoom horizontal position.

Syntax :TIMebase:WINDow:POSition {<NR3> | ?}

Parameter <NR3> Horizontal position for zoom window

Return parameter Returns the zoom horizontal position as <NR3>

Example :TIMebase:WINDow:POSition 2.0E-3  
Sets the zoom horizontal position as 20ms.

Set →

→ Query

**:TIMebase:WINDow:SCALE**

Description	Sets or queries the zoom horizontal scale.	
Syntax	:TIMebase:WINDow:SCALE {<NR3>   ?}	
Parameter	<NR3>	Zoom horizontal scale
	The range will be changed which depends on the time base.	
Return parameter	Returns the zoom horizontal scale as <NR3>	
Example	:TIMebase:WINDow:SCALE 2.0E-3 Sets the zoom horizontal scale to 2ms.	

*Note: If the oscilloscope is under "ZOOM" mode, the main timebase function will be disable, can not modify anymore.*

## Trigger Commands

---

:TRIGger:FREQuency.....	70
:TRIGger:TYPe.....	70
:TRIGger:SOURce.....	70
:TRIGger:COUPle.....	71
:TRIGger:NREJ.....	71
:TRIGger:REJect.....	71
:TRIGger:MODE.....	72
:TRIGger:HOLDoff.....	72
:TRIGger:HLEVel.....	72
:TRIGger:LLEVel.....	73
:TRIGger:EDGE:SLOP.....	73
:TRIGger:DELaY:TYPe.....	73
:TRIGger:DELaY:TIME.....	74
:TRIGger:DELaY:EVENt.....	74
:TRIGger:DELaY:LEVel.....	74
:TRIGger:PULSEWidth:POLarity.....	75
:TRIGger:RUNT:POLarity.....	75
:TRIGger:RISEFall :SLOP.....	76
:TRIGger:VIDeo:TYPe.....	76
:TRIGger:VIDeo:FIELD.....	77
:TRIGger:VIDeo:LINE.....	77
:TRIGger:VIDeo:POLarity.....	77
:TRIGger:PULSE:WHEn.....	78
:TRIGger:PULSE:TIME.....	78
:TRIGger:ALTErnate.....	79
:TRIGger:LEVel.....	79

---

**:TRIGger:FREQuency** → Query

Description	Queries the trigger frequency.
Syntax	:TRIGger:FREQuency{?}
Return parameter	Returns the trigger frequency as <NR3>
Example	:TRIGger:FREQuency? 1.032E+3 Returns the trigger frequency.

Set →

**:TRIGger:TYPe** → Query

Description	Sets or queries the trigger type.												
Syntax	:TRIGger:TYPe {EDGE   DELay   PULSEWidth   VIDeo   RUNT   RISEFall   ?}												
Parameter	<table border="0"> <tr> <td>EDGE</td> <td>Edge trigger</td> </tr> <tr> <td>DELay</td> <td>Delay trigger</td> </tr> <tr> <td>PULSEWidth</td> <td>Pulse width trigger</td> </tr> <tr> <td>VIDeo</td> <td>Video trigger</td> </tr> <tr> <td>RUNT</td> <td>Runt trigger</td> </tr> <tr> <td>RISEFall</td> <td>Rise and fall trigger</td> </tr> </table>	EDGE	Edge trigger	DELay	Delay trigger	PULSEWidth	Pulse width trigger	VIDeo	Video trigger	RUNT	Runt trigger	RISEFall	Rise and fall trigger
EDGE	Edge trigger												
DELay	Delay trigger												
PULSEWidth	Pulse width trigger												
VIDeo	Video trigger												
RUNT	Runt trigger												
RISEFall	Rise and fall trigger												

Return parameter	Returns the trigger type.
Example	:TRIGger:TYPe EDGE Sets the trigger type to edge.

Set →

**:TRIGger:SOURce** → Query

Description	Sets or queries the trigger type.
Syntax	:TRIGger:SOURce {CH1   CH2   CH3   CH4   EXT   LINE   ?}
Parameter	CH1~CH4 Channel 1 to channel 4

EXT External source

LINE AC Line

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 | ?}

Parameter AC  
DC

Return parameter Returns the trigger coupling condition.

Example :TRIGger:COUple AC  
Sets the trigger coupling to AC.

Set →

→ Query

**:TRIGger:NREJ**

Description Sets or queries noise rejection on or off.

Syntax :TRIGger:NREJ {OFF| ON| ?}

Parameter OFF Turns noise rejection off  
ON Turns noise rejection on

Return parameter Returns the noise rejection status (ON, OFF).

Example :TRIGger:NREJ ON  
Turns noise rejection on.

Set →

→ Query

**:TRIGger:REject**

Description Sets or queries frequency rejection on or off.

Syntax :TRIGger:REject {OFF | HF | LF | ?}

Parameter	OFF	Frequency rejection off.
	HF	High frequency filter on
	LF	Low frequency filter on

Return parameter Returns the status of the frequency filter.

Example :TRIGger:REject OFF  
Turns the frequency filter off.

Set →

→ Query

### :TRIGger:MODE

Description Sets or queries the trigger mode.

Syntax :TRIGger:MODE {AUto | NORMal | ?}

Parameter	AUto	Auto trigger (Untriggered roll)
	NORMal	Normal trigger

Return parameter Returns the trigger mode.

Example :TRIGger:MODE NORMal  
Sets the trigger mode to normal.

Set →

→ Query

### :TRIGger:HOLDoff

Description Sets or queries the holdoff time.

Syntax :TRIGger:HOLDoff {<NRf> | ?}

Parameter <NRf> Holdoff time

Return parameter Returns the trigger holdoff time as <NR3>.

Example :TRIGger:HOLDoff 1.00E-8  
Sets the trigger holdoff time to 10ns.

Set →

→ Query

### :TRIGger:HLEVEL

Description Sets or queries the high trigger level (applicable for Rise and Fall/Pulse Runt trigger).



Syntax	:TRIGger:HLEVel {<NRf>   ?}
Parameter	<NRf> High level value
Return parameter	Returns the trigger high level as <NR3>.
Example	:TRIGger:HLEVel 3.30E-1 Sets the trigger high level to time to 330mV/mA.

Set →

→ Query

**:TRIGger:LLEVel**

Description	Sets or queries the low trigger level (applicable for Rise and Fall/Pulse Runt trigger).
Syntax	:TRIGger:LLEVel {<NRf>   ?}
Parameter	<NRf> Low level value
Return parameter	Returns the trigger low level as <NR3>.
Example	:TRIGger:LLEVel -3.30E-3 Sets the trigger low level to time to -330mV/mA.

Set →

→ Query

**:TRIGger:EDGE:SLOP**

Description	Sets or queries the trigger slope.
Syntax	:TRIGger:EDGE:SLOP {RISe   FALL   ?}
Parameter	RISe Rising slope FALL Falling slope
Return parameter	Returns the trigger slope.
Example	:TRIGger:EDGE:SLOP FALL Sets the trigger slope to falling.

Set →

→ Query

**:TRIGger:DELAy:TYPE**

Description	Sets or queries trigger delay type.
Syntax	:TRIGger:DELAy:TYPE {TIME   EVENT   ?}

Parameter	TIME	Sets the delay type to time.
	EVENT	Sets the delay type to event.

Return parameter Returns the trigger delay type.

Example :TRIGger:DElay:TYPe TIME  
Sets the delay type to time delay.

:TRIGger:DElay:TIME (Set) →  
→ (Query)

Description Sets or queries the delay time value.

Syntax :TRIGger:DElay:TIME {<NRf> | ?}

Parameter		Delay time
	<NRf>	1.00E-8~1.00E+1

Return parameter Returns the delay time as <NR3>.

Example :TRIGger:DElay:TIME 1.00E-6  
Sets the delay time to 1us.

:TRIGger:DElay:EVENT (Set) →  
→ (Query)

Description Sets or queries the number of events for the event delay trigger.

Syntax :TRIGger:DElay:EVENT {<NR1> | ?}

Parameter		Delay Event
	<NR1>	1~65535

Return parameter Returns the number of events as <NR1>.

Example :TRIGger:DElay:EVENT 2  
Sets the number of events to 2.

:TRIGger:DElay:LEVel (Set) →  
→ (Query)

Description Sets or queries the trigger delay level.

Syntax	:TRIGger:DELay:LEVel {<NRf>   ?}
Parameter	<NRf> Delay trigger level
Return parameter	Returns the delay trigger as <NR3>
Example	:TRIGger:DELay:LEVel 5.00E-3 Sets the delay trigger to 5mV/mA.

Set →  
 →  Query

---

**:TRIGger:PULSEWidth:POLarity**

Description	Sets or queries the pulse width trigger polarity.	
Syntax	:TRIGger:PULSEWidth:POLarity {POSitive   NEGative   ?}	
Parameter	POSitive	Positive polarity
	NEGative	Negative polarity
Return parameter	Returns the pulse width polarity.	
Example	:TRIGger:PULSEWidth:POLarity POSitive Sets the pulse width polarity to positive.	

Set →  
 →  Query

---

**:TRIGger:RUNT:POLarity**

Description	Sets or queries the Pulse Runt trigger polarity.	
Syntax	:TRIGger:RUNT:POLarity {POSitive   NEGative   EITher   ?}	
Parameter	POSitive	Positive polarity
	NEGative	Negative polarity
	EITher	Positive or negative polarity
Return parameter	Returns the pulse runt trigger polarity.	
Example	:TRIGger:RUNT:POLarity POSitive Sets the Pulse Runt trigger polarity to positive.	

:TRIGger:RISEFall :SLOP (Set) →  
→ (Query)

Description	Sets or queries the Rise & Fall slope.	
Syntax	:TRIGger:RISEFall :SLOP {RISe   FALL   EITHer   ?}	
Parameter	RISe	Rising slope
	FALL	Falling slope
	EITHer	Either rising or falling slope
Return parameter	Returns the rise & fall slope.	
Example	:TRIGger:RISEFall :SLOP RISe Sets the Rise & Fall slope to rising.	

: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   ?}	
Parameter	NTSC	NTSC
	PAL	PAL
	SECam	Secam
	EDTV480P	Enhanced definition 480P
	EDTV576P	Enhanced definition 576P
	HDTV720P	High definition 720P
	HDTV1080I	High definition 1080i
	HDTV1080P	High definition 1080p
Return parameter	Returns the video trigger type.	
Example	:TRIGger:VIDeo:TYPe NTSC Sets the video trigger to NTSC.	

**:TRIGger:VIDeo:FIELD** (Set) →  
→ (Query)

Description	Sets or queries the video trigger field.	
Syntax	:TRIGger:VIDeo:FIELD {FIELD1   FIELD2   ALLFields   ALLLines   ?}	
Parameter	FIELD1	Trigger on field 1
	FIELD2	Trigger on field 2
	ALLFields	Trigger on all fields
	ALLLines	Trigger on all lines
Return parameter	Returns the video trigger field.	
Example	:TRIGger:VIDeo:FIELD ALLFields Sets the video trigger to trigger on all field.	

**:TRIGger:VIDeo:LINE** (Set) →  
→ (Query)

Description	Sets or queries the video trigger line.	
Syntax	:TRIGger:VIDeo:LINE {<NR1>   ?}	
Parameter	<NR1>	Video line
Return parameter	Returns the video trigger line.	
Example	:TRIGger:VIDeo:LINE 1 Sets the video trigger to line 1.	

**:TRIGger:VIDeo:POLarity** (Set) →  
→ (Query)

Description	Sets or queries the video trigger polarity.	
Syntax	:TRIGger:VIDeo:POLarity {POSitive   NEGative   ?}	
Parameter	POSitive	Positive polarity
	NEGative	Negative polarity
Return parameter	Returns the video trigger polarity.	

Example :TRIGger:VIDeo:POLarity POSitive  
 Sets the video trigger polarity to positive.

Set →

:TRIGger:PULSe:WHEn

→ Query

Description Sets or queries the pulse width condition trigger settings.

Syntax :TRIGger:PULSe:WHEn {THAN | LESSthan | Equal | UNEQual | ?}

Parameter	THAN	>
	LESSthan	<
	Equal	=
	UNEQual	≠

Return parameter Returns the pulse width trigger conditions.

Example :TRIGger:PULSe:WHEn UNEQual  
 Sets the trigger pulse width conditions to not equal to.

Set →

:TRIGger:PULSe:TIME

→ Query

Description Sets or queries the pulse width time.

Syntax :TRIGger:PULSe:TIME {<NRf> | ?}

Parameter	<NRf>	Pulse width time
		4ns~10s

Return parameter Returns the pulse width time as <NR3>.

Example :TRIGger:PULSe:TIME 4.00E-5  
 Sets the trigger pulse width to 40.0us.

:TRIGger:ALternate 


Description	Sets alternating between source triggers on or off.	
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:LEVel 


Description	Sets or queries the trigger level.	
Syntax	:TRIGger:LEVel {<NRf>   ?}	
Parameter	<NRf>	Trigger level value
Return parameter	Returns the trigger level as <NR3>.	
Example	:TRIGger:LEVel 3.30E-3 Sets the trigger level to time to 330mV/mA. <i>Note: This command is equal to :TRIGger:HLEVel</i>	

## System Commands

:SYSTem:LOCK {OFF|ON|?} ..... 79

:SYSTem:LOCK {OFF|ON|?} 

  


Description	Turns the panel lock on off.	
Syntax	:SYSTem:LOCK {OFF ON ?}	

Parameter	OFF	System lock off
	ON	System lock on

Return parameter Returns the status of the panel lock (ON, OFF).

Example :SYSTem:LOCK ON  
Turns the panel lock on.

## Save/Recall Commands

:RECALL:SETUp .....	80
:RECALL:WAVEform W<n>,REF<x> .....	81
:SAVE:IMAGe .....	81
:SAVE:IMAGe:FILEFormat .....	82
:SAVE:IMAGe:INKSaver .....	82
:SAVE:SETUp .....	82
:SAVE:WAVEform .....	83
:SAVE:WAVEform:FILEFormat .....	84

:RECALL:SETUp 



Description	Recalls setup settings from memory or USB.	
Syntax	:RECALL:SETUp {S1~S20  <file path>("Disk:/xxx.SET", "USB:/xxx.SET")}	
Parameter	S1~S20	Recall Set1~Set20
	<file path>	Recall a file from the DSO internal files system or from a USB flash drive.

Example :RECALL:SETUp S1  
Recalls setup setting S1 from memory.  
:RECALL:SETUp "Disk:/DS0001.SET"  
Recall setup setting DS0001.SET from system internal disk.



:RECALL:WAVEform W<n>,REF<x> (Set) →  
→ (Query)

Description	Recalls a waveform from wave1~wave20 or from file to REF1~4.	
Syntax	:RECALL:WAVEform{W<n>   <file path> ("Disk:/xxx.LSF", "USB:/xxx.LSF")},REF<x>	
Parameter	n	1~20 (Wave1~wave20)
	xxx.LSF	Filename in file path.
	<x>	1,2,3,4 (REF1, REF2, REF3, REF4)
Example	:RECALL:WAVEform W1, REF1 Recalls the waveform stored in Wave1 to reference 1.	

*Note: All the .CSV format files can not be recalled by GDS-3000 series.*

:SAVE:IMAGe (Set) →  
→ (Query)

Description	Saves a screen image to the assigned file path with a specified filename.	
Syntax	:SAVE:IMAGe {<file path> ("Disk:/xxx.PNG", "USB:/xxx.BMP")}	
Parameter	xxx.PNG or BMP	File name (8 characters max)
Example	:SAVE:IMAGe "Disk:/pic1.PNG" Saves a screen image named pic1.png to root directory (Disk:/) of the scope. :SAVE:IMAGe "USB:/pic1.BMP" Saves a screen image named pic1.bmp to root directory of external USB flash disk.	

:SAVE:IMAGe:FILEFormat (Set) →  
→ (Query)

Description	Sets the file format for image.	
Syntax	:SAVE:IMAGe:FILEFormat {PNG   BMP   ?}	
Parameter	PNG	Sets the file format to PNG
	BMP	Sets the file format to BMP
Return parameter	Returns the file format (PNG, BMP).	
Example	:SAVE:IMAGe:FILEFormat PNG Sets the image file format to PNG.	

:SAVE:IMAGe:INKSaver (Set) →  
→ (Query)

Description	Turns Inksaver on or off.	
Syntax	:SAVE:IMAGe:INKSaver {OFF   ON  ?}	
Parameter	OFF	Turns Inksaver off.
	ON	Turns Inksaver on.
Return parameter	Returns Inksaver status (ON, OFF).	
Example	:SAVE:IMAGe:INKSaver ON Turns Inksaver on.	

:SAVE:SETUp (Set) →  
→ (Query)

Description	Saves the current setup to internal memory (Set1~Set20) or the designated file path.	
Syntax	:SAVE:SETUp {<file path> ("Disk:/xxx.SET", "USB:/xxx.SET")   S1~S20}	
Parameter	S1~S20	Saves the setup to Set1~Set20
	File path	Saves the setup to disk to the specified file path.

Example           :SAVe:SETUp S1  
 Saves the current setup to Set1 in internal memory.  
 :SAVe:SETUp "Disk:/DS0001.SET"  
 Saves the current setup to DS0001.SET in the external USB flash disk.

:SAVe:WAVEform 


Description	Saves a waveform to internal memory or to a designated file path.	
Syntax	:SAVe:WAVEform {CH1~REF4, REF<x> }   {CH1~REF4, W1~W20}   {CH1~ALL, file path}	
Parameter	CH1~REF4,	CH1~CH4, Math, REF1~4
	<x>	1,2,3,4 (REF1, REF2, REF3, REF4)
	W1~W20	Wave1~Wave20
	ALL	All the displayed waveforms on screen.
	File path	Saves the waveform(s) to disk to the specified file path.

Example :SAVe:WAVEform CH1, REF2  
 Saves the channel1 waveform to REF2.

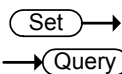
:SAVe:WAVEform ALL, "Disk:/ALL001"  
 Creates a folder which named "ALL001" and saves all displayed waveform to the "ALL001" directory with LSF format.

:SAVe:WAVEform ALL, "Disk:/ALL002.CSV"  
 Save the all channels waveform to root directory (Disk:/) of the internal flash disk with CSV format.

:SAVe:WAVEform CH2, "Disk:/DS0003.LSF"  
 Save the channel 2's waveform to root directory (Disk:/) of the internal flash disk with LSF format.

*Note: Only LSF file format can be recalled by GDS-3000 series, all the .CSV format files can not be recalled by GDS-3000 series.*

**:SAVe:WAVEform:FILEFormat**



Description	Sets the waveform savefile format.	
Syntax	:SAVe:WAVEform:FILEFormat {INTERNAL   SPREADSheet   ?}	
Parameter	INTERNAL	Sets the file format to GDS-3000's internal file format, LSF. (xxx.LSF)
	SPREADSheet	Sets the file format to CSV. (xxx.CSV)
Return parameter	Returns the file format (INTERNAL, INTERNAL).	
Example	:SAVe:WAVEform:FILEFormat INTERNAL. Sets the file format to LSF.	