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1  PicoScope 9400 API Reference

PicoScope 9400 provides an API for any third-party application or library to control the oscilloscope and collect signals. The API is COM-based and is provided by the PicoScope 9400 GUI application.

1.1  PicoScope9400 COM Server

The COM server implementing the API is called PicoSample 4, and is implemented by the PicoScope 9400 GUI application (PicoSample4.exe). It is registered in the system during the setup process, and can be explicitly unregistered and registered again by executing PicoSample4.exe with the /UnregServer or /RegServer switches.

1.2  ExecCommand Method

The COMRC object contains only one method, ExecCommand. This method has one argument, a text string with a command or query. The method returns:

- NULL (Nothing in Visual Basic) if a command without query has been successfully executed
- The text string ERROR if the command was invalid
- Another text string with query results if the command was either a query or a command with a query

The syntax of the commands and queries and the full list of commands are described in the following pages.

1.3  COMRC Object

To implement the API the server exposes only one object, COMRC. This object supports automation, so it can be used by high-level languages like JavaScript (HTML pages) or VBA (Microsoft Word). Additionally, low-level languages like C are also supported. The string defining the system-wide name of the object and used for object creation is PicoSample4.COMRC.
2 Commands Syntax

2.1 Command and Query Structure

2.1.1 Overview

The PicoScope 9400 commands consist of set commands and query commands (usually called commands and queries).

- Commands modify instrument settings or tell the instrument to perform a specific action.
- Queries cause the instrument to return data and information about its status.

Most commands have both a set form and a query form. The query form of the command differs from the set form by the addition of a question mark at the end. For example, the set command

\texttt{ACQuire:NACQuire}

has a query form

\texttt{ACQuire:NACQuire?}

Not all commands have both a set and a query form. Some may have set only and some have query only.

2.1.2 Messages

A command message is a command or query name followed by any information the instrument needs to execute the command or query. Command messages may contain five element types, as defined in the following table.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
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<tbody>
<tr>
<td>&lt;Header&gt;</td>
<td>This is the basic command name. If the header ends with a question mark, the command is a query. If the command is concatenated with other commands, the header must begin with a colon (:).</td>
</tr>
<tr>
<td>&lt;Mnemonic&gt;</td>
<td>This is the header of the sub-function. Some command headers have only one mnemonic. If a command header has multiple mnemonics, a colon (:) character always separates items from one another.</td>
</tr>
<tr>
<td>&lt;Argument&gt;</td>
<td>This is a quantity, quality, restriction or limit associated with the header. Some commands have no arguments while others have multiple arguments. A space separates arguments from the header. A comma separates arguments from one another.</td>
</tr>
<tr>
<td>&lt;Comma&gt;</td>
<td>A single comma is used between the arguments of multiple-argument commands. Optionally, there may be white space characters before and after the comma.</td>
</tr>
<tr>
<td>&lt;Space&gt;</td>
<td>A white space character is used between a command header and its argument. Optionally, a white space may consist of multiple white space characters.</td>
</tr>
</tbody>
</table>

Command message elements
2.1.3 Commands

Commands cause the instrument to perform a specific function or change one of its settings. Commands have this structure:

\[
[:<\text{Header}>][<\text{Space}><\text{Argument}][<\text{Comma}><\text{Argument}>]...\]

A command header consists of one or more mnemonics arranged in a hierarchy or tree structure. The first mnemonic is the base or root of the tree and each subsequent mnemonic is a level or branch off the previous one. Commands at a higher level in the tree may affect those at a lower level. The leading colon (:) always returns you to the base of the command tree.

2.1.4 Queries

Queries cause the instrument to return information about its status or settings. Queries have the structure:

- \[
[:<\text{Header}>]?\]
- \[
[:<\text{Header}>]?[<\text{Space}><\text{Argument}][<\text{Comma}><\text{Argument}>]...\]

You can specify a query command at any level within the command tree unless otherwise noted. These branch queries return information about all the mnemonics below the specified branch or level. For example

\[
\text{HISTogram:STATistics:STDdev}\]

returns the standard deviation of the histogram, whereas

\[
\text{HISTogram:STATistics}\]

returns all the histogram statistics, and

\[
\text{HISTogram}\]

returns all the histogram parameters.

2.1.5 Headers

You can control whether the instrument returns headers as part of the query response. Use the \textbf{HEADer} command to control this feature. If header is on, the query response returns command headers and formats itself as a valid set command. When the header is off, the response includes only the values. This may make it easier to parse and extract the information from the response. The table below shows the difference in responses.

<table>
<thead>
<tr>
<th>Query</th>
<th>Header Off</th>
<th>Header On</th>
</tr>
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<tr>
<td>Ch1:Scale?</td>
<td>200 mV/div</td>
<td>CH1:SCALE 200 mV/div</td>
</tr>
<tr>
<td>ACQ:NAvg?</td>
<td>16</td>
<td>ACQ:NAV 16</td>
</tr>
</tbody>
</table>

Comparison of Header Off and Header On responses
2.2 Command Entry

2.2.1 Rules

The following rules apply when entering commands:

- A mnemonic can be followed by any letters for easier understanding of the program's text. For example, these commands are all equivalent:

  Ch1:ATTEN:DIMENS Volt

  Ch1:ATTENuator:DIMENSion Volt

  Ch1:ATTENblabla:DIMENSblabla Volt

However, arguments must not be followed by additional characters.

- You can enter commands in upper or lower case.

- You can precede any command with white space characters. White space characters include any combination of the ASCII control characters 00 to 09, and 0B to 20 hexadecimal (0 to 9, and 11 to 32 decimal).

- The instrument will ignore commands consisting of any combination of white space characters and line feeds.

2.2.2 Concatenation

You can concatenate any combination of set commands and queries by using a semicolon (;). The instrument executes concatenated commands in the order received. The following rules apply when concatenating commands and queries:

- You can separate completely different headers with a semicolon (;), and by adding a leading colon (:) at the beginning of all commands except the first one. For example

  TRIGger:MODE FREE
  ACQuire:NAVG 10

  can be concatenated into the single command

  TRIGger:MODE FREE;:ACQuire:NAVG 10

- If concatenated commands have headers that differ by only the last mnemonic, you can abbreviate the second command and eliminate the leading colon. For example, you can concatenate the commands

  Zoom1:Ch1:VertFactor 10
  Zoom1:Ch1:VertPosition -1

  into a single command

  Zoom1:Ch1:VertFactor 10; VertPosition -1

  The longer version also works equally well:

  Zoom1:Ch1:VertFactor 10;:Zoom1:Ch1:VertPosition -1

- Set commands and queries may be concatenated in the same message. For example:
Acq:Mode Average;NAvg?

This is a valid message that sets the acquisition mode to Stable Averaging. The message then queries the number of acquisitions for averaging. Concatenated commands and queries are executed in the order received.

- Here are some invalid concatenations:

  Displ:TraceMode AllLocked; ACQ:NAVG 10
  (a colon is needed before ACQuire)

  Displ:TraceMode AllLocked;:Format YT
  (there is an extra colon before FORMAT. Use Displ:TraceMode AllLocked;Format YT instead.)

  Displ:Ch1:Persistence Simple;Ch1:PersistTime 2
  (The levels of these mnemonics are different. Either remove the second use of Ch1: or place :Displ: in front of Ch1:.)
3  Command Classification

Most commands belong to one of a few types. For example, execution-type commands tell the instrument to perform a specific action, selector-type commands modify a specific instrument setting to the one of few fixed values, and so on. All commands of a given type have similar behavior.

3.1  Execution-type commands

Execution-type commands tell the instrument to perform a specific action. For example:

  *Run  
  *ClrDisp1

There are no arguments for these commands.

All execution-type commands have a set form only, with no query form.

3.2  On/off-type commands

On/off type commands tell the instrument to turn on or turn off a specific function. For example:

  Header Off
  Ch1:Display 0

There are four fixed arguments possible in these commands: On, Off, 0, 1. Arguments On and 1 are equivalent and turn on the corresponding function. Arguments Off and 0 are also equivalent and turn off the corresponding function.

All on/off type commands have a query form, which will return one of two fixed values: ON or OFF. It is also possible to use the query form with an argument. For example:

  Ch1:Display? 0

This command turns off the graphic of Channel 1 and returns OFF.

3.3  On/off-group-type commands

Some functions of the instrument have items that may be set on or off independently. It is also possible for the items to be either all on or all off. An example of this type of command is:

  Meas:Ch1:XParam

This command has a set of parameters for automatic X-axis measurements for Ch1. It is possible to select up to 10 parameters from a list of 18:

  Period, Freq, PosWidth, NegWidth, Rise, Fall, PosDuty, NegDuty, PosCross, NegCross, BurstWidth, Cycles, TimeOfMax, TimeOfMin, PosJitterPp, PosJitterRMS, NegJitterPp, NegJitterRMS

There are between 2 and 64 custom items in the on/off-group-type commands. The full set of items for each command is specified in the list of commands.
The on/off-group-type commands can be used in several modes. Every such command can be used in every mode.

**Single-item mode**
Single-item mode is used to control one item of a command without changing its other items. In this case the item's mnemonic is added to the end of the command after a colon (:`). This must be followed by a space character and then one of the following arguments: **On**, **Off**, **0**, **1**. For example, this command turns on a frequency measurement for Channel 1:

```
Meas:Ch1:XParam:Freq 1
```

Single-item mode has a query form similar to the On/off commands. So the query

```
Meas:Ch1:XParam:Period 1
```

or

```
Meas:Ch1:XParam:Freq?
```

returns either **ON** or **OFF**.

**Group-on mode**
Group-on mode is used to simultaneously turn on a custom group of items. In this case the **Include** mnemonic is added to the end of the command. This is then followed by a space and a few items separated by commas. For example, this command turns on the rise time and fall time measurements for Channel 1:

```
Meas:Ch1:XParam:Include Rise,Fall
```

**Group-off mode**
Group-off mode is used to simultaneously turn off a custom group of items. In this case the **Exclude** mnemonic is added to the end of the command. This is then followed by a space and a few items separated by commas. For example, this command turns off the frequency and period measurements for Channel 1:

```
Meas:Ch1:XParam:Exclude Freq,Period
```

**All-off mode**
All-off mode is used for simultaneously turning off all items. In this case the **ClearAll** mnemonic is added to the end of the command. For example, the next command turns off all measurements for Channel 1:

```
Meas:Ch1:XParam:ClearAll
```

Group-on, Group-off and All-off modes do not have a query form.

**Group-query mode**
Group-query mode is used find out which items are currently turned on. This mode only has a query form. For example:

```
Meas:Ch1:XParam?
```

The answer may include one or more items separated by a comma, or **ClearAll** if all items are turned off. For example, the answer **Freq,Period** means there are two items turned on.
3.4 Selector-type commands

The selector-type commands modify a specific instrument setting to one of a few fixed values. For example,

\[ \text{Trig:Analog:Ch1:Slope} \]

has these possible arguments:

- Pos, Neg, BiSlope

and

\[ \text{Trig:Mode} \]

has these possible arguments:

- Free, Trig

Between 2 and 32 custom arguments are available for these commands. The full set of arguments for each command is specified in the list of commands.

The selector-type commands have a query form. It is possible to use the query form with an argument. For example:

\[ \text{Trig:Analog:Ch1:Slope? Pos} \]

This command sets the Direct input as the trigger source and returns POS.

3.5 Integer-type commands

The integer-type commands modify specific integer-value functions. For example, the command

\[ \text{INSTR:TimeBase:RecLen 1000} \]

sets the length of signals to 1000 points. The valid range and increment of each value is different and is described in the list of commands.

The integer-type commands have a query form. It is possible to use the query form with an argument. For example,

\[ \text{INSTR:TimeBase:RecLen? 24} \]

returns 50, since 50 is the minimum valid length of a signal.

3.6 Float-type commands

The float-type commands modify specific real-value functions. For example, the command

\[ \text{Ch1: Scale 0.1} \]

does the Y-scale for Channel 1 to 100 mV/div. The valid range and increment of each value is different and is described in the list of commands.

Float-type commands have a query form. It is also possible to use the query form with an argument. For example,
Ch1:Scale? 0.1
returns 100 mV/div, where V/div is a dimension of the scale, and the prefix m is milli.

The commands

INSTR:TimeBase:ScaleT? 0.0000001

INSTR:TimeBase:ScaleT? 100e-9

INSTR:TimeBase:ScaleT? 0.1u

INSTR:TimeBase:ScaleT? 100p

are equal and set the Scale of the timebase to the value 100 ns/div. All of these commands return 100 ns/div.

3.7 Data-type commands

The data-type commands are used to send data to the instrument or to receive data from the instrument, such as the array of points from an acquired signal, the result of a measurement, and so on.

Some data-type commands only have a query form, while others have both a command and a query form. The structure of the data is different for each command and is specified in the list of commands.
4 Full list of commands

4.1 Header command

Header:  \texttt{Header}
Type: On/Off
Action: Enables/disables headers as part of the query response

4.2 GUI commands

Header:  \texttt{Gui}
Type: Selector
Arguments: \texttt{RemoteLocal, RemoteOnly, Invisible}
Action: Sets the behavior of the GUI when it is controlled by the COM-object

\textbf{GUI ready query}

Header:  \texttt{Instr:GuiReady?}
Type: On/off-type command
Argument: none
Forms: query only
Action: Returns \texttt{On} when the GUI has finished loading and is ready to receive commands. Must be used first at system startup.

\textbf{GUI control command}

Header:  \texttt{Gui:Control}
Type: Selector-type command
Arguments: \texttt{RemoteLocal, RemoteOnly, Invisible}
Action: Set the behavior of the GUI when it controls by COM-object.

\textbf{GUI side menu}

Header:  \texttt{Gui:SideMenu:Left:Menu}  \texttt{Gui:SideMenu:Right:Menu}
Type: Selector-type command
Arguments: \texttt{Off, Ch, Acq, Trig, Displ, Save, Mark, Meas, Math, Hist, Eye, Mask, Util}
Action: Remove or Set the specified side menu panel.
GUI side menu page
Header:  Gui:SideMenu:Left:Page
        Gui:SideMenu:Right:Page
Type:  Integer-type command
Argument:  1 to N, when N is count of pages in the current side menu
Action:  Select the page in the specified side menu panel.
Note:  This command makes sense for side menus with two or more pages.

GUI side menu signal
Header:  Gui:SideMenu:Left:Signal
        Gui:SideMenu:Right:Signal
Type:  Integer-type command
Argument:  1 to N, when N is count of active signals (max 4)
Action:  Select the signal in the specified side menu panel.
Note:  This command makes sense for the Channels, Save/Recall and Math menu.

4.3 System commands

Clear Display
Header:  *ClrDispl
Type:  Execution
Action:  Clears the display immediately

Running Control
Header:  *RunControl
Type:  Selector
Arguments:  Stop, Single, Run
Action:  Run  – Start a continuous acquisition
        Single – Start a single acquisition
        Stop  – Immediately stop the acquisition
Response:  Run  – the instrument is in the continuous acquisition state
          Single – the instrument is in the single acquisition state
          Stop  – the instrument is stopped
Start Autoscaling
Header: *Autoscale
Type: Selector
Arguments: None
Action: Starts autoscaling of the instrument

Recall Default Setup
Header: *DefSetup
Type: Execution
Action: Restores the instrument to its default setup

Set Copy Mode and Copy to the Clipboard
Header: *Copy:<Mode>

where <Mode> is one of:

FullScreen FullWindow
ClientPart InvClientPart
ScopeScreen InvScopeScr

Type: Executing-type command
Action: Sets the specified copy mode (All display, software window, client part of the software window, client part of the software window with colors inverted, software screen area or software screen area with color inversion) and copy specified onto the clipboard.

Copy to the Clipboard
Header: *Copy
Type: Execution
Action: Puts the image onto the clipboard, depending on the Copy Mode

Get Copy Mode query
Header: *Copy?
Argument: None
Forms: Query only
Action: Returns current Copy Mode. See Set Copy Mode and Copy to the Clipboard.
4.4 Channel commands

**General remark on channel commands**
Some channel commands use mnemonics or the arguments Ch1, Ch2, Ch3 and Ch4 related to the channels.

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics Ch1, Ch2, Ch3, Ch4 mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics Ch1, Ch2 mean channels CH1, CH2, respectively. Mnemonics Ch3 and Ch4 are not used for these models.

**Display a Channel**

<table>
<thead>
<tr>
<th>Header</th>
<th>Ch1:Display</th>
<th>Ch2:Display</th>
<th>Ch3:Display</th>
<th>Ch4:Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>On/off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Turns display of the corresponding channel's signal on or off</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Acquire a Channel**

<table>
<thead>
<tr>
<th>Header</th>
<th>Ch1:AcqOnlyEn</th>
<th>Ch2:AcqOnlyEn</th>
<th>Ch3:AcqOnlyEn</th>
<th>Ch4:AcqOnlyEn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>On/off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>On</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- acquisition of the channel is independent of whether it is displayed or not
- acquisition of the channel occurs only when the channel display is On

**Scale a Channel**

<table>
<thead>
<tr>
<th>Header</th>
<th>Ch1:Scale</th>
<th>Ch2:Scale</th>
<th>Ch3:Scale</th>
<th>Ch4:Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Float</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argument</td>
<td>0.01 to 0.25, or other when attenuator is used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Sets the specified display scale in V/div</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Offset a Channel**

<table>
<thead>
<tr>
<th>Header</th>
<th>Ch1:Offset</th>
<th>Ch2:Offset</th>
<th>Ch3:Offset</th>
<th>Ch4:Offset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Float</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argument</td>
<td>−1 to +1, or other when attenuator is used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Sets the specified compensation voltage of the channel in V</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Position a Channel
Header: Ch1:Position   Ch2:Position
        Ch3:Position   Ch4:Position
Type: Float
Argument: -5 to +5
Action: Sets the specified vertical position of the channel on the screen, in divisions.

Bandwidth of Channel
Header: Ch1:Band   Ch2:Band
        Ch3:Band   Ch4:Band
Type: Selector
Arguments: Full, Middle, Narrow
Action: Sets the bandwidth of the channel

Deskew of Channel
Header: Ch1:Deskew   Ch2:Deskew
        Ch3:Deskew   Ch4:Deskew
Type: Float
Argument: 0 to 100e-9
Action: Sets the deskew of the channel in s

Attenuator linear/log
Header: Ch1:Atten:Unit   Ch2:Atten:Unit
        Ch3:Atten:Unit   Ch4:Atten:Unit
Type: Selector
Arguments: Off, Ratio, DB
Action: Sets the presence and scale of the attenuator or converter used with the channel

Attenuator ratio
Header: Ch1:Atten:Ratio   Ch2:Atten:Ratio
        Ch3:Atten:Ratio   Ch4:Atten:Ratio
Type: Float
Argument: 0.0001 to 1000000
Action: Sets the attenuation ratio. This setting is active only when the attenuator unit is ratio.
Attenuator dB

Header: Ch1:Attenu:DB Ch2:Attenu:DB Ch3:Attenu:DB Ch4:Attenu:DB

Type: Float

Argument: -80 to +120

Action: Sets the attenuation in dB. This setting is only active when the attenuator unit is decibels.

Attenuator unit

Header: Ch1:Attenu:Dimens Ch2:Attenu:Dimens Ch3:Attenu:Dimens Ch4:Attenu:Dimens

Type: Selector

Arguments: Volt, Watt, Ampere, Unknown

Action: Sets the units of the converter used with the channel

4.5 Timebase commands

Sampling Mode

Header: Instr:TimeBase:SampleModeSet

Type: Selector

Arguments: RealTime, RandomET, Roll, Auto

Action: Sets the instrument's sampling mode

Primary Priority Mode

Header: TB:Priority:Primary

Type: Selector-type command

Arguments: RecLength, SmplRate, HorScale

Action: Set the primary priority of timebase

Secondary Priority Mode

Header: TB:Priority:Secondary

Type: Selector-type command

Arguments: RecLength, SmplRate, HorScale

Action: Set the secondary priority of timebase
**Timebase scale, sec/div**

Header: `Instr:TimeBase:ScaleT`  
Type: Float  
Argument: PicoScope 9404-05 and PicoScope 9402-05: 50e–12 to 1000;  
PicoScope 9404-16 and PicoScope 9402-16: 20e–12 to 1000  
Action: Sets the scale of the timebase

---

**Timebase Sample Rate**

Header: `Instr:TimeBase:SmplRate`  
Type: Float-type command  
Argument: PicoScope 9404-05 and PicoScope 9402-05: 125e-3 to 1e12;  
PicoScope 9404-16 and PicoScope 9402-16: 125e-3 to 0.4e12  
Action: Sets sample rate in samples per second

---

**Record Length**

Header: `Instr:TimeBase:RecLen`  
Type: Integer-type command  
Argument: 50 to 250000  
Action: Sets number of points of signals

---

**Timebase Delay**

Header: `TB:Delay`  
Type: Float  
Argument: 5E-8 to 4.28  
Action: Sets the delay of the timebase, in seconds

---

**Trigger Position**

Header: `TB:TrigPos`  
Type: Float  
Argument: 0 to 100  
Action: Sets the trigger position, %
4.6 Acquisition commands

4.6.1 Acquisition Mode

**Acquisition Mode**

Header:  \texttt{Acq:Mode}  
Type:  Selector-type command  
Arguments:  \texttt{Sample, Average, EnvMinMax, EnvMin, EnvMax, PeakDetect, HighRes, Segmented}  
Action:  Sets the acquisitions mode  
Note:  Arguments \texttt{PeakDetect, HighRes, Segmented} are possible in \texttt{RealTime} sampling mode.

4.6.2 Common Acquisition Commands

<table>
<thead>
<tr>
<th>General remark on acquisition commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some acquisition commands use mnemonics or the arguments Ch1, Ch2, Ch3 and Ch4 related to the channels.</td>
</tr>
</tbody>
</table>

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics \texttt{Ch1}, \texttt{Ch2}, \texttt{Ch3}, \texttt{Ch4} mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics \texttt{Ch1}, \texttt{Ch2} mean channels CH1, CH2, respectively. Mnemonics \texttt{Ch3} and \texttt{Ch4} are not used for these models.

### # of Averaging

Header:  \texttt{Acq:NAvg}  
Type:  Integer  
Argument:  1, 2, 4, 8, 16, ... 4096  
Action:  Sets the averaging coefficient

### # of Envelopes

Header:  \texttt{Acq:NEnv}  
Type:  Integer  
Argument:  2, 4, 8, 16, ..., 4096, 8192  
Action:  Sets the number of signals for envelope mode. Argument 8192 is used for unlimited number of signals
# of High Resolution Bits

Header:  TB:HiResBits

Type:  Float-type command

Argument:  12.5 to 16 with step = 0.5

Action:  Sets the effective number of bits in HighRes Acquisition Mode

Channels for High Resolution

Header:  Acq:HiResChs

Type:  Group-on/off-type command

Arguments:  Ch1, Ch2, Ch3, Ch4

Action:  Selects channels to increase the effective number of bits

4.6.3  Segmented Acquisition

General remark on acquisition commands

Some acquisition commands use mnemonics or the arguments Ch1, Ch2, Ch3 and Ch4 related to the channels.

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics Ch1, Ch2, Ch3, Ch4 mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics Ch1, Ch2 mean channels CH1, CH2, respectively. Mnemonics Ch3 and Ch4 are not used for these models.

Max Number of Segments query

Header:  Acq:Segment:MaxNSeg?

Type:  Integer-type command

Argument:  none

Action:  Gets max number of segments for current channel’s count and record length

Number of Segments

Header:  Acq:Segment:NSegments

Type:  Integer-type command

Argument:  1 to 1024

Action:  Sets number of segments. Max value may be less than 1024 for current channel’s count and record length
Segments Display Channel
Header: `Acq:Segment:Source`
Type: Selector-type command
Arguments: Ch1, Ch2, Ch3, Ch4
Action: Sets the channels for display segments

Segments View Mode
Header: `Acq:Segment:ViewMode`
Type: Selector-type command
Arguments: Off, Overlay, OverSel
Action: Sets the mode of display segments

Selected Segment
Header: `Acq:Segment:SelectedSeg`
Type: Integer-type command
Argument: 1 to 1024
Action: Selects the segment for highlighting. Max value may be less than 1024 for current channel's count and record length

Range of segments for overlays
Header: `Acq:Segment:FirstSegm`
`Acq:Segment:LastSegm`
Type: Integer-type command
Argument: 1 to 1024
Action: Selects the range of segments for overlays. Max value may be less than 1024 for current channel's count and record length

Segments time table
Header: `Acq:Segment:TimeTable`
Type: On/off-type command
Action: Shows or Hides the table of segment's times
4.6.4 Termination of the Acquisition

Termination of Acquisition
Header: Acq:RunUntil
Type: Selector
Arguments: StopBtn, NAcq
Action: Sets the condition for terminating acquisition when the Stop button is pressed or after the specified number of waveforms is reached.

4.6.5 Number of Waveforms

Number of Waveforms
Header: Acq:NAcq
Type: Integer
Argument: 1 to 65535
Action: Sets the number of signals for the terminating acquisition

4.6.6 Action when Number of Waveforms reached

Action when Number of Waveforms reached
Header: Acq:Action
Type: On/off-group
items: Beep, Save
Action: If Save is turned on, every signal is stored to disk
If Beep is turned on, the beep signal will sound after the specified number of waveforms is reached

4.6.7 File Name

File Name
Header: Acq:FileName
Type: Data
Argument: Text string contains the file path
Action: Defines the full path and base file name for storing the acquired signals onto the Disk. The name of each saved file consists of a base name, followed by an underscore (_) and five-digit auto-incremented numbers.

For example, after the command:
Acq:FileName C:\Temp\Test1\basename

Files basename_00001.wfm, basename_00002.wfm, basename_00003.wfm and so on will be written to the C:\Temp\Test1 folder.

Note: The specified folder must exist

4.6.8 Stored Files Format

Stored Files Format
Header: Acq:FileFormat
Type: Selector
Arguments: Binary, Verbose, YOnly
Action: Sets the format of the file

4.7 Trigger commands

4.7.1 Trigger

General remark on trigger commands
Some trigger commands use mnemonics or the arguments Ch1, Ch2, Ch3 and Ch4 related to the channels.

These mnemonics for various devices mean the following.
- For the PicoScope 9404-05 and the PicoScope 9404-16: mnemonics Ch1, Ch2, Ch3, Ch4 mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05: “Trigger” input corresponds to Ch4 mnemonics;
- For the PicoScope 9402-16: “Direct Trigger” input corresponds to Ch4 mnemonics;
- For the PicoScope 9402-05 and the PicoScope 9402-16: mnemonic Ch3 is not used.

Trigger Source
Header: Trig:Analog:Source
Type: Selector
Arguments: CH1, CH2, CH3, CH4
Action: Sets trigger source

Trigger Style
Header: Trig:Analog:Style
Type: Selector-type command
Arguments: Edge, Divider, ClkRecovery, IntClock, ExtPrescal
Action: Sets trigger style.
**Trigger Level**

**Header:**

```
Trig:Analog:Ch1:Level   Trig:Analog:Ch2:Level  
Trig:Analog:Ch3:Level   Trig:Analog:Ch4:Level  
```

**Type:** Float-type command

**Argument:** -1 to +1

**Action:** Sets the trigger level for the specified channel, in volts

---

**Trigger Slope**

**Header:**

```
Trig:Analog:Ch1:Slope   Trig:Analog:Ch2:Slope  
Trig:Analog:Ch3:Slope   Trig:Analog:Ch4:Slope  
```

**Type:** Selector-type command

**Arguments:** Pos, Neg, BiSlope

**Action:** Sets the slope of trigger for specified channel

---

**Trigger Sensitivity**

**Header:**

```
Trig:Analog:Ch1:Sensitivity   Trig:Analog:Ch2:Sensitivity  
Trig:Analog:Ch3:Sensitivity   Trig:Analog:Ch4:Sensitivity  
```

**Type:** Selector-type command

**Arguments:** High, Low, Var

**Action:** Sets trigger sensitivity for specified channel

---

**Trigger Hysteresis**

**Header:**

```
Trig:Analog:Ch1:Hyst   Trig:Analog:Ch2:Hyst  
Trig:Analog:Ch3:Hyst   Trig:Analog:Ch4:Hyst  
```

**Type:** Float-type command

**Argument:** 0 to 100

**Action:** Sets trigger hysteresis for specified channel in the Var Trigger Sensitivity

---

4.7.2 Trigger Period for Internal Clock Sources

**Trigger Period for Internal Clock**

**Header:**

```
Trig:Analog:IntClkPeriod  
```

**Type:** Float

**Argument:** 2e-6 ... 0.0655

**Action:** Sets the period for the internal clock trigger style in seconds
4.7.3 Trigger Mode and Holdoff commands

**Trigger Mode**

Header: \texttt{Trig:Mode}
Type: Selector
Arguments: \texttt{Free, Trig}
Action: Sets Freerun or Triggered mode for the trigger

**Trigger Sharing**

Header: \texttt{Trig:Shared}
Type: Selector-type command
Arguments: \texttt{Shared, Independ}
Action: Sets sharing mode

**Holdoff Mode**

Header: \texttt{Trig:HoldoffBy}
Type: Selector-type command
Arguments: \texttt{Time, Random}
Action: Sets Holdoff mode

**Holdoff Time**

Header: \texttt{Trig:HoldoffTime}
Type: Float-type command
Argument: 0.5e-6…15
Action: Sets the holdoff time, in seconds

**Holdoff Time for Random mode**

Header: \texttt{Trig:HoffRandMin} \texttt{Trig:HoffRandMax}
Type: Float-type command
Arguments: 0.5e-6…15
Action: Sets the minimum and maximum holdoff times for Random mode, in seconds
### 4.8 Display commands

**General remark on display commands**

Some display commands use mnemonics or the arguments **Ch1, Ch2, Ch3** and **Ch4** related to the channels.

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics **Ch1, Ch2, Ch3, Ch4** mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics **Ch1, Ch2** mean channels CH1, CH2, respectively. Mnemonics **Ch3 and Ch4** are not used for these models.

**Mnemonic <src> in some Display Commands signifies Source**

(<src> is: Ch1, Ch2, Ch3, Ch4, F1, F2, F3, F4, M1, M2, M3, M4, S1, S2)

---

**Trace mode**

Header: `Displ:TraceMode`

Type: Selector

Arguments: `AllLocked, PerTrace`

Action:
- In **PerTrace** mode, every waveform may be displayed in its own style
- In **AllLocked** mode, the display style of all waveforms is set as the style of the active trace

**Select active trace**

Header: `Displ:TraceSel`

Type: Selector

Arguments: `Ch1, Ch2, Ch3, Ch4, F1, F2, F3, F4, M1, M2, M3, M4, XY`

Action: Selects the active trace for **AllLocked** trace mode

**Display Persistence**

Header: `Displ:<src>:Persistence`

Type: Selector-type command

Arguments: `Simple, VarPersist, InfinPers, VarGrayScal, InfGrayScal, VColorGrad, IColorGrad`

Action:
- In **PerTrace** mode, sets display persistence for the specified trace
- In **AllLocked** mode, sets display persistence for all traces
Display Style

Header: \texttt{Displ:<src>:Style}

Type: Selector

Arguments: Dots, Vectors

Action: In \texttt{PerTrace} mode, sets the display style for specified trace
In \texttt{AllLocked} mode, sets the display style for all traces

Persistence Time (for VarPersist Style)

Header: \texttt{Displ:<src>:PersistTime}

Type: Float

Argument: 0.1 to 20

Action: In \texttt{PerTrace} mode, sets the persistence time for the specified trace, in seconds
In \texttt{AllLocked} mode, sets the persistence time for all traces, in seconds

Refresh Time (for VarGrayScal or VColorGrade Styles)

Header: \texttt{Displ:<src>:RefreshTime}

Type: Float

Argument: 1 to 200

Action: In \texttt{PerTrace} mode, sets the refresh time for specified trace, in seconds
In \texttt{AllLocked} mode, sets the refresh time for all traces, in seconds

Reset Display Style

Header: \texttt{Displ:ResetAll}

Type: Execution

Action: Resets Display Styles to initial state (variable persistence 2 c)

Tandem Display Format

Header: \texttt{Displ:TwoColumns}

Type: On/off-type command

Action: Turns on or turn off the two columns display mode.

Display Format

Header: \texttt{Displ:Format}

Type: Selector

Arguments: Auto, YT, 2YT, 4YT, XY, CombYTXY, Comb2YTXY

Action: Selects the number and kinds of screens
Define Trace Screen (for 4YT Format)
Header: \texttt{Displ:Screen4:<trace>},
when \texttt{<trace>} is \texttt{<src>} or \texttt{Hist}
Type: Selector
Arguments: \texttt{1, 2, 3, 4}
Action: Moves the specified trace onto the specified screen in 4YT format

Define Trace Screen (for 2YT, Comb2YTXY Formats)
Header: \texttt{Displ:Screen2:<trace>},
when \texttt{<trace>} is \texttt{<src>} or \texttt{Hist}
Type: Selector
Arguments: \texttt{1, 2}
Action: Moves the specified trace onto the specified screen in 2YT or Comb2YTXY formats

Source of X Axis for XY Screen
Header: \texttt{Displ:XAxis}
Type: Selector
Arguments: \texttt{<src>, exclude XY, DB}
Action: Sets the specified signal as X axis for XY screen

Source of Y Axis for XY Screen
Header: \texttt{Displ:YAxis}
Type: Selector
Arguments: \texttt{<src>, exclude XY, DB}
Action: Sets the specified signal as Y axis for XY screen

Graticule Type
Header: \texttt{Displ:Gratic}
Type: Selector
Arguments: \texttt{Grid, Frame, Axis, Off}
Action: Defines the type of graticule for YT and XY screens

Large Dots Display Mode
Header: \texttt{Displ:Dot3x3}
Type: On/off-type command
Action: Turns on or turn off the large dots display mode. Used only with short signal length.
Visibility of Main Toolbar
Header: Displ:Toolbar
Type: On/off-type command
Action: Turns on or turn off the main toolbar

Visibility of Permanent Controls
Header: Displ:Permanent
Type: On/off-type command
Action: Turns on or turns off the permanent controls

Visibility of Measurements Area
Header: Displ:MeasArea
Type: On/off-type command
Action: Turns on or turn off the measurements area

Visibility of Side Menu Panels
Header: Displ:SideMenu
Type: Selector-type command
Arguments: Left, Right, Both, None
Action: Sets the specified mode of side menus visibility
4.9 Save/Recall commands

4.9.1 Work with Memo Zones (M1, M2, M3, M4)

**General remark on save/recall commands**

Some save/recall commands use mnemonics or the arguments `Ch1`, `Ch2`, `Ch3` and `Ch4` related to the channels.

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics `Ch1`, `Ch2`, `Ch3`, `Ch4` mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics `Ch1`, `Ch2` mean channels CH1, CH2, respectively. Mnemonics `Ch3` and `Ch4` are not used for these models.

**Memory Display**

*Header:* `Save:<mz>:Visible`

*Type:* On/off-group

*Items:* `M1`, `M2`, `M3`, `M4`

*Action:* Controls the display of memory zones

**Source for storing into Memory**

*Header:* `Save:Memo:Source`

*Type:* Selector

*Arguments:* `Ch1`, `Ch2`, `Ch3`, `Ch4`, `F1`, `F2`, `F3`, `F4`, `M1`, `M2`, `M3`, `M4`

*Action:* Defines the signal as source for storing into memory zone

**Save into Memory**

*Header:* `Save:<mz>:Save`

*Type:* Execution

*Action:* Stores the selected source into selected memory
4.9.2 Work with Disk

General remark on save/recall commands
Some save/recall commands use mnemonics or the arguments Ch1, Ch2, Ch3 and Ch4 related to the channels.

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics Ch1, Ch2, Ch3, Ch4 mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics Ch1, Ch2 mean channels CH1, CH2, respectively. Mnemonics Ch3 and Ch4 are not used for these models.

File Type
Header: Save:Disk:FileType
Type: Selector
Arguments: Wfm, DB
Action: Defines the file type for saving

Source for saving to file
Header: Save:Disk:Source
Type: Selector
Arguments: Ch1, Ch2, Ch3, Ch4, F1, F2, F3, F4, M1, M2, M3, M4
Action: Defines the signal as source for saving to file

File Name
Header: Save:Disk:FileName
Type: Data
Argument: Text string
Forms: Command, query, command with query
Action: Defines the file name for saving the specified signal to disk
Note: Specified folder must exist

File Name Mode
Header: Save:Disk:NameMode
Type: Selector
Arguments: Manual, Auto
Action: Sets the file name mode. In Auto mode the file name consists of a base name followed by an underscore (_) and a five-digit number. Each time you save a waveform, the number in the file name is automatically incremented. For example: basename_00001.wfm, basename_00002.wfm, basename_00003.wfm, and so on.
Format of stored files
Header: Save:Disk:FileFormat
Type: Selector
Arguments: Binary, Verbose, YOnly
Action: Sets the file format

Save to Disk
Header: Save:Disk:ExecSave
Type: Executing
Action: Saves the selected source to previously specified file

Load from Disk
Header: Save:<mz>:LoadFromDsk
Type: Executing
Action: Loads the previously specified disk file into the specified Memory Zone

4.9.3 Work with Setups

General remark on save/recall commands
Some save/recall commands use mnemonics or the arguments Ch1, Ch2, Ch3 and Ch4 related to the channels.

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics Ch1, Ch2, Ch3, Ch4 mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics Ch1, Ch2 mean channels CH1, CH2, respectively. Mnemonics Ch3 and Ch4 are not used for these models.

Recall Factory Setup
Header: Save:Setup:RecFact
Type: Execution
Action: Returns the instrument to manufacturer's default setting

Recall Default Setup
Header: Save:Setup:RecDefault
Type: Executing
Action: Returns the instrument to its default setting


Recall Power-Off Setup
Header: \texttt{Save: Setup: RecLast} \\
Type: Execution \\
Action: Returns the instrument to the last setting before the power supply was last switched off

Save Setup as Default
Header: \texttt{Save: Setup: SvAsDefault} \\
Type: Execution \\
Action: Stores the present front-panel setup as the default setup

Name of Custom Setup File
Header: \texttt{Save: Setup: FileName} \\
Type: Data \\
Argument: Text string containing file path \\
Action: Defines the file name for storing Custom Setup \\
Note: The specified folder must exist

Save Custom Setup
Header: \texttt{Save: Setup: Save} \\
Type: Execution \\
Action: Stores the present front-panel setup as previously specified custom setup

Recall Custom Setup
Header: \texttt{Save: Setup: Recall} \\
Type: Execution \\
Action: Recalls the setup previously saved to file. The name of the setup must first be defined by the command \texttt{Save: Setup: FileName}. 

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4.10 Markers commands

General remark on markers commands

Some markers commands use mnemonics or the arguments Ch1, Ch2, Ch3 and Ch4 related to the channels.

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics Ch1, Ch2, Ch3, Ch4 mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics Ch1, Ch2 mean channels CH1, CH2, respectively. Mnemonics Ch3 and Ch4 are not used for these models.

Marker Type

Header: Mark:Type
Type: Selector
Arguments: Off, MX, MY, XY
Action: Sets the marker type

Marker Sources

Header: Mark:M1:Source, Mark:M2:Source
Type: Selector
Arguments: Ch1, Ch2, Ch3, Ch4, F1, F2, F3, F4, M1, M2, M3, M4
Action: Attaches the specified marker to the specified signal

X position of Marker

Header: Mark:M1:XPos, Mark:M2:XPos
Type: Float
Argument: Real value of X-axis
Action: Sets the X position of the specified marker

Y position of Marker

Header: Mark:M1:YPos, Mark:M2:YPos
Type: Float
Argument: Real value of Y-axis
Action: Sets the Y position of the specified marker
Motion of Markers
Header: Mark:Motion
Type: Selector
Arguments: Independ, Paired
Action: When Paired motion is selected, you can move both markers with the M1 POSITION variable simultaneously, while the difference between markers can be moved with the M2 POSITION variable.

4.11 Measure commands
4.11.1 Measurements of Time Domain Signals

<table>
<thead>
<tr>
<th>General remark on measure commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some measure commands use mnemonics or the arguments Ch1, Ch2, Ch3 and Ch4 related to the channels.</td>
</tr>
<tr>
<td>These mnemonics for various devices mean the following:</td>
</tr>
<tr>
<td>• For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics Ch1, Ch2, Ch3, Ch4 mean channels CH1, CH2, CH3 and CH4, respectively;</td>
</tr>
<tr>
<td>• For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics Ch1, Ch2 mean channels CH1, CH2, respectively. Mnemonics Ch3 and Ch4 are not used for these models.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurement Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Header: Meas:Display</td>
</tr>
<tr>
<td>Type: Selector</td>
</tr>
<tr>
<td>Arguments: Off, Param, Statistic</td>
</tr>
<tr>
<td>Action: Sets the measurement type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurement Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Header: Meas:DisplSrc</td>
</tr>
<tr>
<td>Type: Selector</td>
</tr>
<tr>
<td>Arguments: Ch1, Ch2, Ch3, Ch4, F1, F2, F3, F4, M1, M2, M3, M4</td>
</tr>
<tr>
<td>Action: Sets the source for the measurement</td>
</tr>
</tbody>
</table>
Measurement Mode
Header: Meas:Mode
Type: Selector
Arguments: Permanent, Single
Action: Sets the measurement mode

Execute Single Measurement
Header: Meas:SingleMeas
Type: Execution
Action: Executes a single measurement in Single mode

4.11.2 Statistic Commands

Statistic Measurement Mode
Header: Meas:StatMode
Type: Selector
Arguments: Permanent, Window, Weight
Action: Sets the Statistic Measurement mode

Windows Value
Header: Meas:Window
Type: Integer
Argument: 8 to 8192
Action: Sets the number of recently acquired waveforms for Window mode of Statistic Measurement

Weight Value
Header: Meas:Weight
Type: Integer
Argument: 8 to 8192
Action: Sets the weight variable for Weight mode of Statistic Measurement
4.11.3 Define Parameter Commands

**Viewing of Define Parameters**

Header: `Meas:View`  
Type: On/off-type command  
Action: Sets the visibility of define parameters markers for selected sources

**Top/Base Definition Method**

Header: `Meas:<src>:Method`  
Type: Selector  
Arguments: `Hist, MinMax, Marker`  
Action: Sets the Top and Base vertical reference thresholds for amplitude measurements of specified signals

**Top Value for Marker Method**

Header: `Meas:<src>:Top`  
Type: Integer  
Argument: 257 to 1023  
Action: Sets the Top vertical reference threshold for specified signals. Argument 0 corresponds to the bottom of the screen, and argument 1023 corresponds to the top of the screen independently of the real screen's height.

**Base Value for Marker Method**

Header: `Meas:<src>:Base`  
Type: Integer  
Argument: 1 to 767  
Action: Sets the Base vertical reference threshold for specified signals. Argument 0 corresponds to the bottom of the screen, and argument 1023 corresponds to the top of the screen independent of the real screen's height.

**Threshold Definition Method**

Header: `Meas:<src>:Thresh`  
Type: Selector  
Arguments: `10-90, 20-80, Custom`  
Action: Sets the lower, middle, and upper thresholds for measurements of the specified signals. May be set to the fixed values 10%-50%-90%; 20%-50%-80%; or custom values.
Threshold Units
Header: Meas:<src>:Unit
Type: Selector
Arguments: Percent, Volt, Division
Action: Sets the units of thresholds for the specified signals. Used for custom threshold definition method only.

Position of Upper, Middle or Lower Threshold
Headers: Meas:<src>:UpThresh
         Meas:<src>:MidThresh
         Meas:<src>:LowThresh
Type: Float
Arguments: Absolute voltage value (for Volt threshold units only)
           -4 to +4 (for Division threshold units only)
Action: Sets the threshold position for the specified signals

Percentage of Upper, Middle or Lower Threshold
Headers: Meas:<src>:UpThPerc
         Meas:<src>:MidThPerc
         Meas:<src>:LowThPerc
Type: Integer
Argument: -80 to +200
Action: Sets the threshold percentage for the specified signals. Used for Percent threshold units only. Argument 0 (%) corresponds to the Base of the signals, and argument 100 (%) corresponds to the Top of the signals.

Margins Definition Mode
Header: Meas:<src>:MargMode
Type: Selector
Arguments: Slope, Marker
Action: Sets the margins definition mode
Slope of Left or Right Margins
Headers: \texttt{Meas:<src>:LeftSlope} \hfill \texttt{Meas:<src>:RightSlope}

Type: Integer

Argument: 0 to 127

Action: Sets the margin for the specified signals on the specified slope. Used for \texttt{slope} margins definition mode only. Argument 0 = the first rise, value 1 = first fall, 2 = second rise, 3 = second fall, and so on.

Thresholds of Left and Right Margin Slopes
Headers: \texttt{Meas:<src>:LeftTresh} \hfill \texttt{Meas:<src>:RightTresh}

Type: Selector

Arguments: Upper, Middle, Lower

Action: Sets the thresholds for definitions of the left or right slope. Used for slope margins definition mode only.

Position of Left or Right Margin
Headers: \texttt{Meas:<src>:LeftMarker} \hfill \texttt{Meas:<src>:RightMarker}

Type: Float

Argument: Absolute time value

Action: Sets the position of margin for the specified signals. Used for marker margins definition mode only.

4.11.4 List of X Measurements

List of X Measurements
Header: \texttt{Meas:<src>:XParam}

Type: On/off-group

Items: Period, Freq, PosWidth, NegWidth, Rise, Fall, PosDuty, NegDuty, PosCross, NegCross, BurstWidth, Cycles, TimeOfMax, TimeOfMin, PosJitterPp, PosJitterRMS, NegJitterPp, NegJitterRMS

Action: Defines the set of X-axis measurements for the specified signals
4.11.5 List of Y Measurements

List of Y Measurements
Header: `Meas:<src>:YParam`
Type: On/off-group
Items: `Max, Min, Top, Base, PP, Ampl, Middle, Mean, CycMean, dcRMS, CycDcRMS, acRMS, CycAcRMS, PosOver, NegOver, Area, CycArea`
Action: Defines the set of Y-axis measurements for the specified signals

4.11.6 Second Source for Inter-Signal Measurements

General remark on measure commands
Some measure commands use mnemonics or the arguments `Ch1`, `Ch2`, `Ch3` and `Ch4` related to the channels.

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics `Ch1`, `Ch2`, `Ch3`, `Ch4` mean channels `CH1`, `CH2`, `CH3` and `CH4`, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics `Ch1`, `Ch2` mean channels `CH1`, `CH2`, respectively. Mnemonics `Ch3` and `Ch4` are not used for these models.

Second Source for Inter-Signal Measurements
Header: `Meas:Source2`
Type: Selector
Arguments: `Ch1`, `Ch2`, `Ch3`, `Ch4`, `F1`, `F2`, `F3`, `F4`, `M1`, `M2`, `M3`, `M4`
Action: Sets the second source for the inter-signal measurements
4.11.7 List of Inter-Signal Measurements

**List of Inter-Signal Delay Measurements**

- **Header:** `Meas:<src>:DualParDelay`
- **Type:** On/off-group
- **Items:** `Del1R1R, Del1R1F, Del1F1R, Del1F1F, Del1RnR, Del1RnF, Del1FnR, Del1FnF`
- **Action:** Defines the set of the inter-signal delay measurements for the specified signal

**List of Inter-Signal Phase Measurements**

- **Header:** `Meas:<src>:DualParPhase`
- **Type:** On/off-group
- **Items:** `PhaseDeg, PhaseRad, PhasePerc`
- **Action:** Defines the set of the inter-signal phase measurements for the specified signal

**List of Inter-Signal Gain Measurements**

- **Header:** `Meas:<src>:DualPar`
- **Type:** On/off-group
- **Items:** `Gain, DBGain`
- **Action:** Defines the set of the inter-signal gain measurements for the specified signal
4.11.8 Measurements of Spectrum Signals

Mnemonic `<fft_src>` in some Measurement Commands signifies Source (`<fft_src>` is F1, F2, F3, F4, M1, M2, M3, M4)

4.11.8.1 Spectrum Parameter Commands

Limits Definition Method for Spectrum
Header: `Meas:<src>:FFTMethod`
Type: Selector
Arguments: Harmonic, Peak
Action: Sets the method of the limits definition for the specified signal. Used for spectrum signals only.

Left and Right Spectrums Margin
Headers: `Meas:<src>:FFTLeft`
`Meas:<src>:FFTRight`
Type: Float
Arguments: Absolute frequency value
Action: Sets the position of margin for the specified spectrum signals. Used for searching for peak 1 of the spectrum for the Harmonic method.

Peak Level of Spectrum
Header: `Meas:<src>:PeakLevel`
Type: Float
Arguments: −100 to +80 (dBV)
Action: Sets the level for the specified spectrum signals. Used for searching a peak of the spectrum for the Peak method.

Left and Right Spectrum Peaks
Headers: `Meas:<src>:PeakLeft`
`Meas:<src>:PeakRight`
Type: Integer
Arguments: 1 to 41
Action: Sets the first and second peaks for the specified spectrum signals
4.11.8.2 List of Spectrum Frequency Measurements

**List of Spectrum Frequency Measurements**

Header: `Meas:<src>:XFFTPar`

Type: On/off-group

Items: `Freq, DFreq`

**Action:** Defines the set of the frequency measurements for the specified signals

4.11.8.3 List of Spectrum Magnitude Measurements

**List of Spectrum Magnitude Measurements**

Header: `Meas:<src>:YFFTPar`

Type: On/off-group

Items: `Magn, DMagn, TDH`

**Action:** Defines the set of the magnitude measurements for the specified signals

4.11.9 Delete all Measurements for all Sources

**Delete all Measurements for all Sources**

Header: `Meas:ClearAll`

Type: Execution

**Action:** Clears the list of all measurements for all signals
4.11.10 Getting Measurement Results

**Get List of Measured Parameters**

Header: `Meas:Res:List?`

Type: Data

Argument: None

Forms: Query only

Action: Returns text with the list of the active measurements for all signals with ordinal index

**Get Current Value of Parameter**

Header: `Meas:Res:<N>?`

Parameter `<N>`: Index of the parameter in the list

Type: Data

Argument: None

Forms: Query only

Action: Returns the last result of the specified measured parameter

**Get Statistic Value of Parameter**

Header: `Meas:Res:<N>:<Val>?`

Parameter `<N>`: Index of the parameter in the list

Parameter `<Val>`: `Wfm, Min, Max, Mean, StdDev`

Type: Data

Argument: None

Forms: Command with query only

Action: Returns the specified statistic parameter of the measured parameter
4.12 Limit Test commands

4.12.1 Limit Test On/Off

Limit Test On/Off

Header: Limit:TestOn

Type: On/off

Action: Enables/disables the Limit Test. Must be set On after full definition of all other Limit Test parameters.

4.12.2 Limit Test Termination Commands

Limit Test Termination Condition

Header: Limit:RunUntil

Type: Selector

Arguments: StopBtn, Failur, Wfm

Action: Sets the condition of Limit Test Termination

Number of Failures

Header: Limit:Failures

Type: Integer

Argument: 1 to 10000

Action: Sets number of failures for the Failur Condition of the Limit

Number of Waveforms

Header: Limit:NWfms

Type: Integer

Argument: 1 to 100000

Action: Sets the number of waveforms for the Wfm Condition of the Limit
4.12.3 Limit Test Action Commands

**Action**
- Header: Limit:Action
- Type: On/off-group
- Items: Beep, Save, Stop
- Action:
  - **Save**: every signal with a limit condition is stored to the disk
  - **Beep**: the beep signal will sound for every limit condition
  - **Stop**: acquisition immediately stops after the first limit condition

**Action If**
- Header: Limit:If
- Type: Selector
- Arguments: AnyFail, AllPass, AllFail, AnyPass
- Action: Define the limit condition:
  - **AnyFail**: one or more active measures fail
  - **AllPass**: all active measures are good
  - **AllFail**: all active measures fail
  - **AnyPass**: one or more active measurements is good

**Format of Stored Files**
- Header: Limit:FileFormat
- Type: Selector
- Arguments: Binary, Verbose, YOnly
- Action: Sets the file format

**File Name**
- Header: Limit:FileName
- Type: Data
- Argument: Text string
- Forms: Command, query, command with query
- Action: Defines the file name for saving the specified signals to disk
4.12.4 Parameter Definition Commands

Parameter Activity
Headers: Limit1:Activ Limit2:Activ
         Limit3:Activ Limit4:Activ
Type: On/off
Action: Enables/disables the Limit Test for relevant parameter

Parameter Limit Mode
Headers: Limit1:Mode Limit2:Mode
         Limit3:Mode Limit4:Mode
Type: Selector
Arguments: Center, Limit
Action: Sets the mode of limits for the relevant parameter

Upper and Lower Limits of Parameters
Headers: Limit1:UpLimit Limit1:LowLimit
         Limit2:UpLimit Limit2:LowLimit
         Limit3:UpLimit Limit3:LowLimit
         Limit4:UpLimit Limit4:LowLimit
Type: Float
Argument: Absolute value of limit
Action: Sets the limit's value. Used only for Limit mode of the parameter's limit.

Parameter Center Mode
Headers: Limit1:CenterMode Limit2:CenterMode
         Limit3:CenterMode Limit4:CenterMode
Type: Selector
Arguments: CurrMean, UserDef
Action: Sets the mode of the center definition for the relevant parameter. Used only for the Center mode of the parameter limit.

Center Value
Headers: Limit1:CenterVal Limit2:CenterVal
         Limit3:CenterVal Limit4:CenterVal
Type: Float
Argument: Absolute value of center
Action: Sets the absolute center value. Used for UserDef mode of the center of the parameter.
**Parameter Delta Mode**

**Headers:**
- Limit1:Delta
- Limit2:Delta
- Limit3:Delta
- Limit4:Delta

**Type:** Selector

**Arguments:** StdDev, UserDef, UserPerc

**Action:** Sets the mode of delta definition for relevant parameter. Used for Center mode of parameter limit only.

**Parameter Delta Value for Standard Deviation mode**

**Headers:**
- Limit1:StdDev
- Limit2:StdDev
- Limit3:StdDev
- Limit4:StdDev

**Type:** Float

**Argument:** 0.1 to 100 standard deviations of the parameter

**Action:** Sets the delta value. Used for StdDev mode of parameter delta only.

**Parameter Delta Value for User Defined Mode**

**Headers:**
- Limit1:UserDef
- Limit2:UserDef
- Limit3:UserDef
- Limit4:UserDef

**Type:** Float

**Argument:** Absolute value of delta

**Action:** Sets the delta value. Used for UserDef mode of delta of the parameter only.

**Parameter Delta Percentage for User Defined mode**

**Headers:**
- Limit1:UserPerc
- Limit2:UserPerc
- Limit3:UserPerc
- Limit4:UserPerc

**Type:** Float

**Argument:** 0.01% to 90% standard deviations of the parameter

**Action:** Sets the delta value. Used for UserPerc mode of delta of the parameter only.

**Failure When**

**Headers:**
- Limit1:FailWhen
- Limit2:FailWhen
- Limit3:FailWhen
- Limit4:FailWhen

**Type:** Selector

**Arguments:** Outside, Inside, Always

**Action:** Sets the mode of the quality control for the according parameter
4.13 Mathematics commands

4.13.1 Enable Mathematical Function

Enable Mathematical Function

Headers: 
F1:On  F2:On
F3:On  F4:On

Type: On/off

Action: Enables/disables the calculation and display of the relevant functions

4.13.2 Display Mathematical Function

DisplayMathematical Function

Headers: 
F1:Display  F2:Display
F3:Display  F4:Display

Type: On/off

Action: Enables/disables the visibility of the relevant functions

4.13.3 Function Category

Function Category

Headers: 
F1:Category  F2:Category
F3:Category  F4:Category

Type: Selector

Arguments: Arithm, Algebra, Trigonom, FFT, BitOp, Misc, Formula

Action: Sets the category of the specified function
4.13.4 Function Operators

**Arithmetic Function Operator**

Headers:  
F1:ArithmOp  
F2:ArithmOp  
F3:ArithmOp  
F4:ArithmOp

Type: Selector

Arguments:  
Add, Subtract, Multiply, Divide, Ceil, Floor, Fix, Round, Absolute, Invert, Common, ReScale

Action: Sets the operator of the specified function. Used for *Arithm* category only.

**Algebraic Function Operator**

Headers:  
F1:AlgebraOp  
F2:AlgebraOp  
F3:AlgebraOp  
F4:AlgebraOp

Type: Selector

Arguments:  

Action: Sets the operator of the specified function. Used for *Algebra* category only.

**Trigonometric Function Operator**

Headers:  
F1:TrigonOp  
F2:TrigonOp  
F3:TrigonOp  
F4:TrigonOp

Type: Selector

Arguments:  
Sine, ASine, Cosine, ACosine, Tangent, ATangent, Cotangent, ACotangent, HSine, HCosine, HTangent, HCotangent

Action: Sets the operator of the specified function. Used for *Trigonom* category only.

**FFT Function Operator**

Headers:  
F1:FFT0p  
F2:FFT0p  
F3:FFT0p  
F4:FFT0p

Type: Selector

Arguments:  
FFT, IFFT, FFTMagn, FFTPhase, FFTReal, FFTIm

Action: Sets the operator of the specified function. Used for *FFT* category only.
4.13.5 Function Operands

General remark on mathematics commands
Some mathematics commands use mnemonics or the arguments Ch1, Ch2, Ch3 and Ch4 related to the channels.

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics Ch1, Ch2, Ch3, Ch4 mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics Ch1, Ch2 mean channels CH1, CH2, respectively. Mnemonics Ch3 and Ch4 are not used for these models.

Operand 1
Headers:  F1:Source1  F2:Source1
           F3:Source1  F4:Source1
Type:   Selector
Arguments:  Ch1, Ch2, Ch3, Ch4, F1, F2, F3, F4, M1, M2, M3, N4
Action: Sets the first operand of the specified function

Operand 2
Headers:  F1:Source2  F2:Source2
           F3:Source2  F4:Source2
Type:   Selector
Arguments:  Ch1, Ch2, Ch3, Ch4, F1, F2, F3, F4, M1, M2, M3, M4, Constant
Action: Sets the second operand of the specified function. Used for dual- or quad-operand function.
Operands 3/4
Headers: F1:Source3  F1:Source4  
          F2:Source3  F2:Source4  
          F3:Source3  F3:Source4  
          F4:Source3  F4:Source4
Type: Selector
Arguments: Ch1, Ch2, Ch3, Ch4, F1, F2, F3, F4, M1, M2, M3, M4
Action: Sets the third and fourth operands for the specified function. Used for bits function.

Constant Value
Headers: F1:Const  F2:Const  
          F3:Const  F4:Const
Type: Float
Arguments: Absolute value of constant
Action: Sets the constant for the specified function. Used when Const is the second operand.

4.13.6 Additional Parameters for Arithmetic Functions

Rounding Step
Headers: F1:RoundTo  F2:RoundTo  
          F3:RoundTo  F4:RoundTo
Type: Float
Arguments: Value of rounding step
Action: Sets the step for rounding function. Used for Ceil, Floor, Fix, Round arithmetic functions.

Rescale Parameters
Headers: F1:ResMult  F1:ResOffset  
          F2:ResMult  F2:ResOffset  
          F3:ResMult  F3:ResOffset  
          F4:ResMult  F4:ResOffset
Type: Float
Arguments: Value of Mult and Offset parameters
Action: Sets the Mult and Offset parameters. Used for ReScale arithmetic function.
4.13.7 Additional Parameters for Algebraic Functions

**Logarithmic Base**

- **Headers:**
  - F1: LogBase
  - F2: LogBase
  - F3: LogBase
  - F4: LogBase

- **Type:** Float
- **Arguments:** 1.01 to 100
- **Action:** Sets the logarithmic base for LogA algebraic function

**Number Exponent**

- **Headers:**
  - F1: PowerExp
  - F2: PowerExp
  - F3: PowerExp
  - F4: PowerExp

- **Type:** Float
- **Argument:** -100 to +100
- **Action:** Sets the Number Exponent for ExpA algebraic function

4.13.8 Additional Parameters for Trigonometric Functions

**Volt-to-Radian Coefficient**

- **Headers:**
  - F1: YScaleRad
  - F2: YScaleRad
  - F3: YScaleRad
  - F4: YScaleRad

- **Type:** Float
- **Arguments:** -100 to +100
- **Action:** Sets the volt-to-radian coefficient for att trigonometric functions
### 4.13.9 Additional Parameters for FFT Functions

**Window**

| Headers: | F1:Window | F2:Window |
| F3:Window | F4:Window |
| Type: | Selector |
| Arguments: | Rectang, Hamming, Hanning, FlatTop, BlackHarr, KaiserBess |
| Action: | Sets the window for the specified function |

**Suppression**

| Headers: | F1:Suppress | F2:Suppress |
| F3:Suppress | F4:Suppress |
| Type: | Group-on/off |
| Arguments: | DC, PHASE |
| Action: | DC - on/off the suppression of the spectrum DC component; PHASE - on/off the suppression of the spectrum phase noise. |

F1:SupprLevel: Float (−120 to −10, dB)

**Phase Suppression Level**

| Headers: | F1:SupprLevel | F2:SupprLevel |
| F3:SupprLevel | F4:SupprLevel |
| Type: | Float |
| Arguments: | −120 to −10, dB |
| Action: | Sets the phase suppression level with respect to a maximum magnitude |
## 4.13.10 Additional Parameters for Bit Functions

### Source Thresholds

**Headers:**
- F1:Thresh1
- F2:Thresh1
- F3:Thresh1
- F4:Thresh1
- F1:Thresh2
- F2:Thresh2
- F3:Thresh2
- F4:Thresh2
- F1:Thresh3
- F2:Thresh3
- F3:Thresh3
- F4:Thresh3
- F1:Thresh4
- F2:Thresh4
- F3:Thresh4
- F4:Thresh4

**Type:** Float

**Arguments:** Value of thresholds

**Action:** Sets the threshold levels for each source of the bit functions

### Source Inversion

**Headers:**
- F1:SourceInvert
- F2:SourceInvert
- F3:SourceInvert
- F4:SourceInvert

**Type:** Group-on/off

**Arguments:** SRC1, SRC2, SRC3, SRC4

**Action:** Enables/disables the inversion of each source
### 4.13.11 Additional Parameters for Miscellaneous Functions

**Smoothing Parameter**

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Type:</td>
<td>Integer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argument:</td>
<td>0 to 24</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Action:** Sets the length of the smoothing interval in points for the specified function. Used for Smooth operator only. Length is defined as 3 + <Argument> * 2.

**Signal Length**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>Integer-type command</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argument:</td>
<td>4000 to 8192</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Action:** Sets the length of the interpolation function signal. Used for LinInterp and SinXInterp functions.

**Trend Measurement**

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>Selector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arguments:</td>
<td>Period, Freq, PosWidth, NegWidth, RiseTime, FallTime, PosDuty, NegDuty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Action:</td>
<td>Sets the kind of trends for the specified function. Used for Trend operator only.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.13.12 Function Scaling

**Complex Format**

Header:  
F1:ComplexScale  
F2:ComplexScale  
F3:ComplexScale  
F4:ComplexScale  

Type: Selector

Arguments: Magnitude, Phase, Real, Imaginary

Action: Defines the spectrum display mode for FFT function

**Vertical Scale Type**

Header:  
F1:VScaleType  
F2:VScaleType  
F3:VScaleType  
F4:VScaleType  

Type: Selector

Arguments: Linear, Logarithm

Action: Defines the vertical scale type for Magnitude of the FFT function

**Vertical linear Scale**

Header:  
F1:VoltScale  
F2:VoltScale  
F3:VoltScale  
F4:VoltScale  

Type: Float

Argument: 1e-6 to 1e6

Action: Defines the vertical scale in volts/div for Linear vertical scale type

**Vertical linear Offset**

Header:  
F1:VoltOffset  
F2:VoltOffset  
F3:VoltOffset  
F4:VoltOffset  

Type: Float

Argument: 1e-6 to 1e6

Action: Defines vertical offset in volts for Linear vertical scale type

**Vertical linear Position**

Header:  
F1:VoltPosit  
F2:VoltPosit  
F3:VoltPosit  
F4:VoltPosit  

Type: Float

Argument: -10 to +10

Action: Defines the vertical position in div for Linear vertical scale type
## Vertical logarithmic Scale

**Headers:**
- F1:DBScale
- F2:DBScale
- F3:DBScale
- F4:DBScale

**Type:** Float

**Argument:** 1 to 120

**Action:** Defines the vertical scale in dB/div for **Logarithm** vertical scale type.

## Vertical logarithmic Offset

**Headers:**
- F1:DBOffset
- F2:DBOffset
- F3:DBOffset
- F4:DBOffset

**Type:** Float

**Argument:** -100 to 100

**Action:** Defines vertical offset in dB/div for **Logarithm** vertical scale type.

## Vertical logarithmic Position

**Headers:**
- F1:DBPosit
- F2:DBPosit
- F3:DBPosit
- F4:DBPosit

**Type:** Float

**Argument:** -10 to +10

**Action:** Defines the vertical position in div for **Logarithm** vertical scale type.

## Vertical Phase Scale

**Headers:**
- F1:PhaseScale
- F2:PhaseScale
- F3:PhaseScale
- F4:PhaseScale

**Type:** Float

**Argument:** 5.625 to 360

**Action:** Defines the vertical scale in °/div for **Phase** display mode.

## Vertical Phase Offset

**Headers:**
- F1:PhaseOffset
- F2:PhaseOffset
- F3:PhaseOffset
- F4:PhaseOffset

**Type:** Float-type command

**Argument:** -180 to 180

**Action:** Defines vertical offset in ° for **Phase** display mode.
**Vertical Phase Position**

Headers:  

<table>
<thead>
<tr>
<th>F1:PhasePosit</th>
<th>F2:PhasePosit</th>
</tr>
</thead>
<tbody>
<tr>
<td>F3:PhasePosit</td>
<td>F4:PhasePosit</td>
</tr>
</tbody>
</table>

**Type:** Float  

**Arguments:** -10 to +10  

**Action:** Defines the vertical position in div for Phase display mode

### 4.14 Histogram commands

#### 4.14.1 General Histogram Commands

**General remark on histogram commands**

Some histogram commands use mnemonics or the arguments Ch1, Ch2, Ch3 and Ch4 related to the channels.

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics Ch1, Ch2, Ch3, Ch4 mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics Ch1, Ch2 mean channels CH1, CH2, respectively. Mnemonics Ch3 and Ch4 are not used for these models.

**Histogram Axis**

Header: Hist:Axis  

**Type:** Selector  

**Arguments:** Off, Vert, Horiz  

**Action:** Sets the axis of the histogram

**Histogram Source**

Header: Hist:Source  

**Type:** Selector  

**Arguments:** Ch1, Ch2, Ch3, Ch4, F1, F2, F3, F4, M1, M2, M3, M4  

**Action:** Selects the specified signal as source of the histogram

**Histogram Visibility**

Header: Hist:Visible  

**Type:** On/off  

**Action:** Sets the visibility of the histogram. The acquisition of the histogram proceeds independently of this commands.
4.14.2 Histogram Completion Commands

**Histogram Finish Condition**

Header: `Hist:RunUntil`

Type: Selector

Arguments: `StopSingle`, `Wfms`, `Samples`

Action: Sets the finish condition for acquiring the histogram

**Number of Waveforms for Histogram**

Header: `Hist:NWfm`

Type: Integer-type command

Argument: 1 to 1000000

Action: Sets the number of signals for the termination of histogram acquisition

**Number of Samples for Histogram**

Header: `Hist:NSample`

Type: Integer-type command

Arguments: 1 to 1000000

Action: Sets the number of samples for the termination of histogram acquisition

4.14.3 Histogram Window Commands

**Limit Mode for Histogram Window**

Header: `Hist:Limits`

Type: Selector

Arguments: `Paired`, `Independ`

Action: Sets the mode of the limits of the histogram window

**Limit Unit for Histograms Window**

Header: `Hist:Units`

Type: Selector

Arguments: `Absolute`, `Percent`

Action: Sets the units of the limits of the histogram window
Left and Right Window Limits for Vertical or Horizontal Histogram

Headers: Hist:WVert:Left Hist:WVert:Right
Hist:WHor:Left Hist:WHor:Right

Type: Float

Arguments: Real value of the X-axis (for Absolute units)
0% to 100% of the X-axis (for Percent units)

Action: Sets the X positions of the histogram window

Top and Bottom Window Limits for Vertical or Horizontal Histogram

Headers: Hist:WVert:Top Hist:WVert:Bottom
Hist:WHor:Top Hist:WHor:Bottom

Type: Float

Arguments: Real value of the Y-axis (for Absolute units)
0% to 100% of the Y-axis (for Percent units)

Action: Sets the Y positions of the histogram window

Window Visibility

Header: Hist:Display

Type: On/off

Action: Sets the visibility of the window

Set Default Window

Header: Hist:SetDefWind

Type: Executing-type command

Action: Sets the default window depending on the axis
### 4.14.4 Histogram Calculation Commands

**Calculation Mode**

**Header:** `Hist:Mode`

**Type:** Selector

**Arguments:** Normal, Exponent

**Action:** Sets the mode of histogram calculation

**Weight for Exponential Calculation**

**Header:** `Hist:Weight`

**Type:** Integer-type command

**Argument:** 8, 16, 32, ..., 8192

**Action:** Sets the weight coefficient for the Exponent calculation mode

**Reset Calculation**

**Header:** `Hist:RunReset`

**Type:** Execution

**Action:** Restarts histogram calculation

### 4.14.5 Histogram Scale Commands

**Scale Type**

**Header:** `Hist:ScaleType`

**Type:** Selector

**Arguments:** Linear, Logarith

**Action:** Sets the type of histogram scale

**Scale Mode**

**Header:** `Hist:ScaleMode`

**Type:** Selector

**Arguments:** Auto, Manual

**Action:** Sets the mode of histogram scale
Linear Scale of Vertical or Horizontal Histogram
Headers: Hist:VertScale
         Hist:HorScale
Type:    Float
Argument: (10 to 100) %/div
Action:  Sets the scale of histograms. Used for Manual mode and Linear type of scale only.

Linear Offset of Vertical or Horizontal Histogram
Headers: Hist:VertOffset
         Hist:HorOffset
Type:    Float
Argument: 0% to 100%
Action:  Sets the offset of the histograms. It used for Manual mode and Linear type of scale only.

Logarithmic Scale of Vertical or Horizontal Histogram
Header:  Hist:VertDBScale
         Hist:HorDBScale
Type:    Float
Argument: (6 to 60) dB/div
Action:  Sets the scale of the histograms. Used for Manual mode and Logarith type of scale only.

Logarithmic Offset of Vertical or Horizontal Histogram
Header:  Hist:VertDBOffs
         Hist:HorDBOffs
Type:    Float
Arguments: (~60 to 0) dB
Action:  Sets the offset of the histograms. Used for Manual mode and Logarith type of scale only.
4.14.6 Histogram Result Commands

**Get Histogram Data**

Headers:  \texttt{Hist:Data?}

Type:  Data

Argument:  None

Forms:  Query only

Action:  Returns a set of text strings with the pair of numbers (comma-separated). First number in the each pair is the histogram axis value, and second number is the histogram value in this point.

**Get Histogram Measure**

Header:  \texttt{Hist:Res:<Param>?}

Parameter \texttt{<Param>}:  
- \texttt{InBox}  - number of hints in box
- \texttt{Wfm}  - number of waveforms
- \texttt{Peak}  - peak value of histogram
- \texttt{PP}  - difference between highest and lowest values of signal
- \texttt{Median}  - centre between highest and lowest values of signal
- \texttt{Mean}  - average of distribution of histogram
- \texttt{StdDev}  - standard deviation of histogram
- \texttt{Mean1S}  - number of hints in Mean ± StdDev region, %
- \texttt{Mean2S}  - number of hints in Mean ± 2StdDev region, %
- \texttt{Mean3S}  - number of hints in Mean ± 3StdDev region, %
- \texttt{Min}  - min. value of signal
- \texttt{Max}  - max. value of signal
- \texttt{Max-Max}  - difference between two values of signal, matched two max of histogram

Type:  Data

Argument:  None

Forms:  Query only

Action:  Returns a text string with the value of the specified parameter
4.15   Eye Diagram commands
4.15.1   General Eye Commands

**General remark on eye diagram commands**
Some eye diagram commands use mnemonics or the arguments Ch1, Ch2, Ch3 and Ch4 related to the channels.

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics Ch1, Ch2, Ch3, Ch4 mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics Ch1, Ch2 mean channels CH1, CH2, respectively. Mnemonics Ch3 and Ch4 are not used for these models.

**Type of Eye Measurements**
Header: **Eye:Measure**
Type: Selector
Arguments: Off, NRZ, RZ
Action: Sets the type of eye measurements

**Sources for Eye Measurements**
Header: **Eye:Source**
Type: Selector
Arguments: Ch1, Ch2, Ch3, Ch4, F1, F2, F3, F4, DB
Action: Sets the source for eye measurements

**Number of Waveforms in one Measurement**
Header: **Eye:WfmsInCycle**
Type: Integer
Argument: 64, 128, 256, 512, 1024
Action: Sets the number of waveforms in one measurement
4.15.2 Eye Measurements Commands

**List of X-Axis NRZ Measurements**

<table>
<thead>
<tr>
<th>Header:</th>
<th>Eye:XNRZParam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>Group-on/off</td>
</tr>
<tr>
<td>Items:</td>
<td>Area, BitRate, BitTime, CrossTime, CycleArea, DutCycDistP, DutCycDistS, EyeWidth, EyeWidthP, FallTime, Freq, JitterPP, JitterRMS, Period, RiseTime</td>
</tr>
<tr>
<td>Action:</td>
<td>Defines the set of X-axis measurements for NRZ signals</td>
</tr>
</tbody>
</table>

**List of Y-Axis NRZ Measurements**

<table>
<thead>
<tr>
<th>Header:</th>
<th>Eye:YNRZParam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>Group-on/off</td>
</tr>
<tr>
<td>Items:</td>
<td>AcRMS, AvgPower, AvgPWdBm, CrossPerc, CrossLevel, ExtRatioDB, ExtRatioP, ExtRatio, EyeAmpl, EyeHeight, EyeHeightDB, Max, Mean, Mid, Min, NegOver, PPNoiseOne, PPNoiseZero, RMSNoiseOne, RMSNoiseZero, OneLevel, PeakPeak, PosOver, RMS, SNRaio, SNRaioDB, ZeroLevel</td>
</tr>
<tr>
<td>Action:</td>
<td>Defines the set of Y-axis measurements for NRZ signals</td>
</tr>
</tbody>
</table>

**List of X-Axis RZ Measurements**

<table>
<thead>
<tr>
<th>Header:</th>
<th>Eye:XRZParam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>Group-on/off</td>
</tr>
<tr>
<td>Items:</td>
<td>Area, BitRate, BitTime, CycleArea, EyeWidth, EyeWidthP, FallTime, JittPpFall, JittPpRise, JittRMSFall, JittRMSRise, NegCross, PosCross, PosDutyCyc, PulseSymm, PulseWidth, RiseTime</td>
</tr>
<tr>
<td>Action:</td>
<td>Defines the set of X-axis measurements for RZ signals</td>
</tr>
</tbody>
</table>

**List of Y-Axis RZ Measurements**

<table>
<thead>
<tr>
<th>Header:</th>
<th>Eye:YRZParam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>Group-on/off</td>
</tr>
<tr>
<td>Items:</td>
<td>AcRMS, AvgPower, AvgPWdBm, Contrast, ContrastBb, ContrastP, ExtRatioDB, ExtRatioP, ExtRatio, EyeAmpl, EyeHeight, EyeHeightDB, EyeOpenFact, Max, Mean, Mid, Min, PPNoiseOne, PPNoiseZero, RmsNoiseOne, RMSNoiseZero, OneLevel, PeakPeak, RMS, SignToNoise, ZeroLevel</td>
</tr>
<tr>
<td>Action:</td>
<td>Defines the set of Y-axis measurements for RZ signals</td>
</tr>
</tbody>
</table>
**Measurements List Clearing**

Header: Eye:ClearAllMeas  
Type: Executing  
Action: Clears the list of measurement parameters

### 4.15.3 Define Parameters Commands

**Eye Frame Visibility**

Header: Eye:DisplayWind  
Type: On/off  
Action: Sets the visibility of the eye frame

**Left and Right Boundary for NRZ Top/Base Finding**

Headers: Eye:LeftBound  
Eye:RightBound  
Type: Float  
Argument: 10% to 90% of the NRZ period  
Action: Sets the zone of the period of the NRZ signal for the top/base calculation

**Threshold Definition Mode**

Header: Eye:ThreshMode  
Type: Selector  
Arguments: 10–90, 20–80, Custom  
Action: Sets the mode of threshold definition

**Upper and Lower Threshold**

Headers: Eye:UpThresh  
Eye:LowThresh  
Type: Float  
Argument: 5% to 95% of amplitude  
Action: Sets the thresholds for the slopes calculation. Used for Custom mode.
4.15.4 Eye Calculation Commands

**Measurement Statistic**

Header: `Eye:Statistic`

Type: On/off

Action: Enables/disables measurement statistics

**Measurement Statistic Mode**

Header: `Eye:Mode`

Type: Selector

Arguments: Permanent, Window, Weight

Action: Sets the mode of statistics calculation. Used when statistics are enabled.

**Windows Value**

Header: `Eye:Window`

Type: Integer

Argument: 8, 16, 32, …, 8192

Action: Sets the window value. Used for Window mode of statistics.

**Weight Value**

Header: `Eye:Weight`

Type: Integer

Argument: 8, 16, 32, …, 8192

Action: Sets the weight value. Used for Weight mode of statistics.
4.15.5 Getting Eye Measurement Results

**Get List of Measured Parameters**

Header: `Eye:Res:List?`

Type: Data

Argument: None

Forms: Query only

Action: Returns a list of active eye measurements with ordinal index

**Get Current Value of Parameter**

Header: `Eye:Res:<N>?`

Parameter `<N>`: Index of parameter in the list

Type: Data

Argument: None

Forms: Query only

Action: Returns the result of the specified measured parameter

**Get Statistic Value of Parameter**

Header: `Eye:Res:<N>:<Val>?`

Parameter `<N>`: Index of the parameter in the list

Parameter `<Val>`: `Wfm, Min, Max, Mean, StdDev`

Type: Data

Arguments: None

Forms: Command with query only

Action: Returns the specified statistical parameter of the measured parameter
4.16  Mask Test commands

4.16.1  Common Mask Test Commands

**General remark on mask test commands**
Some mask test commands use mnemonics or the arguments Ch1, Ch2, Ch3 and Ch4 related to the channels.

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics Ch1, Ch2, Ch3, Ch4 mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics Ch1, Ch2 mean channels CH1, CH2, respectively. Mnemonics Ch3 and Ch4 are not used for these models.

---

**Mask Test On**
Header: `Mask:TestOn`
Type: On/off
Action: Enables/disables the mask test functionality

**Signal for Mask Testing**
Header: `Mask:CompareWith`
Type: Selector
Arguments: Ch1, Ch2, CH3, CH4, F1, F2, F3, F4, DB
Action: Selects the signal for mask testing

**Actuate Mask Testing**
Header: `Mask:Testing`
Type: On/off
Action: Enables/disables the comparison with current mask

**Mask Erasing**
Header: `Mask:EraseMask`
Type: Execution
Action: Clears the current mask from the display
4.16.2 Mask Creating

**Mask Creating Mode**

**Header:** Mask:CreateAs

**Type:** Selector

**Arguments:** Std, Auto, Edit

**Action:** Sets the mask creation method

4.16.3 Standard Mask Test Commands

**Get List of Standards**

**Header:** Mask:Std:StdsList?

**Type:** Data

**Argument:** None

**Forms:** Query only

**Action:** Returns a list of mask standards with ordinal index

**Select Standard**

**Header:** Mask:Std:StdIndex

**Type:** Integer

**Argument:** 0 to (number of standards–1)

**Action:** Selects the current standard by its ordinal index

**Get List of Masks**

**Header:** Mask:Std:MasksList?

**Type:** Data

**Argument:** None

**Forms:** Query only

**Action:** Returns a list of masks with ordinal index from the selected standard
**Select Standard Mask**
Header: `Mask:Std:MaskIndex`  
Type: Integer  
Argument: 0 to (number of masks in the current standard –1)  
Action: Loads the specified mask by its ordinal index

**Alignment of Signal with Standard Mask**
Header: `Mask:Std:Align`  
Type: On/off  
Action: Enables/disables the alignment of the tested signal with the standard mask parameters

**Enable Margins**
Header: `Mask:Std:MarginsOn`  
Type: On/off  
Action: Enables/disables the margin control of eye-typed masks

**Margins Value**
Header: `Mask:Std:MarginsVal`  
Type: Float  
Arguments: -100% to +100%  
Action: Sets the margin's value. Used when margins are enabled

**Build Immediately**
Header: `Mask:Std:BuildImmediate`  
Type: On/off  
Action: Enables/disables creation of the standard mask immediately after any of its parameters change
### 4.16.4 Automask Commands

#### General remark on mask test commands
Some mask test commands use mnemonics or the arguments Ch1, Ch2, Ch3 and Ch4 related to the channels.

These mnemonics for various devices mean the following:
- For the PicoScope 9404-05 and the PicoScope 9404-16, mnemonics Ch1, Ch2, Ch3, Ch4 mean channels CH1, CH2, CH3 and CH4, respectively;
- For the PicoScope 9402-05 and the PicoScope 9402-16, mnemonics Ch1, Ch2 mean channels CH1, CH2, respectively. Mnemonics Ch3 and Ch4 are not used for these models.

---

**Automask Source**

**Header:** Mask:Auto:Source

**Type:** Selector

**Arguments:** Ch1, Ch2, CH3, CH4, F1, F2, F3, F4, M1, M2, M3, M4

**Action:** Selects the signal as a template for automask building

**Margins Units**

**Header:** Mask:Auto:Unit

**Type:** Selector-type command

**Arguments:** Division, Current

**Action:** Selects the margins units for automask building

**Automask X-Margins**

**Header:** Mask:Auto:DeltaX

**Type:** Float

**Arguments:** (0.02 to 2) div for Division margins units real X-axis value for Current margins units

**Action:** Sets the X-axis margins around the template signal

**Automask Y-Margins**

**Header:** Mask:Auto:DeltaY

**Type:** Float

**Arguments:** (0.03125 to 2) div for Division margins units real Y-axis value for Current margins units

**Action:** Sets the Y-axis margins around the template signal
### Automask Build

**Header:**  \texttt{Mask:Auto:BuildAMask}

**Type:** Execution

**Action:** Builds automask immediately

### 4.16.5 Mask Test Termination

#### Mask Test Finish Condition

**Header:**  \texttt{Mask:RunUntil}

**Type:** Selector

**Arguments:**  \texttt{StopBtn, FailedWfms, FailedSmpls, Wfms, Samples}

**Action:** Sets the condition of mask test termination

#### Number of Failed Waveforms

**Header:**  \texttt{Mask:FailWfms}

**Type:** Integer

**Argument:** 1 to 1000000

**Action:** Sets the number of failed waveforms for the \texttt{FailedWfms} finish condition

#### Number of Failed Samples

**Header:**  \texttt{Mask:FailSmpls}

**Type:** Integer-type command

**Argument:** 1 to 1000000

**Action:** Sets the number of failed samples for the \texttt{FailedSmpls} finish condition

#### Number of Waveforms

**Header:**  \texttt{Mask:NWfms}

**Type:** Integer-type command

**Argument:** 1 to 1000000

**Action:** Sets the number of waveforms for the \texttt{Wfms} finish condition
Number of Samples
Header: Mask:NSamples
Type: Integer-type command
Argument: 1 to 1000000
Action: Sets the number of samples for the Samples finish condition

4.16.6 Mask Test Actions

Select Actions
Header: Mask:Action
Type: Group-on/off
Items: Beep, Save
Action: Save - every failed signal is stored to disk
Beep - the beep signal will sound for every failed signal

Format of Stored Files
Header: Mask:FileFormat
Type: Selector
Arguments: Binary, Verbose, YOnly
Action: Sets the file format. Used when Save action is on.

Stored File Name
Header: Mask:FileName
Type: Data
Argument: Text string
Forms: Command, query, command with query
Action: Defines the name for storing failed signals on Disk. Used when Save action is on.
4.16.7 User Mask

**User Masks File Name**

Header: `Mask:MaskFile`

Type: Data

Argument: Text string

Forms: Command, query, command with query.

Action: Defines the file name for next loading or saving user mask from the disk

**Load User Mask**

Header: `Mask:LoadUser`

Type: Execution

Action: Loads the previously specified user mask

**Save User Mask**

Header: `Mask:SaveUser`

Type: Execution

Action: Saves the current mask as user with previously specified file name

4.16.8 Getting Mask Test Results

**Get Integrated Results of Mask Test**

Headers: `Mask:Res:<Param>`?

Parameter `<Param>`:
- `AllWfm` - number of waveforms
- `FailWfm` - number of failed waveforms
- `AllSmpl` - number of samples
- `FailSmpl` - number of failed samples

Type: Data

Argument: None

Forms: Query only

Action: Returns a text string with the value of the specified parameter
Get Number of Samples in Selected Polygons

Headers: \texttt{Mask:Res:Poly<N>?}

Parameter \texttt{<N>}: Number of the polygon, 1 to 8

Type: Data

Argument: None

Forms: Query only

Action: Returns a text string with the values of failed samples on specified polygon

Get Number of Samples in Margins of Selected Polygon

Headers: \texttt{Mask:Res:Poly<N>Mar?}

Parameter \texttt{<N>}: Number of the polygon, 1 to 4

Type: Data

Argument: None

Forms: Query only

Action: Returns a text string with the values of failed samples on the margin of specified polygon. Used when \texttt{Margins} is enabled.

Get Number of Samples in Selected Polygon with Margins Together

Headers: \texttt{Mask:Res:Poly<N>All?}

Parameter \texttt{<N>}: Number of the polygon, 1 to 4

Type: Data

Argument: None

Forms: Query only

Action: Returns a text string with the total number of failed samples on the margin and on the specified polygon. Used when \texttt{Margins} is enabled.
4.17  Autocalibration commands

4.17.1  Single-shot Autocalibration

Start of vertical auto-calibration
Header:  Flash:Vertical:Autocal:Start
Type:  Executing-type command
Action:  Start self-calibration of Sampler 1

Start of horizontal auto-calibration
Header:  Flash:TB:Calibr:Autocal
Type:  Execution
Action:  Starts self-calibration of timebase

Get the autocalibration status query
Header:  Flash:Calibr:AutocalResult?
Type:  Integer
Action:  Command is ignored, and query returns an integer:
-1 Autocalibration in progress.
0  Autocalibration finished OK.
5  Autocalibration failed.

There are the following additional results for vertical auto-calibration.

101...115  There are signals on separate inputs, auto-calibration is interrupted.
For normal auto calibration, disconnect the signals from the following channels:

101  CH1;
102  CH2;
103  CH1 & CH2;
104  CH3;
105  CH1 & CH3;
106  CH2 & CH3;
107  CH1 & CH2 & CH3;
108  CH4;
109  CH1 & CH4;
110  CH2 & CH4;
111  CH1 & CH2 & CH4;
4.17.2 Periodic Autocalibration

**When to Begin Autocalibration**

*Header:* `Util:CalibrWhen`

*Type:* On/off-group

*Items:* `PowerOn`, `Period`, `Temperature`

*Action:*
- `PowerOn` - autocalibration begins on the next Power On
- `Period` - autocalibration begins periodically after the specified interval
- `Temperature` - autocalibration begins when deviation of temperature inside the instrument exceeds the specified value

*Note:* Periodic autocalibration must be turned off when GUI is in `RemoteOnly` or `Invisible` state. See [GUI command](#).

**Autocalibration Period**

*Header:* `Util:CalPeriod`

*Type:* Float

*Argument:* 0.5 to 16 hours

*Action:* Sets the autocalibration period in hours

**Temperature Deviation**

*Header:* `Util:TempChange`

*Type:* Float

*Argument:* 0.5 to 10 °C

*Action:* Sets the temperature deviation for autocalibration

**Get the Temperature of the Instrument Query**

*Header:* `Calibr:Temperature?`

*Type:* Float

*Argument:* None

*Forms:* Query only

*Action:* Returns the temperature inside the device in degrees Celsius
4.17.3 Balancing the channels manually

Balancing channels 1 and 2 manually

Header: Flash:Sample:Ch1:FullBW:Balance
        Flash:Sample:Ch1:NarrowBW:Balance
        Flash:Sample:Ch2:FullBW:Balance
        Flash:Sample:Ch2:NarrowBW:Balance

Type: Float

Arguments: -0.5 to 0.5

Action: Query or set the balance value in volts for the specified channel

Balancing channels 3 and 4 manually (PicoScope 9341 only)

Header: Flash:Smplr2:Ch3:FullBW:Balance
        Flash:Smplr2:Ch3:NarrowBW:Balance
        Flash:Smplr2:Ch4:FullBW:Balance
        Flash:Smplr2:Ch4:NarrowBW:Balance

Type: Float

Arguments: -0.5 to 0.5

Action: Query or set the balance value in volts for the specified channel of Sampler 2

4.18 Waveforms commands

This group of commands is designed for receiving acquired waveforms from the oscilloscope.

Waveform Source

Header: Wfm:Source

Type: Selector

Arguments: Ch1, Ch2, Ch3, Ch4, F1, F2, F3, F4, M1, M2, M3, M4

Action: Sets the signal to be received

Spectrum Format

Header: Wfm:Complex

Type: Selector

Arguments: Mod, Ph, Re, Im

Action: Selects the received component of the complex signal. Used for spectrum data.
Get Waveform Data
Header: Wfm:Data?
Type: Data
Argument: None
Forms: Query only
Action: Returns a text string with values of all points of the signal (comma-separated)

Get Number of Points in the Waveform
Header: Wfm:Preamb:Poin?
Type: Data
Argument: None
Forms: Query only
Action: Returns the number of points in the signal

Get X-Axis Step
Header: Wfm:Preamb:XInc?
Type: Data
Argument: None
Forms: Query only
Action: Returns the increment on the X-axis for one signal point

Get X-Axis Origin
Header: Wfm:Preamb:X0rg?
Type: Data
Argument: None
Forms: Query only
Action: Returns the X-axis value for the first signal point

Get X-Axis Unit
Header: Wfm:Preamb:XU?
Type: Data
Argument: None
Forms: Query only
Action: Returns the X-axis physical units
Get Y-Axis Unit
Header: Wfm:Preamb:YU?
Type: Data
Argument: None
Forms: Query only
Action: Returns the Y-axis physical units

4.19 Zoom commands

4.19.1 Common commands for zoom

Creation of new zoom zone
Header: Zooms:AddZone
Type: Execution
Action: Creates first or next Zoom zone.
Note: Maximum number of zoom zones: 4

Deletion of all Zoom zones
Header: Zooms:DelAllZones
Type: Execution
Action: Deletes all current zoom zones

Main Graticule size
Header: Zooms:MainSignalZone
Type: Selector
Arguments: msz_1_2, msz_1_4, mszOff
Action: Sets the size of the main graticule as ½ of display height, ¼ of display height or erases the main graticule.

Display Mode for two Zoom zones
Header: Zooms:Display
Type: Selector
Arguments: Combine, Separate
Action: Sets mode of two Zoom zone displays: Combine - on the single zoom-graticule, and Separate – on the different zoom graticules.
4.19.2 Commands for defined zoom zone

Parameter `<Zoom_n>` in Zoom Commands signifies Zoom Zones

(<`Zoom_n`> is: Zoom1, Zoom2, Zoom3, Zoom4)

Mnemonic `<src>` in some Zoom Commands signifies Source

(<`src`> is: Ch1, Ch1B2, Ch2, Ch2B2, F1, F2, F3, F4, M1, M2, M3, M4)

Deleting zone

Header: `<Zoom_n>:DelZone`

Type: Execution

Action: Deletes specified zoom zone. If the removed zoom zone was not the last, then the zones behind it occupy the vacated position.

Horizontal Zoom Factor

Header: `<Zoom_n>:HorFactor`

Type: Float

Argument: 1 to 2000

Action: Sets the horizontal zoom factor for the specified zoom zone.

Horizontal Zoom Position

Header: `<Zoom_n>:HorPosition`

Type: Float-type command

Argument: 1 to 100

Action: Sets the horizontal position, %

Vertical Zoom Source

Header: `<Zoom_n>:Source`

Type: Selector-type command

Arguments: Ch1, Ch2, Ch3, Ch4, F1, F2, F3, F4, M1, M2, M3, M4

Action: Sets the vertical zoom menu signal

Vertical Zoom Factor

Header: `<Zoom_n>:<src>:VertFactor`

Type: Float

Argument: 0.01 to 100

Action: Sets the vertical zoom factor for specified signal in specified zoom zone.
### Vertical Zoom Position

**Header:** `<Zoom_n>:<src>:VertPosition`

**Type:** Float

**Argument:** -8 to 8

**Action:** Sets the vertical position for specified signal in specified zoom zone, divisions

### 4.20 Calibrator commands

#### Calibrator Mode

**Header:** `InOut:Calibr:Wfm`

**Type:** Selector

**Arguments:** Off, DC, Mndr1k, Freq

**Action:** Sets mode of calibrator output: Off, DC level, meander 1 kHz, meander with custom frequency.

#### DC Mode Voltage

**Header:** `InOut:Calibr:Voltage`

**Type:** Float

**Argument:** -1 to 1

**Action:** Sets the calibrator voltage in DC mode, in volts

#### Meander Voltage Mode

**Header:** `InOut:Calibr:Mode`

**Type:** Selector

**Arguments:** AmplOffset, HighLow

**Action:** Selects the method of specifying the amplitude parameters of the meander.

#### Amplitude of Meander

**Header:** `InOut:Calibr:Amplitude`

**Type:** Float

**Argument:** 0.01 to 2

**Action:** Sets the amplitude of meander, in volts
Offset of Meander
Header: InOut:Calibr:Offset
Type: Float
Argument: –0.7 to 0.7
Action: Sets the offset of meander, in volts

High Level of Meander
Header: InOut:Calibr:HighLvl
Type: Float
Argument: -0.99 to 1
Action: Sets the high level of meander, in volts

Low Level of Meander
Header: InOut:Calibr:LowLvl
Type: Float-type command
Argument: –1 to 0.99
Action: Sets the low level of meander, in volts

Period of Meander
Header: InOut:Calibr:Period
Type: Float
Argument: 2e-6 to 0.0655
Action: Sets the period of meander, in seconds

Frequency of Meander
Header: InOut:Calibr:Frequency
Type: Float
Argument: 15.266 to 5e5
Action: Sets the frequency of meander, Hz
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