Programming Manual

2510B Series
Handheld Digital Storage Oscilloscopes

BK PRECISION

Contents

About Commands & Queries

This section lists and describes the remote control commands and queries recognized by the instrument. All commands and queries can be executed in either local or remote state.

The description, command syntax, query syntax, example and respond can be found in a section. The commands are given in both long and short form. All examples are shown in short form. Queries perform actions such as obtaining information are recognized by the question mark (?) following the header.

1.1 How They are Listed

The commands are listed by subsystem and alphabetical order according to their short form.

1.2 How They are Described

In the descriptions themselves, a brief explanation of the function performed is given. This is followed by a presentation of the formal syntax, with the header given in Upper-and-Lower-Case characters and the short form derived from it in ALL UPPER-CASE characters. Where applicable, the syntax of the query is given with the format of its response.

1.3 When can they be used?

The commands and queries listed here can be used for 2510B Series Handheld Digital Storage Oscilloscope.

1.4 Command Notation

The following notation is used in the commands:

< > Angular brackets enclose words that are used as placeholders, of which there are two types: the header path
and the data parameter of a command.

:= A colon followed by an equals sign separates a placeholder from the description of the type and range of values that
may be used in a command instead of the placeholder.

{ } Braces enclose a list of choices, one of which one must be made.

[ ] Square brackets enclose optional items.

… An ellipsis indicates that the items both to its left and right may be repeated a number of times.

Common Command Introduction

The IEEE 488.2 standard defines the common commands used for querying the basic inSyntaxion of the instrument or executing basic operations. These commands usually start with "*" and the length of the keywords of the command is usually 3 characters.

Short	Long Form	Subsystem	What Command/Query does
*IDN?	*IDN?	SYSTEM	Returns a string that uniquely identifies the instrument.
*OPC	*OPC	SYSTEM	Generates the OPC message in the standard event status register when all pending overlapped operations have been completed.
*OPC?	*OPC?	SYSTEM	Returns an ASCII "+1" when all pending overlapped operations have been completed.
*RST	*RST	SYSTEM	Initiates a device reset.

Table 2.1 Common Commands

2.1 *IDN?

Description The *IDN? query causes the instrument to identify itself. The response comprises manufacturer, model, serial number, software version and firmware version.

Query Syntax *IDN?

Response Syntax *IDN, <device id>,<model>,<serial number>,<Uboot-OS version><software version>, <hardware version>.

<device id>:="BK" is used to identify instrument.

<model>:= A model identifier less than 14 characters will contain the model number.

<serial number>:= Each product has its own number, the serial number can labeled product uniqueness.

<Uboot-OS version>:= The Uboot-OS revision of the instument.

<software version>:= A serial numbers about software version.

Example *IDN?

Returns: BK Precision,2510B,XXXXXXXXXXXXXX,5.0.1.3.9R3

2.2 *OPC

Description The operation complete command causes the device to generate the operation complete message in the Standard Event Status Register, on completion of the selected device operation.
The operation complete query places an ASCII character 1 in the output queue on completion of the selected device operation.

Command Syntax *OPC

Query Syntax *OPC?

Ecample OUTP:STAT 1;*OPC

Response Syntax 1

2.3 *RST

Description The *RST command initiates a device reset. The *RST recalls the default setup equivalent to the **Default** key on the front panel..

Command Syntax *RST

Example *RST

Related Commands :RECall:FDEFault
:RECall:SETup
:SAVE:DEFault
:SAVE:SETup

Root(:) Commands

The Root commands are used to query the basic information of an instrument or performing common basic operations. These commands are only located at the root of the command tree, with no next level and no parameters.

3.1 AUToset

Description Automatically adjust the trigger, vertical, and horizontal controls of the oscilloscope to deliver a usable display of the input signal. Autoset is not recommended for use on low frequency events (< 100 Hz).

Command Syntax AUToset

Examlpe AUT

3.2 PRINt

Description Captures the screen and returns the data of the selected file.

Query Syntax :PRINT? <type>
<type>:= {BMP | PNG}

- **BMP**: Selects bitmap format
- **PNG**: Selects Portable Network Graphics format

Example PRIN? BMP
PRIN? PNG

Acquire Commands

The **ACQuire** subsystem commands control the way in which waveforms are acquired. These commands set the parameters for acquiring and storing data.

4.1 ACQuire:AMODe

Description Writes and reads the rate of waveform capture. This command can provide a high-speed
waveform capture rate to help capture signal anomalies.

Syntax ACQuire:AMODe <rate>
<rate>:= {FAST |SLOW}

- FAST selects fast waveform capture
- SLOW selects slow waveform capture

Query ACQuire:AMODe?

Example :ACQ:AMOD FAST
ACQ:AMOD?

Response Returns: FAST

4.2 ACQuire:CSWeep

Description Clears the sweep and restarts the acquisition. It is equivalent to the **Clear Sweeps** key on
the front panel.

Syntax ACQuire:CSWeep

Example ACQ:CSW

4.3 ACQuire:INTerpolation

Description Writes and reads the method of interpolation.

Syntax ACQuire:INTerpolation <state>
<state>:= {ON | OFF}

- ON selects sinx/x (sinc) interpolation
- OFF selects linear(x) interpolation

Query ACQuire:INTerpolation?

Example ACQ:INT ON
ACQ:INT?

Response Returns: ON

4.4 ACQuire:MODE

Description Writes and reads the acquisition mode of the oscilloscope.

Syntax ACQuire:MODE <mode_type>
<mode_type>:= {YT | XY | ROLL}

- YT mode plots amplitude (Y) vs. time (T)
- XY mode plots channel X vs. channel Y, commonly referred to as a Lissajous curve
- Roll mode plots amplitude (Y) vs. time (T) as in YT mode, but begins to write the waveforms from the right-hand side of the display. This is similar to a “strip chart” recording and is ideal for slow events that happen a few times/second.

Query ACQuire:MODE?

Example ACQ:MODE YT
ACQ:MODE?

Response Returns: YT

4.5 ACQuire:MDEPth

Description Write and read the maximum memory depth.

Syntax ACQuire:MDEPth <memory_size>
<memory_size Single Channel>:={20k | 200k | 2M | 20M | 200M}
<memory_size Dual Channel>:={10k | 100k | 1M | 10M | 100M}

- Single Channel Mode: Only one of C1/C2 is turned on, and only one of C3/C4 is turned on.
- Dual-Channel Mode: Both C1/C2 are turned on, or both C3/C4 are turned on.
- Turn on digital channels or set the acquisition type to AVERage/ERES or set the acquisition mode to ROLL, will limit the memory depth.

Query ACQuire:MDEPth?

Example ACQ:MDEP 200M
ACQ:MDEP?

Response Returns: 200M

Related Commands **ACQuire:MODE**
ACQuire:TYPE
DIGital

4.6 ACQuire:POINts

Description Returns the number of sampled points of the current waveform on the screen.

Query ACQuire:POINts?

Example ACQ:POIN?

Response Returns: <point>:= Value in NR3 format, including a decimal point and exponent.
1.25E+08

4.7 ACQuire:SEQuence

Description Write or read the sequence acquisition mode.

Syntax ACQuire:SEQuence <state>
<state>:= ON | OFF

Query ACQuire:SEQuence?

Example ACQ:SEQ ON
ACQ:SEQ?

Response Returns: ON

4.8 ACQuire:SEQuence:COUNt

Description Write or read the number of memory segments to acquire. The maximum number of segments may be limited by the memory depth of your oscilloscope.

Syntax :ACQuire:SEQuence:COUNt <count>
<count>:= Value in NR1 format, including an integer and no decimal point.

NOTICE The range of the value varies from the models and the current timebase, see the user manual for details.

Query ACQuire:SEQuence:COUNt?

Example ACQ:SEQ:COUN? 5
ACQ:SEQ:COUN?

Response <count_value>:= Value in NR1 format, including an integer and no decimal point.
Returns: 5

4.9 ACQuire:SRATe

Description Returns the current sampling rate.

Query ACQuire:SRATe?

Example ACQ:SRAT?

Response <sample_rate>:= Value in NR3 format, including a decimal point and exponent.
Returns: 1.23E+2.

4.10 ACQuire:TYPE

Description Write or read the type of data acquisition that is to take place.

Syntax :ACQuire:TYPE <type>
<type>:= {NORMal | PEAK | AVERage[,<times>] | ERES[,<bits>]}
<times>:= {4 |16 |32 |64 |128 |256 |512 |1024}
<bits>:= {0.5 | 1.0 | 1.5 | 2.0 | 2.5 |3.0}

- NORMal sets the oscilloscope to normal mode.
- PEAK sets the oscilloscope to peak detect mode.
- AVERage sets the oscilloscope acquisition to averaging mode. You can set the number of
  averages by sending the command followed by a numeric integer value <times>.
- ERES sets the oscilloscope to the enhanced resolution mode. This is essentially a digital
  boxcar filter and is used to reduce noise at slower sweep speeds. You can set the enhanced
  bits by sending the command followed by the <bits>

NOTICE The AVERage | ERES type is not available when in sequence mode (**ACQuire:SEQuence ON**).

Query ACQuire:TYPE?

Example ACQuire:TYPE AVER,16
ACQ:TYPE?

Response Returns: AVERage,16

Channel Commands

The **CHANnel<n>** subsystem commands control the analog channels. Channels are independently programmable for offset, probe, coupling, bandwidth limit, inversion, and more functions. The channel index (1, 2, 3, or 4) specified in the command selects the analog channel that is affected by the command.

5.1 CHANnel<n>:BWLimit

Description Write or read the state of the bandwidth-limiting low-pass filter. If the bandwidth filter is on, it will filter the signal to reduce noise and other unwanted high frequency components. When the filter is on, the bandwidth of the specified channel is limited to approximately 20 MHz or 200 MHz.

Syntax CHANnel<n>:BWLimit <bwlimit>
<n>:= 1 to 4 in NR1 format, including an integer and no decimal point.
<bwlimit>:= {FULL | 20M | 200M}

- FULL sets the oscilloscope bandwidth to full.
- 20M enables the 20 MHz bandwidth filter.
- 200M enables the 200 MHz bandwidth filter.

Query CHANnel<n>:BWLimit?

Example CHAN1:BWL 20M
CHAN1:BWL?

Response Returns: 20M

5.2 CHANnel<n>:COUPling

Description Write or read the coupling mode of the specified input channel.

Syntax CHANnel<n>:COUPling <coupling_mode>
<n>:= 1 to 4 in NR1 format, including an integer and no decimal point.
<coupling_mode>:= {DC | AC | GND}

- DC sets the channel coupling to DC.
- AC sets the channel coupling to AC.
- GND sets the channel coupling to Ground.

Query CHANnel<n>:COUPling?

Example CHAN1:COUP AC
CHAN1:COUP?

Response Returns: AC

5.3 CHANnel<n>:IMPedance

Description Write or read the input impedance of the selected channel. There are two impedance values
available, 1 MOhm and 50.

Syntax CHANnel<n>:IMPedance <impedance>
<n>:= 1 to 4 in NR1 format, including an integer and no decimal point.
<impedance>:= {ONEMeg | FIFTy}

- ONEMeg means 1 Mohm.
- FIFTy means 50 ohm.

NOTICE When set to FIFTy, the range of legal values set by the CHAN<n>:SCAL commands is limited to less than 1 V.

Query CHANnel<n>:IMPedance?

Example CHAN2:IMP ONEM
CHAN2:IMP?

Response Returns: ONEMeg

5.4 CHANnel<n>:INVert

Description Write or read the state of the mathematical invert for the specified channel. This is a mathematical operation and does not change the polarity of the input signal with reference to ground.

Syntax :CHANnel<n>:INVert <state>
<n>:= 1 to 4 in NR1 format, including an integer and no decimal point.
<state>:= {ON | OFF}

- ON enables channel inversion.
- Off disables channel inversion.

Query CHANnel<n>:INVert?

Example CHAN2:INV ON
CHAN2:INV?

Response Returns: ON

5.5 CHANnel<n>:LABel

Description Write or read the state of the specified channel label.

Syntax CHANnel<n>:LABel <state>
<n>:= 1 to 4 in NR1 format, including an integer and no decimal point.
<state>:= {ON | OFF}

- ON enables the channel label.
- OFF disables the channel label.

Query CHANnel<n>:LABel?

Example CHAN1:LAB ON
CHAN1:LAB?

Response Returns: ON

5.6 CHANnel<n>:LABel:TEXT

Description Write or the selected channel's label. Setting a label for a channel also adds the name to the label list in non-volatile memory (replacing the oldest label in the list

Syntax CHANnel<n>:LABel:TEXT <qstring>
<n>:= 1 to 4 in NR1 format, including an integer and no decimal point.
<qstring>:= Quoted string of ASCII text. The length of the string is limited to 20.

NOTICE All characters will be automatically converted to uppercase.

Query CHANnel<n>:LABel:TEXT?

Example CHAN2:LAB:TEXT "VIN"
CHAN2:LAB:TEXT?

Response Returns: VIN

Related **CHANnel<n>:LABel**

5.7 CHANnel<n>:OFFSet

Description Write or read the vertical offset of the specified input channel. The maximum ranges depend on the fixed sensitivity setting.

Syntax CHANnel<n>:OFFSet <offset_value>
<n>:= 1 to 4 in NR1 format, including an integer and no decimal point, like 1.
<offset_value>:= Value in NR3 format, including a decimal point and exponent.

NOTICE The range of legal values varies with the value set by the **CHANnel<n>:SCALe** commands.

Query CHANnel<n>:OFFSet?

Example CHAN1:OFFS -3.8E+00
CHAN1:OFFS?

Response Returns: -3.8E+00

Related Commnads **CHANnel<n>:SCALe**

5.8 CHANnel<n>:PROBe

Description Write or read the probe attenuation factor for the selected channel. This command does not change the actual input sensitivity of the oscilloscope. It changes the reference constants for scaling the display factors, for making automatic measurements, and for setting trigger levels.

Syntax CHANnel<n>:PROBe <attenuation>[,<value>]
<n>:= 1 to 4 in NR1 format, including an integer and no decimal point.
<attenuation>:= {DEFault | VALue}

- DEFault means set to the default value 1X.
- VALue means set to the <value>.

<value>:= Probe attenuation ratio in NR3 format when <attenuation> is VALue, and the range is [1E-6, 1E6].

Query CHANnel<n>:PROBe?

Example CHAN1:PROB VAL,1.00E+02
CHAN1:PROB?

Response Returns: 1.00E+02

Related **CHANnel<n>:SCALe**
CHANnel<n>:OFFSet

5.9 CHANnel<n>:SCALe

Description Write or read the vertical sensitivity in Volts/div. If the probe attenuation is changed, the scale value is multiplied by the probe's attenuation factor.

Syntax CHANnel<n>:SCALe <scale>
<n>:= 1 to 4 in NR1 format, including an integer and no decimal point.
<scale>:= Value in NR3 format, including a decimal point and exponent.

NOTICE The range of value varies from the models and the bandwidth of the model. See the data sheet for details.

Query CHANnel<n>:SCALe?

Example CHAN1:SCAL 5.00E-02
CHAN1:SCAL?

Response Returns: 5.00E-02
5.00E-01 (when the probe attenuation ratio is 10:1)

Related **CHANnel<n>:PROBe**

5.10 CHANnel<n>:SKEW

Description Write or read the channel-to-channel skew factor for the specified channel

Syntax CHANnel<n>:SKEW <skew_value>
<n>:= 1 to 4 in NR1 format, including an integer and no decimal point.
<skew_value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-1.00E-07, 1.00E-07].

Query CHANnel<n>:SKEW?

Example CHAN1:SKEW 1.52E-09 CHAN1:SKEW?

Response Returns: 1.52E-09

5.11 CHANnel<n>:SWITch

Description Write or read the display state of the specified channel.

Syntax CHANnel<n>:SWITch <state>
<n>:= 1 to 4 in NR1 format, including an integer and no decimal point.
<state>:= {OFF | ON}

Query CHANnel<n>:SWITch?

Example CHAN1:SWIT ON
CHAN1:SWIT?

Response Returns: ON

5.12 CHANnel<n>:UNIT

Description Write or read the unit of input signal of specified channel. There is voltage (V) and current (A) two choice to choose for each channel.

Syntax CHANnel<n>:UNIT <unit>
<n>:= 1 to 4 in NR1 format, including an integer and no decimal point.
<unit>:= {V | A}

NOTICE The related parameter units are changed to the selected unit after processing this command. This also affects measurement results, cursors value, channel sensitivity, and trigger level.

Query CHANnel<n>:UNIT?

Example CHAN1:UNIT A
CHAN1:UNIT?

Response Returns: A

5.13 CHANnel<n>:VISible

Description Write or read the display state of the waveform of the specified channel or not. Different from the command **CHANnel<n>:SWITch**, it sets the state on the display, and the latter sets the physical switch.

Syntax CHANnel<n>:VISible <display_state>
<n>:= 1 to 4 in NR1 format, including an integer and no decimal point.
<display_state>:= {ON | OFF}

Query CHANnel<n>:VISible?

Example CHAN2:VIS ON
CHAN2:VIS?

Response Returns: ON

Cursor Commands

The **CURSor** subsystem commands control the cursor measurement function.

6.1 CURSor

Description Write or read the state of the cursor function.

Syntax CURSor <state> <state>:= {ON | OFF}

Query CURSor?

Example
CURS ON
CURS?

Response Returns: ON

6.2 CURSor:TAGStyle

Description Write or read the tag type of the cursor value.

Syntax
CURSor:TAGStyle <type>
<type>:= {FIXed | FOLLowing}

Query CURSor:TAGStyle?

Example
CURS:TAGS FOLL
CURS:TAGS?

Response Returns: FOLLowing

6.3 CURSor:IXDelta

Description Returns the current value of cursor $1/(X1 - X2)$

Query CURSor:IXDelta?

Example CURS:IXD?

Response Returns: 5.7143E+00

Related
CURSor:X1
CURSor:X2
CURSor:XDELta

6.4 CURSor:MODE

Description Write or read the cursor mode, and the type of cursor to be displayed in manual mode.

Syntax CURSor:MODE <type>
<type>:= {TRACk | MANual[,<mode>]}
<mode>:= {X | Y | Y}

- MANul means the manual cursors
- TRACk means the track cursors

Query CURSor:MODE?

Example CURS:MODE MAN,X
CURS:MODE?

Response Returns: MANual,X

6.5 CURSor:SOURce1

Description Write or read the source of the cursor source 1.

Syntax CURSor:SOURce1 <source>
<source>:={C<x> | F<x> | REFA | REFB | REFC | REFD | DIGital | HISTOGram}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

NOTICE When the cursor mode is a TRACk, the source cannot be set to HISTOGram or DIGita.

Query CURSor:SOURce1?

Example CURS:SOUR1 C1
CURS:SOUR?

Response Returns: C1

Related **CURSor:SOURce2**

6.6 CURSor:SOURce2

Description Write or read the source of the cursor source 2.

Syntax CURSor:SOURce2 <source>
<source>:={C<x> | F<x> | REFA | REFB | REFC | REFD | DIGital | HISTOGram}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

NOTICE When the cursor mode is a TRACk, the source cannot be set to HISTOGram or DIGita.

Query CURSor:SOURce2?

Example CURS:SOUR2 C1
CURS:SOUR2?

Response Returns: C1

Related **CURSor:SOURce2**

6.7 CURSor:X1

Description Write or read the position of the cursor X1.

Syntax :CURSor:X1 <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-horizontal_grid/2*timebase, horizontal_grid/2*timebase].

Query CURSor:X1?

Example CURS:X1 1.00E-06
CURS:X1?

Response Returns: 1.00E-06

Related **CURSor:X2**
CURSor:XDELta
CURSor:IXDelta

6.8 CURSor:X2

Description Write or read the position of the cursor X2.

Syntax :CURSor:X2 <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-horizontal_grid/2*timebase, horizontal_grid/2*timebase].

Query CURSor:X2?

Example CURS:X2 1.00E-06
CURS:X2?

Response Returns: 1.00E-06

Related **CURSor:X2**
CURSor:XDELta
CURSor:IXDelta

6.9 CURSor:XDELta

Description Returns the horizontal difference between cursor X1 and cursor X2.

Query CURSor:XDELta?

Example CURS:XDEL?

Response Returns: 1.750E-01

Related **CURSor:X1**
CURSor:X2
CURSor:IXDelta

6.10 CURSor:XREFerence

Description Write or read the expansion strategy around the cursor X.

Syntax CURSor:XREFerence <type>
<type>:= {DELay | POSition}

- DELay means that the cursor value is fixed, and the on-screen cursor position changes for different timebase values.
- POSition means that the cursor position is fixed, and does not change at any time. Timebase changes cause an expansion or contraction of the waveforms around the cursor position.

Query CURSor:XREFerence?

Example CURS:XREF DEL
CURS:XREF?

Response Returns: DELay

6.11 CURSor:Y1

Description Write or read the the position of the cursor Y1.

Syntax CURSor:Y1 <value>
<value>:= Value in NR3 format, including a decimal point and exponent.The range of the value is [-vertical_grid/2*vertical_scale, vertical_grid/2*vertical_scale].

Query CURSor:Y1?

Example CURS:Y1 1.20E+01
CURS:Y1

Response Returns: 1.20E+01

Related **CURSor:Y2**
CURSor:YDELta

6.12 CURSor:Y2

Description Write or read the position of the cursor Y2.

Syntax CURSor:Y2 <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-vertical_grid/2*vertical_scale, vertical_grid/2*vertical_scale]

Query CURSor:Y2?

Example CURS:Y2 1.00E+01
CURS:Y2?

Response Returns: 1.00E+01

Related **CURSor:Y1**
CURSor:YDELta

6.13 CURSor:YDELta

Description Returns the vertical difference between the cursor Y1 and cursor Y2.

Query CURSor:YDELta?

Example CURS:YDEL?

Response Returns: -1.390E+00

Related **CURSor:Y1**
CURSor:Y2

6.14 CURSor:YREFerence

Description Write or read the expansion strategy of the Y cursor.

Syntax CURSor:YREFerence <type>
<type>:= {OFFSet | POSition}

- OFFSet means that the cursor value is fixed, and the cursor position moves with vertical scale changes. The cursors expand or contract if the vertical scale changes.
- POSition means that the cursor position is fixed, and does not change at any time.

Query CURSor:YREFerence?

Example CURS:YREF OFFS
CURS:YREF?

Response Returns: OFFSet

Decode Commands

The **DECode** subsystem commands control the basic decode functions of the oscilloscope.

7.1 DECode

Description Write or read the state of the decode function.

Syntax DECode <state>
<state>:= {ON | OFF}

Query DECode?

Example DEC ON
DEC?

Response Returns: ON

7.2 DECode:LIST

Description Write or read the list decode result state.

Syntax DECode:LIST <state>
<state>:= {OFF | D1 |D2}

- D1 means bus 1
- D2 means bus 2

Query DECode:LIST?

Example DEC:LIST D1 DEC:LIST?

Response Returns: D1

7.3 DECode:LIST:LINE

Description Write or read the number of lines displayed in the decoding list on the screen.

Syntax DECode:LIST:LINE <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of value is [1, 7].

Query DECode:LIST:LINE?

Example DEC:LIST:LINE 6
DEC:LIST:LINE?

Response Returns: 6

7.4 DECode:LIST:SCRoll

Description Write or read the selected line when the decode list is turned on.

Syntax DECode:LIST:SCRoll <value>
<value>:= Value in NR1 format, including an integer and no decimal point.

Query DECode:LIST:SCRoll?

Example DEC:LIST:SCR 3
DEC:LIST:SCR?

Response Returns: 3

Related **DECode:LIST**
DECode:LIST:LINE

7.5 DECode:BUS<n>

Description Write or read the status of the decode bus operation.

Syntax DECode:BUS<n> <state>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<state>:= ON | OFF.

Query DECode:BUS<n>?

Example DEC:BUS1 ON
DEC:BUS1?

Response Returns: ON

7.6 DECode:BUS<n>:COPY

Description The command synchronizes the decoding settings with the trigger settings.

Syntax DECode:BUS<n>:COPY <operation>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<operation>:= {FROMtrigger | TOTRigger}.

- FROMtrigger means copy trigger settings to the decoding bus.
- TOTRigger means copy decoding settings to trigger.

Example DEC:BUS1:COPY FROM

7.7 DECode:BUS<n>:FORMat

Description Write or read the display format of the specified decode bus.

Syntax DECode:BUS<n>:FORMat <format>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<format>:= {BINary | DECimal | HEX | ASCii}

Query DECode:BUS<n>:FORMat?

Example DEC:BUS1:FORM ASCii
DEC:BUS1:FORM?

Response Returns: ASCii

7.8 DECode:BUS<n>:PROTocol

Description Write or read the protocol of the specified bus.

Syntax DECode:BUS<n>:PROTocol <protocol> <n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<protocol>:= {IIC| SPI |UART | CAN | LIN | FLEXray | CANFd | IIS | M1553}

Query DECode:BUS<n>:PROTocol?

Example DEC:BUS1:PROT IIC
DEC:BUS1:PROT?

Response Returns: IIC

IIC Commands

The :DECode:BUS<n>:IIC subsystem commands control the IIC decode settings of the specified bus.

8.1 DECode:BUS<n>:IIC:RWBit

Description Write or read the decoding result, which includes the read bit and the write bit.

Syntax DECode:BUS<n>:IIC:RWBit <state>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<state>:= {ON | OFF}

Query DECode:BUS<n>:IIC:RWBit?

Example DEC:BUS1:IIC:RWB ON
DEC:BUS1:IIC:RWB?

Response Returns: ON

8.2 DECode:BUS<n>:IIC:SCLSource

Description Returns the current SCL source of the IIC bus.

Syntax DECode:BUS<n>:IIC:SCLSource <source>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<source>:= {C<x> | D<m>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<m>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

Query DECode:BUS<n>:IIC:SCLSource?

Example DEC:BUS1:IIC:SCLS C1
DEC:BUS1:IIC:SCLS?

Response Returns: C1

Related **DECode:BUS<n>:IIC:SCLThreshold**
DECode:BUS<n>:IIC:SDASource

8.3 DECode:BUS<n>:IIC:SCLThreshold

Description Write or read the threshold of the SCL on IIC bus.

Syntax DECode:BUS<n>:IIC:SCLThreshold <value>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<value>:= Value in NR3 format, including a decimal point and exponent. The range is from
[-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset]

Query DECode:BUS<n>:IIC:SCLThreshold?

Example DEC:BUS1:IIC:SCLT 1.00E+00
DEC:BUS1:IIC:SCLT?

Response Returns: 1.00E+00

Related **DECode:BUS<n>:IIC:SCLSource**

8.4 DECode:BUS<n>:IIC:SDASource

Description Write or read the SDA source of the IIC bus.

Syntax DECode:BUS<n>:IIC:SDASource <source>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command. <source>:= {C<x> | D<m>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<m>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

Query DECode:BUS<n>:IIC:SDASource?

Example DEC:BUS1:IIC:SDAS C1
DEC:BUS1:IIC:SDAS?

Response C1 Returns:

Related **DECode:BUS<n>:IIC:SDAThreshold**
DECode:BUS<n>:IIC:SCLSource

8.5 DECode:BUS<n>:IIC:SDAThreshold

Description Write or read the threshold of the SDA on IIC bus.

Syntax DECode:BUS<n>:IIC:SDAThreshold <value>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset]

Query DECode:BUS<n>:IIC:SDAThreshold?

Example DEC:BUS1:IIC:SDAT 1.00E+00
DEC:BUS1:IIC:SDAT?

Response Returns: 1.00E+00

Related **DECode:BUS<n>:IIC:SDASource**

SPI Commands

The :DECode:BUS<n>:SPI subsystem commands control the SPI decode settings of the specified bus.

9.1 DECode:BUS<n>:SPI:BITorder

Description Write or read the bit order of the SPI bus.

Syntax DECode:BUS<n>:SPI:BITorder <order>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<order>:= {LSB | MSB}.

Query DECode:BUS<n>:SPI:BITorder?

Example DEC:BUS1:SPI:BIT LSB
DEC:BUS1:SPI:BIT?

Response Returns: LSB

9.2 DECode:BUS<n>:SPI:CLKSource

Description Write or read the CLK source of the SPI bus.

Syntax DECode:BUS<n>:SPI:CLKSource <source>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<source>:= {C<x> |D<m>}. <x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<m>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

Query DECode:BUS<n>:SPI:CLKSource?

Example DEC:BUS1:SPI:CLKS C1
DEC:BUS1:SPI:CLKS

Response Returns: C1

Related Command **DECode:BUS<n>:SPI:CLKThreshold**

9.3 DECode:BUS<n>:SPI:CLKThreshold

Description Write or read the threshold of the CLK on SPI bus.

Syntax :DECode:BUS<n>:SPI:CLKThreshold <value>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query DECode:BUS<n>:IIC:CLKThreshold?

Example DEC:BUS1:SPI:CLKT 1.00E+00
DEC:BUS1:SPI:CLKT?

Response Returns: 1.00E+00

Related **DECode:BUS<n>:SPI:CLKSource**

9.4 DECode:BUS<n>:SPI:CSSource

Description Write or read the CS source of the SPI bus.

Syntax DECode:BUS<n>:SPI:CSSource <source>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<source>:= {C<x> | D<m>}.
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<m>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

Query DECode:BUS<n>:SPI:CSSource?

Example DEC:BUS1:SPI:CSS C1
DEC:BUS1:SPI:CSS?

Response Returns: C1

Related **DECode:BUS<n>:SPI:CSThreshold**

9.5 DECode:BUS<n>:SPI:CSThreshold

Description Write or read the threshold of the CS on SPI bus.

Syntax DECode:BUS<n>:SPI:CSThreshold <value>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query DECode:BUS<n>:SPI:CSThreshold?

Example DEC:BUS1:SPI:CST 1.00E+00
DEC:BUS1:SPI:CST?

Response Returns: 1.00E+00

Related **DECode:BUS<n>:SPI:CLKSource**

9.6 DECode:BUS<n>:SPI:CSTYpe

Description Write or read the chip selection type of the SPI bus.

Syntax DECode:BUS<n>:SPI:CSTYpe <type>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<type>:= {NCS | CS | TIMeout[,<time>]}

- CS means set to chip select state (Active High).
- NCS means set to non-chip select state (Active Low).
- TIMeout indicates set to clock timeout status (CLK Timeout).

<time>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [1.00E-07, 5.00E-03].

Query DECode:BUS<n>:SPI:CSTYpe?

Example DEC:BUS1:SPI:CSTY CS
DEC:BUS1:SPI:CSTY?

Response Returns: CS

9.7 DECode:BUS<n>:SPI:DLENgth

Description Write or read the data length of the SPI bus.

Syntax DECode:BUS<n>:SPI:DLENgth <value>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [4, 32].

Query DECode:BUS<n>:SPI:DLENgth?

Example DEC:BUS1:SPI:DLEN 5
DEC:BUS1:SPI:DLEN?

Response Returns: 5

9.8 DECode:BUS<n>:SPI:LATChedge

Description Write or read the sampling edge of CLK on SPI bus.

Syntax DECode:BUS<n>:SPI:LATChedge <slope>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<slope>:= {RISing | FALLing}

Query DECode:BUS<n>:SPI:LATChedge?

Example DEC:BUS1:SPI:LATC RIS
DEC:BUS1:SPI:LATC?

Response Returns: RISing

9.9 DECode:BUS<n>:SPI:MISOSource

Description Write or read the MISO source of the SPI bus.

Syntax DECode:BUS<n>:SPI:MISOSource <source>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<source>:= {C<x> | D<m> | DIS} <x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point. For example, C1 selects analog channel 1.
<m>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point. For example, D1 selects digital channel 1.

- DIS means no source selected.

Query DECode:BUS<n>:SPI:MISOSource?

Example DEC:BUS1:SPI:MISOS C1
DEC:BUS1:SPI:MISOS?

Response Returns: C1

Related Commnads **DECode:BUS<n>:SPI:MISOThreshold**

9.10 DECode:BUS<n>:SPI:MISOThreshold

Description Write or read the threshold of the MISO on SPI bus

Syntax DECode:BUS<n>:SPI:MISOThreshold <value>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<value>:= Value in NR3 format, including a decimal point and exponent. The range for this value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query DECode:BUS<n>:SPI:MISOThreshold?

Example DEC:BUS1:SPI:MISOT 1.00E+00
DEC:BUS1:SPI:MISOT?

Response Returns: 1.00E+00

Related RELATED COMMANDS :DECode:BUS<n>:SPI:MISOSource

9.11 DECode:BUS<n>:SPI:MOSISource

Description Write or read the MOSI source of the SPI bus.

Syntax DECode:BUS<n>:SPI:MOSISource <source>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<source>:= {C<x> | D<m> | DIS} <x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<m>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

- DIS means no source selected

Query DECode:BUS<n>:SPI:MOSISource?

Example DEC:BUS1:SPI:MOSIS C1
DEC:BUS1:SPI:MOSIS?

Response Returns: C1

Related **DECode:BUS<n>:SPI:MOSIThreshold**

9.12 DECode:BUS<n>:SPI:MOSIThreshold

Description Write or read the threshold of the MOSI.

Syntax DECode:BUS<n>:SPI:MOSIThreshold <value>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query DECode:BUS<n>:SPI:MOSIThreshold?

Example DEC:BUS1:SPI:MOSIT 1.00E+00
DEC:BUS1:SPI:MOSIT?

Response Returns: 1.00E+00

Related **DECode:BUS<n>:SPI:MOSISource**

9.13 DECode:BUS<n>:SPI:NCSSource

Description Write or read the NCS source of the SPI bus.

Syntax DECode:BUS<n>:SPI:NCSSource <source>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<source>:= {C<x> | D<m>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<m>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

Query DECode:BUS<n>:SPI:NCSSource?

Example DEC:BUS1:SPI:NCSS C1
DEC:BUS1:SPI:NCSS?

Response Returns: C1

9.14 DECode:BUS<n>:SPI:NCSThreshold

Description Write or read the threshold of the NCS on SPI bus.

Syntax DECode:BUS<n>:SPI:NCSThreshold <value>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<value>:= Value in NR3 format, including a decimal point and exponent. The range of this value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query DECode:BUS<n>:SPI:NCSThreshold?

Example DEC:BUS1:SPI:NCST 1.00E+00
DEC:BUS1:SPI:NCST?

Response Returns: 1.00E+00

Related DECode:BUS<n>:SPI:NCSSource

UART Commands

The :DECode:BUS<n>:UART subsystem commands control the UART decode settings of the specified bus.

10.1 DECode:BUS<n>:UART:BAUD

Description Write or read the baud rate of the UART bus.

Syntax DECode:BUS<n>:UART:BAUD <baud>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<baud>:= {600bps | 1200bps | 2400bps | 4800bps | 9600bps | 19200bps | 384 00bps | 57600bps | 115200bps | CUSTom[,<value>]}
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [300, 20000000].

Query DECode:BUS<n>:UART:BAUD?

Example DEC:BUS1:UART:BAUD 9600bps
DEC:BUS1:UART:BAUD?

Response Returns: 9600bps

10.2 DECode:BUS<n>:UART:BITorder

Description Write or read the bit order of the UART bus.

Syntax DECode:BUS<n>:UART:BITorder <order>
<n>= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<order>:= {LSB | MSB}

Query DECode:BUS<n>:UART:BITorder?

Example DEC:BUS1:UART:BIT LSB
DEC:BUS1:UART:BIT?

Response Returns: LSB

10.3 DECode:BUS<n>:UART:DLENgth

Description Write or read the data length of the UART bus.

Syntax DECode:BUS<n>:UART:DLENgth <value>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<value>:= Value in NR1 format, including an integer and no decimal point. The range of value is [5, 8].

Query DECode:BUS<n>:UART:DLENgth?

Example DEC:BUS1:UART:DLEN 5
DEC:BUS1:UART:DLEN?

Response Returns: 5

10.4 DECode:BUS<n>:UART:IDLE

Description Write or read the idle level of the UART bus.

Syntax DECode:BUS<n>:UART:IDLE <idle>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<idle>:= {LOW | HIGH}

Query DECode:BUS<n>:UART:IDLE?

Example DEC:BUS1:UART:IDLE LOW
DEC:BUS1:UART:IDLE?

Response Returns: LOW

10.5 DECode:BUS<n>:UART:PARity

Description Write or read the parity check of the UART bus.

Syntax DECode:BUS<n>:UART:PARity <parity>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<parity>:= {NONE | ODD | EVEN | MARK |SPACe}

Query DECode:BUS<n>:UART:PARity?

Example DEC:BUS1:UART:PAR NONE
DEC:BUS1:UART:PAR?

Response Returns: NONE

10.6 DECode:BUS<n>:UART:RXSource

Description Write or read the RX source of the UART bus.

Syntax DECode:BUS<n>:UART:RXSource <source>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<source>:= {C<x> | D<m> | DIS} <x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<m>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

- DIS means no source selected

Query DECode:BUS<n>:UART:RXSource?

Example DEC:BUS1:UART:RXS C1
DEC:BUS1:UART:RXS?

Response Returns: C1

Related **DECode:BUS<n>:UART:RXThreshold**

10.7 DECode:BUS<n>:UART:RXThreshold

Description Write or read the threshold of RX on UART bus.

Syntax DECode:BUS<n>:UART:RXThreshold <value>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<value>:= Value in NR3 format, including a decimal point and exponent. The range for this value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query DECode:BUS<n>:UART:RXThreshold?

Example DEC:BUS1:UART:RXT 1.00E+00
DEC:BUS1:UART:RXT?

Response Returns: 1.00E+00

Related DECode:BUS<n>:UART:RXSource

10.8 DECode:BUS<n>:UART:STOP

Description Write or read the length of the stop bit on UART bus.

Syntax DECode:BUS<n>:UART:STOP <bit>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<bit>:= {1 | 1.5 | 2}

Query DECode:BUS<n>:UART:STOP?

Example DEC:BUS1:UART:STOP 1
DEC:BUS1:UART:STOP?

Response Returns: 1

10.9 DECode:BUS<n>:UART:TXSource

Description Write or read the TX source of the UART bus.

Syntax DECode:BUS<n>:UART:TXSource <source>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<source>:= {C<x> | D<m> | DIS}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<m>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

- DIS means no source selected

Query DECode:BUS<n>:UART:TXSource?

Example DEC:BUS1:UART:TXS C1
DEC:BUS1:UART:TXS?

Response Returns: C1

Related **DECode:BUS<n>:UART:TXThreshold**

10.10 DECode:BUS<n>:UART:TXThreshold

Description Write or read the threshold of TX on UART bus.

Syntax DECode:BUS<n>:UART:TXThreshold <value>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<value>:= Value in NR3 format, including a decimal point and exponent. The range of this value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query DECode:BUS<n>:UART:TXThreshold?

Example DEC:BUS1:UART:TXT 1.00E+00
DEC:BUS1:UART:TXT?

Response Returns: 1.00E+00

Related **DECode:BUS<n>:UART:TXSource**

LIN Commands

The :DECode:BUS<n>:LIN subsystem commands control the LIN decode settings of the specified bus.

11.1 DECode:BUS<n>:LIN:BAUD

Description Write or read the baud rate for the LIN bus.

Syntax DECode:BUS<n>:LIN:BAUD <baud>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<baud>:= {600bps | 1200bps | 2400bps | 4800bps | 9600bps | 19200bps | CUSTom[,<value>]}

<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [300, 20000000].

Query DECode:BUS<n>:LIN:BAUD?

Example DEC:BUS1:LIN:BAUD 9600bps
DEC:BUS1:LIN:BAUD?

Response Returns: 9600bps

11.2 DECode:BUS<n>:LIN:SOURce

Description Write or read the source of the LIN bus.

Syntax DECode:BUS<n>:LIN:SOURce <source>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<source>:= {C<x> | D<m>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<m>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

Query DECode:BUS<n>:LIN:SOURce?

Example DEC:BUS1:LIN:SOUR C1
DEC:BUS1:LIN:SOUR?

Response Returns: C1

Related **DECode:BUS<n>:LIN:THReshold**

11.3 DECode:BUS<n>:LIN:THReshold

Description Write or read the threshold of the source on LIN bus.

Syntax DECode:BUS<n>:LIN:THReshold <value>
<n>:= {1 | 2}, is attached as a suffix to BUS and defines the bus that is affected by the command.
<value>:= Value in NR3 format, including a decimal point and exponent. The range of this value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset]

Query DECode:BUS<n>:LIN:THReshold?

Example DEC:BUS1:LIN:THR 1.00E+00
DEC:BUS1:LIN:THR?

Response Returns: 1.00E+00

Related **DECode:BUS<n>:LIN:SOURce**

Display Commands

The **Display** subsystem commands control waveforms and screen displays.

12.1 DISPlay:BACKlight

Description Write or read the backlight level of the screen.

Syntax DISPlay:BACKlight <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 100]. 0 is the least bright and 100 is the brightest.

Query DISPlay:BACKlight?

Example DISP:BACK 100
DISP:BACK?

Response Returns: 100

12.2 DISPlay:CLEar

Description Clears the waveform displayed on the screen.

Syntax DISPlay:CLEar

Example DISP:CLE

Related **ACQuire:CSWeep**

12.3 DISPlay:COLor

Description Write or read the state of the color grade.

Syntax DISPlay:COLor <state>
<state>:= {ON | OFF}

Query DISPlay:COLor?

Example DISP:COL ON
DISP:COL?

Response Returns: ON

12.4 DISPlay:GRATicule

Description Write or read the brightness level of the grid.

Syntax DISPlay:GRATicule <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 100]. 0 is the least bright and 100 is the brightest.

Query DISPlay:GRATicule?

Example DISP:GRAT 50
DISP:GRAT?

Response Returns: 50

12.5 DISPlay:GRIDstyle

Description Wriate or read the type of grid to display.

Syntax DISPlay:GRIDstyle <type>
<type>:= {FULL | LIGHt | NONE}

Query DISPlay:GRIDstyle?

Example DISP:GRID LIGH
DISP:GRID?

Response Returns: LIGH

12.6 DISPlay:INTensity

Description Wrrite or read the intensity level of the waveform.

Syntax DISPlay:INTensity <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 100]. 0 is the least bright and 100 is the brightest.

Query DISPlay:INTensity?

Example DISP:INT 75
DISP:INT?

Response Returns: 75

12.7 DISPlay:PERSistence

Description Write or read the persistence duration of the display, in seconds, in persistence mode.

Syntax DISPlay:PERSistence <time>
<time>:= {OFF | INFinite | 1S | 5S | 10S | 30S}

Query DISPlay:PERSistence?

Example DISP:PERS 5S
DISP:PERS?

Response Returns: 5S

12.8 DISPlay:TRANsparence

Description Write or read he transparency level of the information bar.

Syntax DISPlay:TRANsparence <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 100]. 0 is the least transparent and 100 is the most transparent.

Query DISPlay:TRANsparence?

Example DISP:TRAN 80
DISP:TRAN?

Response Returns: 80

12.9 DISPlay:TYPE

Description Write or read the interpolation lines between data points.

Syntax DISPlay:TYPE <type>
<type>:= {VECTor | DOT}

- **VECTor** is the default mode and draws lines between points.
- **DOT** mode displays data more quickly than vector mode but does not draw lines between sample points.

Query DISPlay:TYPE?

Example DISP:TYPE VECT
DISP:TYPE?

Response Returns: VECTor

Function Commands

The **Function** subsystem commands control the math functions in the oscilloscope.

13.1 FUNCtion:FFTDisplay

Description Write or read the display mode of the FFT waveform.

Syntax FUNCtion:FFTDisplay <mode>
<mode>:= {SPLit | FULL | EXCLusive}

- SPLit means that the channel waveform and the FFT waveform are displayed on the screen separately.
- FULL means a full-screen display of the FFT waveform.
- EXCLusive means that only the FFT waveform is displayed on the screen.

Query FUNCtion:FFTDisplay?

Example FUNC:FFTD SPL
FUNC:FFTD?

Response Returns: SPLit

13.2 FUNCtion:INTGate

Description Write or read the state of the integral operation. (ON | OFF)

NOTICE The command is valid for all math integral waveforms at the same time. The query returns the integration threshold state of F1.

Syntax FUNCtion:INTGate <state>
<state>:= {ON | OFF}

Query FUNCtion:INTGate?

Example FUNC:INTG ON
FUNC:INTG?

Response Returns: ON

Related **FUNCtion:INTGate:GA**
FUNCtion:INTGate:GB

13.3 FUNCtion:INTGate:GA

Description Write or read the position of gate A.

NOTICE The command is valid for all math integral waveforms at the same time. And the query returns the integration gate A of F1.

Syntax FUNCtion<n>:INTGate:GA <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-horizontal_grid/2*timebase, horizontal_grid/2*timebase]

NOTICE The value of GA cannot be greater than that of GB. If you set the value greater than GB, it will automatically be set to the same value as GB.

Query FUNCtion<n>:INTGate:GA?

Example FUNC:INTG:GA -1.00E-07
FUNC:INTG:GA?

Response Returns: -1.00E-07

Related **FUNCtion:INTGate**
FUNCtion:INTGate:GB

13.4 FUNCtion:INTGate:GB

Description Write or read the position of gate B.

NOTICE The command is valid for all math integral waveforms at the same time. And the query returns the integration gate B of F1.

Syntax FUNCtion<n>:INTGate:GB <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-horizontal_grid/2*timebase, horizontal_grid/2*timebase].

NOTICE The value of GB cannot be less than that of GA. If you set the value less than GA, it will automatically be set to the same value as GA.

Query FUNCtion<n>:INTGate:GB?

Example FUNC:INTG:GB 2.00E-07
FUNC:INTG:GB?

Response Returns: 2.00E-07

Related Commnads **FUNCtion:INTGate**
FUNCtion:INTGate:GA

13.5 FUNCtion<n>

Description Write or read the switch of the math function.

Syntax FUNCtion<n> <state>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math function that is affected by the command.
<state>:= {ON | OFF}

Query FUNCtion<n>?

Example FUNC1 ON
FUNC1?

Response Returns: ON

13.6 FUNCtion<n>:DIFF:DX

Description Write or read the step size of the differential operation.

Syntax FUNCtion<n>:DIFF:DX <dx>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<dx>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [2, 20]

Query FUNCtion<n>:DIFF:DX?

Example FUNC1:DIFF:DX 8
FUNC1:DIFF:DX?

Response Returns: 8

13.7 FUNCtion<n>:FFT:AUToset

Description Automatically sets the settings that will cause the FFT waveform to be displayed at the best position on the screen.

Syntax FUNCtion<n>:FFT:AUToset <type> <n>:= {1 | 2}, is attached as a suffix to on FUNCtion and defines the math that is affected by the command.
<type> := {SPAN | PEAK | NORMal}

Example FUNC2:FFT:AUT SPAN

13.8 FUNCtion<n>:FFT:HCENter

Description Write or read the center frequency of FFT.

Syntax FUNCtion<n>:FFT:HCENter
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
:= Value in NR3 format, including a decimal point and exponent.

NOTICE The range of legal values varies with the value set by the command **TIMebase:SCALe**.

Query FUNCtion<n>:FFT:HCENter?

Example FUNC2:FFT:HCEN 2.00E+06
FUNC2:FFT:HCEN?

Response Returns: 2.00E+06Hz

Related **TIMebase:SCALe**

13.9 FUNCtion<n>:FFT:LOAD

Description Write or read sets the external load of the FFT.

Syntax FUNCtion<n>:FFT:LOAD <load>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<load>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1, 1000000].

NOTICE The load can be set only when the FFT unit is dBm.

Query FUNCtion<n>:FFT:LOAD?

Example FUNC2:FFT:LOAD 50
FUNC2:FFT:LOAD?

Response Returns: 50

Related FUNCtion<n>:FFT:UNIT

13.10 FUNCtion<n>:FFT:MODE

Description Write or read the acquisition mode of the FFT operation.

Syntax FUNCtion<n>:FFT:MODE <mode>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command. <mode>:= {NORMal | MAXHold | AVERage[,<num>]}

- NORMal sets the FFT in the normal mode.
- MAXHold sets the FFT in the max detect mode.
- AVERage sets the FFT in the averaging mode.

<num>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [4, 1024].

Query FUNCtion<n>:FFT:MODE?

Example FUNC2:FFT:MODE NORM
FUNC2:FFT:MODE?

Response Returns: Normal

13.11 FUNCtion<n>:FFT:POINts

Description Write or read the maximum number of points for the FFT operation.

Syntax FUNCtion<n>:FFT:POINts <point>
<n>:= {1 |2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<point>:= {2k | 4k | 8k | 16k | 32k | 64k | 128k | 256k | 512k | 1M | 2M}

Query FUNCtion<n>:FFT:POINts?

Example FUNC2:FFT:POIN 2M
FUNC2:FFT:POIN?

Response Returns: 2M

13.12 FUNCtion<n>:FFT:RESET

Description Restarts counting when the acquisition mode is average.

Syntax FUNCtion<n>:FFT:RESET
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.

Example FUNC2:FFT:RESET

Related **FUNCtion<n>:FFT:MODE**

13.13 FUNCtion<n>:FFT:RLEVel

Description Write or read the reference level of the FFT operation.

Syntax FUNCtion<n>:FFT:RLEVel <level>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<level>:= Value in NR3 format, including a decimal point and exponent. The range of the values is related to the probe of the FFT source.

Probe	dBVrms	Vrms	dBm
1E6 X	[-40,200]	[1E-2,1E10]	[-27,213]
1E5 X	[-60,180]	[1E-3,1E9]	[-47,193]
1E4 X	[-80,160]	[1E-4,1E8]	[-67,173]
1000X	[-100,140]	[1E-5,1E7]	[-87,153]
100X	[-120,120]	[1E-6,1E6]	[-107,133]
10X	[-140,100]	[1E-7,1E5]	[-127,113]
1	[-160,80]	[1E-8,1E4]	[-147,93]
0.1X	[-180,60]	[1E-9,1E3]	[-167,73]
0.01X	[-200,40]	[1E-10,1E2]	[-187,53]
1E-3 X	[-220,20]	[1E-11,10]	[-207,33]
1E-4 X	[-240,0]	[1E-12,1]	[-227,13]
1E-5 X	[-260,-20]	[1E-13,1E-1]	[-247,-7]
1E-6 X	[-280,-40]	[1E-14,1E-2]	[-267,-27]

Table 13.1 FFT Level

NOTICE The smaller the :FUNCtion<n>:FFT:SCALe, the greater the accuracy of the level value.

Query FUNCtion<n>:FFT:RLEVel?

Example FUNC2:FFT:RLEV 1.00E+01
FUNC2:FFT:RLEV?

Response Returns: 1.00E+01

Related **CHANnel<n>:PROBe**
FUNCtion<n>:FFT:SCALe

13.14 FUNCtion<n>:FFT:SCALe

Description Write or read the vertical scale of the FFT.

Syntax FUNCtion<n>:FFT:SCALe <scale>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<scale>:= Value in NR3 format, including a decimal point and exponent. The range of the values is related to the vertical unit.

Unit	Rang.
dBVrms	
Vrms	
dBm	

Table 13.2 FFT Scale

Query FUNCtion<n>:FFT:SCALe?

Example FUNC2:FFT:SCAL 2.00E+01
FUNC2:FFT:SCAL?

Response Returns: 2.00E+01

Related **CHANnel<n>:PROBe**

13.15 FUNCtion<n>:FFT:SEARch

Description Write or read the search tools type of the FFT operation.

Syntax FUNCtion<n>:FFT:SEARch <type>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<type>:= {OFF | PEAK | MARKer}

Query FUNCtion<n>:FFT:SEARch?

Example FUNC2:FFT:SEAR MAR
FUNC2:FFT:SEAR?

Response Returns: MARKer

Related **FUNCtion<n>:FFT:SEARch:THReshold**
FUNCtion<n>:FFT:SEARch:EXCursion

13.16 FUNCtion<n>:FFT:SEARch:EXCursion

Description Write or read the search excursion of the search tool (marker or peak) for the FFT operation.

Syntax FUNCtion<n>:FFT:SEARch:EXCursion <value>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the values is [0, 1.60E+02] when the FFT unit is dBVrms. The value range varies with the corresponding unit.

NOTICE The range of values varies with the value set by the **CHANnel<n>:PROBe** commands.

Query FUNCtion<n>:FFT:SEARch:EXCursion?

Example FUNC2:FFT:SEAR:EXC 2.00E+01
FUNC2:FFT:SEAR:EXC?

Response Returns: 2.00E+01

Related **FUNCtion<n>:FFT:SEARch:THReshold**

13.17 FUNCtion<n>:FFT:SEARch:THReshold

Description Write or read the search threshold of the search tool (marker or peak) for the FFT operation.

Syntax FUNCtion<n>:FFT:SEARch:THReshold <value>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the values is [-1.60E+02, 8.00E+01], when FFT unit is dBVrms. The value changes to match the set Units value.

Query FUNCtion<n>:FFT:SEARch:THReshold?

Example FUNC2:FFT:SEAR:THR -1.00E+2
FUNC2:FFT:SEAR:THR?

Response Returns: -1.00E+02

Related **FUNCtion<n>:FFT:SEARch:EXCursion**

13.18 FUNCtion<n>:FFT:UNIT

Description Write or read the unit type of the FFT operation.

Syntax FUNCtion<n>:FFT:UNIT <unit>
<n>:= {1 | 2} is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<unit>:= {DBVrms | Vrms | DBm}

Query FUNCtion<n>:FFT:UNIT?

Example FUNC2:FFT:UNIT DBVrms
FUNC2:FFT:UNIT?

Response Returns: DBVrms

13.19 FUNCtion<n>:FFT:WINDow

Description Write or read the window type of the FFT operation.

Syntax FUNCtion<n>:FFT:WINDow <window>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<window>:= {RECTangle | BLACkman | HANNing | HAMMing | FLATtop}

- RECTangle is useful for transient signals, and signals where there are an integral number of cycles in the time record.
- BLACkman reduces time resolution compared to the rectangular window, but it improves the capacity to detect smaller impulses due to lower secondary lobes (provides minimal spectral leakage).
- HANNing is useful for frequency resolution and general-purpose use. It is good for resolving two frequencies that are close together, or for making frequency measurements.
- HAMMing means Hamming.
- FLATtop is the best for making accurate amplitude measurements of frequency peaks.

Query FUNCtion<n>:FFT:WINDow?

Example FUNC2:FFT:WIND FLAT
FUNC2:FFT:WIND?

Response Returns: FLATtop

13.20 FUNCtion<n>:INTegrate:OFFSet

Description Write or read the dc offset of the integrate operation.

Syntax FUNCtion<n>:INTegrate:OFFSet <offset>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<offset>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-1.67E+00, 1.67E+00].

Query FUNCtion<n>:INTegrate:OFFSet?

Example FUNC1:INT:OFFS 1.00E-01
FUNC1:INT:OFFS?

Response Returns: 1.00E-01

Related **CHANnel<n>:PROBe**

13.21 FUNCtion<n>:INVert

Description Write or read the invert state of the math waveform.

Syntax FUNCtion<n>:INVert <state>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<state>:= {ON | OFF}

Query FUNCtion<n>:INVert?

Example FUNC1:INV ON
FUNC1:INV?

Response Returns: ON

13.22 FUNCtion<n>:LABel

Description Write or read the state of the specified math label.(ON or OFF)

Syntax FUNCtion<n>:LABel <state>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<state>:= {ON | OFF}

Query FUNCtion<n>:LABel?

Example FUNC1:LAB ON
FUNC1:LAB?

Response Returns: **FUNCtion<n>:LABel:TEXT**

13.23 FUNCtion<n>:LABel:TEXT

Description Write or read the selected math label to the string that follows. Setting a label for a math function also adds the name to the label list in non-volatile memory (replacing the oldest label in the list)

Syntax FUNCtion<n>:LABel:TEXT <string>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<string>:= Quoted string of ASCII text. The length of the string is limited to 20.

Query FUNCtion<n>:LABel:TEXT?

Example FUNC1:LAB:TEXT "MATH" FUNC1:LAB:TEXT?

Response Returns: MATH

Related FUNCtion<n>:LABe

13.24 FUNCtion<n>:OPERation

Description Write or read the desired waveform math operation.

Syntax FUNCtion<n>:OPERation <operation>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<operation>:= {ADD | SUBTract | MULTiply | DIVision | INTegrate | DIFF | FFT | SQRT | ERES | AVERage}

Query FUNCtion<n>:OPERation?

Example FUNC1:OPER MULT
FUNC1:OPER?

Response Returns: MULTiply

13.25 FUNCtion<n>:POSition

Description Write or read the vertical position of the selected math operation (arithmetic and algebra operation).

Syntax FUNCtion<n>:POSition <offset>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<offset>:= Value in NR3 format, including a decimal point and exponent.

NOTICE The range of values is uniform related to an operation.

Query FUNCtion<n>:POSition?

Example FUNC1:POS 5.00E-01
FUNC1:POS?

Response Returns: 5.00E-01

Related **FUNCtion<n>:OPERation**

13.26 FUNCtion<n>:SCALe

Description Write or read the vertical scale of the selected math operation (arithmetic and algebra operation).

Syntax FUNCtion<n>:SCALe <scale>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<scale>:= Value in NR3 format, including a decimal point and exponent.

NOTICE The range of the function scale is related to the scale of the function source. When the operation is **INTegrate** or **DIFF**, the scale range is related to the timebase.

Query FUNCtion<n>:SCALe?

Example FUNC1:SCAL 1.00E+00
FUNC1:SCAL?

Response Returns: 1.000E+00

Related **CHANnel<n>:SCALe**

13.27 FUNCtion<n>:SOURce1

Description Write or read the source1 of the math operation.

Syntax FUNCtion<n>:SOURce1 <source>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<source>:= {C<x> | Z<x> | F<x>}

- C is analog channel <x>
- Z is zoom channel <x>
- F is math function <x>, for math-on-math operations

<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

NOTICE Z<x> is optional only when Zoom is on. FUNCtion<n> cannot set itself as the source.

Query FUNCtion<n>:SOURce1?

Example FUNC2:SOUR1 C1
FUNC2:SOUR1?

Response Returns: C1

Related **FUNCtion<n>:SOURce2**

13.28 FUNCtion<n>:SOURce2

Description Write or read the source1 of the math operation.

Syntax FUNCtion<n>:SOURce2 <source>
<n>:= {1 | 2}, is attached as a suffix to FUNCtion and defines the math that is affected by the command.
<source>:= {C<x> | Z<x> | F<x>}

- C is analog channel <x>
- Z is zoom channel <x>
- F is math function <x>, for math-on-math operations

<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

NOTICE Z<x> is optional only when Zoom is on. FUNCtion<n> cannot set itself as the source.

Query FUNCtion<n>:SOURce2?

Example FUNC2:SOUR1 C1
FUNC2:SOUR1?

Response Returns: C1

Related **FUNCtion<n>:SOURce2**

History Commands

The :HISTORy subsystem commands control the waveform recording function and the history waveform play function.

14.1 HISTORy

Description Write or read the mode of the history function.

Syntax HISTORy <state> <state>:= {ON | OFF}

Query HISTORy?

Example HISTOR ON
HISTOR?

Response Returns: ON

14.2 HISTORy:FRAMe

Description Write or read the number of the history frame.

Syntax HISTORy:FRAMe <value>
<value>:= Value in NR1 format, including an integer and no decimal point.

NOTICE

The maximum number of frames is related to the number of samples set for the acquisition (memory depth). More points/frame means less total frames available. Fewer points/frame equals more frames available.

Query HISTORy:FRAMe?

Example HISTOR:FRAM 4
HISTOR:FRAM?

Response Returns: 4

14.3 HISTORy:INTERval

Description Write or read the play interval of the history frame.

Syntax HISTORy:INTERval <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [1.00E-06, 1].

Query HISTORy:INTERval?

Example HISTOR:INTER 1.00E-03
HISTOR:INTER?

Response Returns: 1.00E-03

14.4 HISTORy:LIST

Description Write or read the state of the history list.

Syntax HISTORy:LIST <state>
<state>:= {OFF | ON[,<type>]}
<type>:= {TIME | DELTa}

- TIME indicates that the time column is displayed by sampling time
- DELTa indicates that the time column is displayed by the sampling interval.

Query HISTORy:LIST?

Example HISTOR:LIST ON,TIME
HISTOR:LIST?

Response Returns: ON,TIME

14.5 HISTORy:PLAY

Description Write or read the play state of the history waveform.

Syntax HISTORy:PLAY <state>
<state>:= {BACKWards | PAUSe | FORWards}

- BACKWards indicates that the frame number is played from highest frame number to lowest (last-to-first, chronologically).
- FORWards indicates that the frame number is played from the lowest frame number to the highest (first-to-last, chronologically).
- PAUSe will pause playback.

Query HISTORy:PLAY?

Example HISTOR:PLAY BACKW
HISTOR:PLAY?

Response Returns: BACKWards

14.6 HISTORy:TIME

Description Returns the acquire timestamp of the current frame.

Query HISTORy:TIME?

Example HISTOR:TIME?

Response Returns: 22: 23: 24. 993866

Measure Commands

The **MEASure** subsystem commands are used to control automatic measurements.

15.1 MEASure

Description Write or read the state of the measurement function.

Syntax MEASure <state>
<state>:= {ON | OFF}

Query MEASure?

Example MEAS ON
MEAS?

Response Returns: ON

15.2 MEASure:ADVanced:LINenumber

Description Write or read the total number of advanced measurement items displayed.

Syntax MEASure:ADVanced:LINenumber <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1, 12].

Query MEASure:ADVanced:LINenumber?

Example MEAS:ADV:LIN 12
MEAS:ADV:LIN?

Response Returns: 12

Related **MEASure:MODE**

15.3 MEASure:ADVanced:P<n>

Description Write or read the state of the specified measurement item.

Syntax MEASure:ADVanced:P<n> <state>
P is the physical location of the specified measurement on the display.
<n>:= {1 to 12}
<state>:= {ON | OFF}

Query MEASure:ADVanced:P<n>?

Example
MEAS:ADV:P1 ON
MEAS:ADV:P1?

Response Returns: ON

Related
MEASure:ADVanced:P<n>:TYPE
MEASure:ADVanced:P<n>:SOURce1
MEASure:ADVanced:P<n>:SOURce2

15.4 MEASure:ADVanced:P<n>:SOURce1

Description Write or read the source1 of the specified advanced measurement item.

Syntax MEASure:ADVanced:P<n>:SOURce1 <source>
<n>:= {1 to 12}
<source>:= {C<x> | Z<x | F<x | D<m | ZD<m | REFA | REFB | REFC | REFD}

- C denotes an analog input channel.
- Z denotes a zoomed input.
- F denotes a math function.
- D denotes a digital input channel.
- ZD denotes a zoomed digital input channel.
- REF denotes a reference waveform.

<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<m>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

NOTICE Z<x> and ZD<m> are optional only when Zoom is on. The source can only be set to C<x> when the type is delay measurement.

Query MEASure:ADVanced:P<n>:SOURce1?

Example
MEAS:ADV:P1:SOUR1 C1
MEAS:ADV:P1:SOUR1?

Response Returns: C1

Related MEASure:ADVanced:P<n>:SOURce2
MEASure:ADVanced:P<n>:TYPE

15.5 MEASure:ADVanced:P<n>:SOURce2

Description Write or read the source1 of the specified advanced measurement item.

Syntax MEASure:ADVanced:P<n>:SOURce2 <source>
<n>:= {1 to 12}
<source>:= {C<x> | Z<x | F<x | D<m | ZD<m | REFA | REFB | REFC | REFD}

- C denotes an analog input channel.
- Z denotes a zoomed input.
- F denotes a math function.
- D denotes a digital input channel.
- ZD denotes a zoomed digital input channel.
- REF denotes a reference waveform.

<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<m>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

NOTICE Z<x> and ZD<m> are optional only when Zoom is on. The source can only be set to C<x> when the type is delay measurement.

Query MEASure:ADVanced:P<n>:SOURce2?

Example
MEAS:ADV:P1:SOUR2 C1
MEAS:ADV:P1:SOUR2?

Response Returns: C1

Related MEASure:ADVanced:P<n>:SOURce1
MEASure:ADVanced:P<n>:TYPE

15.6 MEASure:ADVanced:P<n>:STATistics

Description Returns statistics for the specified advanced measurement item.

Query MEASure:ADVanced:P<n>:STATistics? <type>
<n>:= {1 to 12} <type>:= {ALL | CURRent | MEAN | MAXimum | MINimum | STDev | COUNt}

- ALL returns all the statistics
- CURRent returns the current value of the statistics
- MEAN returns the mean value of the statistics
- MAXimum returns the maximum value of the statistics
- MINimum returns the minimum value of the statistics
- STDev returns the standard deviation of the statistics
- COUNt returns the current number of counts used to calculate the statistical data.

NOTICE When measurement statistics are off, it returns OFF.

Example MEAS:ADV:P1:STAT? CURR

Response Returns: 6.7E-02

Related **MEASure:ADVanced:STATistics**

15.7 MEASure:ADVanced:P<n>:TYPE

Description Write or read the type for the specified measurement item.

Syntax MEASure:ADVanced:P<n>:TYPE <parameter> <n>:= {1 to 12} <parameter>:= {PKPK | MAX | MIN | AMPL | TOP | BASE | LEVELX | CMEAN | MEAN | STDEV | VSTD | RMS | CRMS | MEDIAN | CMEDIAN | OVSN | FPRE | OVSP | RPRE | PER | FREQ | TMAX | TMIN | PWID | NWID | DUTY | N DUTY | WID | NBWID | DELAY | TIMEL | RISE | FALL | RISE20T80 | F ALL80T20 | CCJ | PAREA | NAREA | AREA | ABSAREA | CYCLES | REDGES | FEDGES | EDGES | PPULSES | NPULSES | PHA | SKE W | FRR | FRF | FFR | FFF | LRR | LRF | LFR | LFF}

Parameter	Description
PKPK	Vertical peak-to-peak
MAX	Maximum vertical value
MIN	Minimum vertical value
AMPL	Vertical amplitude
TOP	Waveform top value
BASE	Waveform base value
LEVELX	Level measure at trigger position
CMEAN	Average value in the first cycle
MEAN	Average value
STDEV	Standard deviation of the data
VSTD	Standard deviation of the first cycle
RMS	RMS value
CRMS	RMS value in the first cycle
MEDIAN	Value at which 50% of the measurement are above and 50% are below
CMEDIAN	Median of the first cycle
OVSN	Overshoot of a falling edge
FPRE	Preshoot of a falling edge
OVSP	Overshoot of a rising edge
RPRE	Preshoot of a rising edge
PER	Period

Table 15.1 Measurements

Parameter	Description
FREQ	Frequency
TMAX	Time of maximum value
TMIN	Time of minimum value
PWID	Positive pulse width
NWID	Negative pulse width
WID	Time from the first rising edge to the last falling edge at the 50% crossing
DUTY	Positive duty cycle
NDUTY	Negative duty cycle
WID	Time from the first rising edge to the last falling edge at the 50% crossing
NBWID	Time from the first falling edge to the last rising edge at the 50% crossing
DELAY	Time from the trigger to the first transition at the 50% crossing
TIMEL	Time from the trigger to each rising edge at the 50% crossing
RISE	Duration of rising edge from 10-90%
FALL	Duration of falling edge from 10-90%
RISE20T80	Duration of rising edge from 20-80%
FALL80T20	Duration of falling edge from 80-20%
CCJ	The difference between two continuous periods
PAREA	Area of the waveform above zero
NAREA	Area of the waveform below zero
AREA	Area of the waveform
ABSAREA	Absolute area of the waveform
CYCLES	Number of cycles in a periodic waveform
EDGES	Number of edges in a waveform
REDGES	Number of rising edges in a waveform
FEDGES	Number of falling edges in a waveform
PPULSES	Number of edges a periodic waveform
NPULSES	Number of positive pulses in a waveform
PHA	Number of negative pulses in a waveform

Table 15.2 Measurements Continued 2/3

Parameter	Description
SKEW	Phase difference between two edges
FRR	Time of source A edge minus time of nearest source B edge
FRF	The time between the first rising edge of source A and the following first rising edge of source B at the 50% crossing
FFR	The time between the first rising edge of source A and the following first falling edge of source B at the 50% crossing
FFF	The time between the first falling edge of source A and the following first falling edge of source B at the 50% crossing
LRR	The time between the first rising edge of source A and the following last rising edge of source B at the 50% crossing
LRF	The time between the first rising edge of source A and the last falling edge of source B at the 50% crossing
LFR	The time between the first falling edge of source A and the last rising edge of source B at the 50% crossing
LFF	The time between the first falling edge of source A and the last falling edge of source B at the 50% crossing

Table 15.3 Measurements Continued 3/3

Query MEASure:ADVanced:P<n>:TYPE?

Example
MEAS:ADV:P1:TYPE MAX
MEAS:ADV:P1:TYPE?

Response Returns: MAX

Related **MEASure:ADVanced:P<n>**

15.8 MEASure:ADVanced:P<n>:VALue

Description Returns the value of the specified advanced measurement item.

Query MEASure:ADVanced:P<n>:VALue?
<n>:= {1 to 12}

Example MEAS:ADV:P1:VAL?

Response Returns: 4.033E+00

Related **MEASure:ADVanced:P<n>:TYPE**

15.9 MEASure:ADVanced:STATistics

Description Write or read the state of the measurement statistics.

Syntax MEASure:ADVanced:STATistics <state>
<state>:= {ON | OFF}

Query MEASure:ADVanced:STATistics?

Example MEAS:ADV:STAT ON
MEAS:ADV:STAT?

Response Returns: ON

Related **MEASure:ADVanced:P<n>:STATistics**

15.10 MEASure:ADVanced:STATistics:HISTOGram

Description Write or read the state of the histogram function.

Syntax MEASure:ADVanced:STATistics:HISTOGram <state>
<state>:= {ON | OFF}

Query MEASure:ADVanced:STATistics:HISTOGram?

Example MEAS:ADV:STAT:HISTOG ON
MEAS:ADV:STAT:HISTOG?

Response Returns: ON

Related **MEASure:ADVanced:STATistics**

15.11 MEASure:ADVanced:STATistics:MAXCount

Description Write or read the maximum value of the statistics count.

Syntax MEASure:ADVanced:STATistics:MAXCount <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 1024].

NOTICE When the value is set to 0, it means unlimited statistics.

Query MEASure:ADVanced:STATistics:MAXCount?

Example MEAS:ADV:STAT:MAXC 1024
MEAS:ADV:STAT:MAXC?

Response Returns: 1024

Related **MEASure:ADVanced:STATistics**

15.12 MEASure:ADVanced:STATistics:RESet

Description Resets the measurement statistics.

Syntax MEASure:ADVanced:STATistics:RESet

Example MEAS:ADV:STAT:RES

Related **MEASure:ADVanced:STATistics**

15.13 MEASure:ADVanced:STYLe

Description Write or read the display mode of the advanced measurements.

Syntax MEASure:ADVanced:STYLe <type>
<type>:= {M1 | M2}

- M1 lists a measurement, corresponding statistics, and histogram vertically on the display.
- M2 lists a measurement and corresponding statistics horizontally on the display. No histogram is available with M2.

Query MEASure:ADVanced:STYLe?

Example MEAS:ADV:STYL M1
MEAS:ADV:STYL?

Response Returns: M1

15.14 MEASure:GATE

Description Write or read the state of the measurement gate.

Syntax MEASure:GATE <state>
<state>:= {ON | OFF}

Query MEASure:GATE?

Example MEAS:GATE ON
MEAS:GATE?

Response Returns: ON

Related **MEASure:GATE:GA**
MEASure:GATE:GB

15.15 MEASure:GATE:GA

Description Write or read the position of gate A.

Syntax MEASure:GATE:GA <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-horizontal_grid/2*timebase, horizontal_grid/2*timebase]

NOTICE The value of GA cannot be greater than that of GB. If you set the value greater than GB, it will automatically be set to the same value as GB.

Query MEASure:GATE:GA?

Example MEAS:GATE:GA -1.00E-07
MEAS:GATE:GA?

Response Returns: -1.00E-07

Related **MEASure:GATE**
MEASure:GATE:GB

15.16 MEASure:GATE:GB

Description Write or read the position of gate B.

Syntax MEASure:GATE:GB <value> <value>:= Value in NR3 format, including a decimal point and exponent, like 1.23E+2. The range of the value is [-horizontal_grid/2*timebase, horizontal_grid/2*timebase]

NOTICE The value of GB cannot be less than that of GA. If you set the value less than GA, it will automatically be set to the same value as GA.

Query MEASure:GATE:GB?

Example MEAS:GATE:GB 1.00E-07
MEAS:GATE:GB?

Response Returns: 1.00E-07

Related **MEASure:GATE**
MEASure:GATE:GA

15.17 MEASure:MODE

Description Write or read the mode of measurement.

Syntax MEASure:MODE <type>
<type>:= {SIMPle | ADVanced}

- SIMPle shows measurements only.
- ADVanced shows measurements and includes selections for statistics, view mode (M1, M2), histogram, and trending.

Query MEASure:MODE?

Example MEAS:MODE SIMP
MEAS:MODE?

Response Returns: SIMPle

15.18 MEASure:SIMPle:ITEM

Description Sets the type of simple measurement.

Syntax MEASure:SIMPle:ITEM <parameter>,<state>
<parameter>:= {PKPK | MAX | MIN | AMPL | TOP | BASE | LEVELX | CMEAN | MEAN | STDEV | VSTD | RMS | CRMS | MEDIAN | CMEDIAN | OVSN | FPRE | OVSP | RPRE | PER | FREQ | TMAX | TMIN | PWID | NWID | DUTY | N DUTY | WID | NBWID | DELAY | TIMEL | RISE | FALL | RISE20T80 | F ALL80T20 | CCJ | PAREA | NAREA | AREA | ABSAREA | CYCLES | REDGES | FEDGES | EDGES | PPULSES | NPULSES}
<state>:= {ON | OFF}

NOTICE See table **15.1** for details.

Example MEAS:SIMP:ITEM MAX,ON

Related **MEASure:SIMPle:VALue**

15.19 MEASure:SIMPle:SOURce

Description Write or read the source of the simple measurement.

Syntax MEASure:SIMPle:SOURce <source>
<source>:= {C<x> | Z<x> | F<x> | D<m> | ZD<m> | REFA | REFB | REFC | REFD}

- C denotes an analog input channel. For example, C1 is analog input 1.
- Z denotes a zoomed waveform. For example, Z1 is zoom waveform 1.
- F denotes a math function. For example, F1 is math function 1.
- D denotes a digital waveform. For example, D1 denotes digital input 1.
- REF denotes a reference waveform.

<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<m>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

NOTICE Z<x> and ZD<m> are optional only when Zoom is on.

Query MEASure:SIMPle:SOURce?

Example
```
MEAS:SIMP:SOUR C1
MEAS:SIMP:SOUR?
```

Response Returns: C1

15.20 MEASure:SIMPle:VALue

Description Return the specified measurement value that appears on the simple measurement.

Query MEASure:SIMPle:VALue? <type>
<type>:= {PKPK | MAX | MIN | AMPL | TOP | BASE | LEVELX | CMEAN | MEAN | STDEV | VSTD | RMS | CRMS | MEDIAN | CMEDIAN | OVSN | FPRE | OVSP | RPRE | PER | FREQ | TMAX | TMIN | PWID | NWID | DUTY | N DUTY | WID | NBWID | DELAY | TIMEL | RISE | FALL | RISE20T80 | F ALL80T20 | CCJ | PAREA | NAREA | AREA | ABSAREA | CYCLES | REDGES | FEDGES | EDGES | PPULSES | NPULSES | ALL}

NOTICE See table **15.1** for more details. ALL is only valid for queries, and it returns all measurement values of all measurement types except for delay measurements.

Example MEAS:SIMP:VAL? MAX

Response Returns: 2.000E+00

Related **MEASure:SIMPle:ITEM**

RECall Commands

The **RECall** subsystem commands control the recall of setups or waveform data to the oscilloscope.

16.1 RECall:FDEFault

Description Recalls the factory settings.

Syntax RECall:FDEFault

Example REC:FDEF

Related **RECall:SETup**

16.2 RECall:REFerence

Description Recalls the specified waveform file from an external USB memory device and copies it to the selected reference waveform.

Syntax RECall:REFerence <location>,<path>
<location>:= {REFA | REFB | REFC | REFD}
- REF is the reference waveform name

<path>:= Quoted string of path with an extension ".ref"

NOTICE The file format is not automatically determined by the file name extension. You need to choose a file name with an extension which is consistent with the selected file format.

Example REC:REF REFD,"BK\math.ref"

Related SAVE:REFerence

16.3 RECall:SERase

Description Deletes user defined files stored inside the oscilloscope including: reference waveforms, internal setups, internal mask files, custom default setups, the waveform files copied from analog trace to AWG.

Syntax RECall:SERase

Example REC:SER

16.4 RECall:SETup

Description Recalls the saved settings file from internal or external sources.

Syntax RECall:SETup <state>
<state>:= {INTernal,<num> | EXTernal,<path>}
<num>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1 to 10]
<path>:= Quoted string of path with an extension ".xml"

NOTICE

The file format is not automatically determined by the file name extension. You need to choose a file name with an extension which is consistent with the selected file format.

Example REC:SET INT,1
REC:SET EXT,"BK\default.xml"

Related **RECall:FDEFault**
SAVE:SETup

REF Commands

The **REF<r>** subsystem commands control the reference waveforms.

17.1 REF<r>:LABel

Description Write or read the specified reference label on or off.

Syntax REF<r>:LABel <state>
<r>:= {A | B | C | D}
- Reference waveform name

<state>:= {ON | OFF}

Query REF<r>:LABel?

Example
REFA:LAB ON
REFA:LAB?

Response Returns: ON

Related **REF<r>:LABel:TEXT**

17.2 REF<r>:LABel:TEXT

Description Write or read the selected REF label to the string that follows. Setting a label for a REF also adds the name to the label list in non-volatile memory (replacing the oldest label in the list).

Syntax REF<r>:LABel:TEXT <string>
<r>:= {A | B | C | D}
- Reference waveform name

<string>:= Quoted string of ASCII text. The length of the string is limited to 20 characters.

Query REF<r>:LABel:TEXT?

Example
REFA:LAB:TEXT “REFA”
REFA:LAB:TEXT?

Response “REFA” Returns:

Related **REF<r>:LABel**

17.3 REF<r>:DATA

Description Controls the display and saving of reference waveforms.

Syntax REF<r>:DATA <operation>
<r>:= {A | B | C | D}

- Reference waveform name <operation>:= LOADUNLoadSAVE,<source>
- LOAD means to call up the reference waveform display.
- UNLoad means to turn off the reference waveform display.
- SAVE means to save the waveform to the reference waveform.

<source>:= {C<x> | F<x> | D<n>}

- C denotes an analog input channel. For example, C1 is analog input 1.
- F denotes a math function. For example, F1 is math function 1.
- D denotes a digital waveform. For example, D1 denotes digital input 1.

<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<n>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

Example REFA:DATA LOAD

17.4 REF<r>:DATA:SOURce

Description Returns the source of the current reference channel.

Query REF<r>:DATA:SOURce?
<r>:= {A | B | C | D}

Example REFA:DATA:SOUR?

Response Returns: C1

17.5 REF<r>:DATA:SCALe

Description Write or read the vertical scale of the current reference channel. This command is only used when the current reference channel has been stored, and the display state is on.

Syntax REF<r>:DATA:SCALe <value>
<r>:= {A | B | C | D}
- Reference waveform name

<value>:= Value in NR3 format, including a decimal point and exponent.

NOTICE The scale range of the reference waveform is the same as that of the reference source.

Query REF<r>:DATA:SCALe?

Example REFA:DATA:SCAL 1.00E-01
REFA:DATA:SCAL?

Response Returns: 1.00E-01

Related **REF<r>:DATA:POSition**

17.6 REF<r>:DATA:POSition

Description Write or read the vertical offset of the current reference channel. This command is only used when the current reference channel has been saved, and the display state is on.

Syntax REF<r>:DATA:POSition <value>
<r>:= {A | B | C | D}
- Reference channel name

<value>:= Value in NR3 format, including a decimal point and exponent.

NOTICE The position range of the reference waveform is the same as that of the reference source.

Query REF<r>:DATA:POSition?

Example REFA:DATA:POS 2.00E-01
REFA:DATA:POS?

Response Returns: 2.00E-01

Related **REF<r>:DATA:SCALe**

SAVE Commands

The **SAVE** subsystem commands control to save oscilloscope setups and waveform data to internal or external memory locations.

18.1 SAVE:BINary

Description Saves the binary date of lthe channel displayed on the screen to an external USB memory device.

Query SAVE:BINary <path>
<path>:= Quoted string of path with an extension “.bin”

NOTICE

The file format is not automatically determined by the file name extension. Choose a file name with an extension which is consistent with the selected file format.

Example SAVE:BIN "BK\c1_digital.bin

18.2 SAVE:CSV

Description Saves the waveform data of the specified channel to an external U disk/USB memory device in CSV format.

Syntax SAVE:CSV <path>,<source>,<state>
<path>:= Quoted string of path with an extension “.csv”.
<source>:= {C<x>}

- C denotes an analog input channel. For example, C1 is analog input 1.

<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<state>:= {OFF | ON}

- ON enables parameter save. This adds vertical scale values, horizontal timebase settings, and more instrument configuration information to the file.
- OFF means to disables parameter save.

NOTICE

The file format is not automatically determined by the file name extension. Choose a file name with an extension which is consistent with the selected file format.

Example SAVE:CSV "BK/channel1.csv",C1,ON

Related SAVE:MATLab

18.3 SAVE:DEFault

Description Saves the current settings or factory settings as sefault settings.

Syntax SAVE:DEFault <set>
<set>:= {CUSTom | FACTory}

- CUSTom means the current settings.
- FACTory means factory settings.

Example SAVE:DEF CUST

Related **RECall:SETup**

18.4 SAVE:IMAGe

Description Saves the screenshot to external storage.

Syntax SAVE:IMAGe <path>,<type>,<invert>
<path>:= Quoted string of path with an extension ".bmp"/".jpg"/".png"
<type>:= {BMP | JPG | PNG}
<invert>:= {OFF | ON}

- ON will store images that have inverted colors. This means that a normally black background will be white when inverted. This setting is recommended if you plan on printing the image as an inverted image with a white background will save on ink.
- OFF will store images that are identical to the display of the instrument.

Example SAVE:IMAG "BK/screen.bmp",BMP,ON

Related **PRINt**

18.5 SAVE:MATLab

Description Saves the waveform data of the specified channel to an external USB meory device in Matlab format.

Syntax SAVE:MATLab <path>,<source>
<path>:= Quoted string of path with an extension “.dat”.
<source>:= {C<x>}
- C denotes an analog input channel. For example, C1 is analog input 1.

<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

NOTICE The file format is not automatically determined by the file name extension. Choose a file name with an extension which is consistent with the selected file format.

Example SAVE:MATL "BK/channel.dat",C1

Related **SAVE:CSV**

18.6 SAVE:REFerence

Description Saves the selected channel waveform to external memory as reference.

Syntax SAVE:REFerence <path>,<source>
<path>:= Quoted string of path with an extension “.ref”.
<source>:= {C<x> | F<x>}
- C denotes an analog input channel. For example, C1 is analog input 1.
- F denotes a math function. For example, F1 is math function 1.

<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

NOTICE The file format is not automatically determined by the file name extension. Choose a file name with an extension which is consistent with the selected file format.

Example SAVE:REF "channel.ref",C1

Related **RECall:REFerence**

18.7 SAVE:SETup

Description Saves the current setting to internal or external memory locations.

Syntax SAVE:SETup <setup_num>
<setup_num>:= {INTernal,<num> | EXTernal,<path>}
<num>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1 to 10].
<path>:= Quoted string of path with an extension ".xml"

NOTICE

The file format is not automatically determined by the file name extension. Choose a file name with an extension which is consistent with the selected file format.

Example SAVE:SET INT,1

Related **SAVE:DEFault**
RECall:SETup

SYSTem Commands

The **SYSTem** subsystem commands control the basic system functions of the oscilloscope.

19.1 SYSTem:BUZZer

Description Write or read the status of lthe buzzer.

Syntax SYSTem:BUZZer <state>
<state>:= {ON | OFF}

Query SYSTem:BUZZer?

Example SYST:BUZZ ON
SYST:BUZZ?

Response Returns: ON

19.2 SYSTem:CLOCk

Description Write or read the oscilloscope clock source and the state of the 10 MHz clock output.

Syntax SYSTem:CLOCk <source>
<source>:= {EXT | IN_ON | IN_OFF}

- EXT selects the external clock source. The 10 MHz output will be automatically disabled.
- IN_ON selects the internal clock source and enables the 10 MHz output.
- IN_OFF selects the internal clock source and disables the 10M output.

Query SYSTem:CLOCk?

Example SYST:CLOC IN_ON
SYST:CLOC?

Response Returns: IN_ON

19.3 SYSTem:COMMunicate:LAN:GATeway

Description Write or read the gateway of the internal network of the oscilloscope.

Syntax SYSTem:COMMunicate:LAN:GATeway <string>
<string>:=quoted string of ASCII text.

Query SYSTem:COMMunicate:LAN:GATeway?

Example SYST:COMM:LAN:GAT "10.0.0.1"
SYST:COMM:LAN:GAT?

Response Returns: 10.0.0.1"

Related **SYSTem:COMMunicate:LAN:IPADdress**
SYSTem:COMMunicate:LAN:SMASk
SYSTem:COMMunicate:LAN:TYPE

19.4 SYSTem:COMMunicate:LAN:IPADdress

Description Write or read the IP address of the oscilloscope's internal network interface.

Syntax SYSTem:COMMunicate:LAN:IPADdress <string>
<string>:=quoted string of ASCII text.

Query SYSTem:COMMunicate:LAN:IPADdress?

Example SYST:COMM:LAN:IPAD "10.0.0.229"

Response Returns: "10.0.0.229"

Related **SYSTem:COMMunicate:LAN:GATeway**
SYSTem:COMMunicate:LAN:SMASk
SYSTem:COMMunicate:LAN:TYPE

19.5 SYSTem:COMMunicate:LAN:MAC

Description Return the MAC address of the oscilloscope.

Query SYSTem:COMMunicate:LAN:MAC?

Example SYST:COMM:LAN:MAC?

Response Returns:00:01:D2:0C:00:A0

19.6 SYSTem:COMMunicate:LAN:SMASk

Description Write or read the subnet mask of the oscilloscope's internal network interface.

Syntax SYSTem:COMMunicate:LAN:SMASK <string>
<string>:=quoted string of ASCII text.

Query SYSTem:COMMunicate:LAN:SMASK?

Example SYST:COMM:LAN:SMAS "255.255.0.0" SYST:COMM:LAN:SMAS?

Response Returns: "255.255.0.0"

Related **SYSTem:COMMunicate:LAN:GATeway**
SYSTem:COMMunicate:LAN:IPADdress
SYSTem:COMMunicate:LAN:TYPE

19.7 SYSTem:COMMunicate:LAN:TYPE

Description Write or read the type of LAN configuration settings.

Syntax SYSTem:COMMunicate:LAN:TYPE <state>
<state>:= {STATIC | DHCP}

- STATIC means that the Ethernet settings will be configured manually, using commands **SYSTem:COMMunicate:LAN:IPADdress**, S YSTem:COMMunicate:LAN:SMASK, and **SYSTem:COMMunicate:LAN:GATeway**
- DHCP means that the oscilloscope's IP address, subnet mask and gateway settings will be received from a DHCP server on the local network.

Query SYSTem:COMMunicate:LAN:TYPE?

Example SYST:COMM:LAN:TYPE DHCP
SYST:COMM:LAN:TYPE?

Response Returns: DHCP

Related **SYSTem:COMMunicate:LAN:GATeway**
SYSTem:COMMunicate:LAN:IPADdress
SYSTem:COMMunicate:LAN:SMASk

19.8 SYSTem:COMMunicate:VNCPort

Description Write or read the VNC port of the oscilloscope.

Syntax SYSTem:COMMunicate:VNCPort <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [5900, 5999].

Query SYSTem:COMMunicate:VNCPort?

Example SYST:COMM:VNCP 5903
SYST:COMM:VNCP?

Response Returns: 5903

19.9 SYSTem:DATE

Description Write or read the system date of the oscilloscope.

Syntax SYSTem:DATE <date>
<date>:= 8-digit NR1 format, from high to low, is expressed as a 4-digit year, 2-digit month, and 2-digit day.

Query SYSTem:DATE?

Example SYST:DATE 20190819
SYST:DATE?

Response Returns: 20190819

Related **SYSTem:TIME**

19.10 SYSTem:EDUMode

Description Write or read the education mode(locks the AutoSetup, measure and cursors functions) of the oscilloscope.

Syntax SYSTem:EDUMode <func>, <lock>
<func>:= {AUTOSet | MEASure | CURSor}
<lock>:= {ON | OFF}

- ON means the enable the function.
- OFF means disable the function.

Query SYSTem:EDUMode? <func>
SYSTem:EDUMode?

NOTICE The query without parameters will return the lock status of all functions.

Example SYST:EDUM AUTOS,OFF
SYST:EDUM AUTOS?
SYST:EDUM?

Response Returns: OFF

19.11 SYSTem:LANGuage

Description Write or read the oscilloscope's language display.

Syntax SYSTem:LANGuage <language>
<language>:= {SCHinese | TCHinese | ENGLish | FRENch | JAPanese | KORean | DEUTsch | ESPan | RUSSian | ITALiana | PORTuguese}

Query SYSTem:LANGuage?

Example SYST:LANG ENGL
SYST:LANG?

Response Returns: ENGLish

19.12 SYSTem:PON

Description Write or read the state of the Power-On-Line function. When enabled, the instrument will reboot automatically if the power is removed and re-established.

Syntax SYSTem:PON <state>
<state>:= {ON | OFF}

Query SYSTem:PON?

Example SYST:PON ON
SYST:PON?

Response Returns: ON

19.13 SYSTem:REBoot

Description Restarts the oscilloscope.

Syntax SYSTem:REBoot

Example SYST:REB

Related **SYSTem:SHUTdown**

19.14 SYSTem:REMote

Description Write or read the status of the remote control. When the remote control is turned on, the touch screen, the front panel and the touch sccreen, front panel and perphereal will be locked and there will be prompt on the screen.

Syntax SYSTem:REMote <state>
<state>:= {ON | OFF}

Query SYSTem:REMote?

Example SYST:REM ON
SYST:REM?

Response Returns: ON

19.15 SYSTem:SELFCal

Description Write or read the the state of the self-calibration function.

Syntax SYSTem:SELFCal

Query SYSTem:SELFCal?
<state>:= {DOING | DONE}

Example SYST:SELFC
SYST:SELFC?

Response Returns: DONE

19.16 SYSTem:SHUTdown

Description Shuts down the oscilloscope.

Syntax SYSTem:SHUTdown

Example SYST:SHUT

Related **SYSTem:REBoot**

19.17 SYSTem:SSAVer

Description Write or read the state of the automatic screensaver function. The automatic screensaver function shuts down the internal color monitor after a preset time.

Syntax SYSTem:SSAVer <time>
<time>:= {OFF | 1MIN | 5MIN | 10MIN | 30MIN | 60MIN}

Query SYSTem:SSAVer?

Example SYST:SSAV 10MIN
SYST:SSAV?

Response Returns: 10MIN

19.18 SYSTem:TIME

Description Write or read the current time using a 24-hour format.

Syntax SYSTem:TIME <time>
<time>:= 8-digit NR1 format, from high to low, is expressed as 2-digit hour, 2-digit minute, and 2-digit second.

Query SYSTem:TIME?

Example SYST:TIME 081040
SYST:TIME?

Response Returns: 081043

Related **SYSTem:DATE**

19.19 SYSTem:TOUCh

Description Write or read the status of the touch screen.

Syntax SYSTem:TOUCh <state>
<state>:= {ON | OFF}

Query SYSTem:TOUCh?

Example SYST:TOUC ON
SYST:TOUC?

Response Returns: ON

TIMebase Commands

The **TIMEBASE** subsystem commands control the horizontal (X-axis) functions. The time per division, delay, and reference can be controlled for the main and window (zoomed) time bases.

20.1 TIMebase:DELay

Description Write or read the main timebase delay. The main timebase delay is the time between the trigger event and the delay reference point on the screen.

Syntax TIMebase:DELay <delay_value>
<delay_value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-5000div*timebase, 5div*timebase].

Query TIMebase:DELay?

Example TIM:DEL 1.00E-05
TIM:DEL?

Response Returns: 1.00E-05

Related **TIMebase:SCALe**

20.2 TIMebase:SCALe

Description Write or read the horizontal scale per division for the main window.

NOTICE Due to the limitation of the expansion strategy, when the time base is set from large to small, it will automatically adjust to the minimum time base that can be set currently.

Syntax TIMebase:SCALe <value>
<value>:= Value in NR3 format, including a decimal point and exponent.

NOTICE The range of value varies from the models. See the datasheet for details.

Query TIMebase:SCALe?

Example TIM:SCAL 1.00E-07
TIM:SCAL?

Response Returns: 1.00E-07

Related **TIMebase:DELay**

20.3 TIMebase:WINDow

Description Write or read the state of the zommed window.

Syntax TIMebase:WINDow <state>
<state>:= {ON | OFF}

Query TIMebase:WINDow?

Example TIM:WIND ON
TIM:WIND?

Response Returns: ON

Related **TIMebase:WINDow:DELay TIMebase:WINDow:SCALe**

20.4 TIMebase:WINDow:DELay

Description Write or read the horizontal position in the zoomed view of the main sweep.

Syntax TIMebase:WINDow:DELay <delay_value>
<delay_value>:= Value in NR3 format, including a decimal point and exponent.

NOTICE

The main sweep range and the main sweep horizontal position determine the range for the delay value of the zoomed window. It must keep the zoomed view window within the main sweep range. If the delay value is set outside of the legal range, the delay value is automatically set to the nearest legal value.

Query TIMebase:WINDow:DELay?

Example TIM:WIND:DEL 1.00E-03
TIM:WIND:DEL?

Response Returns: 1.00E-03

Related **TIMebase:WINDow:SCALe**
TIMebase:SCALe
TIMebase:DELay

20.5 TIMebase:WINDow:SCALe

Description Write or read the zoomed window horizontal scale(seconds/division).

Syntax TIMebase:WINDow:SCALe <scale_value>
<scale_value>:= Value in NR3 format, including a decimal point and exponent.

NOTICE

The scale of the zoomed window cannot be greater than that of the main window. If the value greater than, it will automatically be set to the same value as the main window.

Query TIMebase:WINDow:SCALe?

Example TIM:WIND:SCAL 1.00E-03
TIM:WIND:SCAL?

Response Returns: 1.00E-03

Related **TIMebase:WINDow:DELay**
TIMebase:SCALe
TIMebase:DELay

Trigger Commands

The **TRIGger** subsystem commands control the trigger modes and parameters for each trigger type.

21.1 TRIGger:MODE

Description Write or read the mode of the trigger.

Syntax TRIGger:MODE <mode>
<mode>:= {SINGle | NORMal | AUTO}

- **AUTO:** The oscilloscope begins to search for the trigger signal that meets the conditions. If the trigger signal is satisfied, the running state on the top left corner of the user interface shows Trig'd, and the interface shows stable waveform. Otherwise, the running state always shows Auto, and the interface shows unstable waveform.

- **NORMal**: The oscilloscope enters the wait trigger state and begins to search for trigger signals that meet the conditions. If the trigger signal is satisfied, the running state shows Trig'd, and the interface shows stable waveform. Otherwise, the running state shows Ready, and the interface displays the last triggered waveform (previous trigger) or does not display the waveform (no previous trigger).

- **SINGle**: The backlight of SINGLE key lights up, the oscilloscope enters the waiting trigger state and begins to search for the trigger signal that meets the conditions. If the trigger signal is satisfied, the running state shows Trig'd, and the interface shows stable waveform. Then, the oscilloscope stops scanning, the RUN/STOP key becomes red, and the running status shows Stop Otherwise, the running state shows Ready, and the interface does not display the waveform.

Query TRIGger:MODE?

Example TRIG:MODE SING
TRIG:MODE?

Response Returns: SINGle

21.2 TRIGger:RUN

Description Sets the oscilloscope to run.

Syntax TRIGger:RUN

Example TRIG:RUN

Related **TRIGger:STOP**

21.3 TRIGger:STATus

Description Returns the current state of the trigger.

Query TRIGger:STATus?

Example TRIG:STAT?

Response Returns: Stop

Related **TRIGger:MODE**

21.4 TRIGger:STOP

Description Sets the oscilloscope from run to stop.

Syntax TRIGger:STOP

Example TRIG:STOP

Related TRIGger:RUN

21.5 TRIGger:TYPE

Description Write or read the type of trigger.

Syntax TRIGger:TYPE <type>
<type>:= {EDGE | PULSe | SLOPe | INTerval | PATTern | RUNT | QUALified | WINDow | DROPout | VIDeo | IIC | SPI | UART | LIN | CAN | FLEXray | CANFd | IIS}

Query TRIGger:TYPE?

Example TRIG:TYPE EDGE
TRIG:TYPE?

Response Returns: EDGE

Trigger Edge Commands

The **TRIGger:EDGE** subsystem commands control the edge trigger parameters.

22.1 TRIGger:EDGE:COUPling

Description Write or read the coupling mode of the edge trigger.

Syntax TRIGger:EDGE:COUPling <mode>
<mode>:= {DC | AC | LFREJect | HFREJect}

- DC coupling allows dc and ac signals into the trigger path.
- AC coupling places a high-pass filter in the trigger path, removing dc offset voltage from the trigger waveform. Use AC coupling to get a stable edge trigger when your waveform has a large dc offset.
- HFREJect which is a high-frequency rejection filter that adds a low-pass filter in the trigger path to remove high-frequency components from the trigger waveform. Use the high-frequency rejection filter to remove high-frequency noise, such as AM or FM broadcast stations, from the trigger path.
- LFREJect which is a low frequency rejection filter adds a high-pass filter in series with the trigger waveform to remove any unwanted low-frequency components from a trigger waveform, such as power line frequencies, that can interfere with proper triggering.

Query TRIGger:EDGE:COUPling?

Example TRIG:EDGE:COUP DC
TRIG:EDGE:COUP?

Response Returns: DC

22.2 TRIGger:EDGE:HLDEVent

Description Write or read the number of holdoff events of the edge trigger.

Syntax TRIGger:EDGE:HLDEVent <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1 to 100000000].

Query TRIGger:EDGE:HLDEVent?

Example TRIG:EDGE:HLDEV 3
TRIG:EDGE:HLDEV?

Response Returns: 3

Related **TRIGger:EDGE:HOLDoff**

22.3 TRIGger:EDGE:HLDTime

Description Write or read the holdoff time of the ede trigger.

Syntax TRIGger:EDGE:HLDTime <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of this value is [8.00E-09, 3.00E+01]

Query TRIGger:EDGE:HLDTime?

Example TRIG:EDGE:HLDT 1.50E-08
TRIG:EDGE:HLDT?

Response Returns: 1.50E-08

Related **TRIGger:DROPout:HOLDoff**

22.4 TRIGger:EDGE:HOLDoff

Description Write or read the holdoff type of the edge trigger.

Syntax TRIGger:EDGE:HOLDoff <holdoff_type>
<holdoff_type>:= {OFF | EVENts |TIME}

- OFF means to turn off the holdoff.
- EVENts means the number of trigger events that the oscilloscope counts before re-arming the trigger circuitry.
- TIME means the amount of time that the oscilloscope waits before re-arming the trigger circuitry.

Query TRIGger:EDGE:HOLDoff?

Example TRIG:EDGE:HOLD OFF
TRIG:EDGE:HOLD?

Response Returns: OFF

Related **TRIGger:EDGE:HLDEVent**
TRIGger:EDGE:HLDTime
TRIGger:EDGE:HSTart

22.5 TRIGger:EDGE:HSTart

Description Write or read the initial position of the edge trigger holdoff.

Syntax TRIGger:EDGE:HSTart <start_holdoff>
<start_holdoff>:= {LAST_TRIG| ACQ_START}

- LAST_TRIG means the initial position of holdoff is the first time point satisfying the trigger condition.
- ACQ_START means the initial position of holdoff is the time of the last trigger.

Query TRIGger:EDGE:HSTart?

Example TRIG:EDGE:HST LAST_TRIG
TRIG:EDGE:HST?

Response Returns: LAST_TRIG

Related **TRIGger:EDGE:HOLDoff**

22.6 TRIGger:EDGE:LEVel

Description Write or read the trigger level of the edge trigger.

Syntax TRIGger:EDGE:LEVel <level_value>
<level_value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset]

Query TRIGger:EDGE:LEVel?

Example TRIG:EDGE:LEV 5.00E-01
TRIG:EDGE:LEV?

Response Returns: 5.00E-01

Related **TRIGger:EDGE:SOURce**

22.7 TRIGger:EDGE:NREJect

Description Write or read the state of the noise rejection.

Syntax TRIGger:EDGE:NREJect <state>
<state>:= {OFF | ON}

Query TRIGger:EDGE:NREJect?

Example TRIG:EDGE:NREJ ON
TRIG:EDGE:NREJ?

Response Returns: ON

22.8 TRIGger:EDGE:SLOPe

Description Write or read the slope of the edge trigger.

Syntax TRIGger:EDGE:SLOPe <slope_type>
<slope_type>:= {RISing | FALLing | ALTernate}

Query TRIGger:EDGE:SLOPe?

Example TRIG:EDGE:SLOP RIS
TRIG:EDGE:SLOP?

Response Returns: RISing

22.9 TRIGger:EDGE:SOURce

Description Write or read the trigger source of the edge trigger.

Syntax TRIGger:EDGE:SOURce <source>
<source>:= {C<x> | EX | EX5 | LINE}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:EDGE:SOURce?

Example TRIG:EDGE:SOUR C1
TRIG:EDGE:SOUR?

Response Returns: C1

Related **TRIGger:EDGE:LEVel**

Trigger Slope Commands

The **TRIGGER:SLOPe** subsystem commands control the slope trigger parameters.

23.1 TRIGger:SLOPe:COUPling

Description Write or read the coupling mode of the slope trigger.

Syntax TRIGger:SLOPe:COUPling <mode>
<mode>:= {DC | AC | LFREJect | HFREJect}

- DC coupling allows dc and ac signals into the trigger path.
- AC coupling places a high-pass filter in the trigger path, removing dc offset voltage from the trigger waveform. Use AC coupling to get a stable slope trigger when your waveform has a large dc offset.
- HFREJect which is a high-frequency rejection filter that adds a low-pass filter in the trigger path to remove high-frequency components from the trigger waveform. Use the high-frequency rejection filter to remove high-frequency noise, such as AM or FM broadcast stations, from the trigger path.
- LFREJect which is a low frequency rejection filter adds a high-pass filter in series with the trigger waveform to remove any unwanted low-frequency components from a trigger waveform, such as power line frequencies, that can interfere with proper triggering.

Query TRIGger:SLOPe:COUPling?

Example TRIG:SLOP:COUP DC
TRIG:SLOP:COUP?

Response Returns: DC

23.2 TRIGger:SLOPe:HLDEVent

Description Write or read the number of holdoff events of the slope trigger.

Syntax TRIGger:SLOPe:HLDEVent <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1 to 100000000].

Query TRIGger:SLOPe:HLDEVent?

Example TRIG:SLOP:HLDEV 3
TRIG:SLOP:HLDEV?

Response Returns: 3

Related **TRIGger:SLOPe:HOLDoff**

23.3 TRIGger:SLOPe:HLDTime

Description Write or read the holdoff time of the slope trigger.

Syntax TRIGger:SLOPe:HLDTime <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of this value is [8.00E-09, 3.00E+01]

Query TRIGger:SLOPe:HLDTime?

Example TRIG:SLOP:HLDT 1.50E-08
TRIG:SLOP:HLDT?

Response Returns: 1.50E-08

Related **TRIGger:DROPout:HOLDoff**

23.4 TRIGger:SLOPe:HOLDoff

Description Write or read the holdoff type of the slope trigger.

Syntax TRIGger:SLOPe:HOLDoff <holdoff_type>
<holdoff_type>:= {OFF | EVENts |TIME}

- OFF means to turn off the holdoff.
- EVENts means the number of trigger events that the oscilloscope counts before re-arming the trigger circuitry.
- TIME means the amount of time that the oscilloscope waits before re-arming the trigger circuitry.

Query TRIGger:SLOPe:HOLDoff?

Example TRIG:SLOP:HOLD OFF
TRIG:SLOP:HOLD?

Response Returns: OFF

Related **TRIGger:SLOPe:HLDEVent**
TRIGger:SLOPe:HLDTime
TRIGger:SLOPe:HSTart

23.5 TRIGger:SLOPe:HSTart

Description Write or read the initial position of the slope trigger holdoff.

Syntax TRIGger:SLOPe:HSTart <start_holdoff>
<start_holdoff>:= {LAST_TRIG| ACQ_START}

- LAST_TRIG means the initial position of holdoff is the first time point satisfying the trigger condition.
- ACQ_START means the initial position of holdoff is the time of the last trigger.

Query TRIGger:SLOPe:HSTart?

Example TRIG:SLOP:HST LAST_TRIG
TRIG:SLOP:HST?

Response Returns: LAST_TRIG

Related **TRIGger:SLOPe:HOLDoff**

23.6 TRIGger:SLOPe:LIMit

Description Write or read the limit range type of the slope trigger.

Syntax TRIGger:SLOPe:LIMit <type>
<type>:= {LESSthan | GREATerthan | INNer | OUTer}

Query TRIGger:SLOPe:LIMit?

Example TRIG:SIOP:LIM LESS
TRIG:SIOP:LIM?

Response Returns: LESSthan

Related **TRIGger:SLOPe:TLOWer**
TRIGger:SLOPe:TUPPer

23.7 TRIGger:SLOPe:LLEVel

Description Write or read the trigger level of the slope trigger.

Syntax TRIGger:SLOPe:LLEVel <level_value>
<level_value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:SLOPe:LLEVel?

Example TRIG:SLOP:LLEV 5.00E-01
TRIG:SLOP:LLEV?

Response Returns: 5.00E-01

Related **TRIGger:SLOPe:SOURce**

23.8 TRIGger:SLOPe:NREJect

Description Write or read the state of the noise rejection.

Syntax TRIGger:SLOPe:NREJect <state>
<state>:= {OFF | ON}

Query TRIGger:SLOPe:NREJect?

Example TRIG:SLOP:NREJ ON
TRIG:SLOP:NREJ?

Response Returns: ON

23.9 TRIGger:SLOPe:SLOPe

Description Write or read the slope of the slope trigger.

Syntax TRIGger:SLOPe:SLOPe <slope_type>
<slope_type>:= {RISing | FALLing | ALTernate}

Query TRIGger:SLOPe:SLOPe?

Example TRIG:SLOP:SLOP RIS
TRIG:SLOP:SLOP?

Response Returns: RISing

23.10 TRIGger:SLOPe:SOURce

Description Write or read the trigger source of the slope trigger.

Syntax TRIGger:SLOPe:SOURce <source>
<source>:= {C<x> | EX | EX5 | LINE}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:SLOPe:SOURce?

Example TRIG:SLOP:SOUR C1
TRIG:SLOP:SOUR?

Response Returns: C1

Related **TRIGger:SLOPe:LLEVel**

23.11 TRIGger:SLOPe:TLOWer

Description Write or read the lower value of the slope trigger limit type.

Syntax TRIGger:SLOPe:TLOWer <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [2.00E-09, 2.00E+01].

NOTICE

The lower value cannot be greater than the upper value using by the command **TRIGger:SLOPe:TUPPer**. The command is not valid when the limit range type is LESSthan.

Query TRIGger:SLOPe:TLOWer?

Example TRIG:SLOP:TLOW 1.00E-08
TRIG:SLOP:TLOW?

Response Returns: 1.00E-08

Related **TRIGger:SLOPe:LIMit**
TRIGger:SLOPe:TUPPer

23.12 TRIGger:SLOPe:TUPPer

Description Write or read the upper value of the slope trigger limit type.

Syntax TRIGger:SLOPe:TUPPer <value> <value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [3.00E-09, 2.00E+01].

NOTICE

The upper value cannot be less than the lower value using by the command **TRIGger:SLOPe:TLOWer**. The command is not valid when the limit range type is GREATerthan.

Query TRIGger:SLOPe:TUPPer?

Example TRIG:SLOP:TUPP 3.00E-08
TRIG:SLOP:TUPP?

Response Returns: **TRIGger:SLOPe:LIMit**
TRIGger:SLOPe:TLOWer

Trigger Pulse Commands

The **TRIGGER:PULSe** subsystem commands control the pulse trigger parameters.

24.1 TRIGger:PULSe:COUPling

Description Write or read the coupling mode of the pulse trigger.

Syntax TRIGger:PULSe:COUPling <mode>
<mode>:= {DC | AC | LFREJect | HFREJect}

- DC coupling allows dc and ac signals into the trigger path.
- AC coupling places a high-pass filter in the trigger path, removing dc offset voltage from the trigger waveform. Use AC coupling to get a stable pulse trigger when your waveform has a large dc offset.
- HFREJect which is a high-frequency rejection filter that adds a low-pass filter in the trigger path to remove high-frequency components from the trigger waveform. Use the high-frequency rejection filter to remove high-frequency noise, such as AM or FM broadcast stations, from the trigger path.
- LFREJect which is a low frequency rejection filter adds a high-pass filter in series with the trigger waveform to remove any unwanted low-frequency components from a trigger waveform, such as power line frequencies, that can interfere with proper triggering.

Query TRIGger:PULSe:COUPling?

Example TRIG:PULS:COUP DC
TRIG:PULS:COUP?

Response Returns: DC

24.2 TRIGger:PULSe:HLDEVent

Description Write or read the number of holdoff events of the pulse trigger.

Syntax TRIGger:PULSe:HLDEVent <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1 to 100000000].

Query TRIGger:PULSe:HLDEVent?

Example TRIG:PULS:HLDEV 3
TRIG:PULS:HLDEV?

Response Returns: 3

Related **TRIGger:PULSe:HOLDoff**

24.3 TRIGger:PULSe:HLDTime

Description Write or read the holdoff time of the pulse trigger.

Syntax TRIGger:PULSe:HLDTime <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of this value is [8.00E-09, 3.00E+01]

Query TRIGger:PULSe:HLDTime?

Example TRIG:PULS:HLDT 1.50E-08
TRIG:PULS:HLDT?

Response Returns: 1.50E-08

Related **TRIGger:DROPout:HOLDoff**

24.4 TRIGger:PULSe:HOLDoff

Description Write or read the holdoff type of the pulse trigger.

Syntax TRIGger:PULSe:HOLDoff <holdoff_type>
<holdoff_type>:= {OFF | EVENts |TIME}

- OFF means to turn off the holdoff.
- EVENts means the number of trigger events that the oscilloscope counts before re-arming the trigger circuitry.
- TIME means the amount of time that the oscilloscope waits before re-arming the trigger circuitry.

Query TRIGger:PULSe:HOLDoff?

Example TRIG:PULS:HOLD OFF
TRIG:PULS:HOLD?

Response Returns: OFF

Related **TRIGger:PULSe:HLDEVent**
TRIGger:PULSe:HLDTime
TRIGger:PULSe:HSTart

24.5 TRIGger:PULSe:HSTart

Description Write or read the initial position of the pulse trigger holdoff.

Syntax TRIGger:PULSe:HSTart <start_holdoff>
<start_holdoff>:= {LAST_TRIG| ACQ_START}

- LAST_TRIG means the initial position of holdoff is the first time point satisfying the trigger condition.
- ACQ_START means the initial position of holdoff is the time of the last trigger.

Query TRIGger:PULSe:HSTart?

Example TRIG:PULS:HST LAST_TRIG
TRIG:PULS:HST?

Response Returns: LAST_TRIG

Related **TRIGger:PULSe:HOLDoff**

24.6 TRIGger:PULSe:LIMit

Description Write or read the limit range type of the pulse trigger.

Syntax TRIGger:PULSe:LIMit <type>
<type>:= {LESSthan | GREATerthan | INNer | OUTer}

Query TRIGger:PULSe:LIMit?

Example TRIG:SIOP:LIM LESS
TRIG:SIOP:LIM?

Response Returns: LESSthan

Related **TRIGger:PULSe:TLOWer**
TRIGger:PULSe:TUPPer

24.7 TRIGger:PULSe:LEVel

Description Write or read the trigger level of the pulse trigger.

Syntax TRIGger:PULSe:LEVel <level_value>
<level_value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:PULSe:LEVel?

Example TRIG:PULS:LEV 5.00E-01
TRIG:PULS:LEV?

Response Returns: 5.00E-01

Related **TRIGger:PULSe:SOURce**

24.8 TRIGger:PULSe:NREJect

Description Write or read the state of the noise rejection.

Syntax TRIGger:PULSe:NREJect <state>
<state>:= {OFF | ON}

Query TRIGger:PULSe:NREJect?

Example TRIG:PULS:NREJ ON
TRIG:PULS:NREJ?

Response Returns: ON

24.9 TRIGger:PULSe:POLarity

Description Write or read the polarity of the pulse trigger.

Syntax TRIGger:PULSe:POLarity <polarity_type>
<polarity_type>:= {POSitive | NEGative}

Query TRIGger:PULSe:POLarity?

Example TRIG:PULS:POL POS
TRIG:PULS:POL?

Response Returns: POSitive

24.10 TRIGger:PULSe:SOURce

Description Write or read the trigger source of the pulse trigger.

Syntax TRIGger:PULSe:SOURce <source>
<source>:= {C<x> | EX | EX5 | LINE}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:PULSe:SOURce?

Example TRIG:PULS:SOUR C1
TRIG:PULS:SOUR?

Response Returns: C1

Related **TRIGger:PULSe:LEVel**

24.11 TRIGger:PULSe:TLOWer

Description Write or read the lower value of the pulse trigger limit type.

Syntax TRIGger:PULSe:TLOWer <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [2.00E-09, 2.00E+01].

NOTICE The lower value cannot be greater than the upper value using by the command **TRIGger:PULSe:TUPPer**. The command is not valid when the limit range type is LESSthan.

Query TRIGger:PULSe:TLOWer?

Example TRIG:PULS:TLOW 1.00E-08
TRIG:PULS:TLOW?

Response Returns: 1.00E-08

Related **TRIGger:PULSe:LIMit**
TRIGger:PULSe:TUPPer

24.12 TRIGger:PULSe:TUPPer

Description Write or read the upper value of the pulse trigger limit type.

Syntax TRIGger:PULSe:TUPPer <value> <value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [3.00E-09, 2.00E+01].

NOTICE

The upper value cannot be less than the lower value using by the command **TRIGger:PULSe:TLOWer**. The command is not valid when the limit range type is GREATerthan.

Query TRIGger:PULSe:TUPPer?

Example TRIG:PULS:TUPP 3.00E-08
TRIG:PULS:TUPP?

Response Returns: 3.00E-08

Related **TRIGger:PULSe:LIMit**
TRIGger:PULSe:TLOWer

Trigger Video Commands

The **TRIGGER:VIDeo** subsystem commands control the video trigger parameters.

25.1 TRIGger:VIDeo:FCNT

Description Write or read the fields of the custom video trigger.

Syntax TRIGger:VIDeo:FCNT <field_cnt>
<field_cnt>:= {1 | 2 | 4 | 8}

Query TRIGger:VIDeo:FCNT?

Example TRIG:VID:FCNT 8
TRIG:VID:FCNT?

Response Returns: 8

Related **TRIGger:VIDeo:STANdard**

25.2 TRIGger:VIDeo:FIELd

Description Write or read the synchronous trigger field when the video standard is NTSC, PAL, 1080i/50 or 1080i/60.

Syntax TRIGger:VIDeo:FIELd <field>
<field>:= {1 | 2}

Query TRIGger:VIDeo:FIELd?

Example TRIG:VID:FIEL 2
TRIG:VID:FIEL?

Response Returns: 2

Related **TRIGger:VIDeo:STANdard**
TRIGger:VIDeo:SYNC

25.3 TRIGger:VIDeo:FRATe

Description Write or read the frame rate of the custom video trigger.

Syntax TRIGger:VIDeo:FRATe <frate>
<frate>:= {25Hz | 30Hz | 50Hz | 60Hz}

Query TRIGger:VIDeo:FRATe?

Example TRIG:VID:FRAT 50Hz
TRIG:VID:FRAT?

Response Returns: 50Hz

Related **TRIGger:VIDeo:STANdard**

25.4 TRIGger:VIDeo:INTerlace

Description Write or read the interlace of the custom video trigger.

Syntax TRIGger:VIDeo:INTerlace <interlace>
<interlace>:= {1 | 2 | 4 | 8}

Query TRIGger:VIDeo:INTerlace?

Example TRIG:VID:INT 8
TRIG:VID:INT?

Response Returns: 8

Related **TRIGger:VIDeo:STANdard**

25.5 TRIGger:VIDeo:LCNT

Description Write or read the lines of the custom video trigger.

If the "Of Lines" is set to 800, the correct relationship between the interface, of fields, trigger line and trigger field is as follows:

Of Lines	Interface	Of Fields	Line	Trigger Field
800	1:1	1	800	1
800	2:1	1/2/4/8	400	1/1 2/1 4/1 8
800	4:1	1/2/4/8	300	1/1 2/1 4/1 8
800	8:1	1/2/4/8	100	1/1 2/1 4/1 8

Table 25.1 Parameters Relationship

Syntax TRIGger:VIDeo:LCNT <line_cnt>
<line_cnt>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [300, 2000].

Query TRIGger:VIDeo:LCNT?

Example TRIG:VID:LCNT 500
TRIG:VID:LCNT?

Response Returns: 500

Related **TRIGger:VIDeo:STANdard**

25.6 TRIGger:VIDeo:LEVel

Description Write or read the trigger level of the video trigger.

Syntax TRIGger:VIDeo:LEVel <level_value>
<level_value>:= Value in NR3 format. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:VIDeo:LEVel?

Example TRIG:VID:LEV 5.00E-01
TRIG:VID:LEV?

Response Returns: 5.00E-01

25.7 TRIGger:VIDeo:LINE

Description Write or read the synchronous trigger line when the video standard is not custom.

Syntax TRIGger:VIDeo:LINE <line>
<line>:= Value in NR1 format, including an integer and no decimal point.

Table 25.2 shows the corresponding relations between line and field for all video standards(except for custom)

Standard	Field 1	Field 2
NTSC	[1, 263]	[1,262]
PAL	[1, 313]	[1, 312]
HDTV 720P/50, 720P/60	[1, 750]	
HDTV 1080P/50, 1080P/60	[1, 1125]	
HDTV 1080i/50, 1080i/60	[1, 563]	[1, 562]

Table 25.2 Line and Field Relationships

Query TRIGger:VIDeo:LINE?

Example TRIG:VID:LINE 2
TRIG:VID:LINE?

Response Returns: 2

Related **TRIGger:VIDeo:STANdard TRIGger:VIDeo:SYNC**

25.8 TRIGger:VIDeo:SOURce

Description Write or read the trigger source of the video trigger.

Syntax TRIGger:VIDeo:SOURce <source>
<source>:= {C<x>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:VIDeo:SOURce?

Example TRIG:VID:SOUR C2
TRIG:VID:SOUR?

Response Returns: C2

25.9 TRIGger:VIDeo:STANdard

Description Write or read the standard of the video trigger.

Syntax TRIGger:VIDeo:STANdard <standard>
<standard>:= {NTSC | PAL | P720L50 | P720L60 | P1080L50 | P1080L60 | I1080L 50 | I1080L60 | CUSTom}

Query TRIGger:VIDeo:STANdard?

Example TRIG:VID:STAN NTSC
TRIG:VID:STAN?

Response Returns: NTSC

25.10 TRIGger:VIDeo:SYNC

Description Write or read the sync mode of the video trigger.

Syntax TRIGger:VIDeo:SYNC <sync>
<sync>:= {SELect | ANY}

Query TRIGger:VIDeo:SYNC?

Example TRIG:VID:SYNC SEL
TRIG:VID:SYNC?

Response Returns: SELect

Related **TRIGger:VIDeo:STANdard**
TRIGger:VIDeo:LINE
TRIGger:VIDeo:FIELd

Trigger Window Commands

The **TRIGGER:WINDow** subsystem commands control the window trigger parameters.

26.1 TRIGger:WINDow:CLEVel

Description Write or read the center level of the window trigger.

Syntax TRIGger:WINDow:CLEVel <value>
<value>:= Value in NR3 format. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:WINDow:CLEVel?

Example
TRIG:WIND:CLEV 5.00E-01
TRIG:WIND:CLEV?

Response Returns: 5.00E-01

Related **TRIGger:WINDow:DLEVel**

26.2 TRIGger:WINDow:COUPling

Description Write or read the coupling mode of the WINDow trigger.

Syntax TRIGger:WINDow:COUPling <mode>
<mode>:= {DC | AC | LFREJect | HFREJect}

- DC coupling allows dc and ac signals into the trigger path.
- AC coupling places a high-pass filter in the trigger path, removing dc offset voltage from the trigger waveform. Use AC coupling to get a stable WINDow trigger when your waveform has a large dc offset.
- HFREJect which is a high-frequency rejection filter that adds a low-pass filter in the trigger path to remove high-frequency components from the trigger waveform. Use the high-frequency rejection filter to remove high-frequency noise, such as AM or FM broadcast stations, from the trigger path.
- LFREJect which is a low frequency rejection filter adds a high-pass filter in series with the trigger waveform to remove any unwanted low-frequency components from a trigger waveform, such as power line frequencies, that can interfere with proper triggering.

Query TRIGger:WINDow:COUPling?

Example
TRIG:WIND:COUP DC
TRIG:WIND:COUP?

Response Returns: DC

26.3 TRIGger:WINDow:DLEVel

Description Write or read the delta level of the window trigger.

Syntax TRIGger:WINDow:DLEVel <value> <value>:= Value in NR3 format. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:WINDow:DLEVel?

Example
TRIG:WIND:DLEV 5.00E-01
TRIG:WIND:DLEV?

Response Returns: 5.00E-01

Related **TRIGger:WINDow:CLEVel**

26.4 TRIGger:WINDow:HLDEVent

Description Write or read the number of holdoff events of the WINDow trigger.

Syntax TRIGger:WINDow:HLDEVent <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1 to 100000000].

Query TRIGger:WINDow:HLDEVent?

Example
TRIG:WIND:HLDEV 3
TRIG:WIND:HLDEV?

Response Returns: 3

Related **TRIGger:WINDow:HOLDoff**

26.5 TRIGger:WINDow:HLDTime

Description Write or read the holdoff time of the WINDow trigger.

Syntax TRIGger:WINDow:HLDTime <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of this value is [8.00E-09, 3.00E+01]

Query TRIGger:WINDow:HLDTime?

Example TRIG:WIND:HLDT 1.50E-08
TRIG:WIND:HLDT?

Response Returns: 1.50E-08

Related **TRIGger:DROPout:HOLDoff**

26.6 TRIGger:WINDow:HLEVel

Description Write or read teh hgih trigger level of the window trigger.

Syntax TRIGger:WINDow:HLEVel <value>
<value>:= Value in NR3 format. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:WINDow:HLEVel?

Example TRIG:WIND:HLEV 5.00E-01
TRIG:WIND:HLEV?

Response Returns: 5.00E-01

Related **TRIGger:WINDow:LEVel**

26.7 TRIGger:WINDow:HOLDoff

Description Write or read the holdoff type of the WINDow trigger.

Syntax TRIGger:WINDow:HOLDoff <holdoff_type>
<holdoff_type>:= {OFF | EVENts |TIME}

- OFF means to turn off the holdoff.
- EVENts means the number of trigger events that the oscilloscope counts before re-arming the trigger circuitry.
- TIME means the amount of time that the oscilloscope waits before re-arming the trigger circuitry.

Query TRIGger:WINDow:HOLDoff?

Example TRIG:WIND:HOLD OFF
TRIG:WIND:HOLD?

Response Returns: OFF

Related **TRIGger:WINDow:HLDEVent**
TRIGger:WINDow:HLDTime
TRIGger:WINDow:HSTart

26.8 TRIGger:WINDow:HSTart

Description Write or read the initial position of the WINDow trigger holdoff.

Syntax TRIGger:WINDow:HSTart <start_holdoff>
<start_holdoff>:= {LAST_TRIG| ACQ_START}

- LAST_TRIG means the initial position of holdoff is the first time point satisfying the trigger condition.
- ACQ_START means the initial position of holdoff is the time of the last trigger.

Query TRIGger:WINDow:HSTart?

Example TRIG:WIND:HST LAST_TRIG
TRIG:WIND:HST?

Response Returns: LAST_TRIG

Related **TRIGger:WINDow:HOLDoff**

26.9 TRIGger:WINDow:LEVel

Description Write or read the trigger level of the WINDow trigger.

Syntax TRIGger:WINDow:LEVel <level_value>
<level_value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:WINDow:LEVel?

Example TRIG:WIND:LEV 5.00E-01
TRIG:WIND:LEV?

Response Returns: 5.00E-01

Related **TRIGger:WINDow:SOURce**

26.10 TRIGger:WINDow:NREJect

Description Write or read the state of the noise rejection.

Syntax TRIGger:WINDow:NREJect <state>
<state>:= {OFF | ON}

Query TRIGger:WINDow:NREJect?

Example TRIG:WIND:NREJ ON
TRIG:WIND:NREJ?

Response Returns: ON

26.11 TRIGger:WINDow:SOURce

Description Write or read the trigger source of the WINDow trigger.

Syntax TRIGger:WINDow:SOURce <source>
<source>:= {C<x> | D<n> | EX | EX5 | LINE}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.
<n>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

Query TRIGger:WINDow:SOURce?

Example
```
TRIG:WIND:SOUR C1
TRIG:WIND:SOUR?
```

Response Returns: C1

Related **TRIGger:WINDow:LEVel**

26.12 TRIGger:WINDow:TYPE

Description Write or read the window type of the window trigger.

Syntax TRIGger:WINDow:TYPE <type>
<type>:= {ABSolute | RELative}

Query TRIGger:WINDow:TYPE?

Example
```
TRIG:WIND:TYPE ABS
TRIG:WIND:TYPE?
```

Response Returns: ABSolute

Trigger Interval Commands

The **TRIGGER:INTerval** subsystem commands control the interval trigger parameters.

27.1 TRIGger:INTerval:COUPling

Description Write or read the coupling mode of the interval trigger.

Syntax TRIGger:INTerval:COUPling <mode>
<mode>:= {DC | AC | LFREJect | HFREJect}

- DC coupling allows dc and ac signals into the trigger path.
- AC coupling places a high-pass filter in the trigger path, removing dc offset voltage from the trigger waveform. Use AC coupling to get a stable interval trigger when your waveform has a large dc offset.
- HFREJect which is a high-frequency rejection filter that adds a low-pass filter in the trigger path to remove high-frequency components from the trigger waveform. Use the high-frequency rejection filter to remove high-frequency noise, such as AM or FM broadcast stations, from the trigger path.
- LFREJect which is a low frequency rejection filter adds a high-pass filter in series with the trigger waveform to remove any unwanted low-frequency components from a trigger waveform, such as power line frequencies, that can interfere with proper triggering.

Query TRIGger:INTerval:COUPling?

Example TRIG:INT:COUP DC
TRIG:INT:COUP?

Response Returns: DC

27.2 TRIGger:INTerval:HLDEVent

Description Write or read the number of holdoff events of the interval trigger.

Syntax TRIGger:INTerval:HLDEVent <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1 to 100000000].

Query TRIGger:INTerval:HLDEVent?

Example TRIG:INT:HLDEV 3
TRIG:INT:HLDEV?

Response Returns: 3

Related **TRIGger:INTerval:HOLDoff**

27.3 TRIGger:INTerval:HLDTime

Description Write or read the holdoff time of the interval trigger.

Syntax TRIGger:INTerval:HLDTime <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of this value is [8.00E-09, 3.00E+01]

Query TRIGger:INTerval:HLDTime?

Example TRIG:INT:HLDT 1.50E-08
TRIG:INT:HLDT?

Response Returns: 1.50E-08

Related **TRIGger:DROPout:HOLDoff**

27.4 TRIGger:INTerval:HOLDoff

Description Write or read the holdoff type of the interval trigger.

Syntax TRIGger:INTerval:HOLDoff <holdoff_type>
<holdoff_type>:= {OFF | EVENts |TIME}

- OFF means to turn off the holdoff.
- EVENts means the number of trigger events that the oscilloscope counts before re-arming the trigger circuitry.
- TIME means the amount of time that the oscilloscope waits before re-arming the trigger circuitry.

Query TRIGger:INTerval:HOLDoff?

Example TRIG:INT:HOLD OFF
TRIG:INT:HOLD?

Response Returns: OFF

Related **TRIGger:INTerval:HLDEVent**
TRIGger:INTerval:HLDTime
TRIGger:INTerval:HSTart

27.5 TRIGger:INTerval:HSTart

Description Write or read the initial position of the interval trigger holdoff.

Syntax TRIGger:INTerval:HSTart <start_holdoff>
<start_holdoff>:= {LAST_TRIG| ACQ_START}

- LAST_TRIG means the initial position of holdoff is the first time point satisfying the trigger condition.
- ACQ_START means the initial position of holdoff is the time of the last trigger.

Query TRIGger:INTerval:HSTart?

Example TRIG:INT:HST LAST_TRIG
TRIG:INT:HST?

Response Returns: LAST_TRIG

Related **TRIGger:INTerval:HOLDoff**

27.6 TRIGger:INTerval:LIMit

Description Write or read the limit range type of the interval trigger.

Syntax TRIGger:INTerval:LIMit <type>
<type>:= {LESSthan | GREATerthan | INNer | OUTer}

Query TRIGger:INTerval:LIMit?

Example TRIG:SIOP:LIM LESS
TRIG:SIOP:LIM?

Response Returns: LESSthan

Related **TRIGger:INTerval:TLOWer**
TRIGger:INTerval:TUPPer

27.7 TRIGger:INTerval:LEVel

Description Write or read the trigger level of the interval trigger.

Syntax TRIGger:INTerval:LEVel <level_value>
<level_value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is
[-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:INTerval:LEVel?

Example TRIG:INT:LEV 5.00E-01
TRIG:INT:LEV?

Response Returns: 5.00E-01

Related **TRIGger:INTerval:SOURce**

27.8 TRIGger:INTerval:NREJect

Description Write or read the state of the noise rejection.

Syntax TRIGger:INTerval:NREJect <state>
<state>:= {OFF | ON}

Query TRIGger:INTerval:NREJect?

Example TRIG:INT:NREJ ON
TRIG:INT:NREJ?

Response Returns: ON

27.9 TRIGger:INTerval:SLOPel

Description Write or read the interval of the interval trigger.

Syntax TRIGger:INTerval:SLOPel <interval_type>
<interval_type>:= {RISing | FALLing | ALTernate}

Query TRIGger:INTerval:SLOPel?

Example TRIG:INT:SLOP RIS
TRIG:INT:SLOP?

Response Returns: RISing

27.10 TRIGger:INTerval:SOURce

Description Write or read the trigger source of the interval trigger.

Syntax TRIGger:INTerval:SOURce <source>
<source>:= {C<x> | EX | EX5 | LINE}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:INTerval:SOURce?

Example TRIG:INT:SOUR C1
TRIG:INT:SOUR?

Response Returns: C1

Related **TRIGger:INTerval:LEVel**

27.11 TRIGger:INTerval:TLOWer

Description Write or read the lower value of the interval trigger limit type.

Syntax TRIGger:INTerval:TLOWer <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [2.00E-09, 2.00E+01].

NOTICE The lower value cannot be greater than the upper value using by the command **TRIGger:INTerval:TUPPer**. The command is not valid when the limit range type is LESSthan.

Query TRIGger:INTerval:TLOWer?

Example TRIG:INT:TLOW 1.00E-08
TRIG:INT:TLOW?

Response Returns: 1.00E-08

Related **TRIGger:INTerval:LIMit**
TRIGger:INTerval:TUPPer

27.12 TRIGger:INTerval:TUPPer

Description Write or read the upper value of the interval trigger limit type.

Syntax TRIGger:INTerval:TUPPer <value> <value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [3.00E-09, 2.00E+01].

NOTICE

The upper value cannot be less than the lower value using by the command **TRIGger:INTerval:TLOWer**. The command is not valid when the limit range type is GREATerthan.

Query TRIGger:INTerval:TUPPer?

Example TRIG:INT:TUPP 3.00E-08
TRIG:INT:TUPP?

Response Returns: **TRIGger:INTerval:LIMit**
TRIGger:INTerval:TLOWer

Trigger Dropout Commands

28.1 TRIGger:DROPout:COUPling

Description Write or read the coupling mode of the dropout trigger.

Syntax TRIGger:DROPout:COUPling <mode>
<mode>:= {DC | AC | LFREJect | HFREJect}

- DC coupling allows dc and ac signals into the trigger path.
- AC coupling places a high-pass filter in the trigger path, removing dc offset voltage from the trigger waveform. Use AC coupling to get a stable dropout trigger when your waveform has a large dc offset.
- HFREJect which is a high-frequency rejection filter that adds a low-pass filter in the trigger path to remove high-frequency components from the trigger waveform. Use the high-frequency rejection filter to remove high-frequency noise, such as AM or FM broadcast stations, from the trigger path.
- LFREJect which is a low frequency rejection filter adds a high-pass filter in series with the trigger waveform to remove any unwanted low-frequency components from a trigger waveform, such as power line frequencies, that can interfere with proper triggering.

Query TRIGger:DROPout:COUPling?

Example TRIG:DROP:COUP DC
TRIG:DROP:COUP?

Response Returns: DC

28.2 TRIGger:DROPout:HLDEVent

Description Write or read the number of holdoff events of the dropout trigger.

Syntax TRIGger:DROPout:HLDEVent <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1 to 100000000].

Query TRIGger:DROPout:HLDEVent?

Example TRIG:DROP:HLDEV 3
TRIG:DROP:HLDEV?

Response Returns: 3

Related **TRIGger:DROPout:HOLDoff**

28.3 TRIGger:DROPout:HLDTime

Description Write or read the holdoff time of the dropout trigger.

Syntax TRIGger:DROPout:HLDTime <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of this value is [8.00E-09, 3.00E+01]

Query TRIGger:DROPout:HLDTime?

Example TRIG:DROP:HLDT 1.50E-08
TRIG:DROP:HLDT?

Response Returns: 1.50E-08

Related **TRIGger:DROPout:HOLDoff**

28.4 TRIGger:DROPout:HOLDoff

Description Write or read the holdoff type of the dropout trigger.

Syntax TRIGger:DROPout:HOLDoff <holdoff_type>
<holdoff_type>:= {OFF | EVENts |TIME}

- OFF means to turn off the holdoff.
- EVENts means the number of trigger events that the oscilloscope counts before re-arming the trigger circuitry.
- TIME means the amount of time that the oscilloscope waits before re-arming the trigger circuitry.

Query TRIGger:DROPout:HOLDoff?

Example TRIG:DROP:HOLD OFF
TRIG:DROP:HOLD?

Response Returns: OFF

Related **TRIGger:DROPout:HLDEVent**
TRIGger:DROPout:HLDTime
TRIGger:DROPout:HSTart

28.5 TRIGger:DROPout:HSTart

Description Write or read the initial position of the dropout trigger holdoff.

Syntax TRIGger:DROPout:HSTart <start_holdoff>
<start_holdoff>:= {LAST_TRIG| ACQ_START}

- LAST_TRIG means the initial position of holdoff is the first time point satisfying the trigger condition.
- ACQ_START means the initial position of holdoff is the time of the last trigger.

Query TRIGger:DROPout:HSTart?

Example TRIG:DROP:HST LAST_TRIG
TRIG:DROP:HST?

Response Returns: LAST_TRIG

Related **TRIGger:DROPout:HOLDoff**

28.6 TRIGger:DROPout:LEVel

Description Write or read the trigger level of the dropout trigger.

Syntax TRIGger:DROPout:LEVel <level_value>
<level_value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is
[-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:DROPout:LEVel?

Example TRIG:DROP:LEV 5.00E-01
TRIG:DROP:LEV?

Response Returns: 5.00E-01

Related **TRIGger:DROPout:SOURce**

28.7 TRIGger:DROPout:NREJect

Description Write or read the state of the noise rejection.

Syntax TRIGger:DROPout:NREJect <state>
<state>:= {OFF | ON}

Query TRIGger:DROPout:NREJect?

Example TRIG:DROP:NREJ ON
TRIG:DROP:NREJ?

Response Returns: ON

28.8 TRIGger:DROPout:SLOPe

Description Write or read the dropout of the dropout trigger.

Syntax TRIGger:DROPout:SLOPe <dropout_type>
<dropout_type>:= {RISing | FALLing | ALTernate}

Query TRIGger:DROPout:SLOPe?

Example TRIG:DROP:DROP RIS
TRIG:DROP:DROP?

Response Returns: RISing

28.9 TRIGger:DROPout:SOURce

Description Write or read the trigger source of the dropout trigger.

Syntax TRIGger:DROPout:SOURce <source>
<source>:= {C<x> | EX | EX5 | LINE}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:DROPout:SOURce?

Example TRIG:DROP:SOUR C1
TRIG:DROP:SOUR?

Response Returns: C1

Related **TRIGger:DROPout:LEVel**

28.10 TRIGger:DROPout:TIME

Description Write or read teh dropout time of the dropout trigger.

Syntax TRIGger:DROPout:TIME <time>
<time>:= Value in NR3 format. The range of the value is [2.00E-09, 2.00E+01].

Query TRIGger:DROPout:TIME?

Example TRIG:DROP:TIME 1.00E-08
TRIG:DROP:TIME?

Response Returns: 1.00E-08

28.11 TRIGger:DROPout:TYPE

Description Write or read the over time type of the dropout trigger.

Syntax TRIGger:DROPout:TYPE <type>
<type>:= {EDGE | STATe}

Query TRIGger:DROPout:TYPE?

Example TRIG:DROP:TYPE EDGE
TRIG:DROP:TYPE?

Response Returns: EDGE

Trigger Runt Commands

The **TRIGGER:RUNT** subsystem commands control the runt trigger parameters.

29.1 TRIGger:RUNT:COUPling

Description Write or read the coupling mode of the runt trigger.

Syntax TRIGger:RUNT:COUPling <mode>
<mode>:= {DC | AC | LFREJect | HFREJect}

- DC coupling allows dc and ac signals into the trigger path.
- AC coupling places a high-pass filter in the trigger path, removing dc offset voltage from the trigger waveform. Use AC coupling to get a stable runt trigger when your waveform has a large dc offset.
- HFREJect which is a high-frequency rejection filter that adds a low-pass filter in the trigger path to remove high-frequency components from the trigger waveform. Use the high-frequency rejection filter to remove high-frequency noise, such as AM or FM broadcast stations, from the trigger path.
- LFREJect which is a low frequency rejection filter adds a high-pass filter in series with the trigger waveform to remove any unwanted low-frequency components from a trigger waveform, such as power line frequencies, that can interfere with proper triggering.

Query TRIGger:RUNT:COUPling?

Example TRIG:RUNT:COUP DC
TRIG:RUNT:COUP?

Response Returns: DC

29.2 TRIGger:RUNT:HLDEVent

Description Write or read the number of holdoff events of the runt trigger.

Syntax TRIGger:RUNT:HLDEVent <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1 to 100000000].

Query TRIGger:RUNT:HLDEVent?

Example TRIG:RUNT:HLDEV 3
TRIG:RUNT:HLDEV?

Response Returns: 3

Related **TRIGger:RUNT:HOLDoff**

29.3 TRIGger:RUNT:HLDTime

Description Write or read the holdoff time of the runt trigger.

Syntax TRIGger:RUNT:HLDTime <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of this value is [8.00E-09, 3.00E+01]

Query TRIGger:RUNT:HLDTime?

Example TRIG:RUNT:HLDT 1.50E-08
TRIG:RUNT:HLDT?

Response Returns: 1.50E-08

Related **TRIGger:DROPout:HOLDoff**

29.4 TRIGger:RUNT:HOLDoff

Description Write or read the holdoff type of the runt trigger.

Syntax TRIGger:RUNT:HOLDoff <holdoff_type>
<holdoff_type>:= {OFF | EVENts |TIME}

- OFF means to turn off the holdoff.
- EVENts means the number of trigger events that the oscilloscope counts before re-arming the trigger circuitry.
- TIME means the amount of time that the oscilloscope waits before re-arming the trigger circuitry.

Query TRIGger:RUNT:HOLDoff?

Example TRIG:RUNT:HOLD OFF
TRIG:RUNT:HOLD?

Response Returns: OFF

Related **TRIGger:RUNT:HLDEVent**
TRIGger:RUNT:HLDTime
TRIGger:RUNT:HSTart

29.5 TRIGger:RUNT:HSTart

Description Write or read the initial position of the runt trigger holdoff.

Syntax TRIGger:RUNT:HSTart <start_holdoff>
<start_holdoff>:= {LAST_TRIG| ACQ_START}

- LAST_TRIG means the initial position of holdoff is the first time point satisfying the trigger condition.
- ACQ_START means the initial position of holdoff is the time of the last trigger.

Query TRIGger:RUNT:HSTart?

Example TRIG:RUNT:HST LAST_TRIG
TRIG:RUNT:HST?

Response Returns: LAST_TRIG

Related **TRIGger:RUNT:HOLDoff**

29.6 TRIGger:RUNT:LIMit

Description Write or read the limit range type of the runt trigger.

Syntax TRIGger:RUNT:LIMit <type>
<type>:= {LESSthan | GREATerthan | INNer | OUTer}

Query TRIGger:RUNT:LIMit?

Example TRIG:SIOP:LIM LESS
TRIG:SIOP:LIM?

Response Returns: LESSthan

Related **TRIGger:RUNT:TLOWer**
TRIGger:RUNT:TUPPer

29.7 TRIGger:RUNT:LLEVel

Description Write or read the trigger level of the runt trigger.

Syntax TRIGger:RUNT:LLEVel <level_value>
<level_value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is
[-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:RUNT:LLEVel?

Example TRIG:RUNT:LLEV 5.00E-01
TRIG:RUNT:LLEV?

Response Returns: 5.00E-01

Related **TRIGger:RUNT:SOURce**

29.8 TRIGger:RUNT:NREJect

Description Write or read the state of the noise rejection.

Syntax TRIGger:RUNT:NREJect <state>
<state>:= {OFF | ON}

Query TRIGger:RUNT:NREJect?

Example TRIG:RUNT:NREJ ON
TRIG:RUNT:NREJ?

Response Returns: ON

29.9 TRIGger:RUNT:POLarity

Description Write or read the polarity of the runt trigger.

Syntax TRIGger:RUNT:POLarity <polarity_type>
<polarity_type>:= {POSitive | NEGative}

Query TRIGger:RUNT:POLarity?

Example TRIG:RUNT:POL POS
TRIG:RUNT:POL?

Response Returns: POSitive

29.10 TRIGger:RUNT:SOURce

Description Write or read the trigger source of the runt trigger.

Syntax TRIGger:RUNT:SOURce <source>
<source>:= {C<x> | EX | EX5 | LINE}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:RUNT:SOURce?

Example TRIG:RUNT:SOUR C1
TRIG:RUNT:SOUR?

Response Returns: C1

Related **TRIGger:RUNT:LLEVel**

29.11 TRIGger:RUNT:TLOWer

Description Write or read the lower value of the runt trigger limit type.

Syntax TRIGger:RUNT:TLOWer <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [2.00E-09, 2.00E+01].

NOTICE

The lower value cannot be greater than the upper value using by the command **TRIGger:RUNT:TUPPer**. The command is not valid when the limit range type is LESSthan.

Query TRIGger:RUNT:TLOWer?

Example TRIG:RUNT:TLOW 1.00E-08
TRIG:RUNT:TLOW?

Response Returns: 1.00E-08

Related **TRIGger:RUNT:LIMit**
TRIGger:RUNT:TUPPer

29.12 TRIGger:RUNT:TUPPer

Description Write or read the upper value of the runt trigger limit type.

Syntax TRIGger:RUNT:TUPPer <value> <value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [3.00E-09, 2.00E+01].

NOTICE

The upper value cannot be less than the lower value using by the command **TRIGger:RUNT:TLOWer**. The command is not valid when the limit range type is GREATerthan.

Query TRIGger:RUNT:TUPPer?

Example TRIG:RUNT:TUPP 3.00E-08
TRIG:RUNT:TUPP?

Response Returns: 3.00E-08

Related **TRIGger:RUNT:LIMit**
TRIGger:RUNT:TLOWer

Trigger Pattern Commands

The **TRIGGER:PATTern** subsystem commands control the pattern trigger parameters.

30.1 TRIGger:PATTern:HLDEVent

Description Write or read the number of holdoff events of the pattern trigger.

Syntax TRIGger:PATTern:HLDEVent <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1 to 100000000].

Query TRIGger:PATTern:HLDEVent?

Example TRIG:PATT:HLDEV 3
TRIG:PATT:HLDEV?

Response Returns: 3

Related **TRIGger:PATTern:HOLDoff**

30.2 TRIGger:PATTern:HLDTime

Description Write or read the holdoff time of the pattern trigger.

Syntax TRIGger:PATTern:HLDTime <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of this value is [8.00E-09, 3.00E+01]

Query TRIGger:PATTern:HLDTime?

Example TRIG:PATT:HLDT 1.50E-08
TRIG:PATT:HLDT?

Response Returns: 1.50E-08

Related **TRIGger:DROPout:HOLDoff**

30.3 TRIGger:PATTern:HOLDoff

Description Write or read the holdoff type of the pattern trigger.

Syntax TRIGger:PATTern:HOLDoff <holdoff_type>
<holdoff_type>:= {OFF | EVENts |TIME}

- OFF means to turn off the holdoff.
- EVENts means the number of trigger events that the oscilloscope counts before re-arming the trigger circuitry.
- TIME means the amount of time that the oscilloscope waits before re-arming the trigger circuitry.

Query TRIGger:PATTern:HOLDoff?

Example TRIG:PATT:HOLD OFF
TRIG:PATT:HOLD?

Response Returns: OFF

Related **TRIGger:PATTern:HLDEVent**
TRIGger:PATTern:HLDTime
TRIGger:PATTern:HSTart

30.4 TRIGger:PATTern:HSTart

Description Write or read the initial position of the pattern trigger holdoff.

Syntax TRIGger:PATTern:HSTart <start_holdoff>
<start_holdoff>:= {LAST_TRIG| ACQ_START}

- LAST_TRIG means the initial position of holdoff is the first time point satisfying the trigger condition.
- ACQ_START means the initial position of holdoff is the time of the last trigger.

Query TRIGger:PATTern:HSTart?

Example TRIG:PATT:HST LAST_TRIG
TRIG:PATT:HST?

Response Returns: LAST_TRIG

Related **TRIGger:PATTern:HOLDoff**

30.5 TRIGger:PATTern:INPut

Description Write or read the logical input condition for the channel (C1-C4) and digital channel (d0-d15) of the pattern trigger.

Syntax TRIGger:PATTern:INPut <logic>[...[,<logic>]]
<logic>:= {X | L | H}

- X means the "don't care" state.
- H means the logic high state.
- L means the logic low state.

NOTICE Parameters are configured to corresponding sources in the order of C1-C4, d0-d15.

Query

Example TRIG:PATT:INP H,H,L,X,X,X,X,X,X,X,X,X,X,X,X,X,X,X,X,X
TRIG:PATT:INP?

Response Returns: H,H,L,X,X,X,X,X,X,X,X,X,X,X,X,X,X,X,X,X

30.6 TRIGger:PATTern:LEVel

Description Write or read the trigger level of the pattern trigger.

Syntax TRIGger:PATTern:LEVel <level_value>
<level_value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is
[-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:PATTern:LEVel?

Example TRIG:PATT:LEV 5.00E-01
TRIG:PATT:LEV?

Response Returns: 5.00E-01

Related **TRIGger:PATTern:IPut**

30.7 TRIGger:PATTern:LIMit

Description Write or read the limit range type of the pattern trigger when the logic combination is AND or NOR.

Syntax TRIGger:PATTern:LIMit <type>
<type>:= {LESSthan | GREATerthan | INNer | OUTer}

Query TRIGger:PATTern:LIMit?

Example TRIG:PATT:LIM LESS
TRIG:PATT:LIM?

Response Returns: LESS

Related **TRIGger:PATTern:TLOWer**
TRIGger:PATTern:TUPPer

30.8 TRIGger:PATTern:LOGic

Description Write or read the logical combination of the input channesl for the pattern trigger.

Syntax TRIGger:PATTern:LOGic <type>
<type>:= {AND | OR | NAND | NOR}

Query TRIGger:PATTern:LOGic?

Example TRIG:PATT:LOG AND
TRIG:PATT:LOG?

Response Returns: AND

30.9 TRIGger:PATTern:TLOWer

Description Write or read the lower value of the pattern trigger limit type.

Syntax TRIGger:PATTern:TLOWer <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [2.00E-09, 2.00E+01].

NOTICE

The lower value cannot be greater than the upper value using by the command **TRIGger:PATTern:TUPPer**. The command is not valid when the limit range type is LESSthan.

Query TRIGger:PATTern:TLOWer?

Example TRIG:PATT:TLOW 1.00E-08
TRIG:PATT:TLOW?

Response Returns: 1.00E-08

Related **TRIGger:PATTern:LIMit**
TRIGger:PATTern:TUPPer

30.10 TRIGger:PATTern:TUPPer

Description Write or read the upper value of the pattern trigger limit type.

Syntax TRIGger:PATTern:TUPPer <value> <value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [3.00E-09, 2.00E+01].

NOTICE

The upper value cannot be less than the lower value using by the command **TRIGger:PATTern:TLOWer**. The command is not valid when the limit range type is GREATerthan.

Query TRIGger:PATTern:TUPPer?

Example TRIG:PATT:TUPP 3.00E-08
TRIG:PATT:TUPP?

Response Returns: 3.00E-08

Related **TRIGger:PATTern:LIMit**
TRIGger:PATTern:TLOWer

Trigger IIC Commands

The **TRIGGER:IIC** subsystem commands control the IIC bus trigger parameters.

31.1 TRIGger:IIC:ADDRess

Description Write or read the address of the IIC bus trigger.

Syntax TRIGger:IIC:ADDRess <addr>
<addr>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 127].

Query TRIGger:IIC:ADDRess?

Example TRIG:IIC:ADDR 10
TRIG:IIC:ADDR?

Response Returns: 10

Related **TRIGger:IIC:CONDition**

31.2 TRIGger:IIC:ALENgth

Description Write or read the length of the address of the IIC bus trigger.

Syntax TRIGger:IIC:ALENgth <length>
<length>:= {7BIT | 10BIT}

Query TRIGger:IIC:ALENgth?

Example TRIG:IIC:ALEN 10BIT
TRIG:IIC:ALEN?

Response Returns: 10BIT

Related**TRIGger:IIC:CONDition**

31.3 TRIGger:IIC:CONDition

Description Write or read the trigger condition of the IIC bus.

Syntax TRIGger:IIC:CONDition <condition>
<condition>:= {STARt | STOP | RESTart | NACK | EEPRom | 7ADDRess | 10ADD Ress | DLENgth}

Query TRIGger:IIC:CONDition?

Example TRIG:IIC:COND STOP
TRIG:IIC:COND?

Response Returns: STOP

31.4 TRIGger:IIC:DAT2

Description Write or read the data2 of the IIC bus trigger.

Syntax TRIGger:IIC:DAT2 <data> <data>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 256].

NOTICE Use the don't care data (256) to ignore the data2 value.

Query TRIGger:IIC:DAT2?

Example TRIG:IIC:DAT2 11
TRIG:IIC:DAT2?

Response Returns: 11

Relatead Commands **TRIGger:IIC:CONDition**

31.5 TRIGger:IIC:DATA

Description Write or read the data of the IIC bus trigger.

Syntax TRIGger:IIC:DATA <data> <data>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 256].

NOTICE Use the don't care data (256) to ignore the data value.

Query TRIGger:IIC:DATA?

Example
TRIG:IIC:DATA 42
TRIG:IIC:DATA?

Response Returns: 42

Related **TRIGger:IIC:CONDition**
TRIGger:IIC:DAT2

31.6 TRIGger:IIC:DLENgth

Description Write or read the data length of the IIC bus trigger.

Syntax TRIGger:IIC:DLENgth <length> <length>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1, 12]

Query TRIGger:IIC:DLENgth?

Example
TRIG:IIC:DLEN 10
TRIG:IIC:DLEN?

Response Returns: 10

Related **TRIGger:IIC:CONDition**

31.7 TRIGger:IIC:LIMit

Description Write or read the data comparison type when the trigger condition is EEPROM on the IIC bus trigger.

Syntax TRIGger:IIC:LIMit <limit_type>
<limit_type>:= {EQUal | GREaterthan |LESSthan}

Query TRIGger:IIC:LIMit?

Example TRIG:IIC:LIM LESS
TRIG:IIC:LIM?

Response Returns: LESS

Related **TRIGger:IIC:CONDition**

31.8 TRIGger:IIC:RWBit

Description Sets whether the trigger frame is read address or write address when the IIC trigger condition is 7 or 10 ADDR&DATA.

Syntax TRIGger:IIC:RWBit <type>
<type>:= {WRITe | READ | ANY}

Query TRIGger:IIC:RWBit?

Example TRIG:IIC:RWB READ
TRIG:IIC:RWB?

Response Returns: READ

Related **TRIGger:IIC:CONDition**

31.9 TRIGger:IIC:SCLSource

Description Write or read teh SCL source of the IIC bus trigger.

Syntax TRIGger:IIC:SCLSource <source>
<source>:= {C<x>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:IIC:SCLSource?

Example TRIG:IIC:SCLS C2
TRIG:IIC:SCLS?

Response Returns: C2

Related **TRIGger:IIC:SCLThreshold**
TRIGger:IIC:SDASource

31.10 TRIGger:IIC:SCLThreshold

Description Write or read the threshold of the SCL on IIC bus trigger.

Syntax TRIGger:IIC:SCLThreshold <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:IIC:SCLThreshold?

Example TRIG:IIC:SCLT 1.50E+00
TRIG:IIC:SCLT?

Response Returns: 1.50E+00

Related **TRIGger:IIC:SCLSource**

31.11 TRIGger:IIC:SDASource

Description Write or read the SDA source of the IIC bus trigger.

Syntax TRIGger:IIC:SDASource <source>
<source>:= {C<x> | D<n>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point. <n>:= 0 to (# digital channels - 1) in NR1 format, including an integer and no decimal point.

Query TRIGger:IIC:SDASource?

Example TRIG:IIC:SDAS C2
TRIG:IIC:SDAS?

Response Returns: C2

Related **TRIGger:IIC:SCLSource**
TRIGger:IIC:SDAThreshold

31.12 TRIGger:IIC:SDAThreshold

Description Write or read the threshold of the SDA on IIC bus trigger.

Syntax TRIGger:IIC:SDAThreshold <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:IIC:SDAThreshold?

Example TRIG:IIC:SDAT 1.50E+00
TRIG:IIC:SDAT?

Response Returns: 1.50E+00

Related **TRIGger:IIC:SDASource**

Trigger SPI Commands

The **TRIGGER:SPI** subsystem commands control the SPI bus trigger modes and parameters.

32.1 TRIGger:SPI:BITorder

Description Write or read the bit order of the SPI bus trigger.

Syntax :TRIGger:SPI:BITorder <bit_order>
<bit_order>:= {LSM | MSB}

Query TRIGger:SPI:BITorder?

Example RIG:SPI:BIT LSB
RIG:SPI:BIT?

Response Returns: LSB

32.2 TRIGger:SPI:CLKSource

Description Write or read the CLK source of the SPI bus trigger.

Syntax TRIGger:SPI:CLKSource <source>
<source>:= {C<x>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:SPI:CLKSource <source>
<source>:= {C<x> | D<n>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Example TRIG:SPI:CLKS C2
TRIG:SPI:CLKS?

Response Returns: C2

Related **TRIGger:SPI:CLKThreshold**

32.3 TRIGger:SPI:CLKThreshold

Description Write or read the threshold of the CLK on SPI bus trigger.

Syntax TRIGger:SPI:CLKThreshold <clk_threshold>
<clk_threshold>:= Value in NR3 format, including a decimal point and exponent. The range of the value is
[-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:SPI:CLKThreshold?

Example TRIG:SPI:CLKT 1.50E+00
TRIG:SPI:CLKT?

Response Returns: 1.50E+00

Related **TRIGger:SPI:CLKSource**

32.4 TRIGger:SPI:CSSource

Description Write or read the CS source of the SPI bus trigger.

Syntax TRIGger:SPI:CSSource <source>
<source>:= {C<x>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:SPI:CSSource?

Example TRIG:SPI:CSS C2
TRIG:SPI:CSS?

Response Returns: C2

32.5 TRIGger:SPI:CSThreshold

Description Write or read the threshold of the CS on SPI bus trigger.

Syntax TRIGger:SPI:CSThreshold <threshold>
<threshold>:= Value in NR3 format, including a decimal point and exponent. The range of the value is
[-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:SPI:CSThreshold?

Example TRIG:SPI:CST 1.50E+00
TRIG:SPI:CST?

Response Returns: 1.50E+00

Related **TRIGger:SPI:CSSource**

32.6 TRIGger:SPI:CSTYpe

Description Write or read the chip selection type of the SPI bus trigger.

Syntax TRIGger:SPI:CSTYpe <type>
<type>:= {NCS | CS | TIMeout[,<time>]}

- CS means set to chip select state
- NCS means set to non-chip select state
- TIMeout indicates set to clock timeout status

<time>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [1.00E-07, 5.00E-03].

Query TRIGger:SPI:CSTYpe?

Example TRIG:SPI:CSTY CS
TRIG:SPI:CSTY?

Response Returns: CS

32.7 TRIGger:SPI:DATA

Description Set the data of the SPI bus trigger.

Syntax TRIGger:SPI:DATA <data>[,<data>[...[,<data>]]]
<data>:= {0 | 1 | X}

NOTICE The number of parameters should be consistent with the data length using by the command **TRIGger:SPI:DLENgth**. Parameters are assigned to each bit in order from high to low.

Example TRIG:SPI:DATA 1,0,0,0,0,0,1,0

Related **TRIGger:SPI:DLENgth**

32.8 TRIGger:SPI:DLENgth

Description Write or read the data length of the SPI bus trigger.

Syntax TRIGger:SPI:DLENgth <data_length>
<data_length>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [4, 96].

Query TRIGger:SPI:DLENgth?

Example TRIG:SPI:DLEN 10
TRIG:SPI:DLEN?

Response Returns: 10

32.9 TRIGger:SPI:LATChedge

Description Write or read the sampling edge of CLK on SPI bus trigger.

Syntax TRIGger:SPI:CLK:LATChedge <slope>
<slope>:= {RISing | FALLing}

Query TRIGger:SPI:LATC?

Example TRIG:SPI:LATC RIS
TRIG:SPI:LATC?

Response Returns: RISing

32.10 TRIGger:SPI:MISOSource

Description Write or read the MISO source of the SPI bus trigger.

Syntax TRIGger:SPI:MISOSource <source>
<source>:= {C<x> }
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:SPI:MISOSource?

Example TRIG:SPI:MISOS C2
TRIG:SPI:MISOS?

Response Returns: C2

Related **TRIGger:SPI:MISOThreshold**

32.11 TRIGger:SPI:MISOThreshold

Description Write or read the threshold of the MISO on SPI bus trigger.

Syntax TRIGger:SPI:MISOThreshold <value> <value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:SPI:MISOThreshold?

Example TRIG:SPI:MISOT 1.50E+00
TRIG:SPI:MISOT?

Response Returns: 1.50E+00

Related **TRIGger:SPI:MISOSource**

32.12 TRIGger:SPI:MOSISource

Description Write or read the MOSI source of the SPI bus trigger.

Syntax TRIGger:SPI:MOSISource <source>
<source>:= {C<x>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:SPI:MOSISource?

Example RIG:SPI:MOSIS C2
RIG:SPI:MOSIS?

Response Returns: C2

Related **TRIGger:SPI:MOSIThreshold**

32.13 TRIGger:SPI:MOSIThreshold

Description Write or read the threshold of the MOSI on SPI bus trigger.

Syntax TRIGger:SPI:MOSIThreshold <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is
[-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:SPI:MOSIThreshold?

Example TRIG:SPI:MOSIT 1.50E+00
TRIG:SPI:MOSIT?

Response Returns: 1.50E+00

Related **TRIGger:SPI:MOSISource**

32.14 TRIGger:SPI:NCSSource

Description Write or read the NCS source of the SPI bus trigger.

Syntax TRIGger:SPI:NCSSource <source>
<source>:= {C<x>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:SPI:NCSSource?

Example TRIG:SPI:NCSS D0
TRIG:SPI:NCSS?

Response Returns: D0

Related **TRIGger:SPI:NCSThreshold**

32.15 TRIGger:SPI:NCSThreshold

Description Write or read the threshold of the NCS on SPI bus trigger.

Syntax TRIGger:SPI:NCSThreshold <value> <value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:SPI:NCSThreshold?

Example TRIG:SPI:NCST 1.50E+00
TRIG:SPI:NCST?

Response Returns: 1.50E+00

Related **TRIGger:SPI:NCSSource**

32.16 TRIGger:SPI:TTYPe

Description Write or read the trigger type of the SPI bus trigger.

Syntax TRIGger:SPI:TTYPe <trigger_type>
<trigger_type>:= {MISO | MOSI}

Query TRIGger:SPI:TTYPe?

Example TRIG:SPI:TTYP MOSI
TRIG:SPI:TTYP?

Response Returns: MOSI

Trigger UART Commands

The **TRIGGER:UART** subsystem commands control the UART bus trigger parameters.

33.1 TRIGger:UART:BAUD

Description Write or read the baud rate of the UART bus trigger.

Syntax TRIGger:UART:BAUD <baud>
<baud>:= {600bps | 1200bps | 2400bps | 4800bps | 9600bps | 19200bps | 384 00bps | 57600bps | 115200bps | CUSTom[,<value>]}
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [300, 20000000].

Query TRIGger:UART:BAUD?

Example TRIG:UART:BAUD 9600bps
TRIG:UART:BAUD?

Response Returns: 9600bps

33.2 TRIGger:UART:BITorder

Description Write or read the bit order of the UART trigger.

Syntax TRIGger:UART:BITorder <order>
<order>:= {LSM | MSB}

Query TRIGger:UART:BITorder?

Example TRIG:UART:BIT LSB
TRIG:UART:BIT?

Response Returns: LSB

33.3 TRIGger:UART:CONDition

Description Write or read the condition of the UART bus trigger.

Syntax TRIGger:UART:CONDition <condition>
<condition>:= {STARt | STOP | DATA | ERRor}

Query TRIGger:UART:CONDition?

Example TRIG:UART:COND STOP
TRIG:UART:COND?

Response Returns: STOP

33.4 TRIGger:UART:DATA

Description Write or read the data of the UART bus trigger.

Syntax TRIGger:UART:DATA <data>
<data>:= Value in NR1 format, including an integer and no decimal point.

NOTICE

The range of the value is related to data length by using the command **TRIGger:UART:DLENgth**. Use the don't care data (256, data length is 8) to ignore the data value.

Query TRIGger:UART:DATA?

Example TRIG:UART:DATA 83
TRIG:UART:DATA?

Response Returns: 83

Related **TRIGger:UART:CONDition**
TRIGger:UART:DLENgth

33.5 TRIGger:UART:DLENgth

Description Write or read the length of the UART bus trigger.

Syntax TRIGger:UART:DLENgth <value>
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [5, 8].

Query TRIGger:UART:DLENgth?

Example TRIG:UART:DLEN 8
TRIG:UART:DLEN?

Response Returns: 8

33.6 TRIGger:UART:IDLE

Description Write or read the idle level of the UART bus trigger.

Syntax TRIGger:UART:IDLE <idle>
<idle>:= {LOW | HIGH}

Query TRIGger:UART:IDLE?

Example TRIG:UART:IDLE LOW
TRIG:UART:IDLE?

Response Returns: LOW

33.7 TRIGger:UART:LIMit

Description Write or read the data comparison type of the UART bus trigger when the trigger condition is Data.

Syntax TRIGger:UART:LIMit <limit_type>
<limit_type>:= {EQUal | GREaterthan | LESSthan}

Query TRIGger:UART:LIMit?

Example
```
TRIG:UART:LIM LESS
TRIG:UART:LIM?
```

Response Returns: LESS

Related **TRIGger:UART:CONDition**

33.8 TRIGger:UART:PARity

Description Write or read the parity check of the UART bus trigger.

Syntax TRIGger:UART:PARity <parity>
<parity>:= {NONE | ODD | EVEN | MARK | SPACe}

Query TRIGger:UART:PARity?

Example
```
TRIG:UART:PAR ODD
TRIG:UART:PAR?
```

Response Returns: ODD

33.9 TRIGger:UART:RXSource

Description Write or read the RX source of the UART bus trigger.

Syntax TRIGger:UART:RXSource <source>
<source>:= {C<x>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:UART:RXSource?

Example
TRIG:UART:RXS C2
TRIG:UART:RXS?

Response Returns: C2

Related **TRIGger:UART:RXThreshold**

33.10 TRIGger:UART:RXThreshold

Description Write or read the threshold of RX on UART bus trigger.

Syntax TRIGger:UART:RXThreshold <value> <value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:UART:RXThreshold?

Example
TRIG:UART:RXT 1.50E+00
TRIG:UART:RXT?

Response Returns: 1.50E+00

Related TRIGger:UART:RXSource

33.11 TRIGger:UART:STOP

Description Write or read the length of the stop bit on UART bus trigger.

Syntax TRIGger:UART:STOP <bit>
<bit>:= {1 | 1.5 | 2}

Query TRIGger:UART:STOP?

Example TRIG:UART:STOP 1
TRIG:UART:STOP?

Response Returns: 1

33.12 TRIGger:UART:TTYPe

Description Write or read the trigger type of the UART bus trigger.

Syntax TRIGger:UART:TTYPe <trigger_type>
<trigger_type>:= {RX | TX}

Query TRIGger:UART:TTYPe?

Example TRIG:UART:TTYP RX
TRIG:UART:TTYP?

Response Returns: RX

33.13 TRIGger:UART:TXSource

Description Write or read the TX source of the UART bus trigger.

Syntax TRIGger:UART:TXSource <source>
<source>:= {C<x> }
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:UART:TXSource?

Example
TRIG:UART:TXS C2
TRIG:UART:TXS?

Response Returns: C2

Related **TRIGger:UART:TXThreshold**

33.14 TRIGger:UART:TXThreshold

Description Write or read the threshold of TX on the UART bus trigger.

Syntax TRIGger:UART:TXThreshold <value> <value>:= Value in NR3 format, including a decimal point and exponent. The range of the calue is [-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:UART:TXThreshold?

Example
TRIG:UART:TXT 1.50E+00
TRIG:UART:TXT?

Response Returns: 1.50E+00

Related **TRIGger:UART:TXSource**

Trigger CAN Commands

The **TRIGGER:CAN** subsystem commands control the CAN bus trigger parameters.

34.1 TRIGger:CAN:BAUD

Description Write or read the baud rate of the CAN bus trigger.

Syntax TRIGger:CAN:BAUD <baud>
<baud>:= {5kbps | 10kbps | 20kbps | 50kbps | 100kbps | 125kbps | 250kbps | 500kbps | 800kbps | 1Mbps | CUSTom[,<value>]}
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [5000, 1000000].

Query TRIGger:CAN:BAUD?

Example
```
TRIG:CAN:BAUD 20kbps
TRIG:CAN:BAUD?
```

Response Returns: 20kbps

34.2 TRIGger:CAN:CONDition

Description Write or read the trigger condition for the CAN bus trigger.

Syntax TRIGger:CAN:CONDition <condition>
<condition>:= {STARt | REMote | ID | ID_AND_DATA | ERRor}

Query TRIGger:CAN:CONDition?

Example
```
TRIG:CAN:COND STAR
TRIG:CAN:COND?
```

Response Returns: STARt

34.3 TRIGger:CAN:DAT2

Description Write or read the data2 of the CAN bus trigger.

Syntax TRIGger:CAN:DAT2 <data>
<data>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 256].

NOTICE Use the don't care data (256) to ignore the data2 value.

Query TRIGger:CAN:DAT2?

Example TRIG:CAN:DAT2 73
TRIG:CAN:DAT2?

Response Returns: 73

Related **TRIGger:CAN:CONDition**

34.4 TRIGger:CAN:DATA

Description Write or read the data of the CAN bus trigger.

Syntax TRIGger:CAN:DATA <data> <data>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 256].

NOTICE Use the don't care data (256) to ignore the data value.

Query TRIGger:CAN:DATA?

Example TRIG:CAN:DATA 67
TRIG:CAN:DATA?

Response Returns: 67

Related **TRIGger:CAN:CONDition**

34.5 TRIGger:CAN:ID

Description Write or read the ID of the CAN bus trigger.

Syntax TRIGger:CAN:ID <id>
<id>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 536870912] when the ID length is 29 bits. The range of the value is [0, 2048] when the ID length is 11 bits.

NOTICE Use the don't care data (536870912, ID length is 29 bits) to ignore the ID value.

Query TRIGger:CAN:ID?

Example TRIG:CAN:ID 125935441
TRIG:CAN:ID?

Response Returns: 125935441

Related **TRIGger:CAN:CONDition**

34.6 TRIGger:CAN:IDLength

Description Write or read the ID length of the CAN bus trigger when the trigger condtion is Remote, ID+ Data.

Syntax TRIGger:CAN:IDLENgth <id_length>
<id_length>:= {11BITS | 29BITS}

Query TRIGger:CAN:IDLENgth?

Example TRIG:CAN:IDL 29BITS
TRIG:CAN:IDL?

Response Returns: 29BITS

Related **TRIGger:CAN:CONDition**

34.7 TRIGger:CAN:SOURce

Description Write or read the source of the CAN bus trigger.

Syntax TRIGger:CAN:SOURce <source>
<source>:= {C<x>}
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:CAN:SOURce?

Example
```
TRIG:CAN:SOUR C2
TRIG:CAN:SOUR?
```

Response Returns: C2

Related **TRIGger:CAN:THReshold**

34.8 TRIGger:CAN:THReshold

Description Write or read the threshold of the source on CAN bus trigger.

Syntax TRIGger:CAN:THReshold <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is
[-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:CAN:THReshold?

Example
```
TRIG:CAN:THR 1.50E+00
TRIG:CAN:THR?
```

Response Returns: 1.50E+00

Related **TRIGger:CAN:SOURce**

Trigger LIN Commands

The **TRIGGER:LIN** subsystem commands control the LIN bus trigger parameters.

35.1 TRIGger:LIN:BAUD

Description Write or read the baud rate of the LIN bus trigger.

Syntax TRIGger:LIN:BAUD <baud>
<baud>:= {600bps | 1200bps | 2400bps | 4800bps | 9600bps | 19200bps | CUS Tom[,<value>]}
<value>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [300, 20000000].

Query TRIGger:LIN:BAUD?

Example TRIG:LIN:BAUD 9600bps
TRIG:LIN:BAUD?

Response Returns: 9600bps

35.2 TRIGger:LIN:CONDition

Description Write or read the trigger condition for the LIN bus trigger.

Syntax TRIGger:LIN:CONDition <condition>
<condition>:= {BReak | ID | ID_AND_DATA | DATA_ERROR}

Query TRIGger:LIN:CONDition?

Example TRIG:LIN:COND ID_AND_DATA
TRIG:LIN:COND?

Response Returns: ID_AND_DATA

35.3 TRIGger:LIN:DAT2

Description Write or read the data2 of the LIN bus trigger.

Syntax TRIGger:LIN:DAT2 <data>
<data>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 256].

NOTICE Use the don't care data (256) to ignore the data2 value.

Query TRIGger:LIN:DAT2?

Example TRIG:LIN:DAT2 73
TRIG:LIN:DAT2?

Response Returns: 73

Related **TRIGger:LIN:CONDition**

35.4 TRIGger:LIN:DATA

Description Write or read the data of the LIN bus trigger.

Syntax TRIGger:LIN:DATA <data> <data>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 256].

NOTICE Use the don't care data (256) to ignore the data value.

Query TRIGger:LIN:DATA?

Example TRIG:LIN:DATA 69
TRIG:LIN:DATA?

Response Returns: 69

Related **TRIGger:LIN:CONDition**
TRIGger:LIN:DAT2

35.5 TRIGger:LIN:ERRor:CHECksum

Description Write or read the checksum errror state of the LIN bus trigger when the trigger condition is Error.

Syntax TRIGger:LIN:ERRor:CHECksum <state>
<state>:= {0 |1}
- 0 means OFF
- 1 means ON

Query TRIGger:LIN:ERRor:CHECksum?

Example
```
TRIG:LIN:ERR:CHEC 1
TRIG:LIN:ERR:CHEC?
```

Response Returns: 1

Related Commans **TRIGger:LIN:CONDition**

35.6 TRIGger:LIN:ERRor:DLENgth

Description Write or read the data length of the error frame when the trigger condition is Error and the checksum error state is on.

Syntax TRIGger:LIN:DLENgth <length>
<length>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [1, 8].

Query TRIGger:LIN:DLENgth?

Example
```
TRIG:LIN:ERR:DLEN 4
TRIG:LIN:ERR:DLEN?
```

Response Returns: 4

Related **TRIGger:LIN:CONDition**
TRIGger:LIN:ERRor:CHECksum

35.7 TRIGger:LIN:ERRor:ID

Description Write or read the error frame ID of the LIN bus when the trigger condtion is Error and the checksum error state is on.

Syntax TRIGger:LIN:ERRor:ID <id>
<id>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 63].

Query TRIGger:LIN:ERRor:ID?

Example TRIG:LIN:ERR:ID 42
TRIG:LIN:ERR:ID?

Response Returns: 42

Related **TRIGger:LIN:CONDition**
TRIGger:LIN:ERRor:CHECksum

35.8 TRIGger:LIN:ERRor:PARity

Description Write or read the header parity error state of the LIN bus trigger when the trigger condition is Error.

Syntax TRIGger:LIN:ERRor:PARity <state>
<state>:= {0 | 1}
- 0 means OFF
- 1 means ON

Query TRIGger:LIN:ERRor:PARity?

Example TRIG:LIN:ERR:PAR 1
TRIG:LIN:ERR:PAR?

Response Returns: 1

Related **TRIGger:LIN:CONDition**

35.9 TRIGger:LIN:ERRor:SYNC

Description Write or read the sync byte error state of the LIN bus trigger.

Syntax TRIGger:LIN:ERRor:SYNC <state>
<state>:= {0 | 1}

Query TRIGger:LIN:ERRor:SYNC?

Example TRIG:LIN:ERR:SYNC 1
TRIG:LIN:ERR:SYNC?

Response Returns: 1

Related **TRIGger:LIN:CONDition**

35.10 TRIGger:LIN:ID

Description Write or read the ID of the LIN bus when the trigger condtion is ID.

Syntax TTRIGger:LIN:ID <id>
<id>:= Value in NR1 format, including an integer and no decimal point. The range of the value is [0, 64].

NOTICE Use the don't care data(64) to ignore the ID value

Query TRIGger:LIN:ID?

Example TRIG:LIN:ID 43
TRIG:LIN:ID?

Response Returns: 43

Related **TRIGger:LIN:CONDition**

35.11 TRIGger:LIN:SOURce

Description Write or read the source of the LIN bus trigger.

Syntax TRIGger:LIN:SOURce <source>
<source>:= {C<x> }
<x>:= 1 to (# analog channels) in NR1 format, including an integer and no decimal point.

Query TRIGger:LIN:SOURce?

Example
```
TRIG:LIN:SOUR C2
TRIG:LIN:SOUR?
```

Response Returns: C2

Related **TRIGger:LIN:THReshold**

35.12 TRIGger:LIN:STANdard

Description Write or read the LIN protocol standard when the trigger condtion is Error and the checksum error state is on.

Syntax TRIGger:LIN:STANdard <version>
<version>:= {0 | 1}
- 0 means Rev1.3
- 1 means Rev2.x

Query TRIGger:LIN:STANdard?

Example
```
TRIG:LIN:STAN 0
TRIG:LIN:STAN?
```

Response Returns: 0

Related **TRIGger:LIN:CONDition**
TRIGger:LIN:ERRor:CHECksum

35.13 TRIGger:LIN:THReshold

Description Write or read the threshold of the source on LIN bus trigger.

Syntax TRIGger:LIN:THReshold <value>
<value>:= Value in NR3 format, including a decimal point and exponent. The range of the value is
[-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset].

Query TRIGger:LIN:THReshold?

Example TRIG:LIN:THR 1.50E+00
TRIG:LIN:THR?

Response Returns: 1.50E+00

Related **TRIGger:LIN:SOURce**

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