QUANTIFI PHOTONICS®
A Teradyne Company

QCA

1000 / 1100 Series

HIGH-SPEED COMMUNICATION ANALYZER

VISEYE version 1.7.X



User Manual

quantifiphotonics.com

Copyright © 2026 Quantifi Photonics Ltd All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form, be it electronically, mechanically, or by any other means such as photocopying, recording or otherwise, without the prior written permission of Quantifi Photonics Ltd (Quantifi Photonics).

Information provided by Quantifi Photonics is believed to be accurate and reliable.
However, no responsibility is assumed by Quantifi Photonics for its use nor for any infringements of patents or other rights of third parties that may result from its use. No license is granted by implication or otherwise under any patent rights of Quantifi Photonics.

The information contained in this publication is subject to change without notice.

Trademarks

Quantifi Photonics' trademarks have been identified as such. However, the presence or absence of such identification does not affect the legal status of any trademark. All third party product and company names are trademarks™ or registered® trademarks of their respective holders. Neither Quantifi Photonics nor any software programs or other goods or services offered by Quantifi Photonics are affiliated with, endorsed by, or sponsored by the third parties listed below.

MATLAB® is a trademark of The MathWorks Inc. Python® is a trademark of the Python Software Foundation. Microsoft Edge®, and Microsoft Windows® are trademarks of the Microsoft Corporation. Google Chrome™ is a trademark of Google LLC.

Units of Measurement

Units of measurement in this publication conform to SI standards and practices.

CE mark related enquiries

EU Authorized Representative
Certification Company
Veluwezoom 42
1327 AH ALMERE
The Netherlands
+31 (0)36 202 40 37
info@certification-company.com

Manufacturer information

Quantifi Photonics Limited
12-14 Parkway Drive
Rosedale, Auckland 0632
New Zealand

User manual version: 1.10

Table of contents

1 What's in this user manual? 12

2 Conventions 13

3 Safety information 14

3.1 Electrostatic discharge precautions 14

3.2 Electromagnetic compatibility 15

3.3 Optical laser radiation precautions 15

3.4 Connecting and disconnecting your instrument 15

4 Introducing QCA and VISEYE 16

4.1 Hardware description 18

4.1.1 QCA 1000 Series (electrical) 18

4.1.2 QCA 1100 Series (optical) 19

4.2 LEDs 20

4.2.1 Trigger Lock LED 20

4.2.2 Acquisition LED 20

4.3 Environmental conditions 21

5 Installing software 22

5.1 Install the VISEYE software package 22

5.2 Install the QCA Operator software package 23

6 Setting up the QCA instrument 24

6.1 Use cases - electrical 26

6.1.1 Triggering using a synchronized clock 26

6.1.2 Triggering using a recovered clock 27

6.2 Use cases - optical 28

6.2.1 Triggering using a synchronized clock 28

6.2.2 Triggering using a recovered clock and optical tap 29

6.2.3 Triggering using a recovered clock and 8-channel DUT 30

7 Managing the QCA instrument with QCA Operator 31
7.1 View and change the QCA IP address and network configuration 31
7.2 Upgrade firmware 33
7.3 View QCA details and log messages 34
8 Working with VISEYE 35
8.1 Set up data sources 36
8.1.1 Load/Start a project 37
8.1.2 Connect with a QCA instrument 38
8.1.3 Add data sources to the virtual instrument 43
8.2 Acquire data 44
8.3 Adjust visualization 45
8.3.1 Horizontal axis 46
8.3.2 Vertical axis and eye diagram settings 47
8.4 Add and read measurements 48
8.5 Build math waveforms 49
8.5.1 Set up a TDECQ measurement 50
8.5.2 Operators 51
8.6 Manage VISEYE data 55
9 Measurements 57
9.1 Overview 57
9.2 Eye measurements 62
9.2.1 Average 62
9.2.2 Amplitude Peak-Peak 63
9.2.3 NRZ Extinction Ratio 64
9.2.4 Eye Amplitude NRZ 65
9.2.5 Eye Amplitudes PAM 66
9.2.6 Eye Center Voltage NRZ 68

9.2.7 Eye Center Voltages PAM 70
9.2.8 Eye Crossing Percentage 71
9.2.9 Eye Height NRZ 72
9.2.10 Eye Heights PAM 74
9.2.11 Eye One Level 77
9.2.12 Eye Zero Level 78
9.2.13 PAM Levels 79
9.2.14 Eye Skews 80
9.2.15 Eye Width NRZ 83
9.2.16 Eye Widths PAM 85
9.2.17 Eye Fall Time 88
9.2.18 Eye Rise Time 89
9.2.19 Eye Jitter (Peak-Peak) 90
9.2.20 Eye Jitter (RMS) 91
9.2.21 Overshoot NRZ 92
9.2.22 Overshoot PAM 93
9.2.23 Undershoot 94
9.2.24 Ratio Level Mismatch (Annex 120D) 95
9.2.25 Ratio Level Mismatch (Clause 94) 96
9.2.26 Signal to Noise Ratio 97
9.2.27 Symbol Period 98
9.2.28 Transmitter and Dispersion Eye Closure Quaternary (TDECQ) 99
9.2.29 Vertical Eye Closure (VEC) (Eye) 103
9.3 Waveform measurements 104
9.3.1 Average 104
9.3.2 Amplitude Peak-Peak 105
9.3.3 One/Zero Levels 106

9.3.4 Optical Modulation Amplitude (OMA) 107
9.3.5 PAM Outer Extinction Ratio 108
9.3.6 Outer OMA 109
9.3.7 Wfm Overshoot NRZ 110
9.3.8 RMS 111
9.3.9 Signal to Noise Distortion Ratio 112
9.3.10 SNR Inter-Symbol Interference 113
9.3.11 Wfm Fall Time 114
9.3.12 Wfm Rise Time 115
9.3.13 Vertical Eye Closure Penalty (VECP) 116
10 Programming guide 117
10.1 SCPI overview 117
10.2 Programming conventions 117
10.3 Message queues 118
10.4 Status and event registers 118
10.4.1 Standard Event Status Register 118
10.4.2 Standard Event Status Enable Register (Mask) 118
10.4.3 Status Byte Register 118
10.4.4 Service Request Enable Register (Mask) 119
10.4.5 Status and event registers diagram 120
10.5 Starting and managing Services 121
10.5.1 Overview of Services 121
10.5.2 Enabling SCPI communication 121
10.5.3 Troubleshooting and notes 123
10.6 SCPI commands summary - Working with VISEYE 124
10.6.1 Common commands 124
10.6.2 System menu functions 125

10.6.3 Set up data sources 126
10.6.4 Acquire data 132
10.6.5 Add and read measurements 133
10.6.6 Build math waveforms 134
10.6.7 Manage VISEYE data 139
10.7 SCPI commands summary - Eye Measurements 140
10.7.1 Average 140
10.7.2 Amplitude Peak-Peak 140
10.7.3 NRZ Extinction Ratio 141
10.7.4 Eye Amplitude NRZ 142
10.7.5 Eye Amplitudes PAM 143
10.7.6 Eye Center Voltage NRZ 144
10.7.7 Eye Center Voltages PAM 145
10.7.8 Eye Crossing Percentage 146
10.7.9 Eye Height NRZ 147
10.7.10 Eye Heights PAM 148
10.7.11 Eye One Level 149
10.7.12 Eye Zero Level 150
10.7.13 PAM Levels 151
10.7.14 Eye Skews 152
10.7.15 Eye Width NRZ 153
10.7.16 Eye Widths PAM 154
10.7.17 Eye Fall Time 155
10.7.18 Eye Rise Time 156
10.7.19 Eye Jitter (Peak-Peak) 157
10.7.20 Eye Jitter (RMS) 158
10.7.21 Overshoot NRZ 159

10.7.22 Overshoot PAM 160
10.7.23 Undershoot 161
10.7.24 Ratio Level Mismatch (Annex 120D, Clause 94) 162
10.7.25 Signal to Noise Ratio 163
10.7.26 Symbol Period 163
10.7.27 Transmitter and Dispersion Eye Closure Quaternary (TDECQ) 164
10.7.28 Vertical Eye Closure 165
10.8 SCPI commands summary - Waveform Measurements 166
10.8.1 RMS 166
10.8.2 One/Zero Levels 167
10.8.3 Optical Modulation Amplitude (OMA) 168
10.8.4 PAM Outer Extinction Ratio 169
10.8.5 Outer OMA 170
10.8.6 Signal to Noise Distortion Ratio 171
10.8.7 SNR Inter-Symbol Interference 172
10.8.8 Wfm Fall Time 173
10.8.9 Wfm Rise Time 174
10.8.10 Vertical Eye Closure Penalty (VECP) 175
10.9 SCPI commands descriptions - Working with VISEYE 176
10.9.1 Common commands 176
10.9.2 System menu functions 179
10.9.3 Set up data sources 180
10.9.4 Acquire data 213
10.9.5 Add and read measurements 216
10.9.6 Build math waveforms 217
10.9.7 Manage VISEYE data 290
10.10 SCPI commands descriptions - Eye Measurements 291

10.10.1 Average 291
10.10.2 Amplitude Peak-Peak 293
10.10.3 NRZ Extinction Ratio 295
10.10.4 Eye Amplitude NRZ 298
10.10.5 Eye Amplitudes PAM 301
10.10.6 Eye Center Voltage NRZ 304
10.10.7 Eye Center Voltages PAM 309
10.10.8 Eye Crossing Percentage 314
10.10.9 Eye Height NRZ 317
10.10.10 Eye Heights PAM 322
10.10.11 Eye One Level 327
10.10.12 Eye Zero Level 330
10.10.13 PAM Levels 333
10.10.14 Eye Skews 336
10.10.15 Eye Width NRZ 341
10.10.16 Eye Widths PAM 347
10.10.17 Eye Fall Time 354
10.10.18 Eye Rise Time 358
10.10.19 Eye Jitter (Peak-Peak) 362
10.10.20 Eye Jitter (RMS) 365
10.10.21 Overshoot NRZ 368
10.10.22 Overshoot PAM 371
10.10.23 Undershoot 374
10.10.24 Ratio Level Mismatch (Annex 120D, Clause 94) 379
10.10.25 Signal to Noise Ratio 382
10.10.26 Symbol Period 385
10.10.27 Transmitter and Dispersion Eye Closure Quaternary (TDECQ) 387

10.10.28 Vertical Eye Closure 389
10.11 SCPI commands descriptions - Waveform Measurements 393
10.11.1 RMS 393
10.11.2 One/Zero Levels 395
10.11.3 Optical Modulation Amplitude (OMA) 400
10.11.4 PAM Outer Extinction Ratio 403
10.11.5 Outer OMA 407
10.11.6 Signal to Noise Distortion Ratio 411
10.11.7 SNR Inter-Symbol Interference 414
10.11.8 Wfm Fall Time 417
10.11.9 Wfm Rise Time 422
10.11.10 Vertical Eye Closure Penalty (VECP) 427
10.12 Programming examples and applications 430
10.12.1 Setting up NI-MAX application 430
10.12.2 Setting up NI-VISA application 431
10.12.3 Python® code example 432
10.12.4 MATLAB® code example 433
11 RF electrical connections 434
12 System requirements 435
13 Maintenance 436
13.1 Annual calibration schedule 436
14 Technical Support 437
14.1 Contacting the Technical Support Group 437
14.2 Transportation 437
15 Warranty Information 438
15.1 General information 438
15.2 Liability 438

15.3 Exclusions 439
15.4 Certification 439
15.5 Service and repairs 439

1 What's in this user manual?

You can find the following information in this document:

Before you begin	Conventions Safety information System requirements RF electrical connections
Getting started	Introducing QCA and VISEYE Install the VISEYE software package Hardware description Setting up the QCA instrument Managing the QCA instrument with QCA Operator
Working with your instrument	Working with VISEYE Measurements

2 Conventions

Please make yourself familiar with these conventions; we use them throughout this user manual:



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in **death or serious injury**.

Do not proceed unless the required conditions are met and understood.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in **minor or moderate injury** or **component damage**.

Do not proceed unless the required conditions are met and understood.

NOTE

Indicates relevant information that requires your attention.

3 Safety information

Carefully read all safety information before using your Quantifi Photonics product.

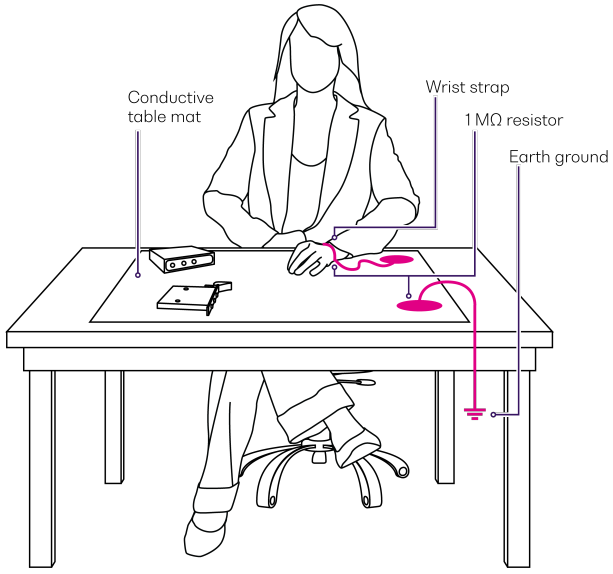
3.1 Electrostatic discharge precautions

CAUTION

The product is sensitive to electrostatic discharge (ESD). To ensure that you do not cause ESD damage to the product:

- Always follow proper grounding and ESD management practices.
- Store the unused product in the original protective electrostatic packaging that it was shipped in.
- Use a wrist strap and grounding table mat when unpacking or handling the product.
- Discharge RF cables before connecting them to the product, for example by shorting the center conductor to ground or by using 50Ω termination temporarily attached to the cable.

This symbol on the unit indicates that ports are sensitive to electrostatic discharge (ESD). Refer to documentation provided with the product for related safety information. Ensure that the required conditions are met and understood before using the product.



3.2 Electromagnetic compatibility

CAUTION

For electromagnetic compatibility, this product is a Class A product. It is intended for use in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.


This symbol on the unit highlights important details, for example connector types or safe input range. For related safety information, refer to documentation provided with the product. Ensure that the required conditions are met and understood before using the product.

3.3 Optical laser radiation precautions

WARNING

To protect yourself from harm caused by optical radiation:

- Do not install or terminate fibers while the light source is active.
- Turn the Quantifi Photonics product OFF before inspecting the end face(s) of the product, or any optical patch cords connected to it.
- Never look directly into a live fiber; ensure that your eyes are protected at all times.

CAUTION

The use of controls, adjustments, and procedures other than those specified in this document may result in exposure to hazardous situations involving optical radiation.

3.4 Connecting and disconnecting your instrument

CAUTION

To protect users from electric shock and prevent damage to the instrument:

- **Earth your instrument:** Before powering on your instrument, ensure the protective grounding wire is securely connected and functioning.
- **Provide easy access to power disconnect**: Position the instrument so that you can easily disconnect it.

4 Introducing QCA and VISEYE

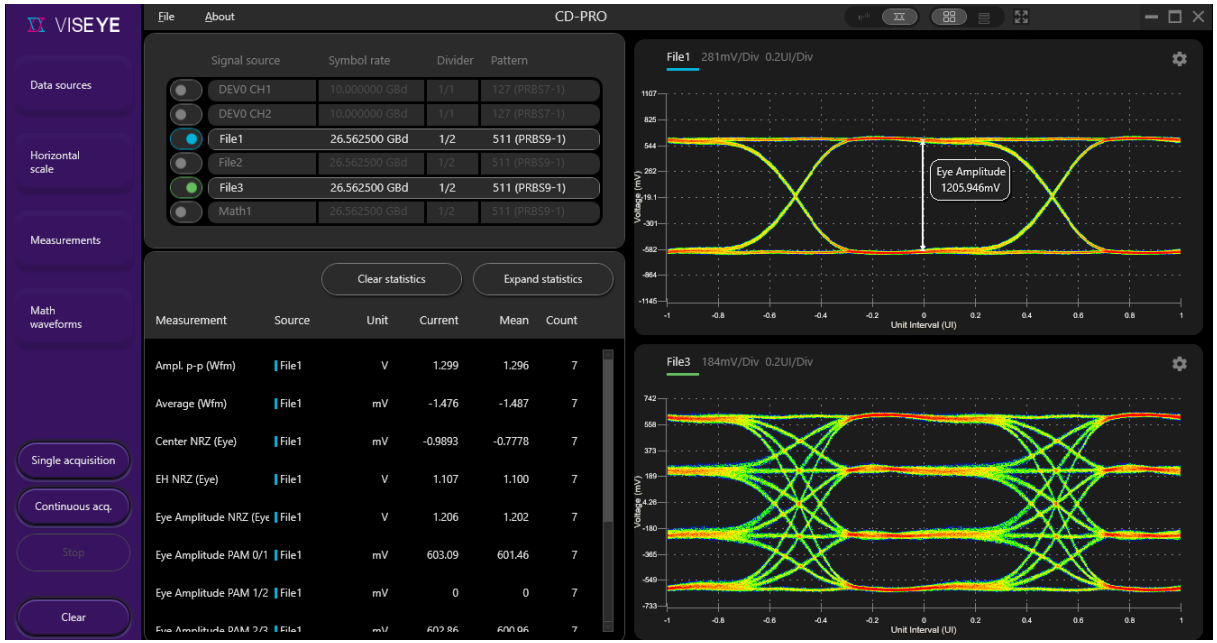
The QCA Series High-Speed Communication Analyzer is a digital equivalent-time sampling oscilloscope with a high-quality precision timebase and low jitter mode.

The QCA Series is designed to enable high-volume testing of electrical ICs and next-generation optical interconnects which are crucial to unlock high-performance computing (HPC) and remove large-scale AI connectivity bottlenecks. With ultra-low jitter performance and unrivalled instrument density, it overcomes the scalability and cost-of-test limitations of traditional solutions by supporting parallel high-speed I/O testing.

Paired with our QCR Series clock recovery instruments, it delivers a cost-effective, scalable approach for accurate, highthroughput testing to reduce the cost-of test in high-volume manufacturing and design verification testing applications.

VISEYE™ signal analysis software

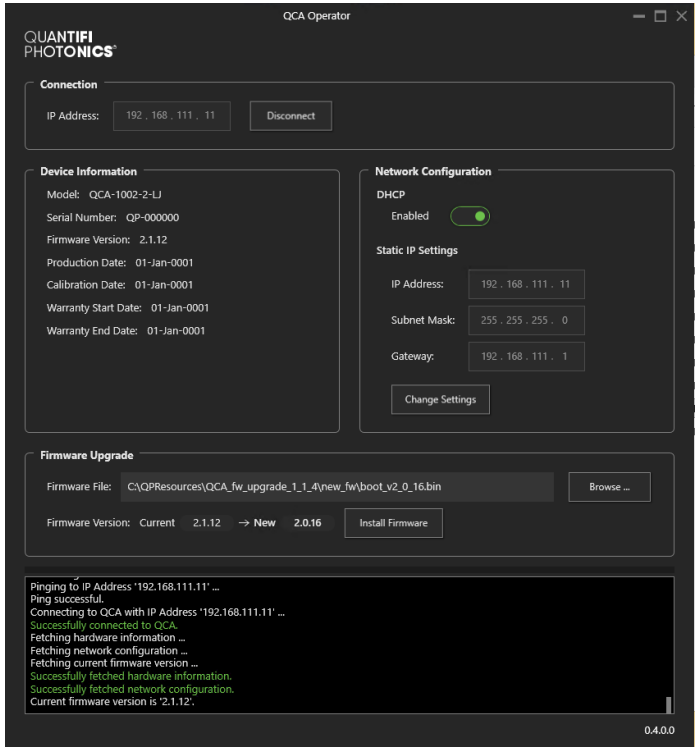
The QCA Series uses Quantifi Photonics' easy-to-use visualization and analysis software VISEYE. VISEYE features a modern interface and has been designed to streamline the analysis process while providing full control of hardware and analysis functions.



To work with VISEYE, download and install the VISEYE software package on your computer, and activate it with a license from Quantifi Photonics. For details refer to Install the VISEYE software package.

QCA Operator software

QCA Operator enables you to manage and maintain your QCA instrument, for example change the IP address of your QCA, or update firmware files.



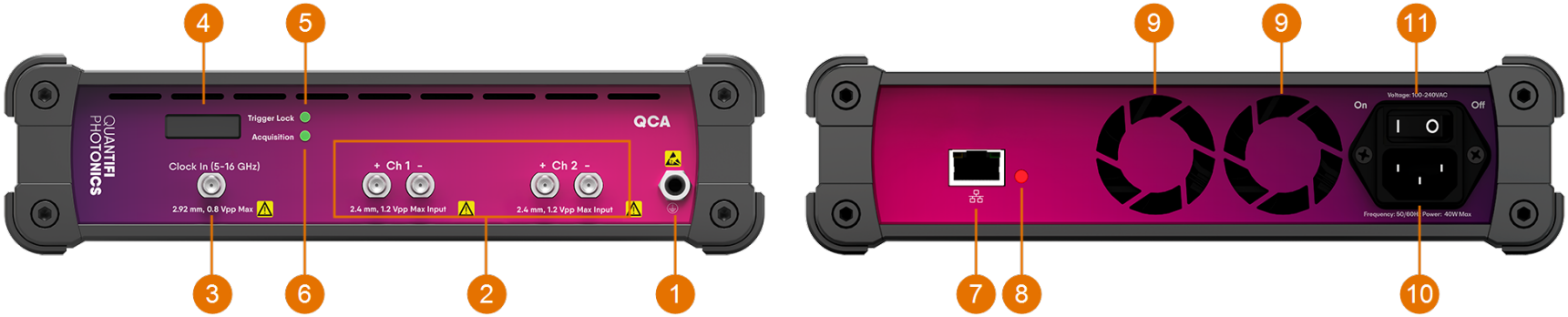
To work with QCA Operator, download and install the QCA Operator software package on your computer. For details refer to Install the QCA Operator software package.

Programming interfaces

Through its programming interfaces you can take advantage of both gRPC and the SCPI-compliant command language, and choose from programming tools such as LabView, C++, Python, or other programming languages used to control automatic test equipment (ATE).

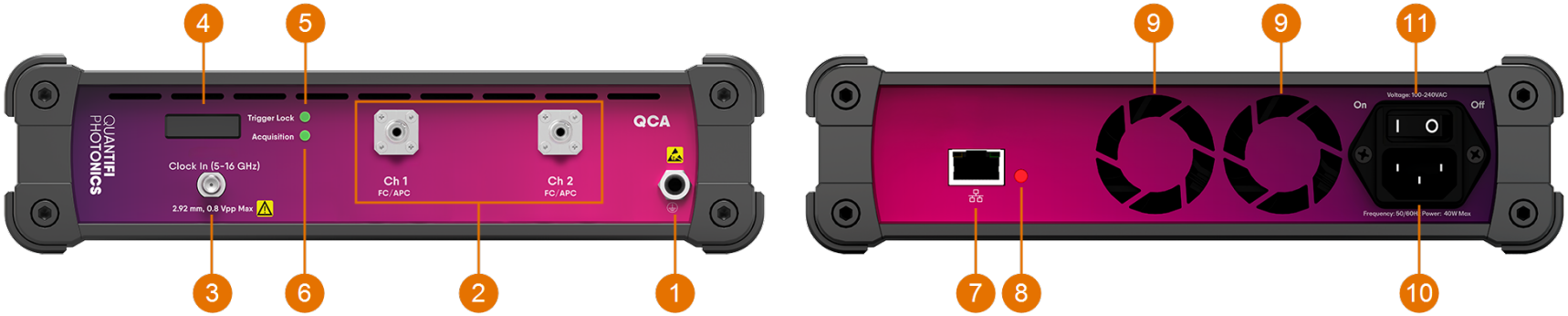
4.1 Hardware description

4.1.1 QCA 1000 Series (electrical)



Front		Rear	
1	Grounding screw This port is sensitive to electrostatic discharge (ESD)	7	Ethernet port
2	Channel 1 and 2 input: QCA-1001-xxx: 2.92mm RF connectors QCA-1002-xxx: 2.4mm RF connectors (compatible with 1.85mm)	8	Network reset button. To reset network parameters to factory settings: Press for about 5 seconds until Acquisition LED stops flashing.
3	Reference clock input: Frequency: 5 GHz - 16 GHz Amplitude (for optimal jitter performance): 250-900 mV_{pp} (≥ 10 GHz) 350-800 mV_{pp} (< 10 GHz).	9	Ventilation fan (DO NOT OBSTRUCT)
4	LCD screen	10	AC power ~100 - 240 V; 50/60 Hz; 40 W Max
5	Trigger Lock LED	11	Mains power On / Off isolation switch
6	Acquisition LED		

4.1.2 QCA 1100 Series (optical)



Front		Rear	
1	Grounding screw	7	Ethernet port
2	Channel 1 and 2 input: SMF-28 2.0 mm Narrow Key Input power 1.5 dBm Damage Level 7 dBm	8	Network reset button. To reset network parameters to factory settings: Press for about 5 seconds until Acquisition LED stops flashing.
3	Reference clock input: Frequency: 5 GHz - 16 GHz Amplitude (for optimal jitter performance): 250-900 mVpp (≥ 10 GHz) 350-800 mVpp (< 10 GHz)	9	Ventilation fan (DO NOT OBSTRUCT)
4	LCD screen	10	AC power ~100 - 240 V; 50/60 Hz; 40 W Max
5	Trigger Lock LED	11	Mains power On / Off isolation switch
6	Acquisition LED		

4.2 LEDs

4.2.1 Trigger Lock LED

The **Trigger Lock** LED shows the locking status of the connected reference clock:

LED	Meaning
solid GREEN	The reference clock is locked.
flashing GREEN	The reference clock is NOT locked. Loss of lock can occur if: • Reference clock signal is not connected to the QCA. • Timebase information in VISEYE and reference clock signal do not match. • Reference clock signal amplitude is too low (minimum amplitude: 50mV$_{pp}$). • Reference clock signal frequency has too much variability (> ± 150ppm)

4.2.2 Acquisition LED

The **Acquisition** LED shows the acquisition status:

LED	Meaning
solid GREEN	A data acquisition request has been received and/or is in progress. The duration of the solid green phase depends on the pattern length and can range from a fraction of a second to >10s.
flashing GREEN	Flashes while the network reset button is being pressed and network parameters are being reset (refer to Hardware description).
OFF	Ready to receive a data acquisition request.

4.3 Environmental conditions

Range of environmental conditions:

Indoor or outdoor use	Indoor only
Altitude	Max. 2000m
Operating temperature range	5°C to 45°C | 41°F to 113°F
Storage temperature range	-40°C to 70°C | -40°F to 158°F
Relative humidity range	20% to 80%
Main supply voltage	100-240V~, 50/60Hz, 40W Max
Main supply voltage fluctuations	±10%
Overvoltage category	OVC II
Pollution degree	2

5 Installing software

5.1 Install the VISEYE software package

The QCA Series uses Quantifi Photonics' easy-to-use visualization and analysis software VISEYE. Your Quantifi Photonics sales manager will make the VISEYE software package available to you; alternatively, contact sales@quantifiphotonics.com.

NOTE

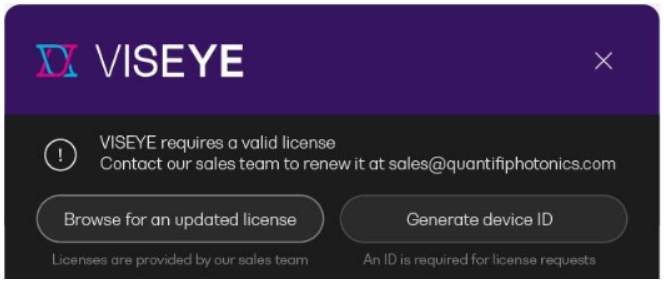
- A VISEYE license enables you to use VISEYE with any QCA instrument, but each license is only valid for one computer and cannot be used on (or transferred to) another computer.
- Make sure the computer that will run VISEYE meets minimum requirements, for details refer to System requirements.
- For software updates, renewal of a license, transfer of a license to a different computer, or any other question regarding your VISEYE license, please contact your Quantifi Photonics sales manager or email sales@quantifiphotonics.com.

To install VISEYE:

1. Save the VISEYE software package on the computer that will run VISEYE.
2. Run **VISEYE-<version>.exe**and follow the on-screen installation prompts. The installation wizard will install required drivers, applications, and desktop icons on the computer.

To activate VISEYE:

1. Open the VISEYE application. In the startup screen, VISEYE will ask for a valid license.
2. To request a license, click **Generate device ID**.
3. VISEYE will generate a **hardwareid.hid** file; please email the file to your Quantifi Photonics sales manager or to sales@quantifiphotonics.com.
4. We will email your license to you; please save it anywhere on the computer.
5. In the start-up screen, browse for the license and select it. Once the license is verified, VISEYE will be ready for use. If you have any questions about the license activation process, please contact your sales manager or sales@quantifiphotonics.com.

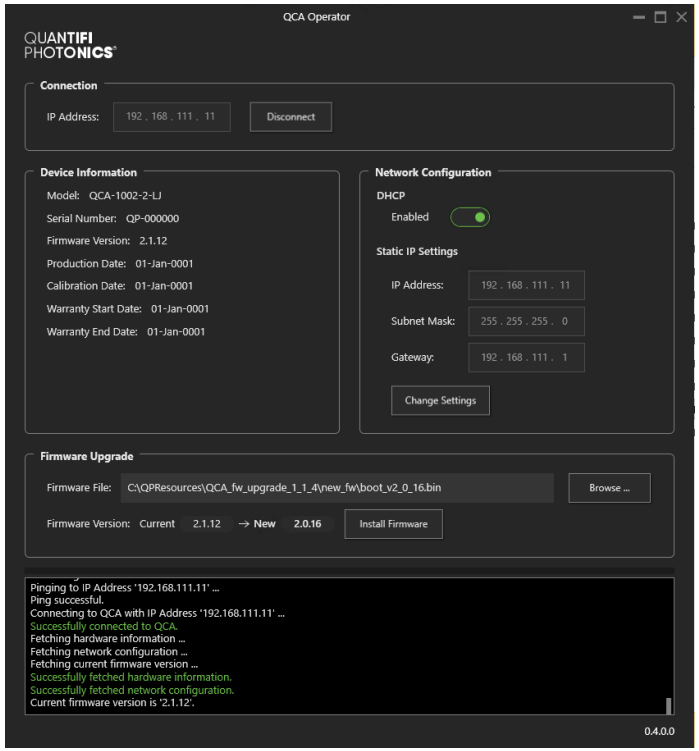


5.2 Install the QCA Operator software package

The QCA Operator enables you to connect with a QCA instrument; you can access device information, change the IP address and network settings, upgrade firmware and view log messages.

To install the QCA Operator software package:

1. Locate and run **QCA Operator-<version>.exe** on the client computer
   - on the USB media device provided with the product; or
   - download it from the Quantifi Photonics website.
2. Follow the on-screen installation prompts. Required drivers, applications, and desktop icons will be installed on the computer.



6 Setting up the QCA instrument

This section describes the basic hardware, network, and signal connections required to prepare the QCA instrument for operation.

CAUTION

To avoid damaging the product, discharge RF cables before connecting them to the QCA.

NOTE

- To allow for optimal air flow and avoid thermal issues, do not block the ventilation fans of the instrument and set up your instrument with a minimum clearance of 2 inches (50.8mm) around it.
- If using an input single-ended, keep the unused input open, i.e. do not terminate the unused input.

QCA network configuration

- By default, a QCA instrument is shipped with **Dynamic Host Configuration Protocol (DHCP)** functionality enabled as part of its factory settings. When connecting a QCA to a network that uses DHCP, the QCA will obtain its IP address from the DHCP server automatically. No additional network configuration is required.
- If no DHCP server is available on the network, the QCA will use its currently set static IP address. The QCA is shipped with the **default static IP address 192.168.111.11** as part of the factory settings.
- When connecting **multiple QCA instruments** to a **network without a DHCP server**: Before connecting the QCA instruments to the network as described below, review the QCAs' network settings using the QCA Operator application, and assign a unique static IP address to each QCA to avoid addressing conflicts. For details, refer to View and change the QCA IP address and network configuration.

To set up and connect your QCA to your network:

1. Provide ground connection to the QCA.
2. Firmly insert the supplied power cable connector into the QCA's power input port and plug the other end into a suitable electrical outlet.
3. Connect the QCA to your network using an **Ethernet** cable (Cat5E or better).
4. Power the QCA ON.
5. The QCA displays its IP address on the LCD screen. With DHCP enabled, this is the IP address automatically assigned to the QCA. If no DHCP server is available, this is the currently set static IP address.
6. Connect a reference clock or recovered clock input, for example a Quantifi Photonics QCR.

7. Connect the signal source to an input channel. If using an input single-ended, keep the unused input open, i.e. do not terminate the unused input.
8. Open the VISEYE application on the client computer.

After turning the QCA on, allow for 30 minutes of temperature stabilization before working with the QCA.

Electrical instruments:

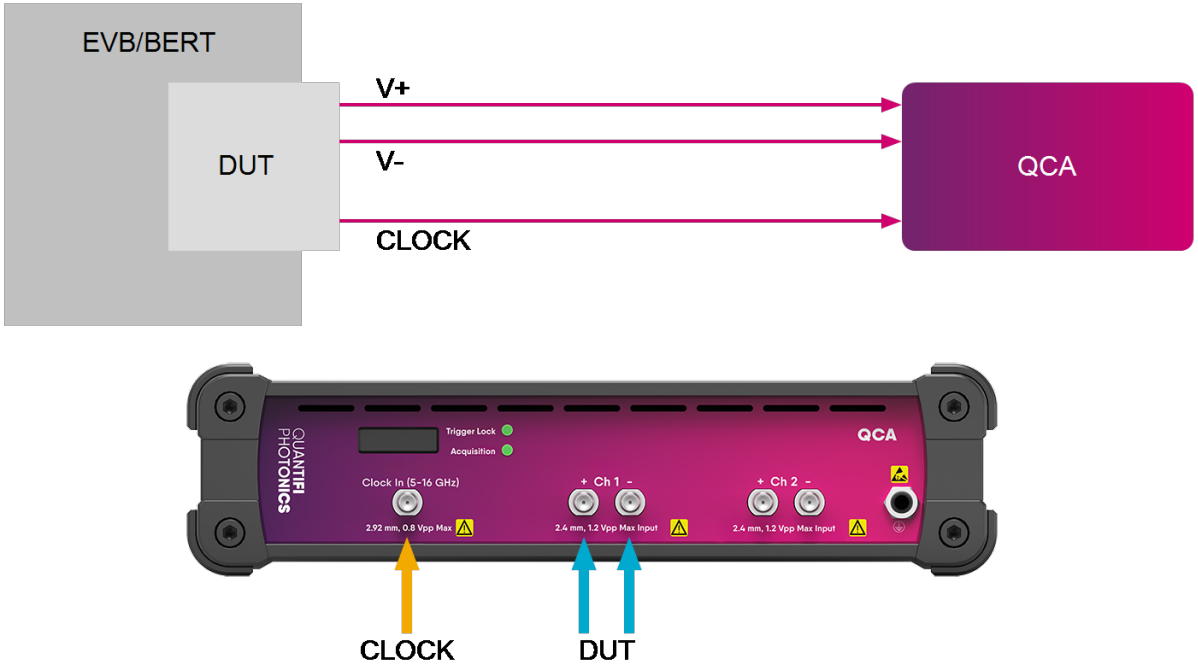


Optical instruments:

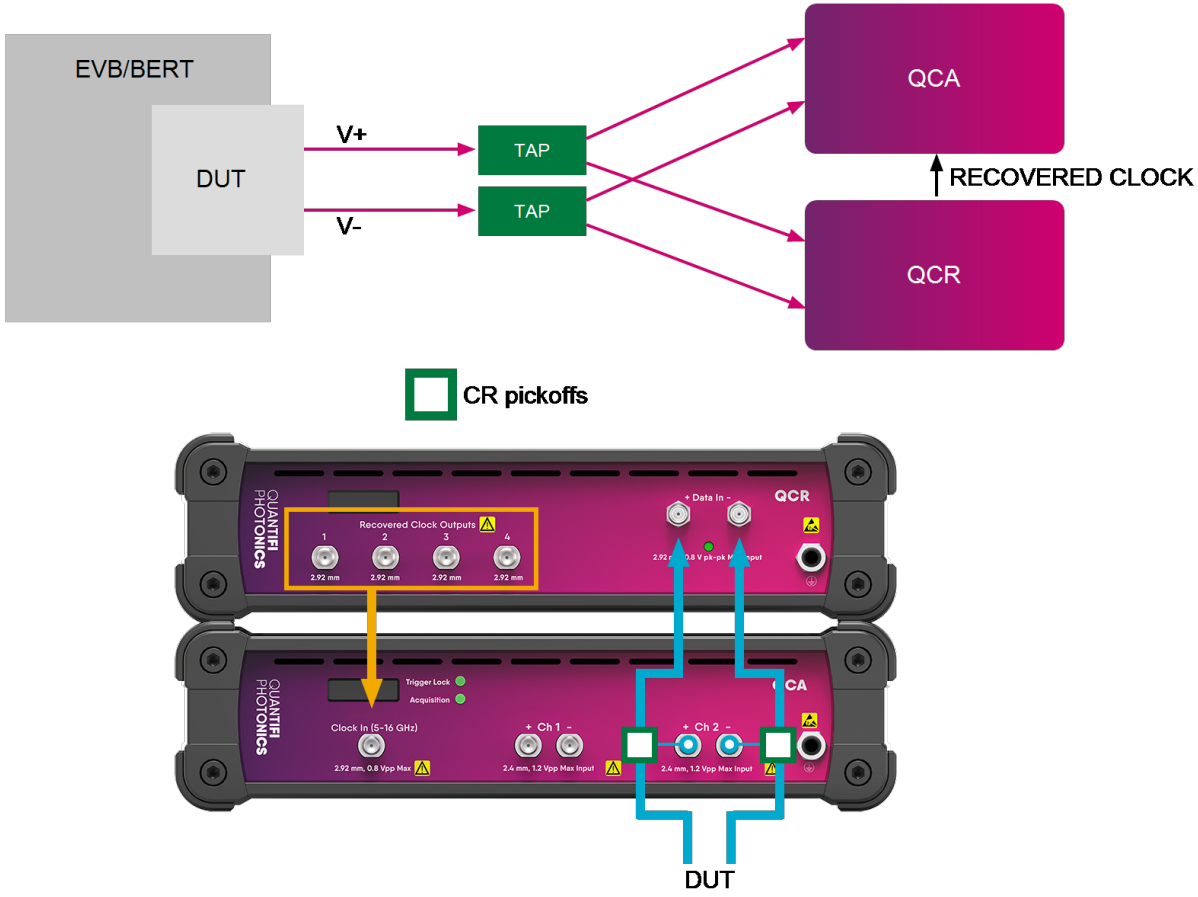


6.1 Use cases - electrical

6.1.1 Triggering using a synchronized clock

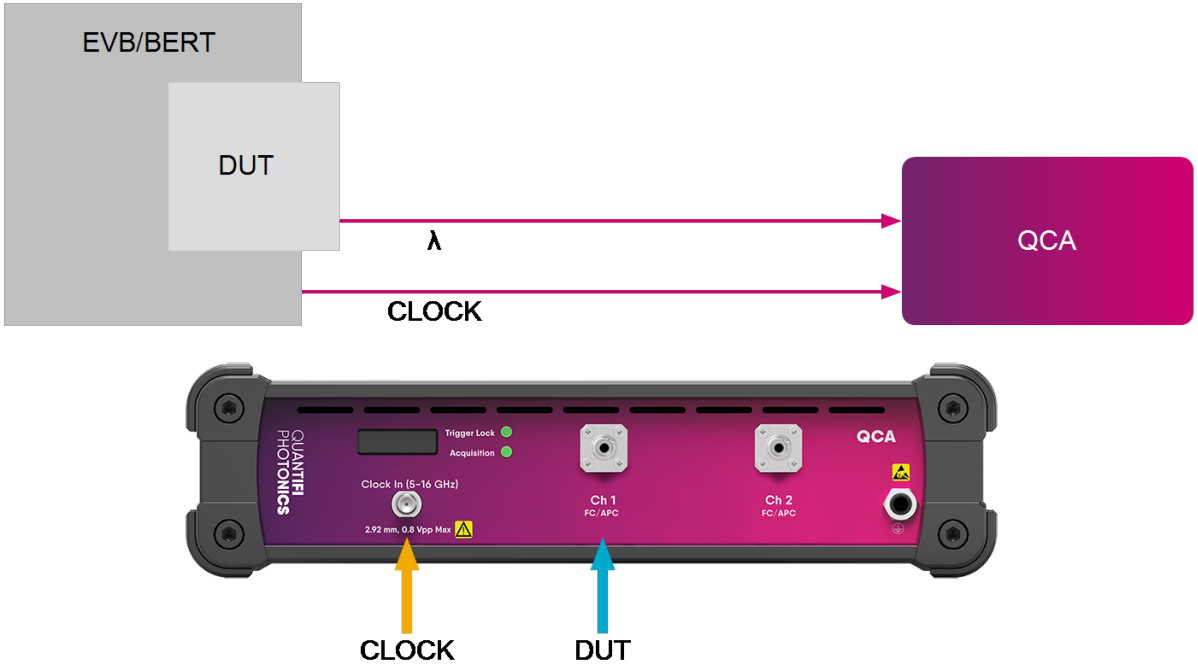


6.1.2 Triggering using a recovered clock

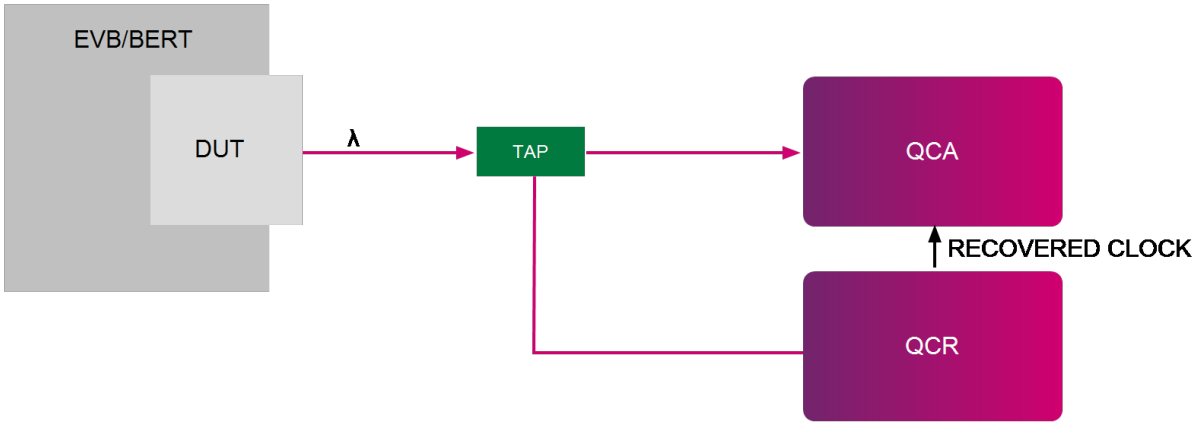


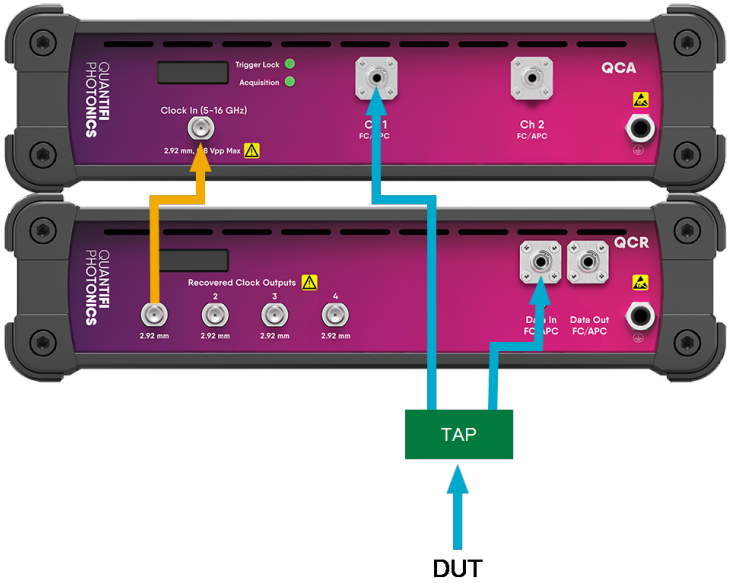
6.2 Use cases - optical

6.2.1 Triggering using a synchronized clock

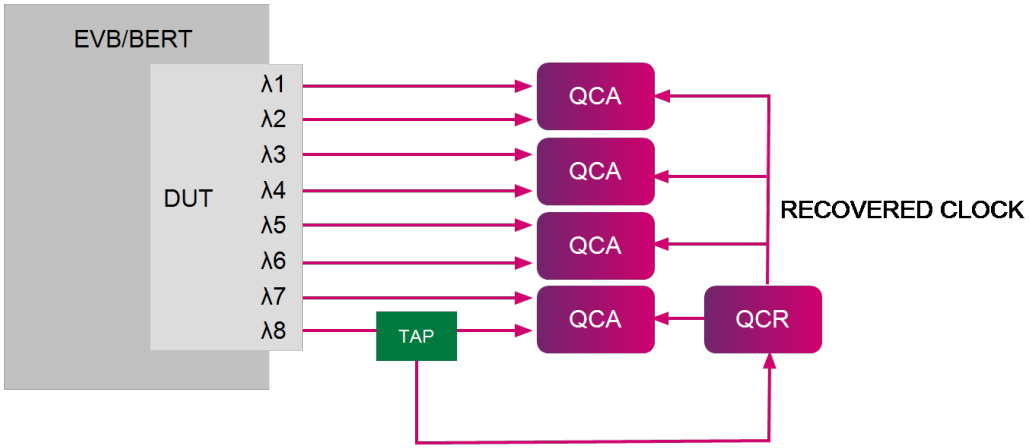


6.2.2 Triggering using a recovered clock and optical tap





6.2.3 Triggering using a recovered clock and 8-channel DUT



7 Managing the QCA instrument with QCA Operator

The **QCA Operator** software package on your client computer enables you to connect with a QCA instrument to:

1. View and change the QCA IP address and network configuration
2. Upgrade firmware
3. View QCA details and log messages

For details on how to install the QCA Operator, refer to Install the QCA Operator software package.

7.1 View and change the QCA IP address and network configuration

By default, a QCA instrument is shipped with **Dynamic Host Configuration Protocol (DHCP)** functionality enabled as part of its factory settings. When connecting to a network and powering on, the QCA will obtain its IP address from the DHCP server automatically.

If no DHCP server is available, the QCA will use its currently set static IP address. The QCA is shipped with the **default static IP address 192.168.111.11** as part of the factory settings.

When connecting **multiple QCA instruments to a network without a DHCP server**: Assign a unique static IP address to each QCA using the QCA Operator application as described below before connecting it to the network. This will avoid addressing conflicts.

▶ To change the IP address and/or network configuration of a QCA instrument:

Please ensure:

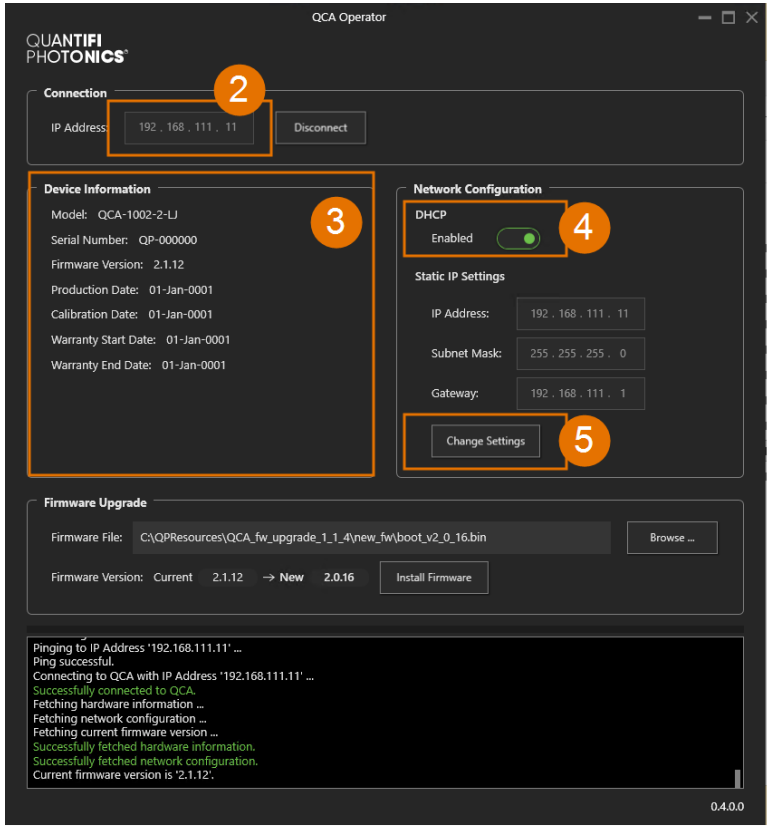
- the QCA and the client computer that runs QCA Operator are on the same network, or
- the QCA is directly connected with the Ethernet port on the client computer, and the Ethernet port of the computer is configured with a different IP address than the QCA.

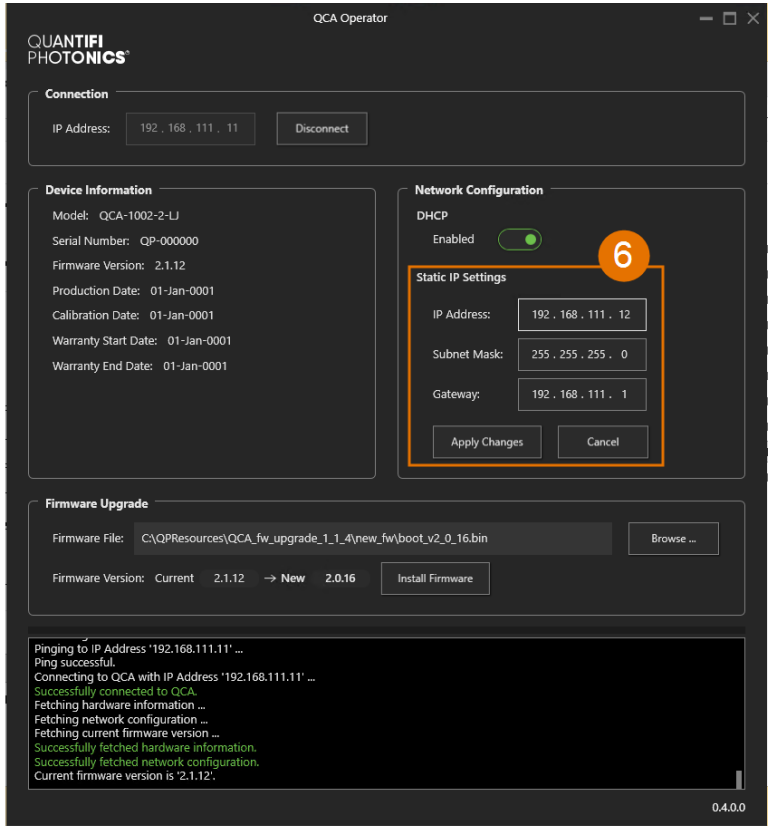
1. Open the **QCA Operator application** on your client computer.
2. Enter the current IP address of the QCA as it appears on the LCD screen of the QCA and click **Connect**.



3. Once connected, check **Device Information** fields (read only) to make sure you have connected with the correct QCA.

4. If required, enable or disable **DHCP**. If disabled, the QCA will use the static IP address.
5. To change the static IP address: In **Network Configuration**, activate edit mode by clicking **Change Settings**.
6. Edit static IP settings and confirm changes with **Apply Changes**. The new IP address will be displayed on the LCD screen of the QCA.

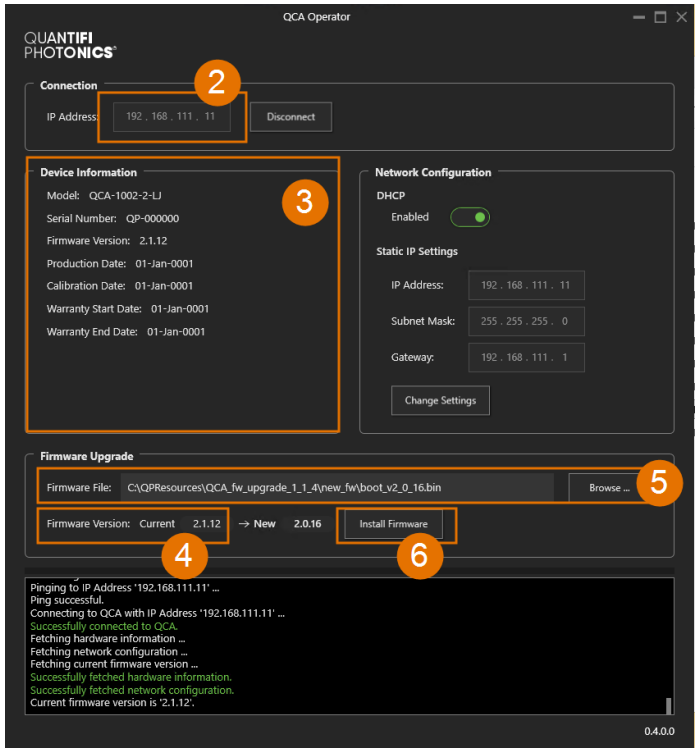




7.2 Upgrade firmware

Using the QCA Operator, you can view the version of the currently installed firmware file, and install a new firmware version that has been supplied for the instrument.

▶ To install a new firmware file on the QCA instrument:

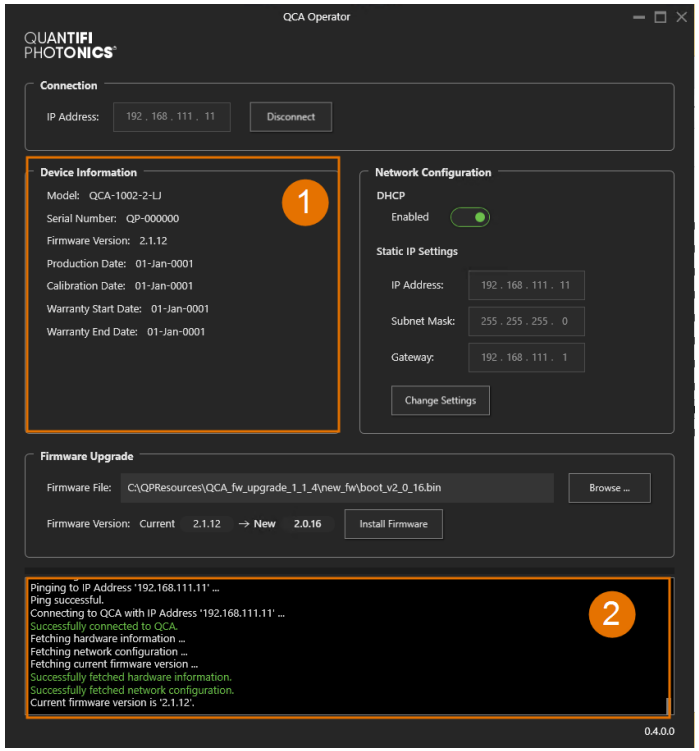


1. Open the **QCA Operator application** on your client computer.
2. Enter the IP address of the QCA as it appears on the LCD screen of the QCA and click **Connect**.
3. Once connected, check **Device Information** fields (read only) to make sure you have connected with the correct QCA.
4. In **Firmware Upgrade** the current firmware version is displayed.
5. Click **Browse** and select a valid firmware file to install (.bin file format).
6. Click **Install Firmware**. The upgrade process may take several minutes and includes one or more instrument reboots. Do not power off the QCA instrument or disconnect it from the network or the client computer until the upgrade is complete.

7.3 View QCA details and log messages

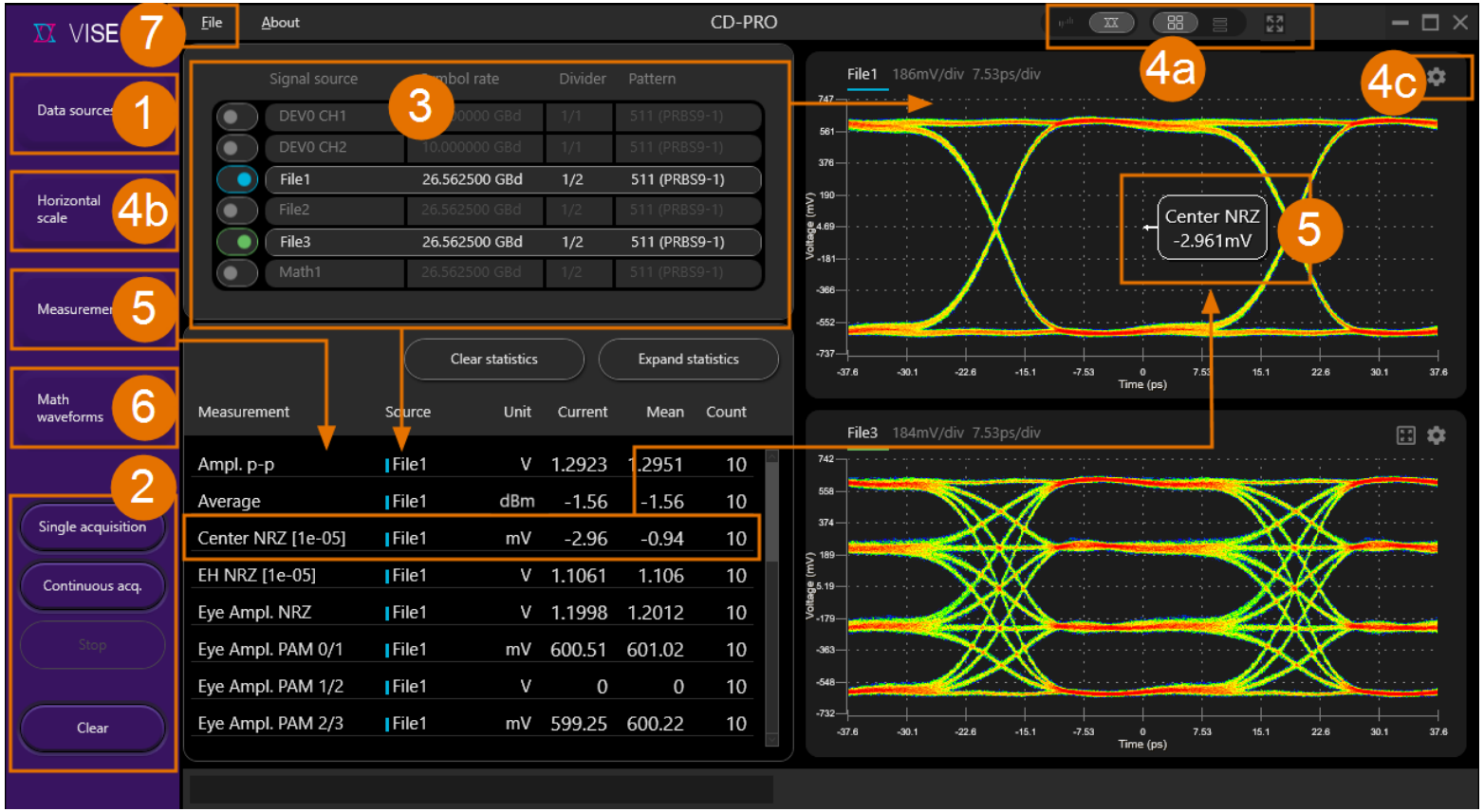
The QCA Operator

1. displays details of the connected QCA instrument in **Device Information**, for example **Model** and **Serial Number**, and
2. records status and activity messages in the log console.



8 Working with VISEYE

1. **Setup data sources**: Set up VISEYE to receive a signal from a QCA instrument and/or load waveform files.
2. **Acquire data**.
3. **Turn data sources ON/OFF**: VISEYE will display plots and measurements for data sources that are turned ON.
4. **Adjust visualization**:
    a. Select waveforms or eye diagrams, and stack or grid view. Autosize all plots.
    b. Configure the **horizontal axis** - settings apply to all plots.
    c. Configure the **vertical axis** and **eye diagram settings** - choose settings for each plot individually.
5. **Add measurements**: VISEYE will list measurements in the table; click on a measurement in the table to display annotations in the plot.
6. **Build math waveforms**.
7. **Manage VISEYE data**: Load and save data, for example in the **File** menu.



8.1 Set up data sources

When opening VISEYE, proceed as follows to set up the data sources to work with:

1. Load/Start a project:

   Start a new project or open an existing project.

2. Connect with a QCA instrument:

   Connect with a QCA instrument and configure input channels of the QCA instrument.

3. Add data sources to the virtual instrument:

   Add QCA channels and/or previously acquired waveform files to the VISEYE virtual instrument for simultaneous analysis. VISEYE can process the signal from up to eight data sources, consisting of:

   a. Input channels of a connected QCA instrument.

   b. Previously acquired waveform files.

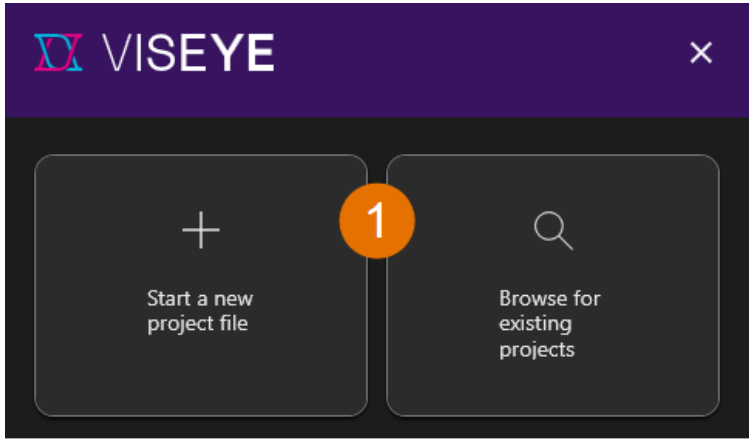
   c. Math waveforms created in VISEYE.

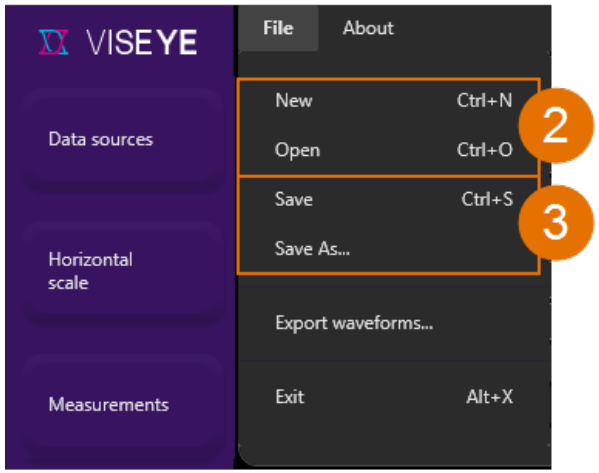
8.1.1 Load/Start a project

Load an **existing project**, or start a **new project**:

- **Loading an existing project:** VISEYE will reload data sources, measurements and visualization settings as they were when saving the project.
- **Starting a new project:** VISEYE will start without loading previous data.

When moving from one project to another, click **Clear** in the left bottom corner to reset plots and delete previously acquired measurement results and statistics.





▶ To load an existing project:

1. Select the project file in the start-up screen, or
2. Load the project from the **File** menu.

▶ To start a new project:

1. Select new project file in the start-up screen, or
2. Start a new project from the **File** menu.

▶ To save the current project:

3. Save the project in the **File** menu, or
4. Save the project when prompted on closing VISEYE.

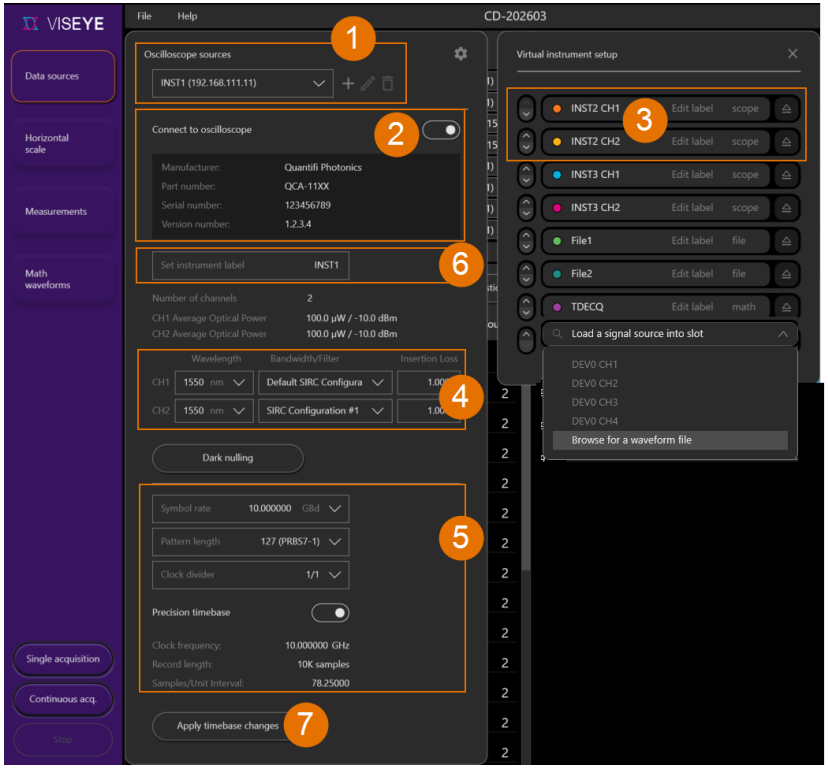
8.1.2 Connect with a QCA instrument

To receive a signal from a **QCA instrument**:

- Connect VISEYE with the QCA instrument.
- Optical QCA: Perform dark level calibration (refer to Dark level calibration (optical QCA-1100 Series)).
- Configure the incoming signal.
- Apply a System Impulse Response Correction (SIRC) digital filter.

  To edit existing and create new SIRC filters, refer to Manage System Impulse Response Correction (SIRC) digital filters).

Parameter		Edit values	Description
Number of channels		read only	Number of channels of the connected QCA
CHx Average Optical Power		read only	(available for optical QCA) Average optical power of the channel
Wavelength		✓	(available for optical QCA) Channel wavelength
Bandwidth/Filter		✓	SIRC filter
Insertion Loss		✓	Power loss of the signal due to splitting the signal between a clock recovery unit (for example Quantifi Photonics' QCR instrument) and the QCA instrument. Enter a percentage value in decimal format with $0.0 < IL \leq 1.0$. For example, if 25% of the signal go to the QCR and 75% of the signal go to the QCA, enter an **Insertion Loss** value of **0.75**.
Symbol rate		✓	Baud rate of the received signal
Pattern length		✓	Select a pattern length based on common test patterns from the dropdown
Clock divider		✓	Divides the clock signal by the selected value
Precision timebase		✓	When turned ON, VISEYE improves jitter performance by increasing sampling accuracy through hardware support.
Clock frequency		read only	Frequency of the received clock signal.
Record length		read only	The number of data points to be captured by VISEYE for a single acquisition
Samples/unit interval		read only	The number of samples per unit interval (UI) to retime your signal to
SIRC config	Bandwidth (Hz)	read only	Controls the filter's bandwidth
	Center (Hz)	read only	Sets the central frequency between the upper and the lower cutoffs
	Filter Type	read only	The type of filter that will be applied, for example bessel
	Order	read only	The order of the filter
	Roll off	read only	Controls the steepness of the frequency transfer function



To connect with a QCA instrument and configure the signal:

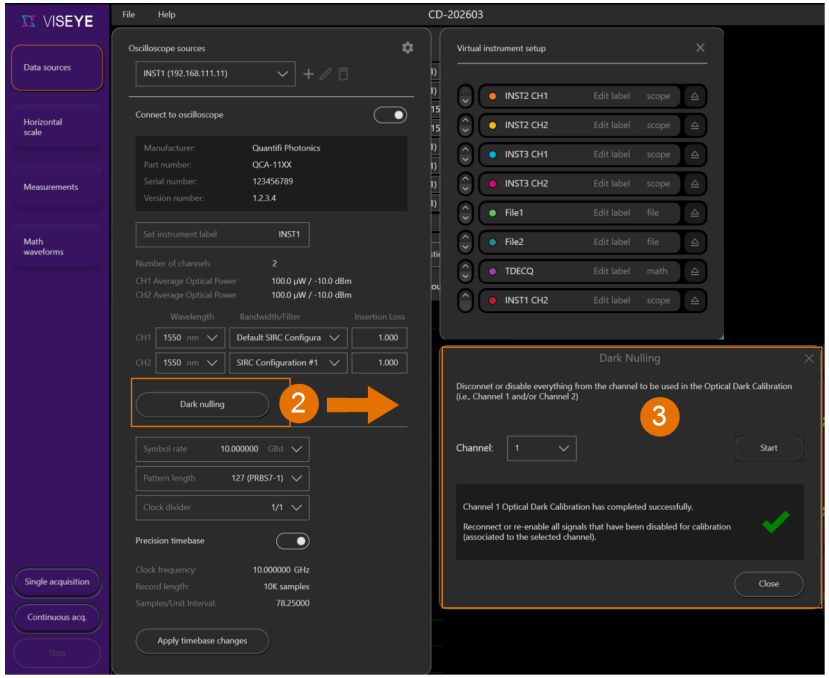
1. In VISEYE, go to **Data sources** and select a QCA from the dropdown, or add a new QCA.
2. Connect with the QCA by setting **Connect to oscilloscope** to **ON**.
3. VISEYE will load the QCA channels into the virtual instrument. Refer to Add data sources to the virtual instrument for details on how to manage the data sources in the virtual instrument.
4. Configure each channel:
   - select a SIRC filter and enter an **Insertion Loss** value.
   - (optical QCA only) select a wavelength.
5. Configure parameters of the received signal - VISEYE does not receive this information from the QCA.
6. (optional) In **Set instrument label**, edit the name of the QCA - this label will be used throughout VISEYE for all QCA channels.
7. Click **Apply timebase changes**.

8.1.2.1 Dark level calibration (optical QCA-1100 Series)

Dark level calibration improves the accuracy of optical measurements by measuring an optical channel's internally generated offsets and noise with no light present at the optical input.

Once calibrated, the QCA automatically corrects measurements by removing the measured offset from the signal levels used in the measurement calculations. This correction is essential for obtaining accurate Extinction Ratio, Outer Extinction Ratio, and TDECQ results and improves accuracy of low-signal-level and high-speed optical measurements.

Because dark level offsets can change with temperature, we recommend performing dark level calibration whenever the operating temperature changes by more than 2°C, and every time the QCA is turned on (allow for 30 minutes of temperature stabilization before calibrating).



- To perform dark level calibration on a QCA channel:

1. Ensure the optical input is fully blocked, for example by covering the optical port of the channel with a dust cap.
2. In **Data Sources**, click **Dark nulling**.
3. In the **Dark Nulling** window, select the channel from the dropdown and click **Start**. The QCA measures the signal levels under this no-light condition and determines the dark level for the selected channel.

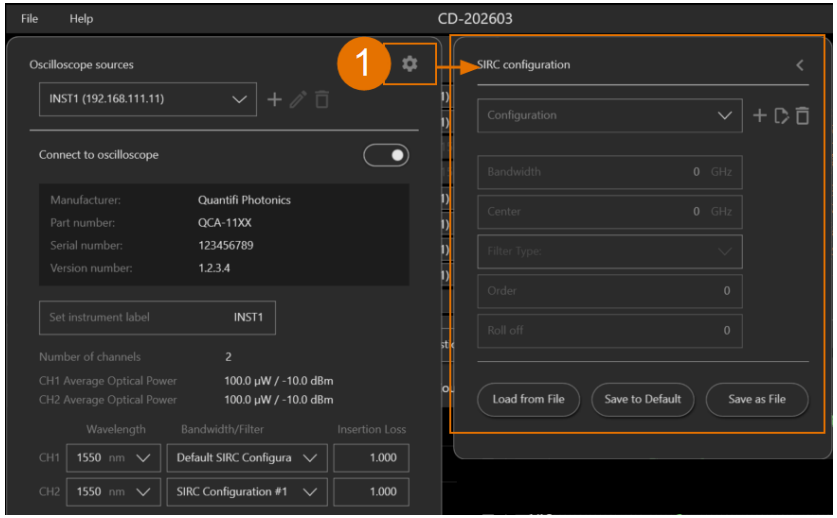
8.1.2.2 Manage System Impulse Response Correction (SIRC) digital filters

Apply a SIRC digital filter to obtain a defined transient response and related channel frequency response.

On startup, VISEYE will load the default SIRC configuration file **sirc.json**. It includes several pre-defined SIRC filters.

You can manage the SIRC filters in the **SIRC configuration** window:

- edit existing filters and create new filters
- save changes to the default SIRC configuration file sirc.json, or as a separate configuration file
- load filters from a file (from the default file sirc.json or filters saved to a separate .json configuration file), replacing the currently loaded SIRC filters



▶ To open the **SIRC configuration** window:

1. In **Data Sources**, click the settings icon.



- To edit an existing or create a new SIRC filter:

1. Select a **SIRC configuration** from the dropdown and click the **Edit** icon.
2. Or, click the **Add** icon and enter a name for a new SIRC filter.
3. To load SIRC folters from a different configuration file: Click **Load from File** and select a SIRC configuration file. The filters defined in the loaded file will replace currently loaded filters in VISEYE.
4. Select/Enter filter parameters as required.
5. Click **Save**.
6. Click **Save to Default** to update the default SIRC configuration file sirc.json with the current SIRC filter settings, or **Save as File** to save as a new or different SIRC configuration file.

- To delete a SIRC filter:

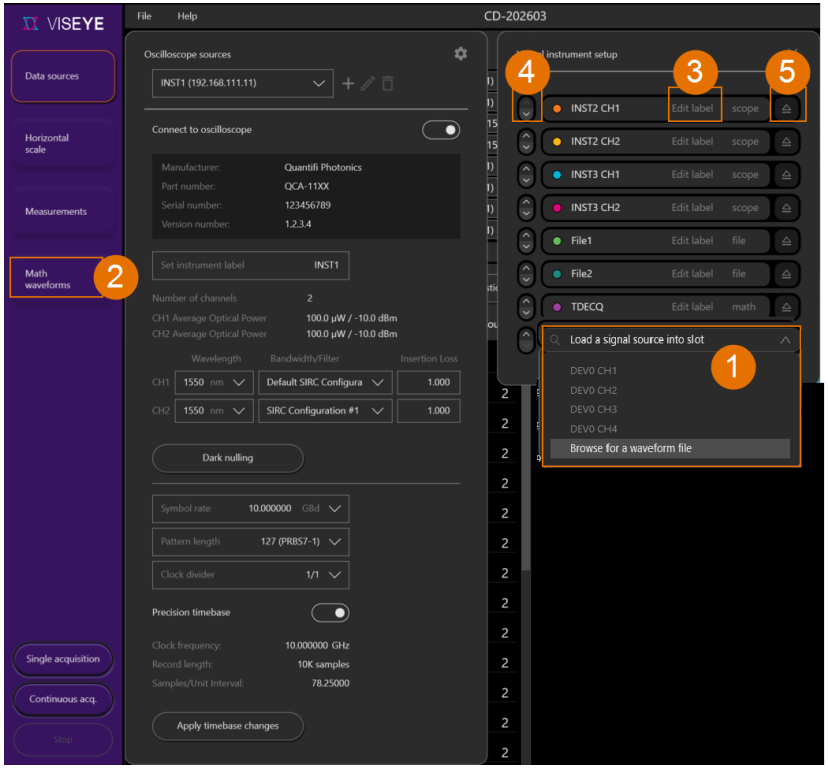
7. Select a filter from the dropdown and click the **Delete** icon.

8.1.3 Add data sources to the virtual instrument

To work with **QCA input channels**, **previously acquired waveform files** and **math waveforms**, load the channels and/or files into the VISEYE virtual instrument as below.

VISEYE will acquire data from all data sources in the virtual instrument.

Example waveform files are included in the VISEYE software package in folder ...\Quantifi Photonics\VISEYE\Examples\Waveform.



- To load a data source into the virtual instrument:

1. In **Data sources**, click on an empty slot of the virtual instrument and
   - select a channel of a connected QCA, or
   - click **Browse for a waveform file** and select a file.
2. To build and add a math waveform to the virtual instrument, go to **Math waveforms**. For details, refer to Build math waveforms.

- To manage data sources in the VISEYE virtual instrument:

3. In **Edit label** you can change the name of a data source as used throughout VISEYE.
4. Click on the **up or down arrows** to change the order of data sources in the virtual instrument.
5. Click **Eject** to remove a data source from the virtual instrument.

NOTE

When removing a data source from the VISEYE virtual instrument, VISEYE will prompt you to first remove associated data sources (for example math waveforms using that data source).

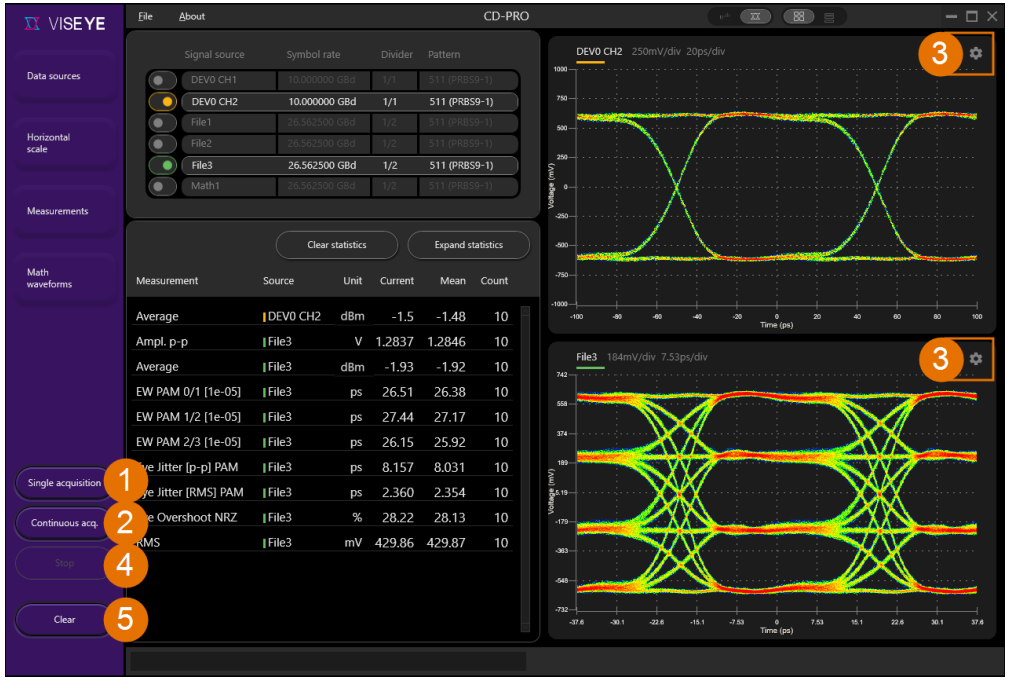
8.2 Acquire data

VISEYE will acquire data from data sources loaded in the VISEYE virtual instrument.

Prior to acquiring data from a connected QCA instrument, ensure the reference clock signal is locked, for example by checking the **Trigger Lock LED** on the front of the QCA. For details, refer to Trigger Lock LED in Hardware description.

Any loss of lock will stop acquisition of the signal to avoid unreliable measurement results. Loss of lock can occur if:

- Reference clock signal is not connected to the QCA.
- Timebase information in VISEYE and reference clock signal do not match.
- Reference clock signal amplitude is too low (minimum amplitude: 50mV$_{pp}$).
- Reference clock signal frequency has too much variability (> ± 150ppm)



To acquire data:

1. Click **Single acquisition** to capture a single acquisition.
2. Click **Continuous acq.** to repeatedly capture a single acquisition.

   VISEYE will update plots and set measurements.
3. You can control the number of acquisitions VISEYE uses for an eye diagram plot, for details refer to Vertical axis and eye diagram settings.
4. Click **Stop** to stop continuous acquisition.

To reset data:

5. Click **Clear**. This resets plots and measurement results and recalibrates the timebase.

8.3 Adjust visualization

VISEYE offers a wide range of options to fine-tune the visualization of your signal:

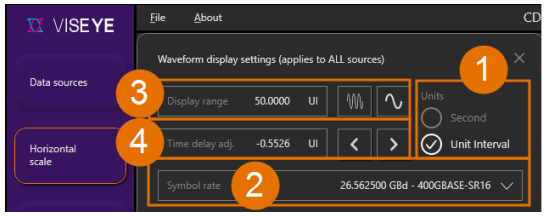
1. **Turn data sources ON/OFF**: VISEYE will display plots and measurement values for data sources that are turned ON.
2. Select **eye or waveform** mode and/or **stack or grid** view.
3. **Plots - horizontal scale**: Define the horizontal axis, for details refer to Horizontal axis.
4. **Plots - vertical scale**: Define the vertical axis and eye diagram settings, for details refer to Vertical axis and eye diagram settings.
5. **Zoom in/out**: Use mouse controls to zoom in or out.
6. **Annotations**: Click on a measurement in the table to display annotations in the plot (available for relevant measurements).
7. **Autoscale** a plot.
8. **Autoscale** all plots.



8.3.1 Horizontal axis

In **Horizontal scale** you control the scale and position of a waveform on the horizontal time axis of a plot. These settings apply to all data sources.

Parameter	Edit values	Description
Display range	✓	Range of the horizontal axis
Time delay adj.	✓	Offset
Units	✓	Unit used on the horizontal axis: Seconds or Unit Interval
Symbol rate	✓	Baud rate of the received signal



▶ To adjust the horizontal axis of the waveform plots:

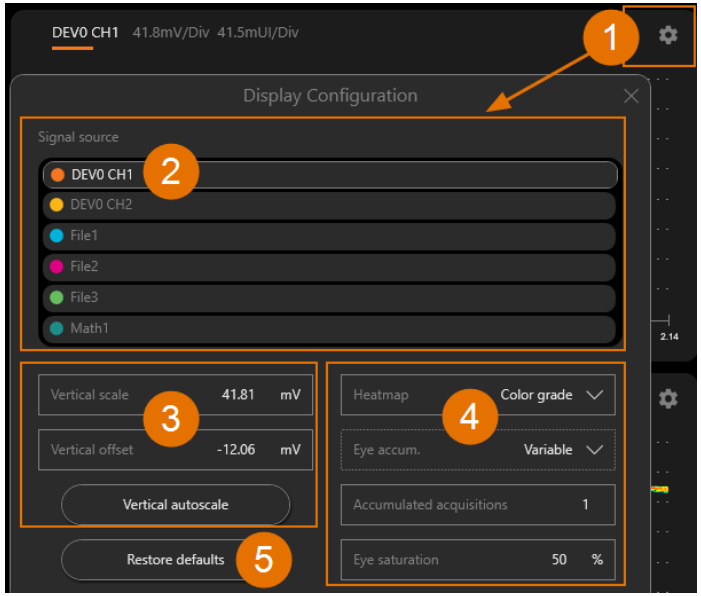
1. In **Horizontal scale**, select the **Unit**.
2. If **Unit = Unit Interval**: Select **symbol rate**.
3. Enter a **display range** value or click the icons to increase or decrease the range.
4. Enter a **Time delay adj** value or click the icons to increase or decrease the time delay.

8.3.2 Vertical axis and eye diagram settings

In plot **Settings** you configure for each data source:

- the scale and position of a waveform on the vertical axis of the plot
- eye diagram settings

Parameter	Edit values	Description
Vertical scale	✓	Scale of the vertical axis of the plot
Vertical offset	✓	Vertical axis offset
Heat map	✓	Heat map type
Eye accum.	✓	Determines the data VISEYE uses for an eye diagram. **Single-shot**: VISEYE will use the latest acquisition only. **Infinite**: VISEYE will use all acquisitions. **Variable**: VISEYE will use the number of acquisitions as set in **accumulated acquisitions** - this includes the latest acquisition and the required number of acquisitions prior to that.
Accumulated acquisitions	✓	(For **Eye accum = variable**) Number of acquisitions to be used for the eye diagram.
Eye saturation	✓	Saturation intensity



▶ To configure plot settings:

1. In the plot, click the **Settings** icon.
2. In the **Display Configuration** window, select a data source.
3. (available in waveform mode) Enter settings for the vertical axis, or click **Vertical autoscale**.
4. Select eye diagram settings.

▶ To restore default settings:

5. Click **Restore Defaults**.

8.4 Add and read measurements

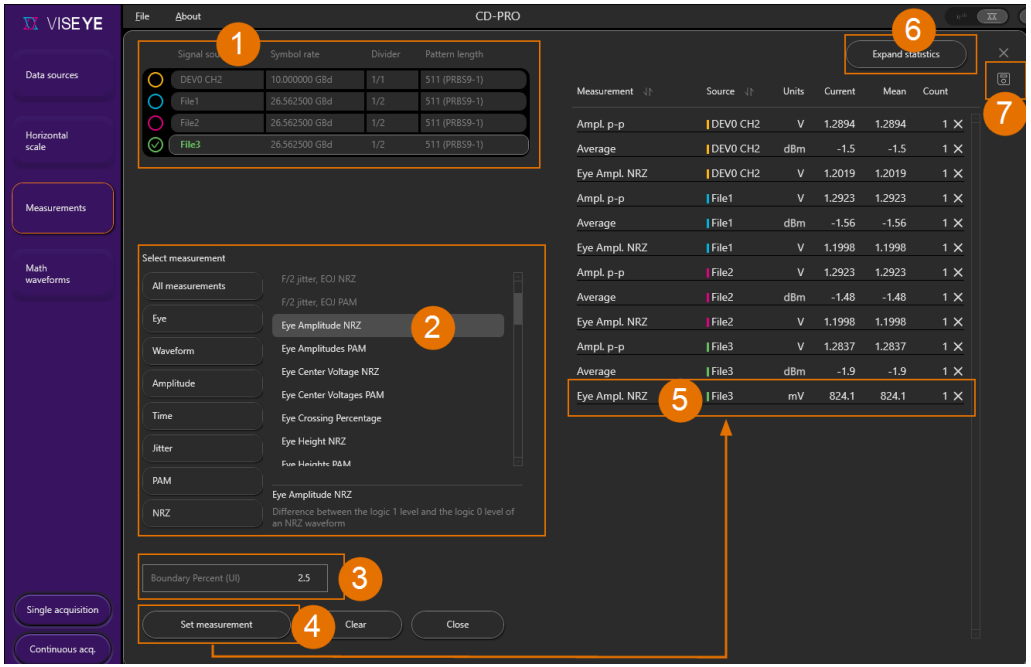
VISEYE supports a great range of relevant measurements, you can add them to waveforms in **Measurements** as described below.

For detailed descriptions of the measurements and configurable parameters, refer to Measurements.

NOTE

The process is different for **TDECQ** measurements: To add and manage **TDECQ** measurements, go to **Math waveforms**, select the required waveform as the primary source, add the math function **TDECQ Reference Equalizer** and select parameters as required. VISEYE will add the **TDECQ** measurement to the measurement table. For details, refer to Build math waveforms.

To add and manage all other measurements, go to **Measurements** and proceed as described below.



To add a measurement:

1. In **Measurements**, select one or several data sources.
2. Select a measurement.
3. Edit measurement properties as required.
4. Click **Set measurement**.
5. VISEYE will add the measurement to the table. With each acquisition, VISEYE will update results for all set measurements, **Count** values will go up by one.
6. Click **Expand statistics** to display all columns of the the measurement table.

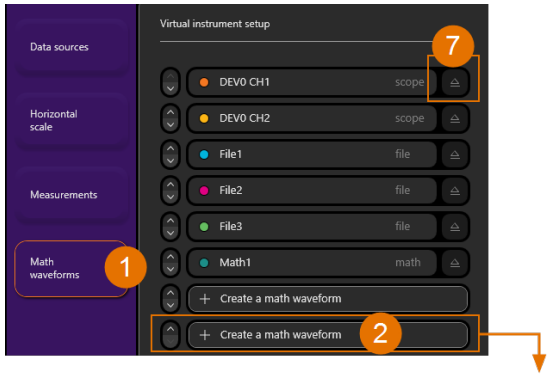
To save measurement results as a .csv file:

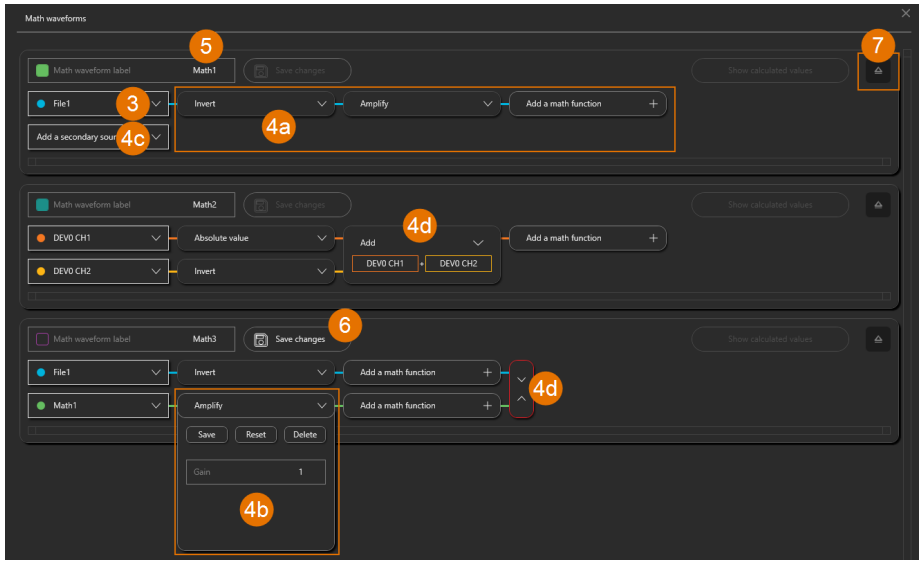
7. In **Measurements**, click the **Save** icon.

8.5 Build math waveforms

You can generate math waveforms by applying operators to waveforms that are loaded in your VISEYE virtual instrument. You can work with math waveforms like with any other waveform.

To set up a TDECQ measurement, refer to Set up a TDECQ measurement.



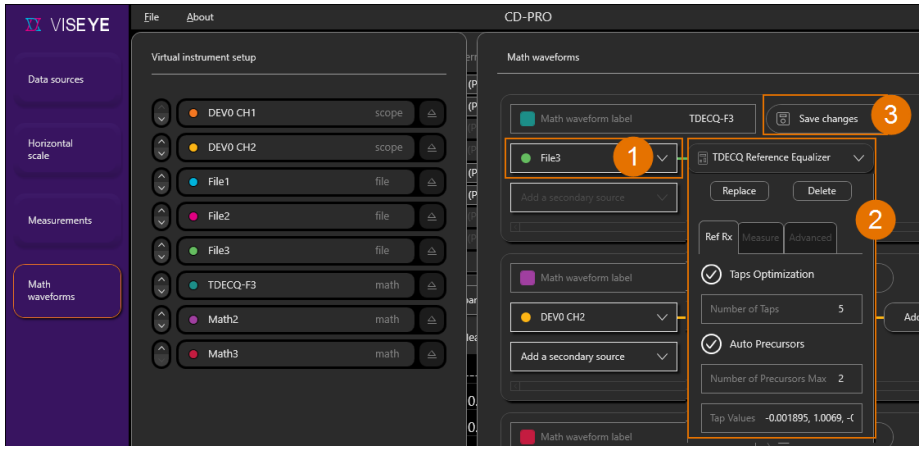


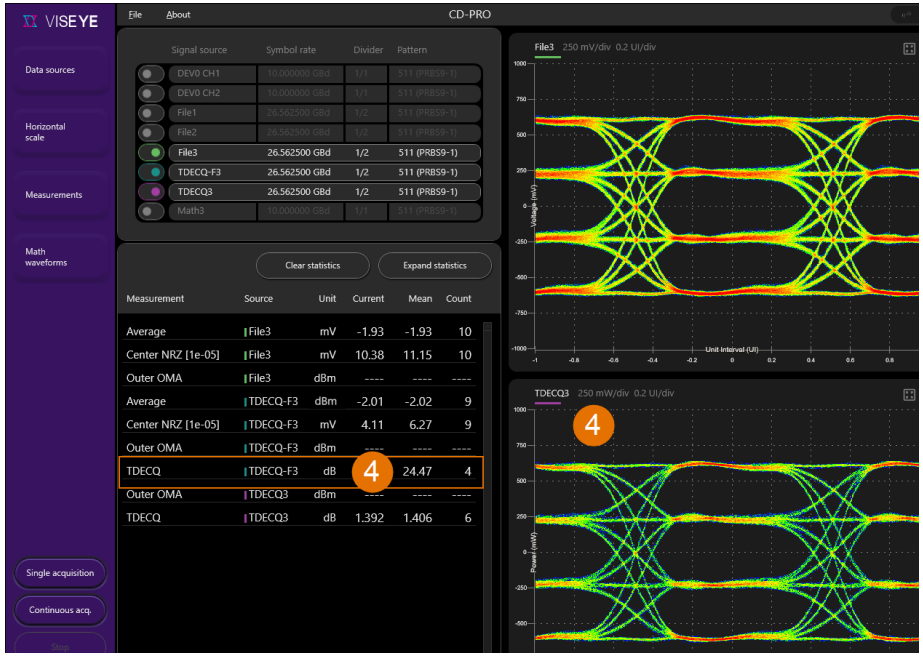
- To build or edit a math waveform:
  1. Go to **Math waveforms**. Existing math waveforms are listed.
  2. To create a new math waveform, click on an empty slot in the virtual instrument.
  3. Select a **primary data source** for the math waveform.
  4. Build the math waveform by using a combination of the following steps:
     a. Click **Add a math function** and select an operator to apply to the data source. You can repeat this step and add several operators.
     b. You can reset and delete operators, and edit settings if applicable.
     c. Add a secondary data source if required.
     d. Combine the primary and secondary data sources.
  5. (optional) Edit the name of the math waveform.
  6. Click **Save changes**.

- To remove a math waveform from the virtual instrument:
  7. Click **Eject**.

8.5.1 Set up a TDECQ measurement

When setting up a TDECQ measurement, proceed as follows.





To set up a **TDECQ** measurement:

1. Select a PAM4 waveform as the primary data source.
2. Click **Add a math function** and select the operator **TDECQ Reference Equalizer**. Select parameters as required, for details refer to Transmitter and Dispersion Eye Closure Quaternary (TDECQ).
3. Click **Save changes**.
4. VISEYE will create the waveform and add the measurement to the table in the main window.

8.5.2 Operators

8.5.2.1 Math operators

Operator	Description	Parameters	
Invert	Inverts the voltage values of the data source point by point.		
Amplify	Amplifies the values of the data source point by point.	Gain	Specifies the linear scalar factor for amplification
Absolute value	Uses the absolute values of the data source point by point.		
Add/subtract offset	Applies a constant offset to the input signal by adding the specified value to each data sample. To subtract an offset, a negative value must be provided. This operation shifts the signal vertically without modifying its shape or other characteristics.	Offset value (W)	Specifies the constant value, in volts, to be added to each sample of the input signal.

8.5.2.2 Simulations

Operator	Description	Parameters	
Apply s2p file	Applies s21 transfer function to the signal	S parameter file	Name of the s2p file with scattering parameters
		Align input and output waveforms	Compensates the delay imposed by applied s21 transfer.
		Use auto upper limit for frequency	When switched off, allows to specify the highest frequency up to which the s21 transfer function will be applied.
		Freq upper limit	The highest frequency up to which the s21 transfer function will be applied. Effective when 'Use auto upper limit for frequency' is switched off.
Remove s2p file	De-embeds the s21 transfer function from the signal by applying its inverse.	S parameter file	Name of the s2p file with scattering parameters
		Align input and output waveforms	Compensates the delay imposed by applied inverse s21 transfer.
		Use auto upper for frequency	When switched off, allows to specify the highest frequency up to which the inverse s21 transfer function will be applied.
		Freq upper limit	The highest frequency up to which the inverse s21 transfer function will be applied. Effective when 'Use auto upper limit for frequency' is switched off.

8.5.2.3 Signal processing

Operator	Description	Parameters	
Continuous Time Linear Equalizer (CTLE)	Applies to the signal the CTLE transfer function that amplifies higher frequencies.	Gain	Specifies the difference of equalizer gain at the peak frequency and at the zero frequency.
		Peak frequency	The frequency at which the equalizer provides maximum gain.
Linear Feed-Forward Equalizer (FFE) with automatic tap optimization	Applies the FFE to the signal.	Automatic taps	When switched on, the equalizer taps are optimized using the LMS algorithm. The optimized tap values are displayed in 'Tap Values' input box. When switched off the taps specified in 'Tap Values' are used.
		Taps per UI	Specifies number of taps per symbol.
		Number of taps	Specifies total number of equalizer taps.
		Precursors	Number of precursor taps.
		Tap values	Specifies equalizer tap values when 'Automatic taps' is switched off. Displays the automatically optimized tap values when 'Automatic taps' is switched on.
		Signal type	Specifies signal type (NRZ, PAM4) which is crucial for automatic taps optimization.
Difference	Calculates difference between neighboring data points.		
TDECQ Reference Equalizer	A measure of vertical eye closure relative to an ideal optical transmitter		For details including configurable parameters, refer to Transmitter and Dispersion Eye Closure Quaternary (TDECQ).

8.5.2.4 Combine two data sources

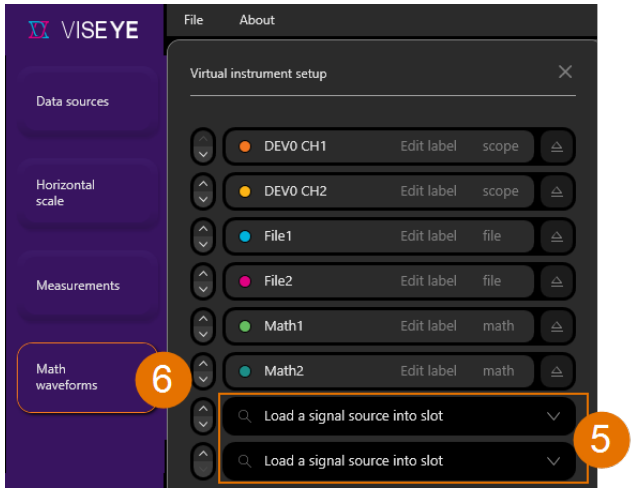
Operator	Description	Parameters	
Add	Adds each data source point by point.		
Subtract	Subtracts one data source from the other point by point.		
Common mode	Adds the data sources point by point, and divides by two: $\frac{A+B}{2}$		
Align	Lines up the data sources by applying a time delay to one data source.		

8.6 Manage VISEYE data

VISEYE organizes data in waveform files and project files:

- Waveform files contain raw signal data only.
- Project files contain waveform files, measurement results and the project settings that were selected when saving the file.





Project files

▶ To start a new project or load an existing project file:

1. Select a new or existing project in the start-up screen when opening VISEYE, or
2. Select a new or existing project in the **File** menu.

> When loading a project file, click **Clear** in the left bottom corner to reset plots and measurements.

▶ To save or export the current project:

3. Save or export the project in the **File** menu, or
4. Save the project when prompted on closing VISEYE.

Waveform files

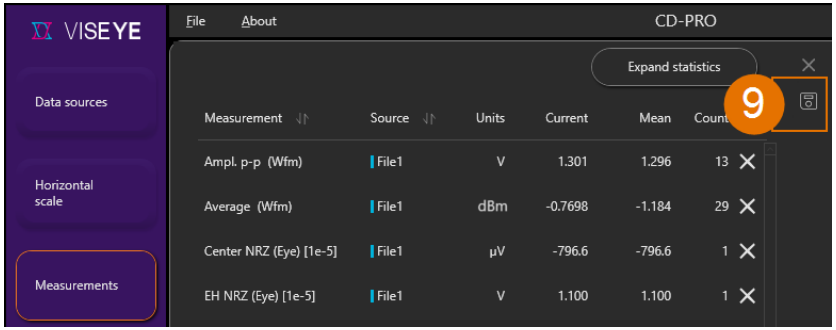
▶ To manage waveform files:

5. Load a waveform file in **Data sources**, refer to Set up data sources.
6. Create a math waveform in **Math waveforms**, refer to Build math waveforms.
7. Export current waveforms in the **File** menu: VISEYE will create a .zip file that includes one .json file and one .vwav file per channel.

Configurations

▶ To export a configuration:

8. Export a configuration.



Measurements

- To save measurement results:

9. In **Measurements**, save measurement results and statistics as a .csv file .

9 Measurements

9.1 Overview

VISEYE supports the following measurements:

- Eye measurements
- Waveform measurements

Eye measurements

Measurement	Signal type	Summary
Average	NRZ, PAM4	Mean value of the waveform's voltage
Amplitude Peak-Peak	NRZ, PAM4	Difference between the absolute maximum and the absolute minimum of a waveform's voltage.
NRZ Extinction Ratio	NRZ, PAM4	The ratio of the optical power of the highest signal level (Logic 1 in NRZ or Logic 3 in PAM4) to that of the lowest level (Logic 0).
Eye Amplitude NRZ	NRZ	Difference between the logic 1 level and the logic 0 level of an NRZ waveform
Eye Amplitudes PAM	PAM4	Difference between adjacent logic levels (0-1, 1-2, 2-3) of a PAM-4 waveform
Eye Center Voltage NRZ	NRZ	Vertical center voltage of an NRZ eye diagram as defined in IEEE Std 802.3-2022 120E.4.2
Eye Center Voltages PAM	PAM4	Vertical center voltage of all three eyes in a PAM-4 eye diagram as defined in IEEE Std 802.3-2022 120E.4.2
Eye Crossing Percentage	NRZ	Crossing point voltage level relative to the logic 1 level and logic 0 level
Eye Height NRZ	NRZ	Vertical opening of an NRZ eye diagram at specified probability level as defined in IEEE Std 802.3-2022 120E.4.2

Measurement	Signal type	Summary
Eye Heights PAM	PAM4	Vertical opening of all three eyes in a PAM-4 eye diagram at specified probability level as defined in IEEE Std 802.3-2022 120E.4.2
Eye One Level	NRZ	Mean value of the logic 1 level of the eye diagram
Eye Zero Level	NRZ	Mean value of the logic 0 level of the eye diagram
PAM Levels	PAM4	Mean voltage of all four logic levels (0, 1, 2, 3) in a PAM-4 eye diagram
Eye Skews	PAM4	Horizontal deviation of the center of each of three eyes in a PAM4 eye diagram relative to the average center of all three eyes
Eye Width NRZ	NRZ	Horizontal opening of an NRZ eye diagram at specified probability level as defined in IEEE Std 802.3-2022 120E.4.2
Eye Widths PAM	PAM4	Horizontal opening of all three eyes of a PAM-4 eye diagram at specified probability level as defined in IEEE Std 802.3-2022 120E.4.2
Eye Fall Time	NRZ	Transition time of the eye diagram's falling edge
Eye Rise Time	NRZ	Transition time of the eye diagram's rising edge
Eye Jitter (Peak-Peak)	NRZ, PAM4	Peak-to-Peak of time variances of either the rising or falling edges of a waveform
Eye Jitter (RMS)	NRZ, PAM4	Root-mean-square of time variances of either the rising or falling edges of a waveform
Overshoot NRZ	NRZ	Relative overshoot of the rising (falling) transition above (below) the logic 1 (0) level in percentage
Overshoot PAM	PAM4	Relative overshoot of the rising transition above the logic 3 level in percentage of the 3 - 0 levels difference

Measurement	Signal type	Summary
Undershoot	NRZ, PAM4	Relative undershoot of a transition above the logic 0 level in percentage
Ratio Level Mismatch (Annex 120D)	PAM4	Level separation mismatch ratio as defined in IEEE 802.3bs 120D.3.1.2
Ratio Level Mismatch (Clause 94)	PAM4	Transmitter linearity as defined in IEEE 802.3-2022 94.3.12.5.1
Signal to Noise Ratio	NRZ	Ratio of the Eye Amplitude to the sum of the noise at the Logic 0 and Logic 1 level
Symbol Period	NRZ	Time duration of one symbol
Transmitter and Dispersion Eye Closure Quaternary (TDECQ)	PAM4	Transmission and Dispersion Eye Closure Quaternary for PAM4 is a measure of vertical eye closure relative to an ideal optical transmitter as defined in clause 121.8.5 of the IEEE 802.3-2022 standard
Vertical Eye Closure (VEC) (Eye)	PAM4	Vertical Eye Closure quantifies the closure of the eye diagram compared to an ideal signal

Waveform measurements

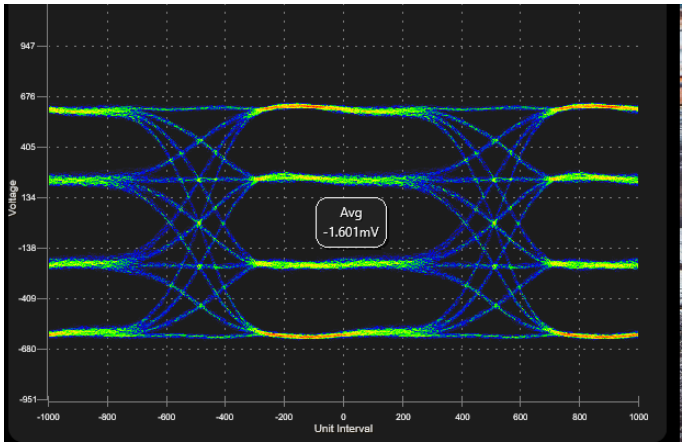
Measurement	Signal type	Summary
Average	NRZ, PAM4	Mean value of the waveform's voltage
Amplitude Peak-Peak	NRZ, PAM4	Difference between the absolute maximum and the absolute minimum of a waveform's voltage.
RMS	NRZ, PAM4	DC Root-mean-square value of the waveform's voltage
One/Zero Levels	NRZ	Mean value of the logic 0 and 1 levels of the eye diagram as defined in IEEE Std 802.3-2022 120D.3.1.2.1
Optical Modulation Amplitude (OMA)	NRZ	OMA is the difference in optical power for the nominal “1” and “0” levels of the optical signal
PAM Outer Extinction Ratio	PAM4	The ratio of average optical power levels of the logic 3 and logic 0 symbols, measured within a specified portion (Boundary Percent) around the middle of a sequence of consecutive identical symbols
Outer OMA	PAM4	The difference between the average optical power levels of the logic 3 and logic 0 symbols, measured within a specified portion (Boundary Percent) around the middle of a sequence of consecutive identical symbols
Wfm Overshoot NRZ	NRZ	Relative overshoot of the rising transition above the logic 1 level in percentage
RMS	NRZ PAM4	DC Root-mean-square value of the waveform's voltage
Signal to Noise Distortion Ratio	PAM4	Signal to Noise and Distortion Ratio as defined in IEEE 802.3bs
SNR Inter-Symbol Interference	NRZ, PAM4	Signal-to-Noise Ratio due to Inter-Symbol Interference as defined in IEEE 802.3bs

Measurement	Signal type	Summary
Wfm Fall Time	NRZ	The fall time of a single edge in the waveform specified by a minimum number of consecutive preceding logic high symbols and succeeding logic low symbols as defined in IEEE Std 802.3-2022 120E.3.1.5
Wfm Rise Time	NRZ	The rise time of a single edge in the waveform specified by a minimum number of consecutive preceding logic low symbols and succeeding logic high symbols as defined in IEEE Std 802.3-2022 120E.3.1.5
Vertical Eye Closure Penalty (VECP)	NRZ	Vertical Eye Closure Penalty

9.2 Eye measurements

9.2.1 Average

Summary	Mean value of the waveform's voltage
Mode	Eye
Signal type	NRZ, PAM4
Unit	V (electrical QCA 1000 Series) dBm (optical QCA 1100 Series)
Annotations	**Avg**: Marks the average value
Configurable parameters	N/A

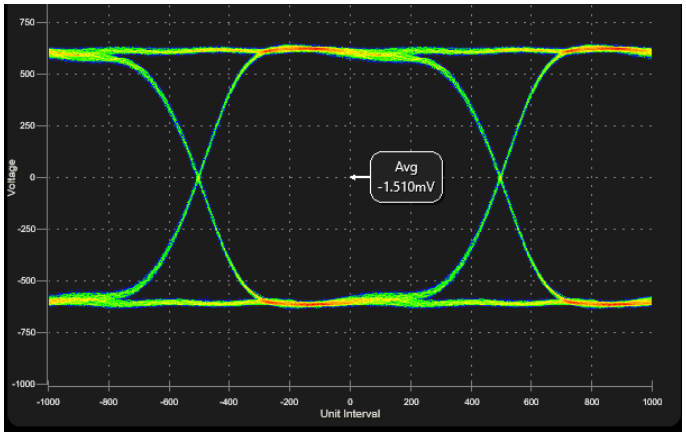


$$Amp_{mean} = \frac{1}{n}\sum_{k=1}^{n} Amp_n$$

where:

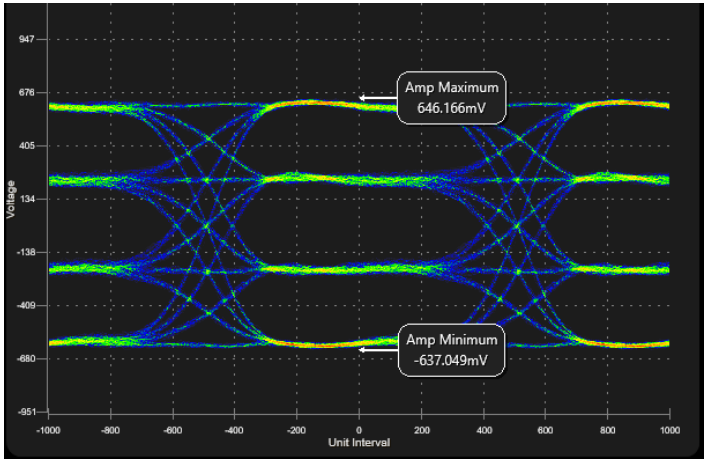
n: number of waveform samples, determined by the record length

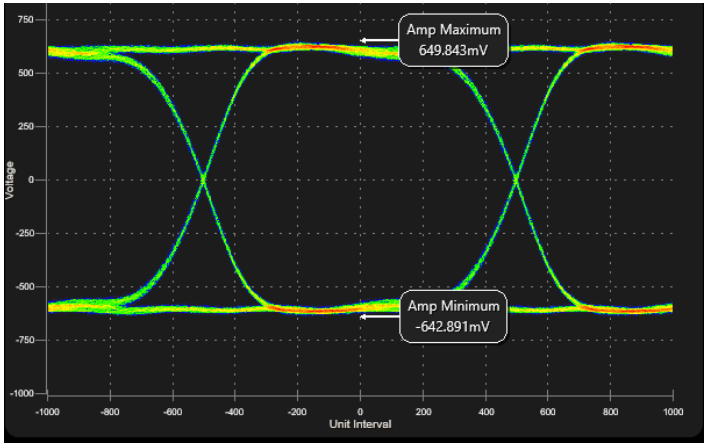
Amp_n: n^{th} sample amplitude



9.2.2 Amplitude Peak-Peak

Summary	Difference between the absolute maximum and the absolute minimum of a waveform's voltage.
Mode	Eye
Signal type	NRZ, PAM4
Unit	V
Annotations	**Amp Maximum**: absolute maximum amplitude value of the waveform **Amp Minimum**: absolute minimum amplitude value of the waveform
Configurable parameters	N/A





$$Amp_{pkpk} = Amp_{max} - Amp_{min}$$

where:

Amp_{max}: Maximum amplitude value of the eye

Amp_{min}: Minimum amplitude value of the eye

9.2.3 NRZ Extinction Ratio

Summary	The ratio of the optical power of the highest signal level (Logic 1 in NRZ or Logic 3 in PAM4) to that of the lowest level (Logic 0).	
Mode	Eye	
Signal type	NRZ, PAM4	
Unit	dB	
Annotations		
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.

The Extinction Ratio is calculated as:

$$\boldsymbol{ER = 10 \cdot log_{10}(\frac{PN}{P0})}$$

where:

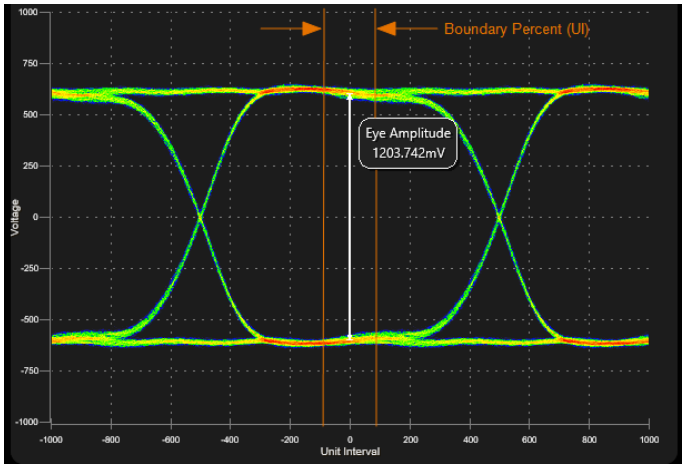
$\boldsymbol{PN}$ is the optical power level of the Ligic 1 in NRZ or Logic 3 in PAM4,;

$\boldsymbol{P0}$ is the optical power level of the Logic 0.

$\boldsymbol{PN}$ and $\boldsymbol{P0}$ are obtained as described in Eye One Level and Eye Zero Level for NRZ, and PAM Levels for PAM4.

9.2.4 Eye Amplitude NRZ

Summary	Difference between the logic 1 level and the logic 0 level of an NRZ waveform	
Mode	Eye	
Signal type	NRZ	
Unit	V	
Annotations	**Eye Amplitude**	
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.



$$EA = < Amp_1 > - < Amp_0 >$$

where:

$< Amp_1 >$: amplitude of the logical 1 averaged within specified boundaries - samples with an amplitude greater than average are considered to be logical 1

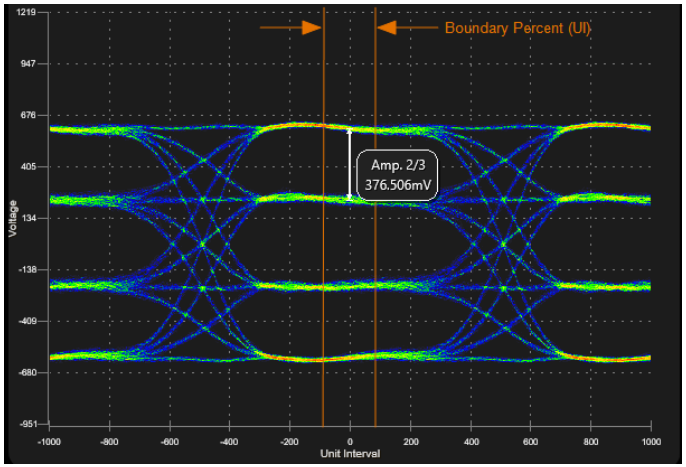
$< Amp_0 >$: amplitude of the logical 0 averaged within specified boundaries - samples with an amplitude less than average are considered to be logical 0

The average amplitude is defined as described in Average.

The horizontal eye center TC_{mid} is found as described in Eye Center Voltage NRZ.

9.2.5 Eye Amplitudes PAM

Summary	Difference between adjacent logic levels (0-1, 1-2, 2-3) of a PAM-4 waveform	
Mode	Eye	
Signal type	PAM4	
Unit	V	
Annotations	**Amp. 0/1**: **Amp. 1/2**: **Amp. 2/3**:	
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
	Boundary Percent (Amplitude)	Defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude
	Probability value	Defines the time or amplitude key points for eye metric calculation (see figure Eye Metrics Definition below) so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.



$$Amp_{0/1} = < Amp_1 > - < Amp_0 >$$

$$Amp_{1/2} = < Amp_2 > - < Amp_1 >$$

$$Amp_{2/3} = < Amp_3 > - < Amp_2 >$$

where:

$< Amp_n >$: amplitude of the logical n ($n = 0, 1, 2, 3$) averaged within specified boundaries around the eye center TC_{mid}.

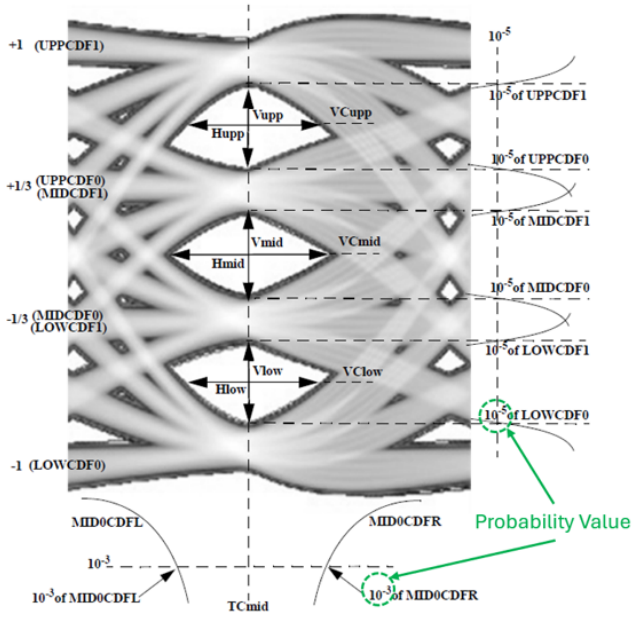
The horizontal eye center TC_{mid} is found as described in Eye Center Voltage NRZ.

The logical decision thresholds are defined as:

$$d_{1/2} = < D >$$

$$d_{0/1} = < D_L >$$

Figure Eye Metrics Definition (source: IEEE standard 802.3):



$d_{2/3} =< D_U >$

where:

D: the data set containing all samples within specified boundaries

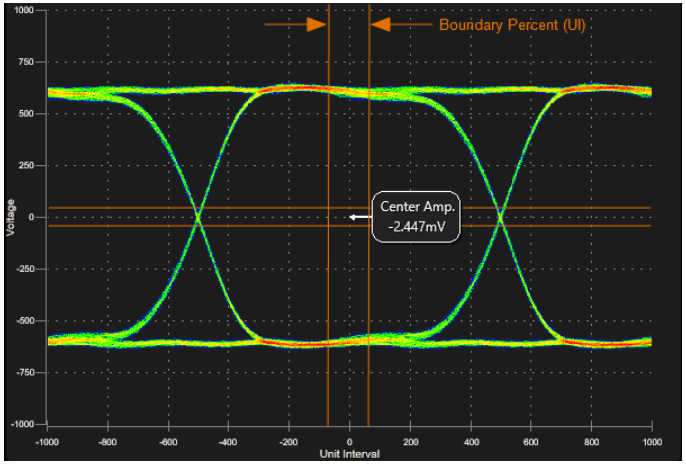
D_L: the subset of D, containing samples with amplitudes below $d_{1/2}$

D_U: the subset of D, containing samples with amplitudes above $d_{1/2}$

<>: defines averaging

9.2.6 Eye Center Voltage NRZ

Summary	Vertical center voltage of an NRZ eye diagram as defined in IEEE Std 802.3-2022 120E.4.2	
Mode	Eye	
Signal type	NRZ	
Unit	V	
Annotations	**Center Amp.**	
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
	Boundary Percent (Amplitude)	Defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude
	Probability value	Defines the time or amplitude key points for eye metric calculation (see figure Eye Metrics Definitions) so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.



$$VC_{mid} = \frac{A0_P + A1_P}{2}$$

where:

$A0_P$ and $A1_P$ are amplitude values satisfying

$$MIDCDF1(A1_P) = P, MIDCDF0(A0_P) = P.$$

$MIDCDF1/0$ are the cumulative distribution function of the data sets consisting of samples within specified Boundary Percent (UI) around TC_{mid} whose values are above/below the mean eye amplitude.

$$TC_{mid} = \frac{TL_3 + TR_3}{2}$$

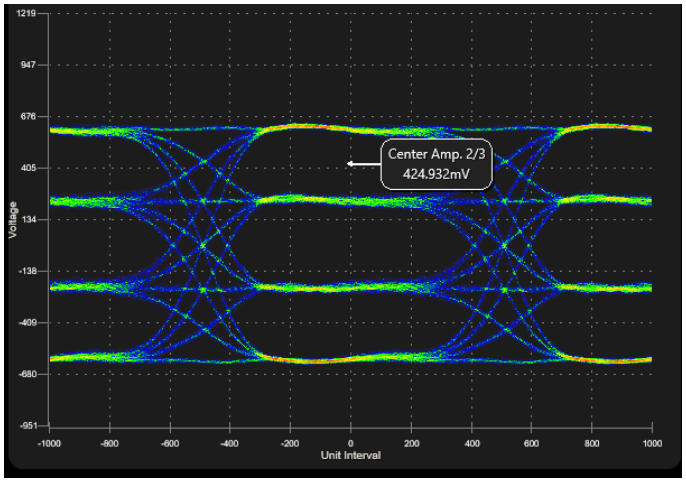
TL_P and TR_P are time values satisfying

$MID0CDFL(TL_3) = 1e-3$, $MID0CDFR(TR_3) = 1e-3$.

$MID0CDFL/R$ are the horizontal cumulative distribution functions of the sample data sets at the eye crossing, consisting of samples within specified Boundary Percent (Amplitude) around the mean eye amplitude located to the left/right of the symbol center that is defined as the middle point between eye edges.

9.2.7 Eye Center Voltages PAM

Summary	Vertical center voltage of all three eyes in a PAM-4 eye diagram as defined in IEEE Std 802.3-2022 120E.4.2	
Mode	Eye	
Signal type	PAM4	
Unit	V	
Annotations	**Center Amp. 0/1** **Center Amp. 1/2** **Center Amp. 2/3**	
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
	Boundary Percent (Amplitude)	Defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude
	Probability value	Defines the time or amplitude key points for eye metric calculation (see figure Eye Metrics Definitions) so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.



$$VC_{mid} = \frac{Amid0_P + Amid1_P}{2}$$

$$VC_{upp} = \frac{Aupp0_P + Aupp1_P}{2}$$

$$VC_{low} = \frac{Alow0_P + Alow1_P}{2}$$

where:

$AxxxYP$ are amplitude values satisfying $XXXCDFY(AxxxY_P) = P$, see figure Eye Metrics Definition.

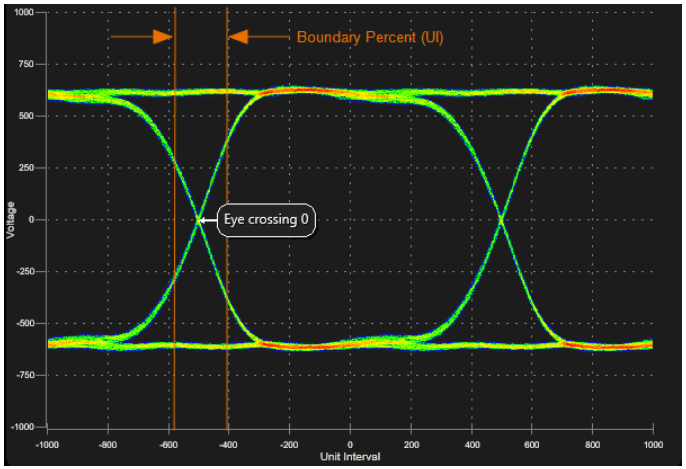
$XXXCDFY$ are the cumulative distribution function of the data sets consisting of samples within specified Boundary Percent (UI) around TC_{mid}, whose values are above/below the corresponding logical decision threshold.

The horizontal eye center TC_{mid} is found as described in Eye Center Voltage NRZ.

The logical decision thresholds are defined as described in Eye Amplitudes PAM.

9.2.8 Eye Crossing Percentage

Summary	Crossing point voltage level relative to the logic 1 level and logic 0 level	
Mode	Eye	
Signal type	NRZ	
Unit	Percent	
Annotations	**Eye crossing 0** **Eye crossing 1**	
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.



Measures the amplitude at the locations of the crossing points in relation to the mean one and zero level values.

$$EC_0 = 100\frac{XampL - <Amp_0>}{EA}$$

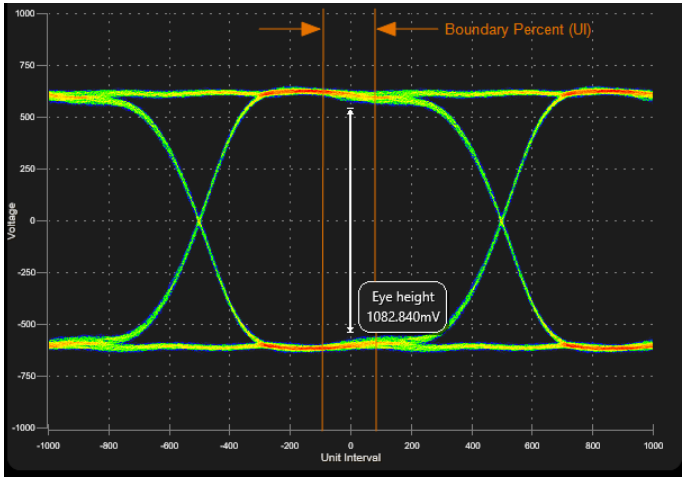
$$EC_1 = 100\frac{XampR - <Amp_0>}{EA}$$

where the eye amplitude EA and eye zero level <Amp0> are calculated using specified boundary percent (UI) as described in Eye Amplitude NRZ.

$XampL$ and $XampR$ are left and right crossing amplitudes that are found as the levels at which the corresponding edge of the eye within 5% around the level has minimum jitter.

9.2.9 Eye Height NRZ

Summary	Vertical opening of an NRZ eye diagram at specified probability level as defined in IEEE Std 802.3-2022 120E.4.2	
Mode	Eye	
Signal type	NRZ	
Unit	V	
Annotations	**Eye height**:	
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
	Probability value	Defines the time or amplitude key points for eye metric calculation (see figure Eye Metrics Definitions) so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.
	Cal Mode	Defines the calculation mode. Supported modes: • IEEE • Optimum Eye Height • Optimum Eye Width



$$H = A1_P - A0_P$$

where:

$A1_P$ and $A0_P$ are are amplitude values satisfying

$$MIDCDF1A1p = P, MIDCDF0A0p = P$$

Where P is specified by the **Probability Value** parameter.

$MIDCDF1/0$ are the cumulative distribution function of the data sets consisting of samples within specified **Boundary Percent (UI)** around horizontal eye center TC, whose values are above/below the mean eye amplitude.

TC is defined depending on the **Cal Mode** setting:

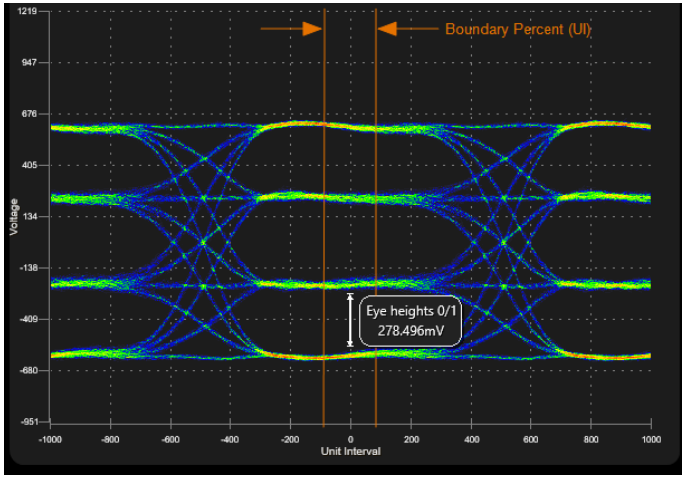
- When **Cal Mode** is set to **IEEE**, the measurement is performed at the time center of the eye ($TCmid$) in accordance with clause 120E.4.2 of the IEEE 802.3-2022 standard. See also Eye Center Voltage NRZ.
- When **Cal Mode** is set to **Optimum Eye Height**, the measurement is performed at

the time that maximizes the eye height.

- When **Cal Mode** is set to **Optimum Eye Width**, the measurement is performed at the time that is in the middle between the edges of the eye at the amplitude level that maximizes the eye width.

9.2.10 Eye Heights PAM

Summary	Vertical opening of all three eyes in a PAM-4 eye diagram at specified probability level as defined in IEEE Std 802.3-2022 120E.4.2	
Mode	Eye	
Signal type	PAM4	
Unit	V	
Annotations	**Eye heights 0/1**: Height of the lower eye **Eye heights 1/2**: Height of the middle eye **Eye heights 2/3**: Height of the upper eye	
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
	Probability value	Defines the time or amplitude key points for eye metric calculation (see figure Eye Metrics Definitions) so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.
	Cal Mode	Defines the calculation mode. Supported modes: • IEEE • Optimum Eye Height • Optimum Eye Width
	Opt Mode	Defines if the optimization is performed: • for the Middle Eye (Opt Mode = Middle Eye), or • independently for lower, middle and upper eyes (Opt Mode = Independent Eye).
SCPI commands	Refer to SCPI section Eye Heights PAM.	



Measures the vertical opening of each of the three eyes of the PAM4 signal as the distance between upper and lower mean levels of each eye.

VISEYE lists one measurement per eye: 0/1, 1/2, 2/3.

$$H_{1/2} = Amid1_P - Amid0_P$$

$$H_{2/3} = Aupp1_P - Aupp0_P$$

$$H_{0/1} = Alow1_P - Alow0_P$$

where:

$AxxxY_P$ are amplitude values satisfying $XXXCDFY(AxxxY_P) = P$, see figure Eye Metrics Definitions).

$XXXCDFY$ are the cumulative distribution function of the data sets consisting of samples within specified **Boundary Percent (UI)** around TC, whose values are above/below the corresponding logical decision threshold.

The horizontal eye center TC is found depending on the **Cal Mode** setting:

- When **Cal Mode** is set to **IEEE**, the measurement is performed at the time center of the middle eye ($TCmid$) in accordance with clause 120E.4.2 of the IEEE 802.3-2022 standard. See also Eye Center Voltage NRZ.
- When **Cal Mode** is set to **Optimum Eye Height**, the measurement is performed depending on the **Opt Mode** setting:
    - If **Opt Mode** is set to **Middle Eye**, then the heights of the upper, lower, and middle eyes are calculated at the time that maximizes the height of the middle eye.
    - If **Opt Mode** is set to **Independent Eyes**, then the heights of the upper, lower, and middle eyes are calculated at different times that maximize the height of the corresponding eye.
- When **Cal Mode** is set to **Optimum Eye Width**, the measurement is performed depending on the **Opt Mode** setting:
    - If **Opt Mode** is set to **Middle Eye**, then the heights of the upper, lower, and middle eye are calculated at the time that is in the middle between the

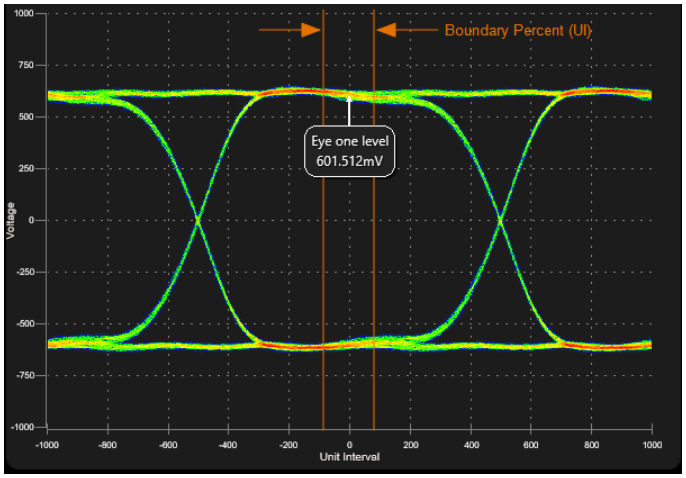
edges of the middle eye at the amplitude level that maximizes the width of the middle eye.

- If **Opt Mode** is set to **Independent Eyes**, then the heights of the upper, lower, and middle eyes are calculated at different times that are in the middle between the edges of the corresponding eye at the levels that maximize the width of the corresponding eye.

The logical decision thresholds are defined as described in Eye Amplitudes PAM.

9.2.11 Eye One Level

Summary	Mean value of the logic 1 level of the eye diagram	
Mode	Eye	
Signal type	NRZ	
Unit	V	
Annotations	**Eye one level**	
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.



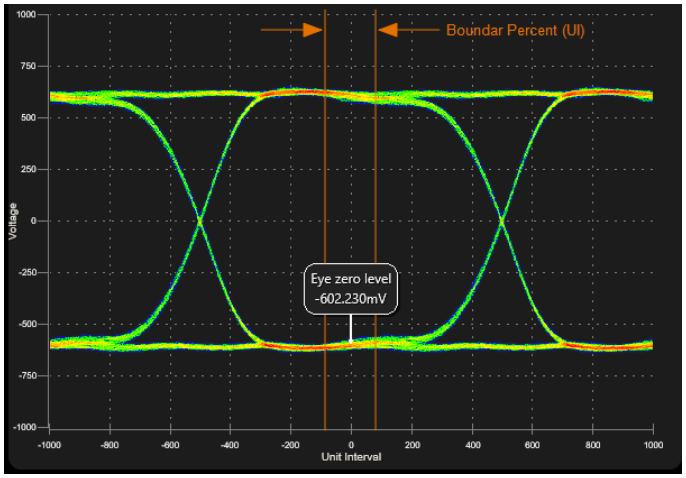
Calculated as the mean of all samples within specified Boundary Percent (UI) around the eye center TC_{mid}, whose values are above the mean eye amplitude.

The horizontal eye center TC_{mid} is found as described in Eye Center Voltage NRZ.

The mean eye amplitude is found as described in Average.

9.2.12 Eye Zero Level

Summary	Mean value of the logic 0 level of the eye diagram	
Mode	Eye	
Signal type	NRZ	
Unit	V	
Annotations	**Eye zero level**	
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.



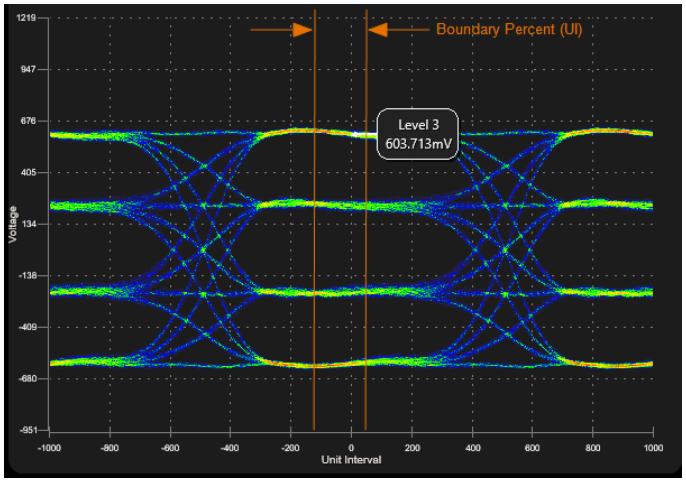
Calculated as the mean of all samples within specified Boundary Percent (UI) around the eye center TC_{mid}, whose values are below the mean eye amplitude.

The horizontal eye center TC_{mid} is found as described in Eye Center Voltage NRZ.

The mean eye amplitude is found as described in Average.

9.2.13 PAM Levels

Summary	Mean voltage of all four logic levels (0, 1, 2, 3) in a PAM-4 eye diagram	
Mode	Eye	
Signal type	PAM4	
Unit	V	
Annotations	**Level 0** **Level 1** **Level 2** **Level 3**	
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.



L_0 is the mean of all samples within specified Boundary Percent (UI) around the eye center TC_{mid}, whose values are below decision threshold $d_{0/1}$.

L_1 is the mean of all samples within specified Boundary Percent (UI) around the eye center TC_{mid}, whose values are between decision thresholds $d_{0/1}$ and $d_{1/2}$.

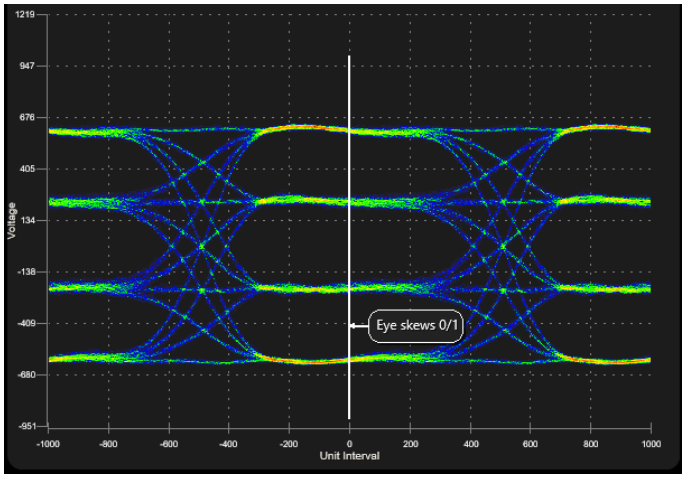
L_2 is the mean of all samples within specified Boundary Percent (UI) around the eye center TC_{mid}, whose values are between decision thresholds $d_{1/2}$ and $d_{2/3}$.

L_3 is the mean of all samples within specified Boundary Percent (UI) around the eye center TC_{mid}, whose values are above decision threshold $d_{2/3}$.

The logical decision thresholds $d_{0/1}$, $d_{1/2}$ and $d_{2/3}$ are defined as described in Eye Amplitudes PAM.

9.2.14 Eye Skews

Summary	Horizontal deviation of the center of each of three eyes in a PAM4 eye diagram relative to the average center of all three eyes	
Mode	Eye	
Signal type	PAM4	
Unit	s or UI	
Annotations	**Eye skews 0/1** **Eye skews 1/2** **Eye skews 2/3**	
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
	Boundary Percent (Amplitude)	Defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude
	Probability value	Defines the time or amplitude key points for eye metric calculation (see figure Eye Metrics Definitions) so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.



Provides a measurement of the skew of each eye in relation to the average center of the PAM4 eye diagram.

$$ES_{0/1} = TC_{0/1} - TC_{mid}$$

$$ES_{1/2} = TC_{1/2} - TC_{mid}$$

$$ES_{2/3} = TC_{2/3} - TC_{mid}$$

The horizontal eye center TC_{mid} is found as described in Eye Center Voltage NRZ using **Boundary Percent (Amplitude)** = **1**.

The horizontal centers of eyes between levels 0/1, 1/2 and 2/3 are calculated as

$$TC_{x/y} = \frac{TL_3^{x/y} + TR_3^{x/y}}{2}$$

where:

$TL_3^{x/y}$ and $TR_3^{x/y}$ are values satisfying $CDFL_{x/y}(TL_3^{x/y}) = 1e-3$;

$$CDFR_{x/y}(TR_3^{x/y}) = 1e-3$$

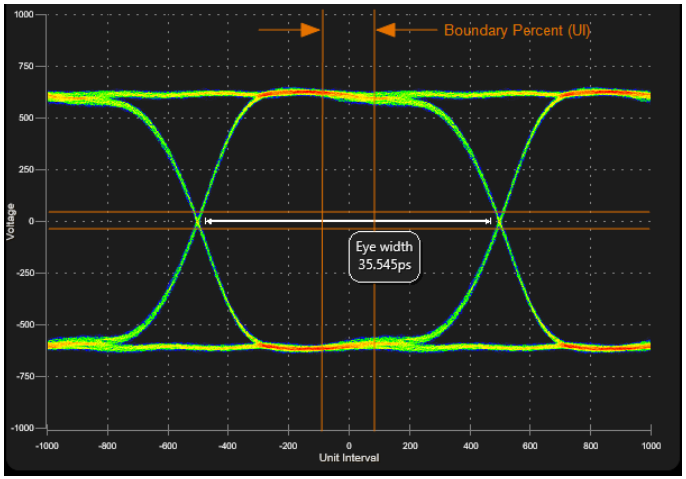
$$CDFL/R_{x/y}$$

a
r
e

the horizontal cumulative distribution functions of the data sets, consisting of samples within specified Boundary Percent (Amplitude) around the corresponding eye center amplitudes (VC_{low}, VC_{mid}, VC_{upp}), located to the left/right of the corresponding symbol centers that are defined as the middle point between eye edges who are also defined within specified Boundary Percent (Amplitude). The vertical eye centers VC_{low}, VC_{mid}, VC_{upp} are calculated as described in Eye Center Voltages PAM using specified Boundary Percent (UI).

9.2.15 Eye Width NRZ

Summary	Horizontal opening of an NRZ eye diagram at specified probability level as defined in IEEE Std 802.3-2022 120E.4.2	
Mode	Eye	
Signal type	NRZ	
Unit	s	
Annotations	**Eye width**	
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
	Boundary Percent (Amplitude)	Defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude
	Probability value	Defines the time or amplitude key points for eye metric calculation (see figure Eye Metrics Definitions) so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.
	Cal Mode	Defines the calculation mode. Supported modes: • IEEE • Optimum Eye Height • Optimum Eye Width



$$EW = TR_P - TL_P$$

where:

TL_P and TR_P are values satisfying $CDFL(TL_P) = p$; $CDFR(TR_P) = p$, and p is specified by the configurable parameter **Probability value**.

$CDFL/R$ are the horizontal cumulative distribution functions of the data sets,

consisting of samples within specified Boundary Percent (Amplitude) around the vertical eye center, located to the left/right of the horisontal symbol center that is defined as the middle point between eye edges who are also defined within specified Boundary Percent (Amplitude).

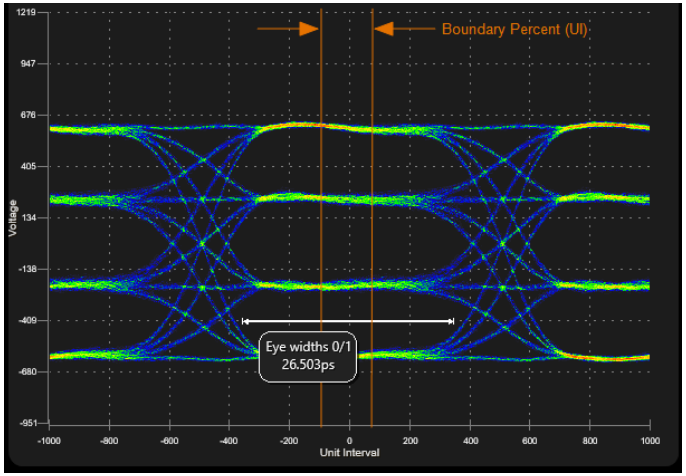
The vertical eye center is calculated depending on the **Cal Mode** setting:

- When **Cal Mode** is set to **IEEE**, the measurement is performed at the vertical eye center $VCmid$ in accordance with clause 120E.4.2 of the IEEE 802.3-2022 standard. See also Eye Center Voltage NRZ.

- When **Cal Mode** is set to **Optimum Eye Height**, the measurement is performed at the midpoint amplitude level at the time that maximizes the eye height.
- When **Cal Mode** is set to **Optimum Eye Width**, the measurement is performed at the midpoint amplitude level at the time that is in the middle between the edges of the eye at the amplitude level that maximizes the eye width.

9.2.16 Eye Widths PAM

Summary	Horizontal opening of all three eyes of a PAM-4 eye diagram at specified probability level as defined in IEEE Std 802.3-2022 120E.4.2	
Mode	Eye	
Signal type	PAM4	
Unit	s	
Annotations	**Eye widths 0/1** **Eye widths 1/2** **Eye widths 2/3**	
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
	Boundary Percent (Amplitude)	Defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude
	Probability value	Defines the time or amplitude key points for eye metric calculation (see figure Eye Metrics Definitions) so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.
	Cal Mode	Defines the calculation mode. Supported modes: • IEEE • Optimum Eye Height • Optimum Eye Width
	Opt Mode	Defines if the optimization is performed: • for the Middle Eye (Opt Mode = Middle Eye), or • independently for lower, middle and upper eyes (Opt Mode = Independent Eye).
SCPI commands	Refer to SCPI section Eye Widths PAM.	



$$EW_{0/1} = TR_P^{0/1} - TL_P^{0/1}$$

$$EW_{1/2} = TR_P^{1/2} - TL_P^{1/2}$$

$$EW_{2/3} = TR_P^{2/3} - TL_P^{2/3}$$

$TL_P^{x/y}$ and $TR_P^{x/y}$ are values satisfying $CDFL_{x/y}(TL_P^{x/y}) = p$; $CDFR_{x/y}(TR_P^{x/y}) = p$, and p is specified by the configurable parameter **Probability value**.

$CDFL/R_{x/y}$ are the horizontal cumulative distribution functions of the data sets, consisting of samples within specified Boundary Percent (Amplitude) around the corresponding eye center amplitudes (VC_{low}, VC_{mid}, VC_{upp}), located to the left/right of the corresponding symbol centers that are defined as the middle point between eye edges who are also defined within specified Boundary Percent (Amplitude).

The vertical eye centers VC_{low}, VC_{mid}, VC_{upp} are calculated depending on the **Cal Mode** setting:

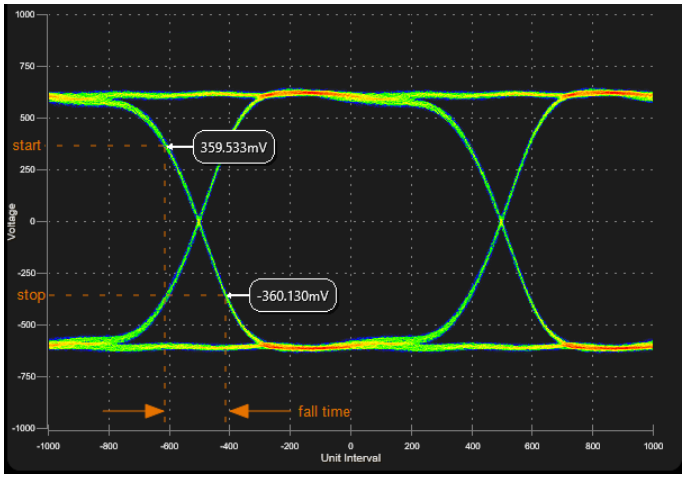
- When **Cal Mode** is set to **IEEE**, the measurement is performed at the vertical eye centers (VC_{upp}, VC_{mid}, VC_{low}) in accordance with clause 120E.4.2 of the IEEE 802.3-2022 standard. See also Eye Center Voltages PAM.
- When **Cal Mode** is set to **Optimum Eye Height**, the measurement is performed depending on the **Opt Mode** setting:
  - If **Opt Mode** is set to **Middle Eye**, then the widths of the upper, lower, and middle eyes are calculated at the midpoint amplitude levels at the time that maximizes the height of the middle eye.
  - If **Opt Mode** is set to **Independent Eyes**, then the widths of the upper, lower, and middle eyes are calculated at the midpoint amplitude levels at the different times that maximize the height of the corresponding eye.
- When **Cal Mode** is set to **Optimum Eye Width**, the measurement is performed depending on the **Opt Mode** setting:
  - If **Opt Mode** is set to **Middle Eye**, then the widths of the upper, lower, and middle eyes are calculated at the midpoint amplitude levels at the time that is in the middle between the edges of the middle eye at the amplitude

level that maximizes the width of the middle eye.

- If **Opt Mode** is set to **Independent Eyes**, then the widths of the upper, lower, and middle eyes are calculated at the amplitude levels that maximize the width of the corresponding eye.

9.2.17 Eye Fall Time

Summary	Transition time of the eye diagram's falling edge	
Mode	Eye	
Signal type	NRZ	
Unit	s	
Annotations	**Voltage at start percent on the downward slope of the eye** **Voltage at stop percent on the downward slope of the eye**	
Configurable parameters	Start percent	Defines the start amplitude threshold of the measurement in percent of the eye amplitude. The time measurement starts when decreasing signal crosses the threshold.
	Stop percent	Defines the stop amplitude threshold of the measurement in percent of the eye amplitude. The time measurement stops when decreasing signal crosses the threshold.



$$TF = TXstop - TXstart$$

where:

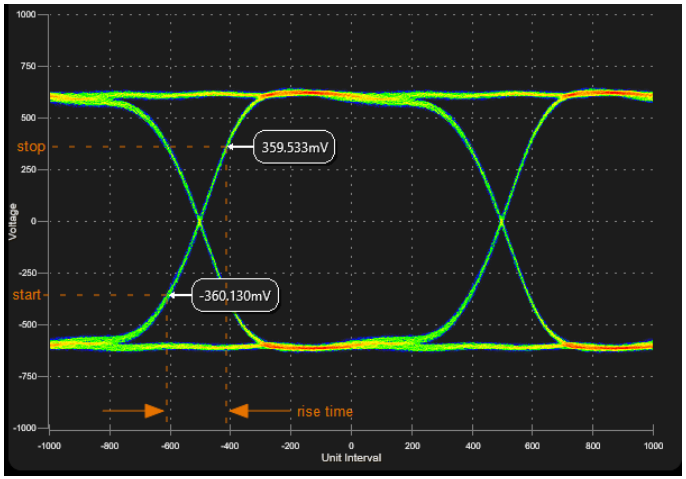
$TXstart$ is the average time at which the transitions from logical 1 to logical 0 cross the start amplitude threshold $Dstart =< Amp_0 > + StartPerc/100 * EA$;

$TXstop$ is the average time at which the transitions from logical 1 to logical 0 cross the stop amplitude threshold $Dstop =< Amp_0 > + StopPerc/100 * EA$;

the eye amplitude EA and eye zero level $< Amp_0 >$ are calculated using Boundary Percent (UI) of 2.5% as described in Eye Amplitude NRZ.

9.2.18 Eye Rise Time

Summary	Transition time of the eye diagram's rising edge	
Mode	Eye	
Signal type	NRZ	
Unit	s	
Annotations	**Voltage at start percent on the upward slope of the eye** **Voltage at stop percent on the upward slope of the eye**	
Configurable parameters	Start percent	Defines the start amplitude threshold of the measurement in percent of the eye amplitude. The time measurement starts when increasing signal crosses the threshold.
	Stop percent	Defines the stop amplitude threshold of the measurement in percent of the eye amplitude. The time measurement stops when increasing signal crosses the threshold.



$$TR = TXstop - TXstart$$

where:

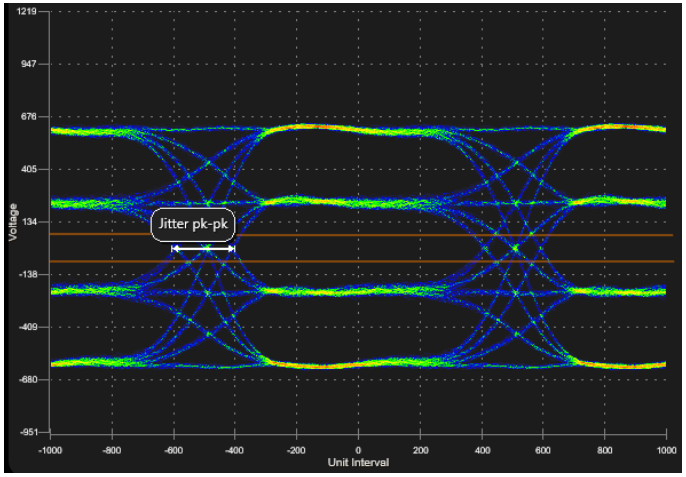
$TXstart$ is the average time at which the transitions from logical 0 to logical 1 cross the start amplitude threshold $Dstart = < Amp_0 > + StartPerc/100 * EA$;

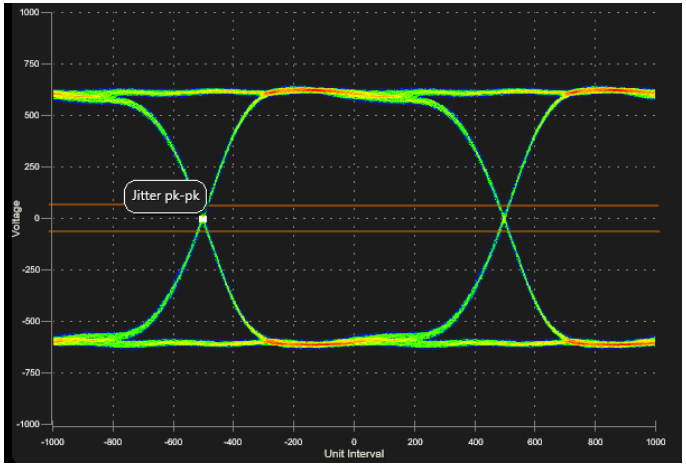
$TXstop$ is the average time at which the transitions from logical 0 to logical 1 cross the stop amplitude threshold $Dstop = < Amp_0 > + StopPerc/100 * EA$;

the eye amplitude EA and eye zero level $< Amp_0 >$ are calculated using Boundary Percent (UI) of 2.5% as described in Eye Amplitude NRZ.

9.2.19 Eye Jitter (Peak-Peak)

Summary	Peak-to-Peak of time variances of either the rising or falling edges of a waveform	
Mode	Eye	
Signal type	NRZ, PAM4	
Unit	s	
Annotations	**Jitter pk-pk**	
Configurable parameters	Vertical Window Size (%)	Defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude



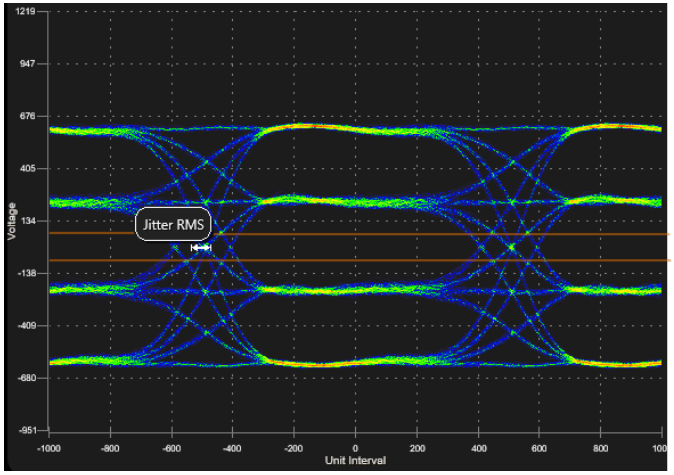


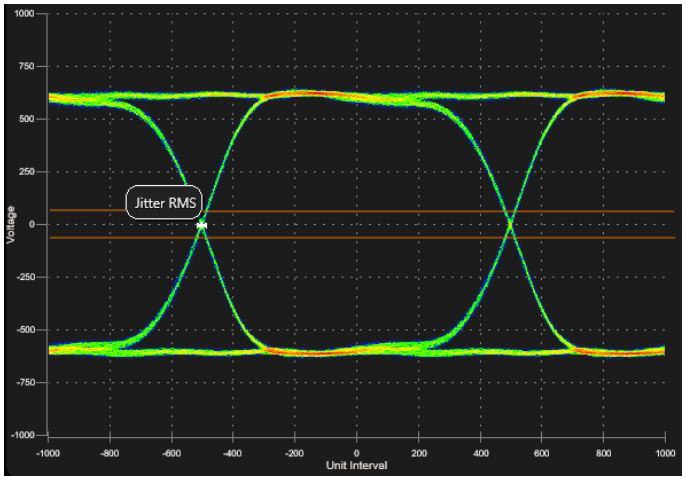
Jitter Peak-Peak is calculated as the horizontal peak to peak difference of the time positions of data samples that form the eye edges within a specified Vertical Window Size around the eye crossing amplitude.

The eye crossing amplitude is defined as described in Eye Crossing Percentage.

9.2.20 Eye Jitter (RMS)

Summary	Root-mean-square of time variances of either the rising or falling edges of a waveform	
Mode	Eye	
Signal type	NRZ, PAM4	
Unit	s	
Annotations	**Jitter RMS**	
Configurable parameters	Vertical Window Size (%)	Defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude

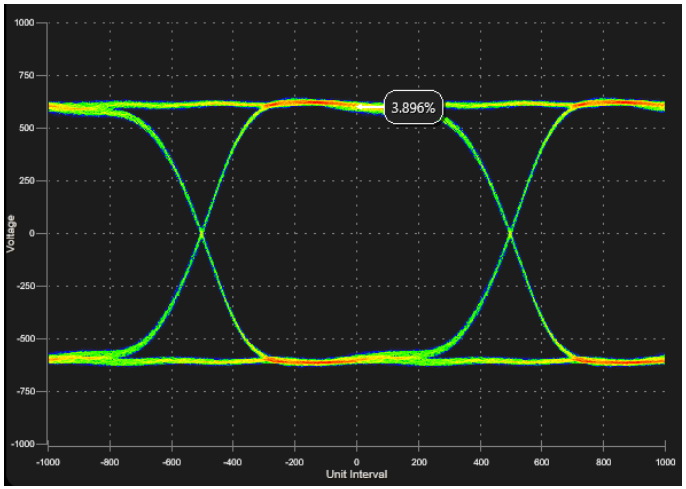




Jitter RMS is calculated as the standard deviation of the time positions of data samples that form the eye edges within a specified Vertical Window Size around the eye crossing amplitude. The eye crossing amplitude is defined as described in Eye Crossing Percentage.

9.2.21 Overshoot NRZ

Summary	Relative overshoot of the rising (falling) transition above (below) the logic 1 (0) level in percentage	
Mode	Eye	
Signal type	NRZ	
Unit	Percent	
Annotations		
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.



The Overshoot NRZ is calculated as:

$$overshoot\ perc = 100(\frac{Amp_{Max} - L1}{L1 - L0})$$

where:

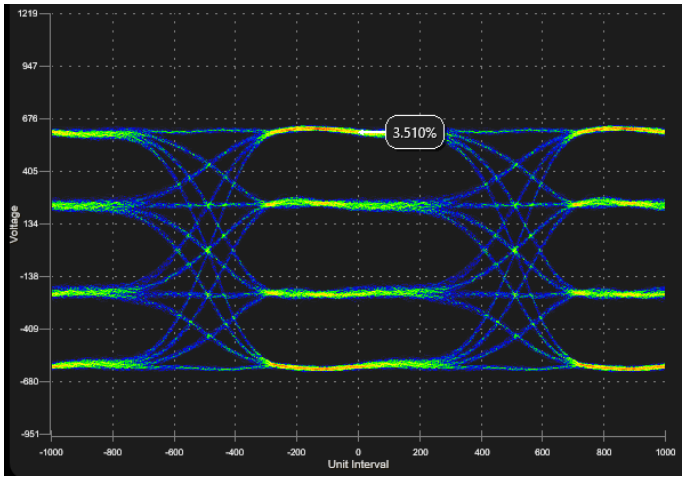
Amp_{Max} is the maximum eye amplitude;

$L1$ is the mean logical One level measured with specified Boundary Percent (UI) (see Eye One Level);

$L0$ is the mean logical Zero level measured with specified Boundary Percent (UI) (see Eye Zero Level).

9.2.22 Overshoot PAM

Summary	Relative overshoot of the rising transition above the logic 3 level in percentage of the 3 - 0 levels difference	
Mode	Eye	
Signal type	PAM4	
Unit	Percent	
Annotations		
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.



The Overshoot PAM is calculated as:

$$overshoot\ perc = 100(\frac{Amp_{Max} - L3}{L3 - L0})$$

where:

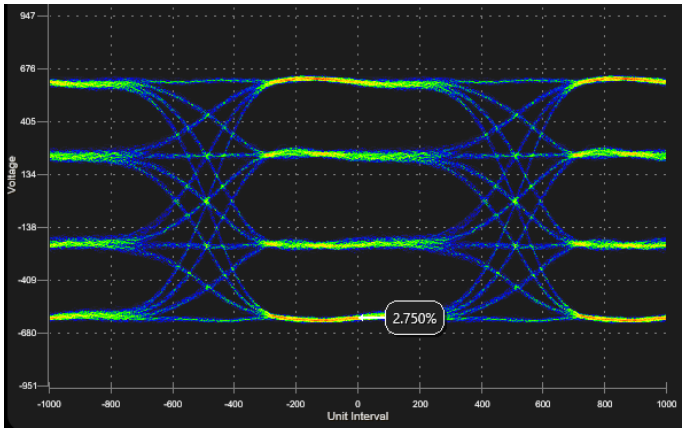
Amp_{Max} is the maximum eye amplitude;

$L3$ is the mean logical Three level measured with specified Boundary Percent (UI) (see PAM Levels);

$L0$ is the mean logical Zero level measured with specified Boundary Percent (UI) (see Eye Zero Level).

9.2.23 Undershoot

Summary	Relative undershoot of a transition above the logic 0 level in percentage	
Mode	Eye	
Signal type	NRZ, PAM4	
Unit	Percent	
Annotations		
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.



The Undershoot is calculated as:

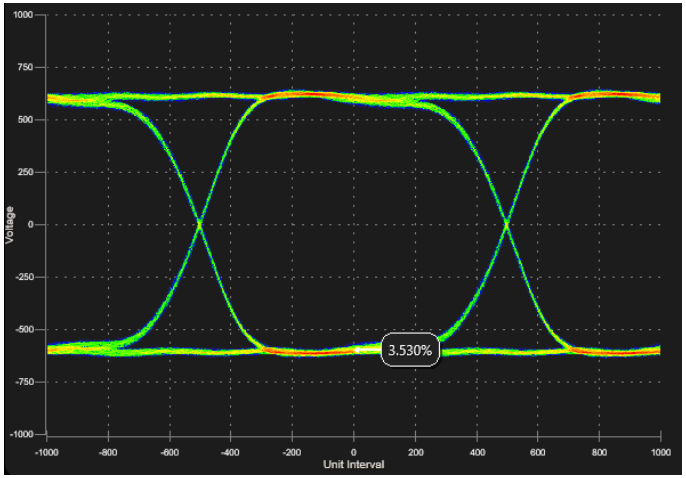
$$undershoot\ perc = 100(\frac{L0 - Amp_{Min}}{L1 - L0})$$

where:

Amp_{Max} is the maximum eye amplitude;

$L1$ is the mean logical One level measured with specified Boundary Percent (UI) (see Eye One Level);

$L0$ is the mean logical Zero level measured with specified Boundary Percent (UI) (see Eye Zero Level).



9.2.24 Ratio Level Mismatch (Annex 120D)

Summary	Level separation mismatch ratio as defined in IEEE 802.3bs 120D.3.1.2	
Mode	Eye	
Signal type	PAM4	
Unit		
Annotations		
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.

RLM is calculated according to IEEE802.3bs.

$$RLM = min(3 \cdot ES1, 3 \cdot ES2, 2 - 3 \cdot ES1, 2 - 3 \cdot ES2)$$

$$ES1 = \frac{V1 - Vmid}{V0 - Vmid}$$

$$ES2 = \frac{V2 - Vmid}{V3 - Vmid}$$

$$Vmid = \frac{V0 + V3}{2}$$

where:

$$V0 = Alow0_P$$

$$V1 = Amid0_P$$

$$V2 = Aupp0_P$$

$$V3 = Aupp1_P$$

$AxxxYP$ are calculated as described in Eye Center Voltages PAM with specified Boundary Percent (UI) and Probability Value = 1e-3 and Boundary Percent (Amplitude) = 1.

9.2.25 Ratio Level Mismatch (Clause 94)

Summary	Transmitter linearity as defined in IEEE 802.3-2022 94.3.12.5.1	
Mode	Eye	
Signal type	PAM4	
Unit		
Annotations		
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.

RLM is calculated according to IEEE802.3-2022.

$$RLM = 3 \cdot min(V3 - V2, V2 - V1, V2 - V0)$$

$$RLM = \frac{3 \cdot min(V3 - V2, V2 - V1, V1 - V0)}{V3 - V0}$$

where:

$$V0 = Alow0_P$$

$$V1 = Amid0_P$$

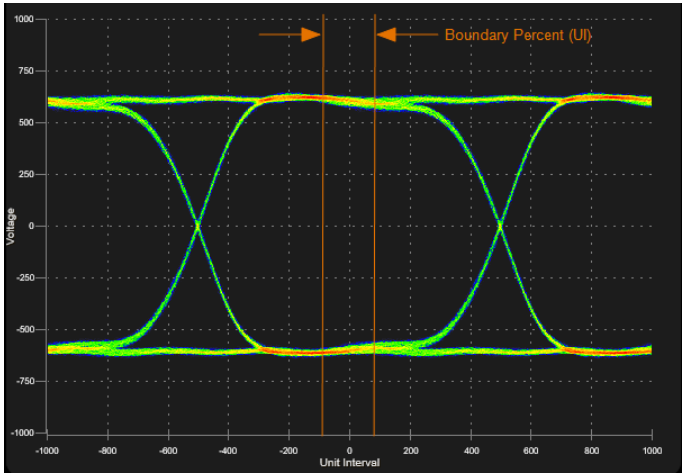
$$V2 = Aupp0_P$$

$$V3 = Aupp1_P$$

$AxxxYP$ are calculated as described in Eye Center Voltages PAM with specified Boundary Percent (UI) and Probability Value = 1e-3 and Boundary Percent (Amplitude) = 1.

9.2.26 Signal to Noise Ratio

Summary	Ratio of the Eye Amplitude to the sum of the noise at the Logic 0 and Logic 1 level	
Mode	Eye	
Signal type	NRZ	
Unit		
Annotations		
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
SCPI commands	Refer to SCPI section Signal to Noise Ratio.	



$$SNR = \frac{\mu_1 - \mu_0}{\sigma_1 + \sigma_0}$$

where:

μ_1 and σ_1 are calculated as mean and standard deviation of all samples within specified Boundary Percent (UI) around the eye center TC_{mid}, whose values are above the mean eye amplitude.

μ_0 and σ_0 are calculated as mean and standard deviation of all samples within specified Boundary Percent (UI) around the eye center TC_{mid}, whose values are below the mean eye amplitude.

The horizontal eye center TC_{mid} is found as described in Eye Center Voltage NRZ.

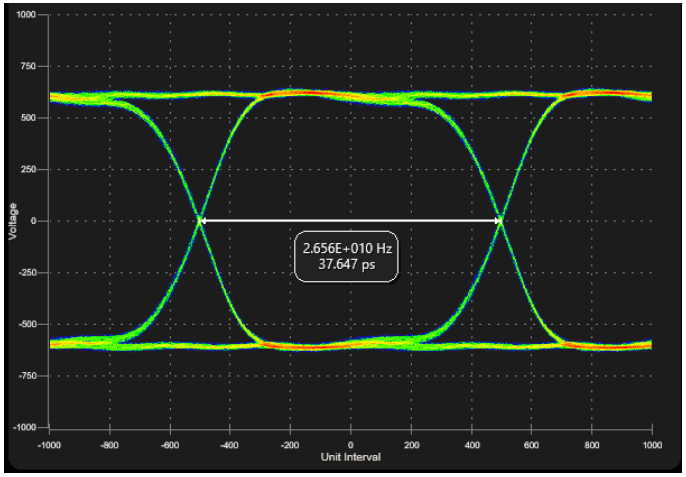
The mean eye amplitude is found as described in Average.

NOTE

μ_1 corresponds to eye one level Eye One Level, and μ_0 corresponds to eye zero level Eye Zero Level.

9.2.27 Symbol Period

Summary	Time duration of one symbol
Mode	Eye
Signal type	NRZ
Unit	Hz, s
Annotations	**Symbol Rate (Baud Rate) value (Hz)** **Symbol Period Value (s)**
Configurable parameters	N/A



Measures the horizontal distance between eye crossings in s (symbol period), and converts it to the symbol rate value (1 / symbol period).

$$T = tx_R - tx_L$$

$$S = \frac{1}{T}$$

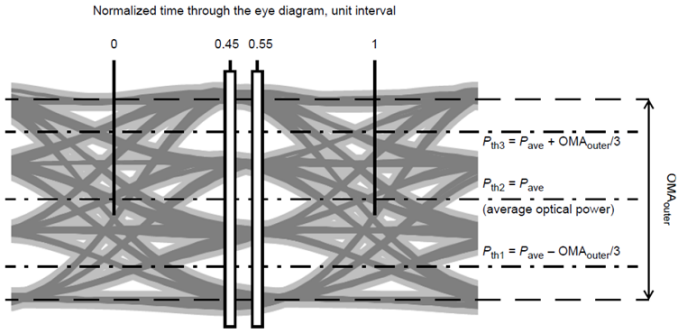
Eye crossings tx_R and tx_L are found as the averages of times of samples within 5% around the vertical eye center that form the left / right eye edges.

9.2.28 Transmitter and Dispersion Eye Closure Quaternary (TDECQ)

Summary	Transmission and Dispersion Eye Closure Quaternary for PAM4 is a measure of vertical eye closure relative to an ideal optical transmitter as defined in clause 121.8.5 of the IEEE 802.3-2022 standard	
Mode	Eye	
Signal type	PAM4	
Unit	dB	
Annotations		
Configurable parameters	Number of Taps	Defines the number of taps in the symbol-spaced reference equalizer applied to the waveform prior to TDECQ calculation.
	Number of Precursors Max	The maximum possible number of precursor taps in the reference equalizer, applicable when both tap values and number of precursor taps are optimized automatically.
	Number of Precursors	Specifies the number of precursor taps in the reference equalizer, applicable when tap values are optimized automatically
	Tap Values	Specifies the values of the reference equalizer tap weights or displays automatically optimized values.
	TargetSER	The symbol error rate value for which the TDECQ is estimated.
	HistSpacing	The distance between the left and right histograms used for symbol error rate estimation, specified as a fraction of the unit interval. Effective when histograms positions are optimized automatically.
	HistAdjustLimit	The range in which the positions of the left and right histograms are optimized, specified as a fraction of the unit interval. Effective when histograms positions are optimized automatically.
	LeftHistPosition	Specifies the position of the left histogram as a fraction of the unit interval. Effective when histograms positions optimization is turned off.
	RightHistPosition	Specifies the position of the right histogram as a fraction of the unit interval. Effective when histograms positions optimization is turned off.
	HistWidth	Widths of the histogram window specified as a fraction of the unit interval.
	Number of Bins	The number of bins in the left and right histograms used for symbol error rate estimation.
	ThresholdsAdjLimit	The range in which decision thresholds for symbol error rate estimation are optimized, specified as a fraction of the outer optical modulation amplitude (OMA outer). Effective when thresholds optimization is enabled.

	RefType	Specifies the type and the source of reference data required for symbol error rate estimation.
		BlindDecision: The reference data is determined using the blind decision on signal under measurement
		Symbols: The reference data is specified as a sequence of logical symbols. **Source**: Specifies the source of the logical symbols sequence: **Binary File** or **Text File**.
		Pattern: Specifies the reference symbol pattern. Supported patterns: **SSPRQ**, **PRBS9Q**, **PRBS13Q**, **PRBS15Q**.
		PRBS: Specifies the pseudo-random bit sequence used for waveform encoding. **Encoding**: **Gray**, **Binary** or **Auto**. When set to **Auto**, the encoding will be determined automatically. **PRBS order**: Specifies the order of the pseudo-random bit sequence. Supported values: **Auto**, **6**, **7**, **8**, **9**, **10**, **11**, **12**, **13**, **14**, **15**, **16**, **20**, **23**, **31**. When set to **Auto**, the order will be determined automatically.
		Even/odd: Specifies whether an even or odd bit sequence was used for waveform encoding. Possible values: **OddEven**, **Auto**. When set to **Auto**, the evenness will be determined automatically.

Figure Illustration of the TDECQ measurement (source: IEEE standard 802.3-2022):



TDECQ is a penalty metric that indicates how much extra noise needs to be added to the signal generated by the transmitter at the reference receiver to achieve the target symbol error rate (SER), compared to the noise that would be added to the signal from an ideal transmitter to achieve the target SER.

The TDECQ measurement is implemented following the clause 121.8.5 Transmitter and dispersion eye closure for PAM4 (TDECQ) of the IEEE 802.3-2022 standard.

The reference receiver for TDECQ measurement should satisfy the following requirements:

The combined optical-to-electrical transfer function should be a fourth-order Bessel-Thomson with a 3 dB bandwidth of half the baud rate. The receiver should include a 5-tap, symbol-spaced feedforward equalizer with optimized tap values.

The reference equalizer tap values optimization is a part of the TDECQ measurement process.

The TDECQ in dB unit is calculated as:

$$TDECQ = 10 \times \log_{10} \frac{\sigma_i}{\sigma}$$

where:

σ_i is the standard deviation of Gaussian noise that needs to be added at the reference receive to the signal generated by ideal transmitter to achieve the target SER.

For Gray-coded PAM4 σ_i is found analytically [1]:

$$\sigma_i = \frac{OMA_{outer}}{6Q_t}$$

where OMA_{outer} is the Outer Optical Modulation Amplitude as defined in clause 121.8.4 Outer Optical Modulation Amplitude (OMAouter) of the IEEE 802.3-2022 standard.

$$Q_t = Q^{-1}(\frac{2}{3}SER_{target})$$

for Gray coded PAM4 and SERtarget of 4.8e-4 the Q_t is approximately 3.414.

σ is the standard deviation of Gaussian noise at the reference receiver that must be present in the signal generated by the transmitter under test to achieve the target SER.

$$\sigma = \sqrt{\sigma_s^2 + \sigma_G^2}$$

where σ_s is the standard deviation of noise that is present in the signal, whose value is obtained during the calibration, and σ_G is the standard deviation of additional Gaussian noise that is required to achieve the target SER.

The purpose of TDECQ measurement process is finding the σ_G value that provides the target SER. The search is done iteratively by analytically adding noise to the cumulative probability functions built from two data samples histograms and performing optimization of the histograms positions, decision thresholds and reference equalizer tap values on every step with respect to SER. The detailed description of the algorithm can be found in clause 121.8.5.3 TDECQ measurement method of the IEEE 802.3-2022 standard.

During a TDECQ measurement, the software also reports the reference equalizer's noise-enhancement factor (CEQ). This dimensionless value is calculated in accordance with clause 121.8.5.3 "TDECQ measurement method" of the IEEE 802.3 standard and is displayed alongside the TDECQ result.

References:

1. 1. J. King, D. Leyba and G. D. LeCheminant, "TDECQ (transmitter dispersion eye closure quaternary) replaces historic eye-mask and TDP test for 400 Gb/s PAM4 optical transmitters," 2017 Optical Fiber Communications Conference and Exhibition (OFC), Los Angeles, CA, USA, 2017, pp. 1-3.

9.2.29 Vertical Eye Closure (VEC) (Eye)

Summary	Vertical Eye Closure quantifies the closure of the eye diagram compared to an ideal signal	
Mode	Eye	
Signal type	PAM4	
Unit	dB	
Annotations		
Configurable parameters	Boundary Percent (UI)	Defines the section of the eye diagram that is used for the measurement as a percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
	Probability value	Defines the time or amplitude key points for eye metric calculation (see figureEye Metrics Definition below) so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.

Vertical Eye Closure (VEC) is a measurement that compares the ideal eye opening to the actual eye height. VEC is calculated for all three eyes of the PAM4 signal.

$$VEC_{0/1} = k \cdot log_{10}(\frac{Amp_{0/1}}{H_{0/1}})$$

$$VEC_{1/2} = k \cdot log_{10}(\frac{Amp_{1/2}}{H_{1/2}})$$

$$VEC_{2/3} = k \cdot log_{10}(\frac{Amp_{2/3}}{H_{2/3}})$$

where:

$Amp_{0/1}, Amp_{1/2}, Amp_{2/3}$ are the amplitudes of the lower, middle and upper eye respectively calculated as described in Eye Amplitudes PAM.

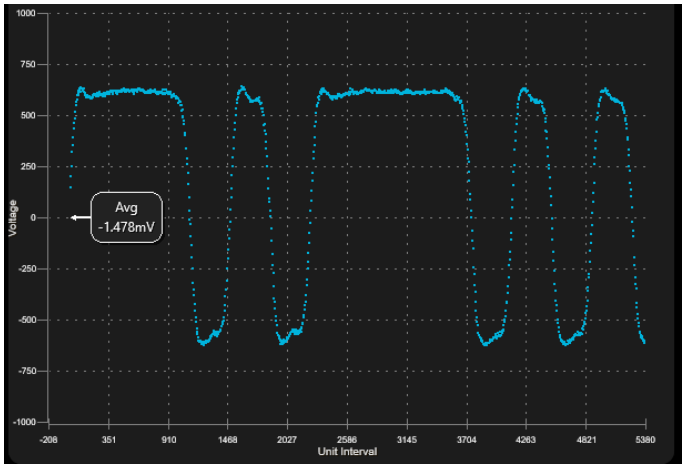
$H_{0/1}, H_{1/2}, H_{2/3}$ are heights of the lower, middle and upper eye respectively calculated as described in Eye Heights PAM.

k is the scaling coefficient, assigned a value of 20 for electrical signals and 10 for optical signals.

9.3 Waveform measurements

9.3.1 Average

Summary	Mean value of the waveform's voltage
Mode	Waveform
Signal type	NRZ, PAM4
Unit	V (electrical QCA 1000 Series) dBm (optical QCA 1100 Series)
Annotations	**Avg**: Mean value of the waveform's amplitude
Configurable parameters	N/A



$$Amp_{mean} = \frac{1}{n}\sum_{k=1}^{n} Amp_n$$

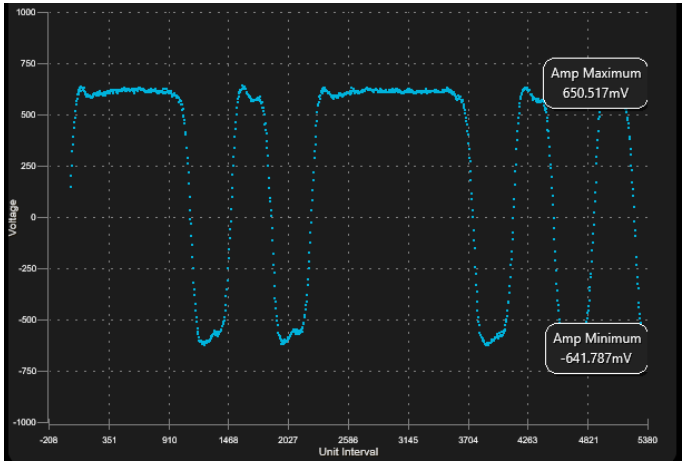
where:

n: number of waveform samples, determined by the record length

Amp_n: n^{th} sample amplitude

9.3.2 Amplitude Peak-Peak

Summary	Difference between the absolute maximum and the absolute minimum of a waveform's voltage.
Mode	Waveform
Signal type	NRZ, PAM4
Unit	V
Annotations	**Amp Maximum**: absolute maximum amplitude value of the waveform **Amp Minimum**: absolute minimum amplitude value of the waveform
Configurable parameters	N/A



$$Amp_{pkpk} = Amp_{max} - Amp_{min}$$

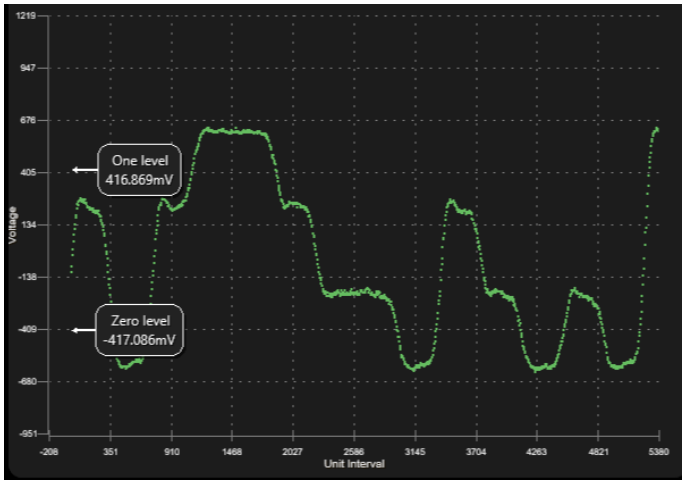
where:

Amp_{max}: Maximum amplitude value of the waveform

Amp_{min}: Minimum amplitude value of the waveform

9.3.3 One/Zero Levels

Summary	Mean value of the logic 0 and 1 levels of the eye diagram as defined in IEEE Std 802.3-2022 120D.3.1.2.1	
Mode	Waveform	
Signal type	NRZ	
Unit	V	
Annotations	**One level** **Zero level**	
Configurable parameters	Boundary Percent (UI)	Defines the sections of the waveform that are used for the measurement as a percentage of UI around the symbol center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.



One/Zero level is the mean value of all samples within the specified Boundary Percent (UI) around the symbol center times whose amplitude is greater/less than waveform average.

The symbol center times are determined using the clock recovery algorithm.

9.3.4 Optical Modulation Amplitude (OMA)

Summary	OMA is the difference in optical power for the nominal “1” and “0” levels of the optical signal	
Mode	Waveform	
Signal type	NRZ	
Unit	dBm	
Annotations		
Configurable parameters	Boundary Percent (UI)	Defines the sections of the waveform that are used for the measurement as a percentage of UI around the symbol center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.

$$OMA = 10 \cdot log_{10}(P_1 - P_0) + 30$$

Where P_1 is measured as the average of the samples within a specified boundary percentage around the symbol center corresponding to a logical one symbols, preceded by five or more logical ones.

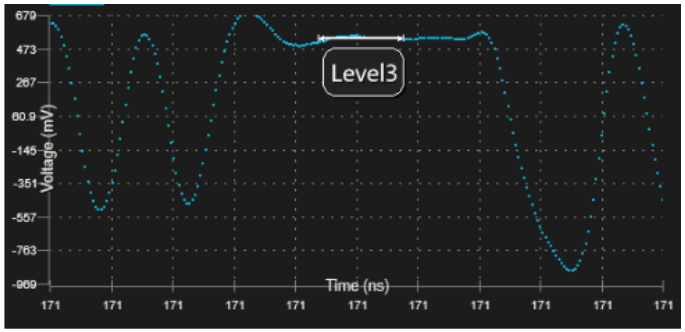
Where P_0 is measured as the average of the samples within a specified boundary percentage around the symbol center corresponding to a logical zero symbols, preceded by five or more logical zeros.

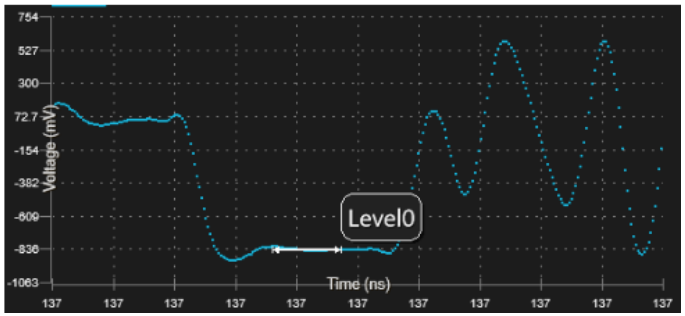
The determination of the logical symbol is performed using the signal's average power as a decision threshold.

The symbol center is determined by a timing error estimation algorithm.

9.3.5 PAM Outer Extinction Ratio

Summary	The ratio of average optical power levels of the logic 3 and logic 0 symbols, measured within a specified portion (Boundary Percent) around the middle of a sequence of consecutive identical symbols	
Mode	Waveform	
Signal type	PAM4	
Unit	dB	
Annotations		
Configurable parameters	Boundary Percent (UI)	Defines the sections of the waveform that are used for the measurement as a percentage of UI around the symbol center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
	Consecutive 0 Symbols	Length of a sequence of the 0 symbols used for P0 measurement
	Consecutive 3 Symbols	Length of a sequence of the 3 symbols used for P3 measurement





Outer extinction ratio is defined as:

$$ER_{outer} = 10 \cdot log_{10}(\frac{P3}{P0})$$

where:

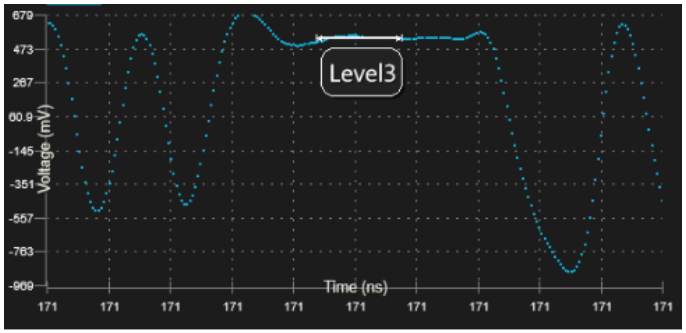
$P3$ is the average optical power level of the logic 3 symbol, calculated over the specified Boundary Percent centered around the middle of a sequence of consecutive logic 3 symbols.

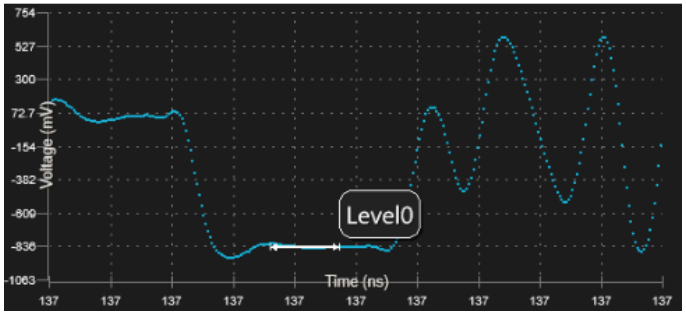
$P0$ is the average optical power level of the logic 0 symbol, calculated over the specified Boundary Percent centered around the middle of a sequence of consecutive logic 0 symbols.

The logic 0 and 3 symbols are determined using decision thresholds, as described in Eye Amplitudes PAM.

9.3.6 Outer OMA

Summary	The difference between the average optical power levels of the logic 3 and logic 0 symbols, measured within a specified portion (Boundary Percent) around the middle of a sequence of consecutive identical symbols	
Mode	Waveform	
Signal type	PAM4	
Unit	dBm	
Annotations	**Level0** **Level3**	
Configurable parameters	Boundary Percent (UI)	Defines the sections of the waveform that are used for the measurement as a percentage of UI around the symbol center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
	Consecutive 0 Symbols	Length of a sequence of the 0 symbols used for P0 measurement
	Consecutive 3 Symbols	Length of a sequence of the 3 symbols used for P3 measurement





Outer optical modulation amplitude is defined as:

$$OMA_{outer} = 10 \cdot log_{10}(P3 - P0) + 30,$$

where:

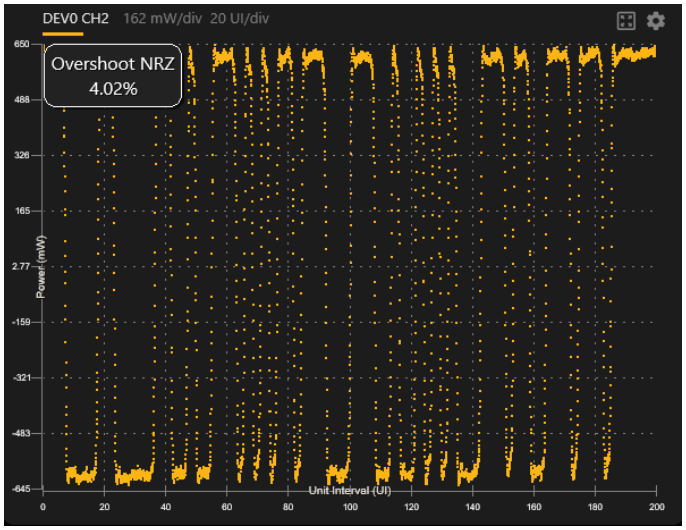
$P3$ is the average optical power level of the logic 3 symbol, calculated over the specified Boundary Percent centered around the middle of a sequence of consecutive logic 3 symbols.

$P0$ is the average optical power level of the logic 0 symbol, calculated over the specified Boundary Percent centered around the middle of a sequence of consecutive logic 0 symbols.

The logic 0 and 3 symbols are determined using decision thresholds, as described in section Eye Amplitudes PAM.

9.3.7 Wfm Overshoot NRZ

Summary	Relative overshoot of the rising transition above the logic 1 level in percentage	
Mode	Waveform	
Signal type	NRZ	
Unit	%	
Annotations	**Overshoot NRZ**	
Configurable parameters	Boundary Percent (UI)	Defines the sections of the waveform that are used for the measurement as a percentage of UI around the symbol center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.



The Overshoot NRZ is calculated as:

$$overshootperc = 100 \cdot (\frac{Amp_{Max} - L1}{L1 - L0})$$

where:

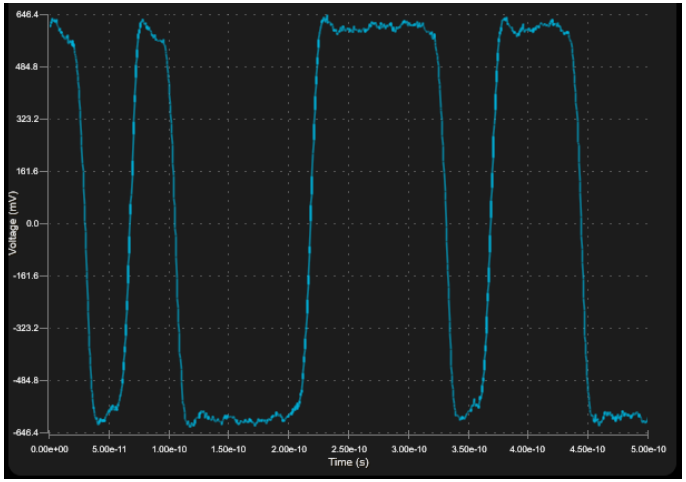
Amp_{Max} is the maximum waveform amplitude;

$L1$ is the mean logical One level measured with specified **Boundary Percent (UI)** (see One/Zero Levels);

$L0$L0 is the mean logical Zero level measured with specified **Boundary Percent (UI)** (see One/Zero Levels).

9.3.8 RMS

Summary	DC Root-mean-square value of the waveform's voltage
Mode	Waveform
Signal type	NRZ, PAM4
Unit	V
Annotations	
Configurable parameters	N/A



$$Amp_{rms} = \sqrt{\frac{1}{n}\left(Amp_1^2 + Amp_2^2 + \cdots + Amp_n^2\right)}$$

where:

n: number of waveform points, determined by the record length

$Amp_{<n>}$: Amplitude at waveform point <n>

9.3.9 Signal to Noise Distortion Ratio

Summary	Signal to Noise and Distortion Ratio as defined in IEEE 802.3bs	
Mode	Waveform	
Signal type	PAM4	
Unit	dB	
Annotations		
Configurable parameters	Boundary Percent (UI)	Defines the sections of the waveform that are used for the measurement as a percentage of UI around the symbol center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
SCPI commands	Refer to SCPI section Signal to Noise Distortion Ratio.	

The Signal to Noise and Distortion Ratio (SNDR) is defined as:

$$SNDR = 10 \cdot log_{10}\left(\frac{p_{max}^2}{\sigma_e^2 + \sigma_n^2}\right)$$

where:

p_{max} is the maximum value of the linear fit pulse response;

σ_e is the standard deviation of the linear fit error waveform e;

σ_n is the mean of the root mean square deviations from the mean voltages, calculated within a specified boundary percent (UI) around the points located at the centers of the sequences of at least six consecutive identical symbols.

The linear fit pulse response and linear fit error waveform are calculated in accordance with the clause 85.8.3.3.5 of the IEEE802.3-2022 standard with the following settings:

Linear fit pulse length $N_p = 200$;

Linear fit pulse delay $D_p = 2$;

Equalizer length $N_b = 10$.

9.3.10 SNR Inter-Symbol Interference

Summary	Signal-to-Noise Ratio due to Inter-Symbol Interference as defined in IEEE 802.3bs
Mode	Waveform
Signal type	NRZ, PAM4
Unit	dB
Annotations	

The SNR_{ISI} is defined in accordance with clause 120D.3.1.7 Transmitter output residual ISI of the IEEE 802.3-2022.

$$SNR_{ISI} = 20 \cdot \log_{10}\left(\frac{p_{max}}{\sqrt{\sum(ISI_{cursors}^2)}}\right)$$

where:

p_{max} is is the maximum value of the linear fit pulse response p;

$ISI_{cursors}$ are computed from the linear fit pulse response as:

$$ISI_{cursors} = [p(t_p + M \times (N_b + k))],$$

$$k - 1, 2, \ldots, N_p - D_p - 1 - N_b$$

where:

t_p is the index of the linear fit pulse maximum: $p(t_p) = p_{max}$ equals p_{max};

M is the oversampling ratio of the waveform and linear fit pulse;

N_p is the linear fit pulse length;

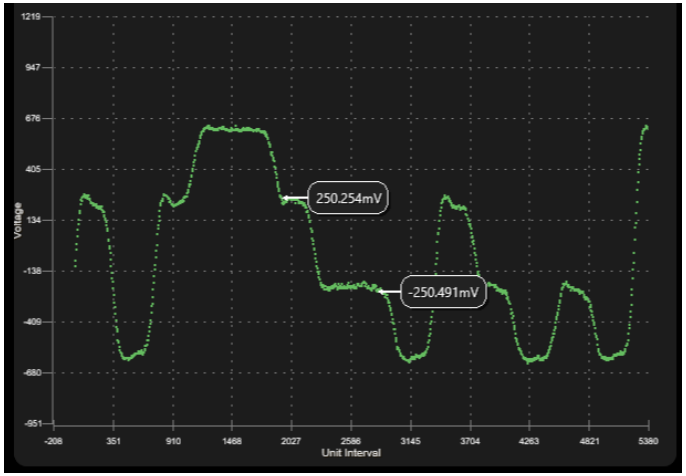
N_b is the decision feedback equalizer (DFE) length.

The linear fit pulse response and linear fit error waveform are calculated in accordance with the clause 85.8.3.3.5 of the IEEE802.3-2022 standard with the following settings:

Linear fit pulse length $N_p = 200$; Linear fit pulse delay $D_p = 2$; Equalizer length $N_b = 10$.

9.3.11 Wfm Fall Time

Summary	The fall time of a single edge in the waveform specified by a minimum number of consecutive preceding logic high symbols and succeding logic low symbols as defined in IEEE Std 802.3-2022 120E.3.1.5	
Mode	Waveform	
Signal type	NRZ, PAM4	
Unit	s	
Annotations	Start and Stop percentage levels in V	
Configurable parameters	Start Percent	Defines the start amplitude threshold of the measurement in percent of the signal amplitude. The time measurement starts when decreasing signal crosses the threshold.
	Stop Percent	Defines the stop amplitude threshold of the measurement in percent of the signal amplitude. The time measurement stops when decreasing signal crosses the threshold.
	Consecutive Zero Symbols	Specifies the minimum number of consecutive logic 0 symbols succeeding the transition.
	Consecutive Three Symbols	Specifies the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols preceding the transition.



$$TF = < TXstop - TXstart >$$

where:

<> stands for averaging

$TXstart$ is the time at which the transition from specified number of consecutive three (PAM4) or 1 (NRZ) symbols to the specified number of consecutive zero symbols crosses the start amplitude threshold $Dstart$.

$TXstop$ is the time at which the transitions from specified number of consecutive three (PAM4) or 1 (NRZ) symbols to the specified number of consecutive zero symbols cross the stop amplitude threshold $Dstop$.

The transition thresholds are defined as

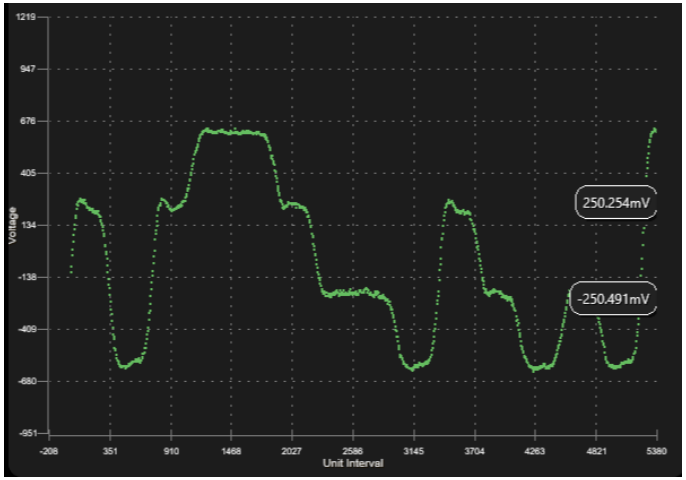
$$Dstart = Amp0 + StartPerc/100 * (Amp3 - Amp0)$$

$$Dstop = Amp0 + StopPerc/100 * (Amp3 - Amp0)$$

where $Amp0$ is the average amplitude of the logic 0 symbols, and $Amp3$ is the average amplitude of the logic 3 (PAM4) or 1 (NRZ) symbols, measured at the symbol center time.

9.3.12 Wfm Rise Time

Summary	The rise time of a single edge in the waveform specified by a minimum number of consecutive preceding logic low symbols and succeeding logic high symbols as defined in IEEE Std 802.3-2022 120E.3.1.5	
Mode	Waveform	
Signal type	NRZ	
Unit	s	
Annotations	Start and stop percentage levels in V	
Configurable parameters	Start Percent	Defines the start amplitude threshold of the measurement in percent of the signal amplitude. The time measurement starts when increasing signal crosses the threshold.
	Stop Percent	Defines the stop amplitude threshold of the measurement in percent of the signal amplitude. The time measurement stops when increasing signal crosses the threshold
	Consecutive Zero Symbols	Specifies the minimum number of consecutive logic 0 (NRZ) symbols preceding the transition.
	Consecutive Three Symbols	Specifies the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols succeeding the transition.



$$TF = < TXstop - TXstart >$$

where:

<> stands for averaging

$TXstart$ is the time at which the transition from specified number of consecutive zero symbols to the specified number of consecutive three (PAM4) or 1 (NRZ) symbols crosses the start amplitude threshold $Dstart$.

$TXstop$ is the time at which the transitions from specified number of consecutive zero symbols to the specified number of consecutive three (PAM4) or 1 (NRZ) symbols crosses the stop amplitude threshold $Dstop$.

The transition thresholds are defined as

$$Dstart = Amp0 + StartPerc/100 * (Amp3 - Amp0)$$

$$Dstop = Amp0 + StopPerc/100 * (Amp3 - Amp0)$$

where $Amp0$ is the average amplitude of the logic 0 symbols, and $Amp3$ is the average amplitude of the logic 3 (PAM4) or 1 (NRZ) symbols, measured at the symbol center time.

9.3.13 Vertical Eye Closure Penalty (VECP)

Summary	Vertical Eye Closure Penalty	
Mode	Waveform	
Signal type	NRZ	
Unit	dB	
Annotations		
Configurable parameters	Boundary Percent (UI)	Defines the sections of the waveform that are used for the measurement as a percentage of UI around the symbol center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.

The Vertical Eye Closure Penalty is calculated as:

$$\boldsymbol{VECP = 10 \cdot log_{10}(\frac{OMA}{H})}$$

where:

$\boldsymbol{OMA}$ is the optical modulation amplitude calculated with the specified Boundary Percent (UI) as described in Optical Modulation Amplitude (OMA);

$\boldsymbol{H}$ is the Eye Height calculated with the specified Boundary Percent (UI) and Probabililty Value of 0.005 as described in Eye Height NRZ.

10 Programming guide

10.1 SCPI overview

Remote communication with the SCPI service is achieved through the Standard Commands for Programmable Instruments (SCPI).

Support for VISA I/O API over TCP/IP is provided by the VXI-11 compliant VISEYESCPI service. With VISA communication drivers installed on the client, the implementation of VISA programming within environments such as MATLAB becomes available.

This section details the programming and measurement conventions to follow while executing the commands for the VISEYESCPI service.

> **NOTE**
>
> In NI-MAX a RIO interface will show up, however there are no communication methods available or implemented on this interface. Quantifi Photonics products are **ONLY** accessible through the **VISA TCPIP INSTR** interface provided by the VISEYESCPI service installed on the system.

For details on supported SCPI commands, refer to:

- SCPI commands summary - Working with VISEYE
- SCPI commands summary - Eye Measurements
- SCPI commands summary - Waveform Measurements

We provide a number of programming examples with VISEYE. You can find them on your client computer that runs VISEYE in the folder **C:\Program Files\Quantifi Photonics\VISEYE\Examples**.

10.2 Programming conventions

This section details the programming and measurement conventions to follow while executing the commands for the VISEYESCPI service.

Argument	Data Format
`<wsp>`	Specifies whitespace character (01_{16} – 09_{16}, $0B_{16}$ – 20_{16}).
`<value>`	Is numerical data, an integer, a decimal, exponential (10e-9 or 5.8e6) or string.
`[VALUE1 | VALUE2]`	A parameter choice. The '|' separates the unique parameters available, only one of the choices can be used. In the example, either the input parameter `[VALUE1]` or `[VALUE2]` can be used, but not both. Some commands may have more than two choices available. This parameter can be omitted where the command has a default defined in the command description.

10.3 Message queues

Information is exchanged in the form of messages. These messages are held in input and output queues.

The output queue stores responses to query commands. The VISEYESCPI service transmits any data in the output queue when a read request is received. Unless specified, all output response data is transmitted in ASCII format.

10.4 Status and event registers

10.4.1 Standard Event Status Register

The Standard Event Status Register (SESR) is modified by the Quantifi Photonics product with the results of the command operations.

Bit	Description
7 (MSB), 6	Not used
5	Is set when a Command Error event has been detected
4	Is set when a command Execution Error has been detected
3	Is set when a Device Dependent Error event has been detected
2	Is set when there a Query Error event has been detected
1	Not used
0 (LSB)	Is set when an Operation Complete event has been generated

10.4.2 Standard Event Status Enable Register (Mask)

The Standard Event Status Enable Register (SESR Mask) is used to build the Event Status Bit (ESB) within the Status Byte Register (STB). To ignore any of the events detected and set in the SESR, set the corresponding bit within the SESR Mask to 0. The STB can then be queried and the value of the ESB can be used to determine service request requirements based on the SESR Mask applied.

NOTE

The 0 (LSB) value within the SESR Mask is 0.

10.4.3 Status Byte Register

The Status Byte Register (STB) is built from all other status registers and masks. This register can be used in queries to determine if an event has been detected and where that event has been detected.

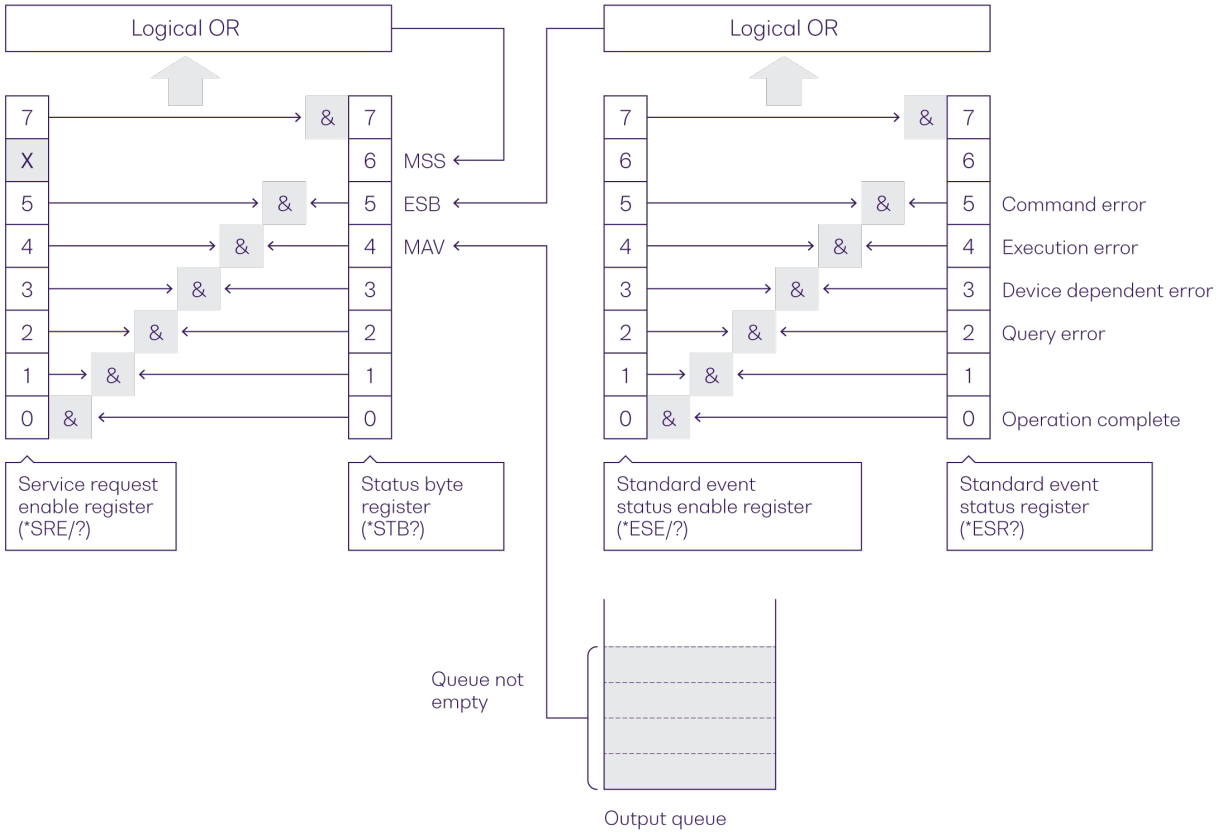
Bit	Description
7 (MSB)	Not used
6	The Master Summary Status (MSS) bit is set from the STB and SRE Mask
5	The Event Status Bit (ESB) is set from the SESR and the SESR Mask
4	Message Available (MAV) is set when there is data in the output queue
3, 2, 1, 0 (LSB)	Not used

10.4.4 Service Request Enable Register (Mask)

The Standard Request Enable Register (SRE Mask) is used to build the Master Summary Status Bit (MSS) within the Status Byte Register (STB). To ignore any of the events detected and set in the STB register itself, set the corresponding bit within the SRE Mask to 0. The STB can then be queried and the value of the MSS can be used to determine the type of service request required based on the SRE Mask applied.

Bit	Description
7 (MSB)	Not used
6	The Master Summary Status (MSS) bit is set from the STB and SRE Mask
5	The Event Status Bit (ESB) is set from the SESR and the SESR Mask
4	Message Available (MAV) is set when there is data in the output queue
3, 2, 1, 0 (LSB)	Not used

10.4.5 Status and event registers diagram



10.5 Starting and managing Services

This section describes how to verify, start, and use the Windows services that make up the VISEYE System.

At boot, this service starts automatically:

- VISEYE GRPC Service

When SCPI communication is required, you have to manually start these services:

- VISEYE Portmap Service
- VISEYE SCPI Service

10.5.1 Overview of Services

Service	Startup	Description
VISEYE GRPC Service	Automatic	Main server controlling and managing all VISEYE components.
VISEYE Portmap Service	Manual	Only needed for SCPI mode. Supports the VXI11 protocol required by SCPI.
VISEYE SCPI Service	Manual	Only needed for SCPI mode. Provides SCPI protocol communication with the VISEYE System.

10.5.2 Enabling SCPI communication

> Ensure **VISEYE GRPC Service** is running before enabling SCPI communication.

Option A: Using Portmap and SCPI Services (recommended for VXI11 discovery)

▶ To enable SCPI communication:

1. Open the Windows Services console: **Win + R** > type `services.msc` > **OK**.
2. Start **VISEYE Portmap Service**.
3. Start **VISEYE SCPI Service**.
4. Connect using VXI11 discovery; there is no need to specify the SCPI port—the Portmap service resolves it.

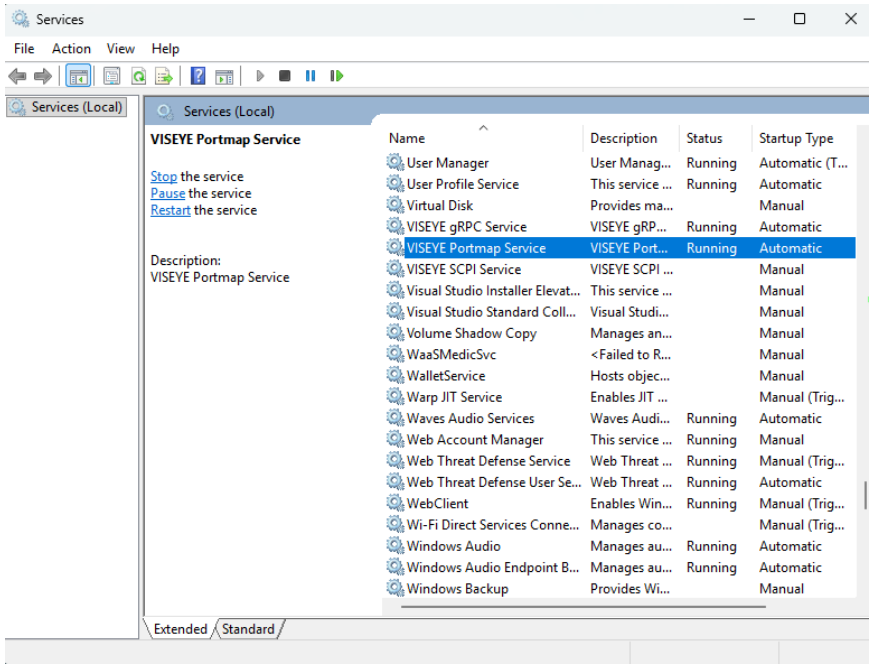
Option B: Using only the SCPI Service

> Firewall rules must allow inbound connections to the SCPI port when using Option B.

▶ To enable SCPI communication:

1. Open the Windows Services console: **Win + R** > type `services.msc` > **OK**.
2. Start **VISEYE SCPI Service**.
3. When connecting, provide the IP address and the TCP port used by the SCPI service.

How to start Services manually



▶ To start a Service:

1. Open the Windows Services console: **Win + R** > type `services.msc` > **OK**).
2. In the Services list, locate the Service, right-click it and select Start.
3. Confirm the Service status changes to Running

10.5.3 Troubleshooting and notes

Please note:

- Administrative privileges may be required to start or stop services.
- If a service fails to start, check the Windows Event Viewer → Windows Logs → Application for error details.
- Ensure VISEYE GRPC Service and QCA GRPC Service are running before enabling SCPI communication.
- Firewall rules must allow inbound connections to the SCPI port when using Option B.

10.6 SCPI commands summary - Working with VISEYE

When working with VISEYE, refer to SCPI command descriptions in the following sections:

1. Common commands
2. Get started and open the VISEYE application: Refer to System menu functions.
3. Set up data sources
4. Acquire data
5. Add and read measurements
6. Build math waveforms
7. Manage VISEYE data

10.6.1 Common commands

Command	Description
`*CLS`	Clear session message queues >>
`*ESE`	Set the Standard Event Status Enable Register >>
`*ESE?`	Query the Standard Event Status Enable Register (Mask) >>
`*ESR?`	Query the Standard Event Status Register >>
`*IDN?`	Query the software identification >>
`*OPC?`	Query the Operation Complete Status >>
`*OPT?`	Query the application >>
`*RST`	Reset instrument to default power-on settings >>

10.6.2 System menu functions

The following commands enable you to connect to the VISEYE system and query the system status.

Command	Description
`:APP`	
`:CONNect`	Connect to the VISEYE system **>>**
`:DISConnect`	Disconnect from the VISEYE system **>>**
`:STATe?`	Query the state of the VISEYE system **>>**

10.6.3 Set up data sources

To set up data sources:

- Load/Start a project.
- Connect with a QCA instrument.
- Add data sources to the virtual instrument.

10.6.3.1 Load/Start a project

Load an **existing project**, or start a **new project**:

- **Loading an existing project:** VISEYE will reload data sources, measurements and visualization settings as they were when saving the project.
- **Starting a new project:** VISEYE will start without loading previous data.

> **NOTE**
>
> The following commands only work if the VISEYE application is running.

Command	Description
`:DISK`	
`:PROJect`	
`:NEW`	Create a new project file - only works when the VISEYE application is running **>>**
`:SAVE`	Save the current project in the specified file - only works when the VISEYE application is running **>>**
`:RECall`	Open a project file from the specified file path - only works when the VISEYE application is running **>>**

10.6.3.2 Connect with a QCA instrument

To receive a signal from a **QCA instrument**: Add and connect the QCA instrument with VISEYE, configure the incoming signal and apply a System Impulse Response Correction (SIRC) digital filter.

Index <n>: QCA instrument ID, this is an integer <1 to 8>.

Index <m>: SIRC filter ID, this is an integer <1 to 32>.

Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.

Command	Description
:QCAScope?	Query QCA instruments that have been added to VISEYE >>
:QCAScope<n>	
:STATe?	Query the status of the QCA instrument >>
:ADD	Add a QCA instrument to VISEYE >>
:REMOve	Remove a QCA instrument from VISEYE >>
:CONNect	Connect with a QCA instrument >>
:DISConnect	Disconnect from a QCA instrument >>
:INFO?	Query QCA instrument details >>
:UNAMe?	Query the QCA instrument label >>
:UNAMe	Set the QCA instrument label >>
:CHANnel	
:COUNt?	Query the number of channels of the QCA >>
:SRATe?	Query the symbol rate of the received signal >>
:SRATe	Set the symbol rate of the received signal >>
:UNITs?	Query the symbol rate unit >>
:PATTern?	Query the test pattern length >>
:PATTern	Set the test pattern length >>
:INFO?	Query supported test pattern lengths >>
:LOCK?	Query if signal lock is on or off >>
:CDIVide?	Query the clock divider setting >>
:CDIVide	Set the clock divider setting >>
:INFO?	Query supported clock divider settings >>

Command	Description
:PTB?	Query the precision timebase status >>
:PTB	Set the precision timebase status >>
:INFO?	Query supported precision timebase settings >>
:ReSeT	Reset the QCA configuration >>
:SIRC	
:ADD	Add a SIRC filter >>
:INFO?	Query details >>
:REMOve	Remove a SIRC filter >>
:FBANdwidth?	Query the order of the SIRC filter >>
:FBANdwidth	Set the bandwidth of the SIRC filter >>
:UNITs?	Query the SIRC filter bandwidth unit >>
:CENTer?	Query the central frequency between the upper and lower cutoffs of the the SIRC filter >>
:CENTer	Set the central frequency between the upper and lower cutoffs of the the SIRC filter >>
:UNITs?	Query the unit of the central frequency >>
:RESPonse?	Query the type of SIRC filter >>
:RESPonse	Set the type of SIRC filter >>
:INFO?	Query supported filter types >>
:ORDer?	Query the order of the filter >>
:ORDer	Set the order of the SIRC filter >>
:RollOFF?	Query the steepness of the frequency transfer function >>
:RollOFF	Set the steepness of the frequency transfer function >>
:SAVE	Save currently configured SIRC filters >>
:RECall	Load a SIRC configuration file >>
:CHANnel	
:WAVelength	
:VALue?	(available for optical QCA) Query channel wavelength >>
:VALue	(available for optical QCA) Query channel wavelength >>
:UNITs?	(available for optical QCA) Query wavelength unit >>
:INFO?	(available for optical QCA) Query supported wavelengths >>
:INSertion	
:LOSS?	Query Insertion Loss value >>
:LOSS	Set Insertion Loss value >>

Command	Description
:APOWer	
:VALue?	(available for optical QCA) Query average optical power of the channel >>
:INFO?	(available for optical QCA) Query supported average optical power units >>
:SIRC?	Query SIRC filter >>
:SIRC	Set a SIRC filter >>
:INFO?	Query SIRC filter details >>
:CALibrate	
:DARK	
:CHANnel	
:STARt	(available for optical QCA) Perform dark level calibration >>

10.6.3.3 Add data sources to the virtual instrument

When working with VISEYE, you can work with the following data sources and load them into the VISEYE virtual instrument:

- QCA input channels
- previously acquired waveform files
- math waveforms

VISEYE will acquire data from all data sources in the virtual instrument. VISEYE can simultaneously process the signal from up to eight data sources.

The SCPI commands in this section enable you to add and manage QCA input channels and waveform files. To add **math waveforms** to the virtual instrument, refer to SCPI commands in section Build math waveforms.

Example waveform files are included in the VISEYE software package in folder ...\Quantifi Photonics\VISEYE\Examples\Waveform.

Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.

Index <N>: QCA channel ID N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.

Command	Description
`:SOURce?`	Query data sources in the virtual instrument **>>**
`:SOURce<n>`	
`:ADD`	Add a data source to the virtual instrument **>>**
`:REMOve`	Remove a data source from the virtual instrument **>>**
`:UNAMe?`	Query the data source label **>>**
`:UNAMe`	Set the data source label **>>**
`:FORMat?`	Query the data source signal type **>>**
`:FORMat`	Set the data source signal type **>>**
`:WMEMory`	
`:FILE`	Add a data source to the virtual instrument using the provided waveform file **>>**
`:NAME?`	Query the waveform file associated with the given data source **>>**
`:NAME`	Select the waveform file name that will be used to create the data source **>>**
`:LOAD`	Create a data source with the waveform file specified in `:WMEMory<n>:FILE:NAME` **>>**
`:SIGNal`	
`:TYPE?`	Query the data source signal type **>>**

Command	Description
:TYPE	Set the data source signal type >>
:UNAMe?	Query the data source label >>
:UNAMe	Set the data source label >>

10.6.4 Acquire data

VISEYE will acquire data from data sources loaded in the VISEYE virtual instrument.

Prior to acquiring data from a connected QCA instrument, ensure the reference clock signal is locked, for example by checking the **Trigger Lock LED** on the front of the QCA. For details, refer to Trigger Lock LED in Hardware description.

Any loss of lock will stop acquisition of the signal to avoid unreliable measurement results. Loss of lock can occur if:

- Reference clock signal is not connected to the QCA.
- Timebase information in VISEYE and reference clock signal do not match.
- Reference clock signal amplitude is too low (minimum amplitude: 50mV$_{pp}$).
- Reference clock signal frequency has too much variability (> ± 150ppm)

Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.

Command	Description
:ACQuire	
:SINGle	Capture a single acquisition >>
:WAVeform<n>	
:EYE	
:COLumns?	Returns the number of horizontal data points (columns) in the eye diagram (horizontal resolution) >>
:ROWS?	Returns the number of vertical data points (rows) in the eye diagram (vertical resolution) >>
:POINts?	Returns the number of points of the eye diagram >>
:ASCii	
:DATa?	Returns the points of the eye diagram in ASCII format >>
:XYFormat	
:POINts?	Returns the number of points of the waveform >>
:ASCii	
:XDATa?	Returns the x-axis values of the waveform in ASCII format >>
:YDATa?	Returns the y-axis values of the waveform in ASCII format >>

10.6.5 Add and read measurements

VISEYE can perform a great range of measurements on waveforms.

For detailed descriptions of the measurements and configurable parameters, refer to section Measurements.

For detailed descriptions of the relevant SCPI commands, including how to perform a measurement and query measurement results, refer to each measurement in SCPI commands summary - Eye Measurements and SCPI commands summary - Waveform Measurements.

Command	Description
`:MEASure`	
`:EYE`	
`:LIST`	
`:REMove`	Remove a measurement at a given location **>>**

10.6.6 Build math waveforms

For detailed descriptions of math operators, refer to Operators.

Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.

Index <m>: 1-based index of math node, default is 1

Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.

Command	Description
:FUNCtion?	Query the math data source >>
:ADD	Create a math data source >>
:REMOve	Remove a math data source >>
:OPERand1?	Query the primary input source of the math data source >>
:OPERand1	Set the primary input source of the math data source >>
:OPERand2?	Query the secondary input source of the math data source >>
:OPERand2	Set the secondary input source of the math data source >>
:UNAMe?	Query the name of the math data source >>
:UNAMe	Set the name of the math data source >>
:FOPerator?	Query the math operator of the given math data source >>
:FOPerator	Create a math operator in a given math data source >>
:INFO?	Query all supported math operators >>
:SPRocess	
:AMPLify	
:GAIN?	Query the Gain value of the Amplify operator >>
:GAIN	Set the Gain value of the Amplify operator >>
:YOFFset	
:VALue?	Query Offset value >>
:VALue	Set Offset value >>
:UNITs?	Query Offset unit >>
:CTLequalizer	
:GAIN?	Query the Gain value of the CTLE operator >>

Command	Description
:GAIN	Set the Gain value of the CTLE operator >>
:UNITs?	Query Gain unit >>
:PEAK?	Query the Peak frequency value of the CTLE operator >>
:PEAK	Set the Peak frequency value of the CTLE operator >>
:UNITs?	Query Peak frequency unit >>
:FFEQualizer	
:TSPacing	
:TPUI?	Query the Taps per UI value of the FFE operator >>
:TPUI	Set the Taps per UI value of the FFE operator >>
:TAPS?	Query Tap values parameter of FFE operator >>
:TAPS	Set Taps value parameter of FFE operator >>
:COUNt?	Query the Number of taps value of the FFE operator >>
:COUNt	Set the Number of taps value of the FFE operator >>
:AUTo?	Query the Automatic taps value of the FFE operator >>
:AUTo	Set the Automatic taps value of the FFE operator >>
:INFO?	Query supported Automatic taps values >>
:NPRecursors?	Query the Precursors value of the FFE operator >>
:NPRecursors	Set the Precursors value of the FFE operator >>
:SIGnal	
:FORMat?	Query the Signal type of the FFE operator >>
:FORMat	Set the Signal type of the FFE operator >>
:INFO?	Query supported Signal types >>
:CONVolve	
:FNAMe?	Query the S parameter file name of the Apply s2p file operator >>
:FNAMe	Set the S parameter file name of the Apply s2p file operator >>
:ALIGn?	Query the Align input and output waveforms value of the Apply s2p file operator >>
:ALIGn	Set the Align input and output waveforms value of the Apply s2p file operator >>
:INFO?	Query supported values >>
:FREQuency	
:LiMiT?	Query Freq upper limit value of the Apply s2p operator >>
:LiMiT	Set the Freq upper limit value of the Apply s2p operator >>
:UNITs?	Query Freq upper limit unit >>
:AUTo?	Query auto upper limit for frequency of the Apply s2p file operator >>

Command	Description
:AUTo	Set auto upper limit for frequency of the Apply s2p file operator >>
:INFO?	Query supported auto upper limit for frequency settings >>
:DEConvolve	
:FNAMe?	Query the S parameter file name of the Remove s2p file operator >>
:FNAMe	Set the S parameter file name of the Remove s2p file operator >>
:ALIGn?	Query the Align input and output waveforms value of the Remove s2p file operator >>
:ALIGn	Set the Align input and output waveforms value of the Remove s2p file operator >>
:INFO?	Query supported values >>
:FREQ	
:LiMiT?	Query Freq upper limit level of the Remove s2p file operator >>
:LiMiT	Set the Freq upper limit value of the Remove s2p file operator >>
:UNITs?	Query Freq upper limit unit >>
:AUTo?	Query auto upper limit for frequency of the Remove s2p file operator >>
:AUTo	Set auto upper limit for frequency of the Remove s2p file operator >>
:INFO?	Query supported auto upper limit for frequency settings >>
:TEQualizer	
:TAPS?	Query Taps of the TDECQ Reference Equalizer operator >>
:TAPS	Set Taps of the TDECQ Reference Equalizer operator >>
:AUTo?	Query Auto Precursors setting of the TDECQ Reference Equalizer operator >>
:AUTo	Set Auto Precursors setting of the TDECQ Reference Equalizer operator >>
:INFO?	Query supported Auto Precursors settings >>
:COUNt?	Query Number of Taps >>
:COUNt	Set Number of Taps >>
:NPRecursors?	Query Number of Precursors >>
:NPRecursors	Set Number of Precursors >>
:AUTo?	Query Auto Precursors setting >>
:AUTo	Set Auto Precursors settings >>
:INFO?	Query supported settings >>
:MNPRecursors?	Query Number of Precursors Max >>
:MNPRecursors	Set Number of Precursors Max >>
:TSER?	Query TargetSER >>
:TSER	Set TargetSER >>
:OHTime?	Query HistOptimization >>

Command	Description
:OHTime	Set HistOptimization >>
:INFO?	Query supported settings >>
:OHSeparation?	Query HistSpacing >>
:OHSeparation	Set HistSpacing >>
:OHTLimit?	Query HistAdjustLimit >>
:OHTLimit	Set HistAdjustLimit >>
:LHTime?	Query LeftHistPosition >>
:LHTime	Set LeftHistPosition >>
:RHTime?	Query RightHistPosition >>
:RHTime	Set RightHistPosition >>
:HWIDth?	Query HistWidth >>
:HWIDth	Set HistWidth >>
:BIN	
:COUNt?	Query Number of Bins >>
:COUNt	Set Number of Bins >>
:OHTHresholds?	Query ThresholdOptimization setting >>
:OHTHresholds	Set ThresholdOptimization setting >>
:INFO?	Query supported settings >>
:TALimit?	Query ThresholdsAdjLimit >>
:TALimit	Set ThresholdsAdjLimit >>
:PATTern	
:MODE?	Query Reference type >>
:MODE	Set Reference type >>
:INFO?	Query supported settings >>
:FILE	
:NAME?	Query the File name >>
:NAME	Set the File name >>
:FORMat?	Query Source >>
:FORMat	Select Source >>
:INFO?	Query supported settings >>
:KPATtern?	Query Pattern >>
:KPATtern	Set Pattern >>
:INFO?	Query supported settings >>

Command	Description
:PRBS	
:ORDer?	Query PRBS order >>
:ORDer	Set PRBS order >>
:INFO?	Query supported settings >>
:ENCode?	Query Encoding >>
:ENCode	Set Encoding >>
:INFO?	Query supported settings >>
:MODE?	Query even/odd >>
:MODE	Query even/odd >>
:INFO?	Query supported settings >>

10.6.7 Manage VISEYE data

VISEYE organizes data in waveform files and project files:

- Waveform files contain raw signal data only.
- Project files contain waveform files, measurement results and the project settings that were selected when saving the file.

Command	Description
`:DISK`	
`:PROJect`	
`:NEW`	Refer to Load/Start a project
`:SAVE`	Refer to Load/Start a project
`:RECall`	Refer to Load/Start a project
`:SETup`	
`:SAVE`	Save the current project in the specified file **>>**
`:RECall`	Open a project from the specified file path **>>**
`:WAVEform`	
`:SAVE`	Save the current waveform in the specified file **>>**

10.7 SCPI commands summary - Eye Measurements

Find summaries of SCPI commands in the following sections.

10.7.1 Average

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Average.

Command	Description
:MEASure	
:EYE	
:APOWer?	Query measurement results >>
:APOWer	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>

10.7.2 Amplitude Peak-Peak

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Amplitude Peak-Peak.

Command	Description
:MEASure	
:EYE	
:PAM	
:PPAMplitude?	Query measurement results >>
:PPAMplitude	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>

10.7.3 NRZ Extinction Ratio

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section NRZ Extinction Ratio.

Command	Description
:MEASure	
:EYE	
:ERATio?	Query measurement results >>
:ERATio	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.7.4 Eye Amplitude NRZ

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Amplitude NRZ.

Command	Description
:MEASure	
:EYE	
:AMPlitude?	Query measurement results >>
:AMPlitude	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.7.5 Eye Amplitudes PAM

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Amplitudes PAM.

Command	Description
:MEASure	
:EYE	
:PAM	
:AMPLitude?	Query measurement results >>
:AMPLitude	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:EYE?	Query the eye to be measured >>
:EYE	Select the eye to be measured >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.7.6 Eye Center Voltage NRZ

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Center Voltage NRZ.

Command	Description
:MEASure	
:EYE	
:ELEVel?	Query measurement results >>
:ELEVel	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>
:VBOundary?	Query the vertical boundary of the measurement >>
:VBOundary	Set the vertical boundary of the measurement >>
:UNITs?	Query the vertical boundary unit >>
:DEFine	
:EOPening	
:PROBability?	Query the Probability value >>
:PROBability	Set the Probability value >>

10.7.7 Eye Center Voltages PAM

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Center Voltages PAM.

Command	Description
:MEASure	
:EYE	
:PAM	
:ELEVel?	Query measurement results >>
:ELEVel	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:EYE?	Query the eye to be measured >>
:EYE	Select the eye to be measured >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>
:VBOundary?	Query the vertical boundary of the measurement >>
:VBOundary	Set the vertical boundary of the measurement >>
:UNITs?	Query the vertical boundary unit >>
:DEFine	
:EOPening	
:PROBability?	Query the Probability value >>
:PROBability	Set the Probability value >>

10.7.8 Eye Crossing Percentage

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Crossing Percentage.

Command	Description
:MEASure	
:EYE	
:CROSsing?	Query measurement results >>
:CROSsing	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.7.9 Eye Height NRZ

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Height NRZ.

Command	Description
:MEASure	
:EYE	
:EHEight?	Query measurement results >>
:EHEight	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>
:DEFine	
:EOPening	
:PROBability?	Query the Probability value >>
:PROBability	Set the Probability value >>
:ESTiming?	Query the eye the optimization is performed for >>
:ESTiming	Define the eye the optimization is performed for >>
:INFO?	Query options >>
:ELMethod?	Query the calculation mode >>
:ELMethod	Define the calculation mode >>
:INFO?	Query options >>

10.7.10 Eye Heights PAM

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Heights PAM.

Command	Description
:MEASure	
:EYE	
:PAM	
:EHEight?	Query measurement results >>
:EHEight	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:EYE?	Query the eye to be measured >>
:EYE	Select the eye to be measured >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>
:DEFine	
:EOPening	
:PROBability?	Query the Probability value >>
:PROBability	Set the Probability value >>
:ESTiming?	Query the eye the optimization is performed for >>
:ESTiming	Define the eye the optimization is performed for >>
:INFO?	Query options >>
:ELMethod?	Query the calculation mode >>
:ELMethod	Define the calculation mode >>
:INFO?	Query options >>

10.7.11 Eye One Level

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye One Level.

Command	Description
:MEASure	
:EYE	
:OLEVel?	Query measurement results >>
:OLEVel	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.7.12 Eye Zero Level

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Zero Level.

Command	Description
:MEASure	
:EYE	
:ZLEVel?	Query measurement results >>
:ZLEVel	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.7.13 PAM Levels

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section PAM Levels.

Command	Description
:MEASure	
:EYE	
:PAM	
:LEVel?	Query measurement results >>
:LEVel	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LEVel?	Query the level to be measured >>
:LEVel	Select the level to be measured >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.7.14 Eye Skews

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Skews.

Command	Description
:MEASure	
:EYE	
:PAM	
:ESKew?	Query measurement results >>
:ESKew	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:EYE?	Query the eye to be measured >>
:EYE	Select the eye to be measured >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>
:VBOundary?	Query the vertical boundary of the measurement >>
:VBOundary	Set the vertical boundary of the measurement >>
:UNITs?	Query the vertical boundary unit >>
:DEFine	
:EOPening	
:PROBability?	Query the Probability value >>
:PROBability	Set the Probability value >>

10.7.15 Eye Width NRZ

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Width NRZ.

Command	Description
:MEASure	
:EYE	
:EWIDth?	Query measurement results >>
:EWIDth	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>
:VBOundary?	Query the vertical boundary of the measurement >>
:VBOundary	Set the vertical boundary of the measurement >>
:UNITs?	Query the vertical boundary unit >>
:DEFine	
:EOPening	
:PROBability?	Query the Probability value >>
:PROBability	Set the Probability value >>
:ESTiming?	Query the eye the optimization is performed for >>
:ESTiming	Define the eye the optimization is performed for >>
:INFO?	Query options >>
:ELMethod?	Query the calculation mode >>
:ELMethod	Define the calculation mode >>
:INFO?	Query options >>

10.7.16 Eye Widths PAM

Click >> in the summary table below to navigate to the detailed command description.

Command	Description
:MEASure	
:EYE	
:PAM	
:EWIDth?	Query measurement results >>
:EWIDth	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:EYE?	Query the eye to be measured >>
:EYE	Select the eye to be measured >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>
:VBOundary?	Query the vertical boundary of the measurement >>
:VBOundary	Set the vertical boundary of the measurement >>
:UNITs?	Query the vertical boundary unit >>
:DEFine	
:EOPening	
:PROBability?	Query the Probability value >>
:PROBability	Set the Probability value >>
:ESTiming?	Query the eye the optimization is performed for >>
:ESTiming	Define the eye the optimization is performed for >>
:INFO?	Query options >>
:ELMethod?	Query the calculation mode >>
:ELMethod	Define the calculation mode >>
:INFO?	Query options >>

10.7.17 Eye Fall Time

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Fall Time.

Command	Description
:MEASure	
:EYE	
:FALLtime?	Query measurement results >>
:FALLtime	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:STArtPercent?	Query the start amplitude threshold >>
:STArtPercent	Set the start amplitude threshold >>
:UNITs?	Query the start amplitude threshold unit >>
:STOpPercent?	Query the stop amplitude threshold >>
:STOpPercent	Set the stop amplitude threshold >>
:UNITs?	Query the stop amplitude threshold unit >>

10.7.18 Eye Rise Time

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Rise Time.

Command	Description
:MEASure	
:EYE	
:RISetime?	Query measurement results >>
:RISetime	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:STArtPercent?	Query the start amplitude threshold >>
:STArtPercent	Set the start amplitude threshold >>
:UNITs?	Query the start amplitude threshold unit >>
:STOpPercent?	Query the stop amplitude threshold >>
:STOpPercent	Set the stop amplitude threshold >>
:UNITs?	Query the stop amplitude threshold unit >>

10.7.19 Eye Jitter (Peak-Peak)

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Jitter (Peak-Peak).

Command	Description
:MEASure	
:EYE	
:JITTer?	Query measurement results >>
:JITTer	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:FORMAT?	Query measurement format >>
:FORMAT	Set measurement format >>
:VBOundary?	Query the vertical boundary of the measurement >>
:VBOundary	Set the vertical boundary of the measurement >>
:UNITs?	Query the vertical boundary unit >>

10.7.20 Eye Jitter (RMS)

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Eye Jitter (RMS).

Command	Description
:MEASure	
:EYE	
:JITTer?	Query measurement results >>
:JITTer	Query measurement results >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:FORMAT?	Query measurement format >>
:FORMAT	Set measurement format >>
:VBOundary?	Query the vertical boundary of the measurement >>
:VBOundary	Set the vertical boundary of the measurement >>
:UNITs?	Query the vertical boundary unit >>

10.7.21 Overshoot NRZ

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Overshoot NRZ.

Command	Description
:MEASure	
:EYE	
:OVER?	Query measurement results >>
:OVER	Perform measurement on the current data source >>
:SOUR	Query the data source >>
:SOUR	Add this measurement to the specified data source and switch to this data source >>
:LOC?	Query the location of the measurement in the current data source >>
:UNIT?	Query the measurement unit >>
:EBO?	Query the horizontal boundary of the measurement >>
:EBO	Set the horizontal boundary of the measurement >>
:UNIT?	Query the horizontal boundary unit >>

10.7.22 Overshoot PAM

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Overshoot PAM.

Command	Description
:MEASure	
:EYE	
:PAM	
:OVERshoot?	Query measurement results >>
:OVERshoot	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.7.23 Undershoot

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Undershoot.

Command	Description
:MEASure	
:EYE	
:UNDershoot?	Query measurement results >>
:UNDershoot	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>
:PAM	
:UNDershoot?	Query measurement results >>
:UNDershoot	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.7.24 Ratio Level Mismatch (Annex 120D, Clause 94)

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurements, refer to measurement sections Ratio Level Mismatch (Annex 120D) and Ratio Level Mismatch (Clause 94).

Command	Description
:MEASure	
:EYE	
:PAM	
:LINearity?	Query measurement results >>
:LINearity	Perform measurement on the current data source >>
:DEFinition?	Query the measurement method >>
:DEFinition	Set the measurement method >>
:INFO?	Query the set measurement method >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.7.25 Signal to Noise Ratio

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Signal to Noise Ratio.

Command	Description
:MEASure	
:EYE	
:ESN?	Query measurement results >>
:ESN	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.7.26 Symbol Period

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Average Amplitude.

Command	Description
:MEASure	
:EYE	
:BITRate?	Query measurement results >>
:BITRate	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>

10.7.27 Transmitter and Dispersion Eye Closure Quaternary (TDECQ)

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Transmitter and Dispersion Eye Closure Quaternary (TDECQ).

To configure parameters of the TDECQ measurement, refer to SCPI commands listed in Build math waveforms.

Command	Description
:MEASure	
:EYE	
:PAM	
:TDEQ?	Query measurement results >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:UNITs?	Query the measurement unit >>
:CEQ?	Query CEQ >>

10.7.28 Vertical Eye Closure

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Vertical Eye Closure (VEC) (Eye).

Command	Description
:MEASure	
:EYE	
:PAM	
:VECLosure?	Query measurement results >>
:VECLosure	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:EYE?	Query the eye to be measured >>
:EYE	Select the eye to be measured >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>
:DEFine	
:EOPening	
:PROBability?	Query the Probability value >>
:PROBability	Set the Probability value >>

10.8 SCPI commands summary - Waveform Measurements

Find summaries of SCPI commands in the following sections.

10.8.1 RMS

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section RMS.

Command	Description
:MEASure	
:WAVeform	
:RMS?	Query measurement results >>
:RMS	Perform measurement on the current data source >>
:SOUR?	
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>

10.8.2 One/Zero Levels

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section One/Zero Levels.

Command	Description
:MEASure	
:WAVeform	
:ZLEVel?	Query measurement results >>
:ZLEVel	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>
:OLEVel?	Query measurement results >>
:OLEVel	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.8.3 Optical Modulation Amplitude (OMA)

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Optical Modulation Amplitude (OMA).

Command	Description
:MEASure	
:EYE	
:OMA?	Query measurement results >>
:OMA	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.8.4 PAM Outer Extinction Ratio

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section PAM Outer Extinction Ratio.

Command	Description
:MEASure	
:EYE	
:OER?	Query measurement results >>
:OER	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>
:THReeSymbol?	Query the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols >>
:THReeSymbol	Set the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols >>
:ZERoSymbol?	Query the minimum number of consecutive logic 0 symbols >>
:ZERoSymbol	Set the minimum number of consecutive logic 0 symbols >>

10.8.5 Outer OMA

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Outer OMA.

Command	Description
:MEASure	
:EYE	
:OOMA?	Query measurement results >>
:OOMA	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>
:THReeSymbol?	Query the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols >>
:THReeSymbol	Set the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols >>
:ZERoSymbol?	Query the minimum number of consecutive logic 0 symbols >>
:ZERoSymbol	Set the minimum number of consecutive logic 0 symbols >>

10.8.6 Signal to Noise Distortion Ratio

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Signal to Noise Distortion Ratio.

Command	Description
:MEASure	
:EYE	
:PAM	
:SNDR?	Query measurement results >>
:SNDR	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.8.7 SNR Inter-Symbol Interference

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section SNR Inter-Symbol Interference.

Command	Description
:MEASure	
:WAVeform	
:PAM	
:SNRIsi?	Query measurement results >>
:SNRIsi	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.8.8 Wfm Fall Time

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Wfm Fall Time.

Command	Description
:MEASure	
:WAVeform	
:FALLtime?	Query measurement results >>
:FALLtime	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:STArtPercent?	Query the start amplitude threshold >>
:STArtPercent	Set the start amplitude threshold >>
:UNITs?	Query the start amplitude threshold unit >>
:STOpPercent?	Query the stop amplitude threshold >>
:STOpPercent	Set the stop amplitude threshold >>
:UNITs?	Query the stop amplitude threshold unit >>
:THReeSymbol?	Query the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols >>
:THReeSymbol	Set the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols >>
:ZERSymbol?	Query the minimum number of consecutive logic 0 symbols >>
:ZERSymbol	Set the minimum number of consecutive logic 0 symbols >>

10.8.9 Wfm Rise Time

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Wfm Rise Time.

Command	Description
:MEASure	
:WAVeform	
:RISetime?	Query measurement results >>
:RISetime	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:STArtPercent?	Query the start amplitude threshold >>
:STArtPercent	Set the start amplitude threshold >>
:UNITs?	Query the start amplitude threshold unit >>
:STOpPercent?	Query the stop amplitude threshold >>
:STOpPercent	Set the stop amplitude threshold >>
:UNITs?	Query the stop amplitude threshold unit >>
:THReeSymbol?	Query the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols >>
:THReeSymbol	Set the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols >>
:ZERSymbol?	Query the minimum number of consecutive logic 0 symbols >>
:ZERSymbol	Set the minimum number of consecutive logic 0 symbols >>

10.8.10 Vertical Eye Closure Penalty (VECP)

Click >> in the summary table below to navigate to the detailed command description.

For details on the measurement, refer to measurement section Vertical Eye Closure Penalty (VECP).

Command	Description
:MEASure	
:EYE	
:VECP?	Query measurement results >>
:VECP	Perform measurement on the current data source >>
:SOURce?	Query the data source >>
:SOURce	Add this measurement to the specified data source and switch to this data source >>
:LOCation?	Query the location of the measurement in the current data source >>
:UNITs?	Query the measurement unit >>
:EBOundary?	Query the horizontal boundary of the measurement >>
:EBOundary	Set the horizontal boundary of the measurement >>
:UNITs?	Query the horizontal boundary unit >>

10.9 SCPI commands descriptions - Working with VISEYE

10.9.1 Common commands

*CLS

Command	***CLS**	Summary >>
Syntax	`*CLS`	
Description	Clear session message queues	
Parameters	N/A	
Response	N/A	
Example	`*CLS`	

*ESE

Command	***ESE**	Summary >>
Syntax	`*ESE<wsp><value>`	
Description	Set the Standard Event Status Enable Register	
Parameters	N/A	
Response	N/A	
Example	`*ESE 254`	

*ESE?

Command	***ESE?**	Summary >>
Syntax	`*ESE?`	
Description	Query the Standard Event Status Enable Register (Mask)	
Parameters	N/A	
Response	Unsigned integer 8 bit value for the register <0 to 255>, as a string.	
Example	`*ESE? -> 254`	

***ESR?**

Command	***ESR?**		Summary >>
Syntax	`*ESR?`		
Description	Query the Standard Event Status Register		
Parameters	N/A		
Response	Unsigned integer 8 bit value for the register <0 to 255>, as a string.		
	Bit	Description	Decimal Value
	7 (MSB)	Not used	0
	6	Not used	0
	5	Command error	32
	4	Command Execution Error	16
	3	Device Dependent Error	8
	2	Not used	0
	1	Not used	0
	0 (LSB)	Operation Complete	1
Example	`*ESR? -> 8` `*ESR? -> 32`		

NOTE

It is recommended to use the `*ESR?` command query after every command that is sent to the device. The `*ESR?` query will be able to catch:

- **Device dependent Error** – the device is reporting an error in operation.
- **Execution Error** – SCPI was unable to execute the given command.
- **Command Error** – SCPI was unable to parse the given command, likely due to an incorrect command.

***IDN?**

Command	***IDN?**	Summary >>
Syntax	`*IDN?`	
Description	Query the software identification	
Parameters	N/A	
Response	A comma-separated array of values	
Example		

*OPC?

Command	**`*OPC?`**	Summary >>
Syntax	`*OPC?`	
Description	Query the Operation Complete Status	
Parameters		
Response	**`1`**: all modules installed in the chassis are ready to execute commands	
	`0`: modules installed in the chassis still have commands to execute in the input queue	
	NOTE: Any commands sent to the module when `:MODUle:OPC?` is NOT equal `1`, may not execute or return an error.	
Example	`*OPC? -> 1`	

*OPT?

Command	**`*OPT?`**	Summary >>
Syntax	`*OPT?`	
Description	Query the application	
Parameters	N/A	
Response		
Example		

*RST

Command	**`*RST`**	Summary >>
Syntax	`*RST`	
Description	Reset modules to default power-on settings	
Parameters	N/A	
Response	N/A	
Example	`*RST`	

10.9.2 System menu functions

:APP:CONNect

Command	**:APP:CONNect** Summary >>
Syntax	`:APP:CONNect<wsp>VISEYE`
Description	Connect to the VISEYE system
Parameters	**VISEYE**: Connects to the VISEYE system
Response	N/A
Example	`:APP:CONN VISEYE`

:APP:DISConnect

Command	**:APP:DISConnect** Summary >>
Syntax	`:APP:DISConnect<wsp><VISEYE>`
Description	Disconnect from the VISEYE system
Parameters	**VISEYE**: Disconnects from the VISEYE system
Response	N/A
Example	`:APP:DISC VISEYE`

:APP:STATe?

Command	**:APP:STATe?** Summary >>
Syntax	`:APP:STATe?[<wsp>INFO]`
Description	Query the state of the VISEYE system
Parameters	**INFO**:
Response	**1**: Idle: ready
	2: Busy
	3: Unknow
Example	`:APP:STAT? -> IDLE`

10.9.3 Set up data sources

10.9.3.1 Load/Start a project

:DISK:PROJect:NEW

Command	**:DISK:PROJect:NEW** Summary >>
Syntax	`:DISK:PROJect:NEW`
Description	Create a new project file - only works when the VISEYE application is running NOTE: Save your current project before creating a new project file.
Parameters	N/A
Response	N/A
Example	`:DISK:PROJ:NEW`

:DISK:PROJect:RECall

Command	**:DISK:PROJect:RECall** Summary >>
Syntax	`:DISK:PROJect:RECall<wsp><FilePath>`
Description	Open a project file from the specified file path - only works when the VISEYE application is running NOTE: Save your current project before opening a new project file.
Parameters	**`FilePath`**: file path to the project file
Response	N/A
Example	`:DISK:PROJ:REC "C:\Program Files\Quantifi Photonics\myfiles\xyz.vproj"`

:DISK:PROJect:SAVE

Command	**:DISK:PROJect:SAVE** Summary >>
Syntax	`:DISK:PROJect:SAVE<wsp><FilePath>`
Description	Save the current project in the specified file - only works when the VISEYE application is running
Parameters	**`FilePath`**: Saves the current project as a file in this location
Response	N/A
Example	`:DISK:PROJ:SAVE "C:\Program Files\Quantifi Photonics\VISEYE\myfiles\abc.vproj"`

10.9.3.2 Connect with a QCA instrument

Index <n>: QCA instrument ID, this is an integer <1 to 8>.

Index <m>: SIRC filter ID, this is an integer <1 to 32>.

Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.

:CALibrate:DARK:CHANnel<N>:STARt

Command	**:CALibrate:DARK:CHANnel<nN>:STARt** Summary >>
Syntax	:CALibrate:DARK:CHANnel<nN>:STARt
Description	(available for optical QCA) Perform dark level calibration Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.
Parameters	N/A
Response	N/A
Example	:CAL:DARK:CHAN1A:STAR

:CHANnel<nN>:APOWer:INFO?

Command	**:CHANnel<nN>:APOWer:INFO?** Summary >>
Syntax	:CHANnel<nN>:APOWer:INFO?
Description	(available for optical QCA) Query supported average optical power units Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.
Parameters	N/A
Response	**W**: W
	DBM: dBm
Example	

:CHANnel<nN>:APOWer:VALue?

Command	**:CHANnel<nN>:APOWer:VALue?** Summary >>
Syntax	`:CHANnel<nN>:APOWer:VALue?<wsp><W|DBM>`
Description	(available for optical QCA) Query average optical power of the channel Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.
Parameters	**W**: Returns the value in W (default)
	DBM: Returns the value in dBm
Response	
Example	

:CHANnel<nN>:INSertion:LOSS

Command	**:CHANnel<nN>:INSertion:LOSS** Summary >>
Syntax	`:CHANnel<nN>:INSertion:LOSS<wsp><value|MIN|MAX|DEF>`
Description	Set Insertion Loss value Power loss of the signal due to splitting the signal between a clock recovery unit (for example Quantifi Photonics' QCR instrument) and the QCA instrument. Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:CHANnel<nN>:INSertion:LOSS?

Command	**:CHANnel<nN>:INSertion:LOSS?** Summary >>
Syntax	:CHANnel<nN>:INSertion:LOSS?<wsp>[MIN|MAX|DEF|SET|ALL]
Description	Query Insertion Loss value Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
	UNIT: Returns the default unit
Response	N/A
Example	

:CHANnel<nN>:SIRC

Command	**:CHANnel<nN>:SIRC<wsp><value>** Summary >>
Syntax	:CHANnel<nN>:SIRC<wsp><value>
Description	Set a SIRC filter Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.
Parameters	**<value>**: Sets this value
Response	N/A
Example	:CHAN1A:SIRC 1

:CHANnel<nN>:SIRC?

Command	**:CHANnel<nN>:SIRC?** Summary >>
Syntax	:CHANnel<nN>:SIRC?
Description	Query SIRC filter Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.
Parameters	N/A
Response	
Example	:CHAN1A:SIRC? -> 1:50 GHz

:CHANnel<nN>:SIRC:INFO?

Command	**:CHANnel<nN>:SIRC:INFO?** Summary >>
Syntax	:CHANnel<nN>:SIRC:INFO?
Description	Query SIRC filter details Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.
Parameters	N/A
Response	
Example	:CHAN1A:SIRC:INFO? -> 1:50 GHz 2:45 GHz 3:40 GHz 4:35 GHz 5:32 GHz 6:30 GHz 7:25 GHz 8:20 GHz 9:15 GHz

:CHANnel<nN>:WAVelength:INFO?

Command	**:CHANnel<nN>:WAVelength:INFO?** Summary >>
Syntax	:CHANnel<nN>:WAVelength:INFO?
Description	(available for optical QCA) Query supported wavelengths Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.
Parameters	N/A
Response	
Example	

:CHANnel<nN>:WAVelength:UNITs?

Command	**:CHANnel<nN>:WAVelength:UNITs?** Summary >>
Syntax	:CHANnel<nN>:WAVelength:UNITs?
Description	(available for optical QCA) Query wavelength unit Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.
Parameters	N/A
Response	
Example	

:CHANnel<nN>:WAVelength:VALue

Command	**:CHANnel<nN>:WAVelength:VALue** Summary >>
Syntax	:CHANnel<nN>:WAVelength:VALue<wsp><value>
Description	(available for optical QCA) Query channel wavelength Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.
Parameters	**<value>**: Sets this value
Response	N/A
Example	

:CHANnel<nN>:WAVelength:VALue?

Command	**:CHANnel<nN>:WAVelength:VALue?** Summary >>
Syntax	:CHANnel<nN>:WAVelength:VALue?
Description	(available for optical QCA) Query channel wavelength Index <nN>: <QCA instrument ID n><QCA channel ID N>. n is an integer <1 to 8>. N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.
Parameters	N/A
Response	
Example	

:QCAScope?

Command	**:QCAScope?** Summary >>
Syntax	:QCAScope?[<wsp>list]
Description	Query QCA instruments that have been added to VISEYE
Parameters	**list**: Returns QCA instruments, format: <n>, IP address
Response	
Example	:QCAS? list -> 1,10.198.177.123 2,10.198.177.45 :QCAS? -> 1,10.198.177.123 2,10.198.177.45

:QCAScope<n>:ADD

Command	**:QCAScope<n>:ADD** Summary >>
Syntax	:QCAScope<n>:ADD<wsp>"<IPPort|IP>" Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Description	Add a QCA instrument to VISEYE
Parameters	**<IPPort>**: IP address and port of the QCA instrument
	<IP>: IP address of the QCA instrument
Response	N/A
Example	:QCAS1:ADD "127.0.0.1:5778" :QCAS1:ADD "127.0.0.1"

:QCAScope<n>:CDIVide

Command	**:QCAScope<n>:CDIVide** Summary >>
Syntax	:QCAScope<n>:CDIVide<wsp><DIV1|DIV2|DIV4|DIV8>
Description	Set the clock divider setting Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	**DIV1**: Divides the clock signal by 1
	DIV2: Divides the clock signal by 2
	DIV4: Divides the clock signal by 4
	DIV8: Divides the clock signal by 8
Response	N/A
Example	:QCAS1:CDIV DIV4

:QCAScope<n>:CDIVide?

Command	**:QCAScope<n>:CDIVide?** Summary >>
Syntax	:QCAScope<n>:CDIVide?<wsp><LIST|SET>
Description	Query the clock divider setting Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	**LIST**: Returns supported settings
	SET: Returns the current setting
Response	A single value, a comma-separated array of values, or the mapping between numerals and text format
Example	:QCAS1:CDIV? SET -> DIV4

:QCAScope<n>:CDIVide:INFO?

Command	**:QCAScope<n>:CDIVide:INFO?** Summary >>
Syntax	:QCAScope<n>:CDIVide:INFO?
Description	Query supported clock divider settings Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	N/A
Response	N/A
Example	

:QCAScope<n>:CHANnel:COUNt?

Command	**:QCAScope<n>:CHANnel:COUNt?** Summary >>
Syntax	:QCAScope<n>:CHANnel:COUNt?
Description	Query the number of channels of the QCA Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	N/A
Response	A single value
Example	:QCAS1:CHAN:COUN? -> 2

:QCAScope<n>:CONNect

Command	:QCAScope<n>:CONNect	Summary >>
Syntax	:QCAScope<n>:CONNect	
Description	Connect with a QCA instrument Index <n>: QCA instrument ID, this is an integer <1 to 8>.	
Parameters	N/A	
Response	N/A	
Example	:QCAS1:CONN	

:QCAScope<n>:DISConnect

Command	:QCAScope<n>:DISConnect	Summary >>
Syntax	:QCAScope<n>:DISConnect	
Description	Disconnect from a QCA instrument Index <n>: QCA instrument ID, this is an integer <1 to 8>.	
Parameters		
Response	N/A	
Example	:QCAS1:DISC	

:QCAScope<n>:INFO?

Command	`:QCAScope<n>:INFO?` Summary >>
Syntax	`:QCAScope<n>:INFO?`
Description	Query QCA instrument details Index `<n>`: QCA instrument ID, this is an integer <1 to 8>.
Parameters	N/A
Response	Returns QCA instrument details

Example	`:QCAS1:INFO? ->`
	`Company: Quantifi Photonics`
	`Model: xxxxxx`
	`Serial Number: xxxxxx`
	`Version: xxxxxx`
	`IP: xxxxxx`
	`Type: QCA`

:QCAScope<n>:PATTern

Command	**:QCAScope<n>:PATTern** Summary >>
Syntax	:QCAScope<n>:PATTern<wsp><PRBS7|EPRBs7|PRBS9|EPRBs9|PRBS11|EPRBs11|PRBS13|EPRBs13|PRBS15|EPRBs15|QSSPr|EPRB16>
Description	Set the test pattern length Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	**PRBS7**: PRBS7 (127 symbols)
	EPRBs7: EPRBs7 (128 symbols)
	PRBS9: PRBS9 (511 symbols)
	EPRBs9: EPRBs9 (512 symbols)
	PRBS11: PRBS11 (2047 symbols)
	EPRBs11: EPRBs11 (2048 symbols)
	PRBS13: PRBS13 (8191 symbols)
	EPRBs13: EPRBs13 (8192 symbols)
	PRBS15: PRBS15 (32767 symbols)
	EPRBs15: EPRBs15 (32768 symbols)
	QSSPr: QSSPr (65535 symbols)
	EPRB16: EPRB16 (65536 symbols)
Response	N/A
Example	:QCAS1:PATT PRBS15

:QCAScope<n>:PATTern?

Command	**:QCAScope<n>:PATTern?** Summary >>
Syntax	:QCAScope<n>:PATTern?<wsp><LIST|SET>
Description	Query the test pattern length Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	**LIST**: Lists the supported pattern lengths which are based on common test patterns
	SET: Returns the set pattern length
Response	
Example	:QCAS1:PATT? LIST -> PRBS7(127 symbols) EPRBs7(128 symbols) PRBS9(511 symbols) EPRBs9(512 symbols) PRBS11(2047 symbols) EPRBs11(2048 symbols) PRBS13(8191 symbols) EPRBs13(8192 symbols) PRBS15(32767 symbols) EPRBs15(32768 symbols) QSSPr(65535 symbols) EPRB16(65536 symbols)

:QCAScope<n>:PATTern:INFO?

Command	**:QCAScope<n>:PATTern:INFO?** Summary >>
Syntax	:QCAScope<n>:PATTern:INFO?
Description	Query supported test pattern lengths Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	N/A
Response	The mapping between numerals and text format :
Example	

:QCAScope<n>:PATTern:LOCK?

Command	:QCAScope<n>:PATTern:LOCK?	Summary >>
Syntax	:QCAScope<n>:PATTern:LOCK?	
Description	Query if signal lock is on or off Index <n>: QCA instrument ID, this is an integer <1 to 8>.	
Parameters	N/A	
Response		
Example	:QCAS1:PATT:LOCK?	

:QCAScope<n>:PTB

Command	:QCAScope<n>:PTB	Summary >>
Syntax	:QCAScope<n>:PTB<wsp><1|0|ON|OFF>	
Description	Set the precision timebase status When turned ON, VISEYE improves jitter performance by increasing sampling accuracy through hardware support. Index <n>: QCA instrument ID, this is an integer <1 to 8>.	
Parameters	**1|ON**:	
	0|OFF:	
Response	N/A	
Example	:QCAS1:PTB ON	

:QCAScope<n>:PTB?

Command	:QCAScope<n>:PTB?	Summary >>
Syntax	:QCAScope<n>:PTB?<wsp><LIST|SET>	
Description	Query the precision timebase status Index <n>: QCA instrument ID, this is an integer <1 to 8>.	
Parameters	**LIST**: Lists supported settings	
	SET: Returns current setting	
Response	:	
Example		

:QCAScope<n>:PTB:INFO?

Command	:QCAScope<n>:PTB:INFO? Summary >>
Syntax	:QCAScope<n>:PTB:INFO?
Description	Query supported precision timebase settings Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	N/A
Response	**1 | ON**: **0 | OFF**:
Example	

:QCAScope<n>:REMOve

Command	:QCAScope<n>:REMOve Summary >>
Syntax	:QCAScope<n>:REMOve Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Description	Remove a QCA instrument from VISEYE
Parameters	N/A
Response	N/A
Example	:QCAS1:REMO

:QCAScope<n>:ReSeT

Command	:QCAScope<n>:ReSeT Summary >>
Syntax	:QCAScope<n>:ReSeT
Description	Reset the QCA configuration Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	N/A
Response	N/A
Example	

:QCAScope<n>:SIRC:ADD

Command	**:QCAScope<n>:SIRC:ADD** Summary >>
Syntax	`:QCAScope<n>:SIRC:ADD<wsp><SIRCName>,[BandWidth],[Center],[Order],[RollOff],[FilterType]`
Description	Add a SIRC filter Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	**SIRCName**: Name of the SIRC filter
	BandWidth: Filter bandwidth
	Center: Central frequency between the upper and the lower cutoffs
	Order: Order of the filter
	RollOff: Steepness of the frequency transfer function
	FilterType: Filter type
Response	N/A
Example	

:QCAScope<n>:SIRC<m>:CENTer

Command	**:QCAScope<n>:SIRC<m>:CENTer** Summary >>
Syntax	`:QCAScope<n>:SIRC<m>:CENTer<wsp><value|MIN|MAX|DEF>`
Description	Set the central frequency between the upper and lower cutoffs of the the SIRC filter Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:QCAScope<n>:SIRC<m>:CENTer?

Command	**:QCAScope<n>:SIRC<m>:CENTer?** Summary >>
Syntax	:QCAScope<n>:SIRC<m>:CENTer?<wsp>[MIN|MAX|DEF|SET|ALL|UNITs]
Description	Query the central frequency between the upper and lower cutoffs of the the SIRC filter Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
	UNIT: Returns the default unit
Response	N/A
Example	

:QCAScope<n>:SIRC<m>:CENTer:UNITs?

Command	**:QCAScope<n>:SIRC<m>:CENTer:UNITs?** Summary >>
Syntax	:QCAScope<n>:SIRC<m>:CENTer:UNITs?
Description	Query the unit of the central frequency Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	N/A
Response	
Example	

:QCAScope<n>:SIRC<m>:FBANdwidth

Command	**:QCAScope<n>:SIRC<m>:FBANdwidth** Summary >>
Syntax	:QCAScope<n>:SIRC<m>:FBANdwidth<wsp><value|MIN|MAX|DEF>
Description	Set the bandwidth of the SIRC filter Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query MIN and MAX values.
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:QCAScope<n>:SIRC<m>:FBANdwidth?

Command	**:QCAScope<n>:SIRC<m>:FBANdwidth?** Summary >>
Syntax	:QCAScope<n>:SIRC<m>:FBANdwidth?<wsp>[MIN|MAX|DEF|SET|ALL|UNITs]
Description	Query the order of the SIRC filter Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
	UNIT: Returns the default unit
Response	N/A
Example	

:QCAScope<n>:SIRC<m>:FBANdwidth:UNITs?

Command	**:QCAScope<n>:SIRC<m>:FBANdwidth:UNITs?** Summary >>
Syntax	:QCAScope<n>:SIRC<m>:FBANdwidth:UNITs?
Description	Query the SIRC filter bandwidth unit Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	N/A
Response	
Example	

:QCAScope<n>:SIRC:INFO?

Command	**:QCAScope<n>:SIRC:INFO?** Summary >>
Syntax	:QCAScope<n>:SIRC:INFO?
Description	Query details Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	N/A
Response	
Example	:QCAS1:SIRC:INFO? -> Id:Name,BandWidth,Center,Order,RollOff,Filter Type 1:50 GHz,5.0000e+10,0.000000,4,0.000000,bessel 2:45 GHz,4.5000e+10,0.000000,4,0.000000,bessel 3:40 GHz,4.0000e+10,0.000000,4,0.000000,bessel 4:35 GHz,3.5000e+10,0.000000,4,0.000000,bessel 5:32 GHz,3.2000e+10,0.000000,4,0.000000,bessel 6:30 GHz,3.0000e+10,0.000000,4,0.000000,bessel 7:25 GHz,2.5000e+10,0.000000,4,0.000000,bessel 8:20 GHz,2.0000e+10,0.000000,4,0.000000,bessel 9:15 GHz,1.5000e+10,0.000000,4,0.000000,bessel

:QCAScope<n>:SIRC<m>:ORDer

Command	**:QCAScope<n>:SIRC<m>:ORDer** Summary >>
Syntax	:QCAScope<n>:SIRC<m>:ORDer<wsp><value|MIN|MAX|DEF>
Description	Set the order of the SIRC filter Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:QCAScope<n>:SIRC<m>:ORDer?

Command	**:QCAScope<n>:SIRC<m>:ORDer?** Summary >>
Syntax	:QCAScope<n>:SIRC<m>:ORDer?<wsp>[MIN|MAX|DEF|SET|ALL]
Description	Query the order of the SIRC filter Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	:QCA1:SIRC1:ORD? ALL -> 1,10,4,4

:QCAScope<n>:SIRC:RECall

Command	**:QCAScope<n>:SIRC:RECall** Summary >>
Syntax	:QCAScope<n>:SIRC:RECall<wsp><FilePath>
Description	Load a SIRC configuration file Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	**FilePath**: Loads a SIRC configuration file from this location
Response	N/A
Example	:QCAS1:SIRC:REC "C:\\Users\\user\\Desktop\\sirc.json"

:QCAScope<n>:SIRC<m>:REMOve

Command	**:QCAScope<n>:SIRC<m>:REMOve** Summary >>
Syntax	:QCAScope<n>:SIRC<m>:REMOve
Description	Remove a SIRC filter Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	
Response	N/A
Example	

:QCAScope<n>:SIRC<m>:RESPonse

Command	**:QCAScope<n>:SIRC<m>:RESPonse** Summary >>
Syntax	:QCAScope<n>:SIRC<m>:RESPonse<wsp><BESSel|GAUSsian|RCOSine|RRCoSine|BUTTerworth|SINC>
Description	Set the type of SIRC filter Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	**BESSel**:
	GAUSsian:
	RCOSine:
	RRCoSine:
	BUTTerworth:
	SINC:
Response	N/A
Example	

:QCAScope<n>:SIRC<m>:RESPonse?

Command	**:QCAScope<n>:SIRC<m>:RESPonse?** Summary >>
Syntax	:QCAScope<n>:SIRC<m>:RESPonse?
Description	Query the type of SIRC filter Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	N/A
Response	**BESSel**:
	GAUSsian:
	RCOSine:
	RRCoSine:
	BUTTerworth:
	SINC:
Example	

:QCAScope<n>:SIRC<m>:RESPonse:INFO?

Command	**:QCAScope<n>:SIRC<m>:RESPonse:INFO?** Summary >>
Syntax	:QCAScope<n>:SIRC<m>:RESPonse:INFO?
Description	Query supported filter types Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	N/A
Response	
Example	

:QCAScope<n>:SIRC<m>:RollOFF

Command	**:QCAScope<n>:SIRC<m>:RollOFF** Summary >>
Syntax	:QCAScope<n>:SIRC<m>:RollOFF<wsp><value|MIN|MAX|DEF>
Description	Set the steepness of the frequency transfer function Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:QCAScope<n>:SIRC<m>:RollOFF?

Command	**:QCAScope<n>:SIRC<m>:RollOFF?** Summary >>
Syntax	:QCAScope<n>:SIRC<m>:RollOFF?<wsp>[MIN|MAX|DEF|SET|ALL]
Description	Query the steepness of the frequency transfer function Index <n>: QCA instrument ID, this is an integer <1 to 8>. Index <m>: SIRC filter ID, this is an integer <1 to 32>.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

:QCAScope<n>:SIRC:SAVE

Command	**:QCAScope<n>:SIRC:SAVE** Summary >>
Syntax	:QCAScope<n>:SIRC:SAVE<wsp><"FilePath"|DEFault>
Description	Save currently configured SIRC filters Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	**FilePath**: Saves the SIRC filters into a new SIRC configuration file sirc.json in the defined location
	DEFault: Saves the SIRC filters into the default SIRC configuration file sirc.json
Response	N/A
Example	:QCAS1:SIRC:SAVE DEF :QCAS1:SIRC:SAVE "D:\\Temp\\SircConfig\\MySirc.json"

:QCAScope<n>:SRATe

Command	**:QCAScope<n>:SRATe** Summary >>
Syntax	:QCAScope<n>:SRATe<wsp><value>
Description	Set the symbol rate of the received signal Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	**<value>**: Sets this value
Response	N/A
Example	

:QCAScope<n>:SRATe?

Command	**:QCAScope<n>:SRATe?** Summary >>
Syntax	:QCAScope<n>:SRATe?<wsp><LIST|SET>
Description	Query the symbol rate of the received signal Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	**LIST**: Returns supported settings
	SET: Returns the current setting
Response	
Example	

:QCAScope<n>:SRATe:UNITs?

Command	**:QCAScope<n>:SRATe:UNITs?** Summary >>
Syntax	:QCAScope<n>:SRATe:UNITs?
Description	Query the symbol rate unit Index <n>: QCA instrument ID, this is an integer <1 to 8>.
Parameters	N/A
Response	
Example	

:QCAScope<n>:STATe?

Command	:QCAScope<n>:STATe?	Summary >>
Syntax	:QCAScope<n>:STATe?	
Description	Query the status of the QCA instrument Index <n>: QCA instrument ID, this is an integer <1 to 8>.	
Parameters	N/A	
Response		
Example		

:QCAScope<n>:UNAMe

Command	:QCAScope<n>:UNAMe	Summary >>
Syntax	:QCAScope<n>:UNAMe<wsp><label>	
Description	Set the QCA instrument label - this label will be used throughout VISEYE for all channels of the QCA. Index <n>: QCA instrument ID, this is an integer <1 to 8>.	
Parameters	**<label>**:	
Response	N/A	
Example	:QCAS1:UNAM INST0	

:QCAScope<n>:UNAMe?

Command	:QCAScope<n>:UNAMe?	Summary >>
Syntax	:QCAScope<n>:UNAMe?	
Description	Query the QCA instrument label Index <n>: QCA instrument ID, this is an integer <1 to 8>.	
Parameters	N/A	
Response	Returns the QCA instrument label	
Example	:QCAS1:UNAM? -> INST0	

10.9.3.3 Add data sources to the virtual instrument

Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.

Index <N>: QCA channel ID N is a letter <A|B|C|D>: A=channel 1, B=channel 2, C=channel 3, D=channel 4.

:SOURce?

Command	**:SOURce?** Summary >>
Syntax	:SOURce?<wsp><LIST>
Description	Query data sources in the virtual instrument
Parameters	**LIST**: Lists all data source that are currently set up in VISEYE for analysis
Response	
Example	:SOUR? LIST -> 1,QCA1,Instrument,PAM4 3,math_nod,Math,PAM4

:SOURce<n>:ADD

Command	**:SOURce<n>:ADD** Summary >>
Syntax	:SOURce<n>:ADD<wsp><PAM4|NRZ>,<SCOPE&CHANNEL>,<LABEL>
Description	Add a data source to the virtual instrument Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.
Parameters	**PAM4**:
	NRZ:
	SCOPE&CHANNEL: <Oscilloscope ID><channel ID N>
	LABEL:
Response	N/A
Example	:SOUR1:ADD NRZ,"1A","QCA1"

:SOURce<n>:FORMat

Command	:SOURce<n>:FORMat	Summary >>
Syntax	:SOURce<n>:FORMat<wsp><PAM4|NRZ>	
Description	Set the data source signal type Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.	
Parameters	**PAM4**:	
	NRZ:	
Response	N/A	
Example		

:SOURce<n>:FORMat?

Command	:SOURce<n>:FORMat?	Summary >>
Syntax	:SOURce<n>:FORMat?<wsp>[LIST|INFO]	
Description	Query the data source signal type Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.	
Parameters	**LIST**: lists supported signal types	
	INFO:	
Response		
Example		

:SOURce<n>:REMOve

Command	:SOURce<n>:REMOve	Summary >>
Syntax	:SOURce<n>:REMOve	
Description	Remove a data source from the virtual instrument Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.	
Parameters	N/A	
Response	N/A	
Example	:SOUR:REMO	

:SOURce<n>:UNAMe

Command	**:SOURce<n>:UNAMe**	Summary >>
Syntax	`:SOURce<n>:UNAMe<wsp><label>`	
Description	Set the data source label Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.	
Parameters	**label**:	
Response	N/A	
Example		

:SOURce<n>:UNAMe?

Command	**:SOURce<n>:UNAMe?**	Summary >>
Syntax	`:SOURce<n>:UNAMe?`	
Description	Query the data source label Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.	
Parameters	N/A	
Response		
Example		

:WMEMory<n>:FILE

Command	**:WMEMory<n>:FILE**	Summary >>
Syntax	:WMEMory<n>:FILE<wsp><PAM4|NRZ>,<filepath>,<LABEL>	
Description	Add a data source to the virtual instrument using the provided waveform file Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.	
Parameters	**PAM4**:	
	NRZ:	
	filepath:	
	LABEL:	
Response		
Example		

:WMEMory<n>:FILE:LOAD

Command	**:WMEMory<n>:FILE:LOAD**	Summary >>
Syntax	:WMEMory<n>:FILE:LOAD	
Description	Create a data source with the waveform file specified in :WMEMory<n>:FILE:NAME Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.	
Parameters	N/A	
Response	N/A	
Example		

:WMEMory<n>:FILE:NAME

Command	**:WMEMory<n>:FILE:NAME** Summary >>
Syntax	:WMEMory<n>:FILE:NAME<wsp><filepath>
Description	Select the waveform file name that will be used to create the data source The process of creating the data source is triggered by the command **:WMEMory<n>:FILE:LOAD**. Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.
Parameters	**filepath**:
Response	N/A
Example	

:WMEMory<n>:FILE:NAME?

Command	**:WMEMory<n>:FILE:NAME?** Summary >>
Syntax	:WMEMory<n>:FILE:NAME?
Description	Query the waveform file associated with the given data source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.
Parameters	N/A
Response	
Example	

:WMEMory<n>:SIGNal:TYPE

Command	**:WMEMory<n>:SIGNal:TYPE** Summary >>
Syntax	:WMEMory<n>:SIGNal:TYPE<wsp><PAM4|NRZ>
Description	Set the data source signal type Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.
Parameters	**PAM4**: **NRZ**:
Response	N/A
Example	

:WMEMory<n>:SIGNal:TYPE?

Command	**:WMEMory<n>:SIGNal:TYPE?** Summary >>
Syntax	:WMEMory<n>:SIGNal:TYPE?
Description	Query the data source signal type Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.
Parameters	N/A
Response	
Example	

:WMEMory<n>:UNAMe

Command	**:WMEMory<n>:UNAMe** Summary >>
Syntax	:WMEMory<n>:UNAMe<wsp><LABEL>
Description	Set the data source label Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.
Parameters	**<LABEL>**:
Response	N/A
Example	

:WMEMory<n>:UNAMe?

Command	**:WMEMory<n>:UNAMe?** Summary >>
Syntax	:WMEMory<n>:UNAMe?
Description	Query the data source label Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location (or slot) of the data source in the virtual instrument.
Parameters	N/A
Response	
Example	

10.9.4 Acquire data

Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.

:ACQuire:SINGle

Command	**:ACQuire:SINGle**	Summary >>
Syntax	:ACQuire:SINGle	
Description	Capture a single acquisition	
Parameters	N/A	
Response	N/A	
Example	:ACQ:SING	

:WAVeform<n>:EYE:ASCii:DATa?

Command	**:WAVeform<n>:EYE:ASCii:DATa?**	Summary >>
Syntax	:WAVeform<n>:EYE:ASCii:DATa?	
Description	Returns the points of the eye diagram in ASCII format Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.	
Parameters	N/A	
Response		
Example	:WAV1:EYE:ASC:DAT?	

:WAVeform<n>:EYE:COLumns?

Command	**:WAVeform<n>:EYE:COLumns?**	Summary >>
Syntax	:WAVeform<n>:EYE:COLumns?	
Description	Returns the number of horizontal data points (columns) in the eye diagram (horizontal resolution) Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.	
Parameters	N/A	
Response		
Example	:WAV1:EYE:COL?	

:WAVeform<n>:EYE:POINts?

Command	**:WAVeform<n>:EYE:POINts?** Summary >>
Syntax	:WAVeform<n>:EYE:POINts?
Description	Returns the number of points of the eye diagram Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.
Parameters	N/A
Response	
Example	:WAV1:EYE:POIN?

:WAVeform<n>:EYE:ROWS?

Command	**:WAVeform<n>:EYE:ROWS?** Summary >>
Syntax	:WAVeform<n>:EYE:ROWS?
Description	Returns the number of vertical data points (rows) in the eye diagram (vertical resolution) Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.
Parameters	N/A
Response	
Example	:WAV1:EYE:ROWS?

:WAVeform<n>:XYFormat:ASCii:XDATa?

Command	**:WAVeform<n>:XYFormat:ASCii:XDATa?** Summary >>
Syntax	:WAVeform<n>:XYFormat:ASCii:XDATa?
Description	Returns the x-axis values of the waveform in ASCII format Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.
Parameters	N/A
Response	
Example	:WAV1:XYF:ASC:XDAT?

:WAVeform<n>:XYFormat:ASCii:YDATa?

Command	**:WAVeform<n>:XYFormat:ASCii:YDATa?**	Summary >>
Syntax	:WAVeform<n>:XYFormat:ASCii:YDATa?	
Description	Returns the y-axis values of the waveform in ASCII format Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.	
Parameters	N/A	
Response		
Example	:WAV1:XYF:ASC:YDAT?	

:WAVeform<n>:XYFormat:POINts?

Command	**:WAVeform<n>:XYFormat:POINts?**	Summary >>
Syntax	:WAVeform<n>:XYFormat:POINts?	
Description	Returns the number of points of the waveform Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.	
Parameters	N/A	
Response		
Example	:WAV1:XYF:POIN?	

10.9.5 Add and read measurements

:MEASure:EYE:LIST:REMove

Command	**:MEASure:EYE:LIST:REMove**	Summary >>
Syntax	:MEASure:EYE:LIST:REMove<wsp><value>	
Description	Remove a measurement at a given location	
Parameters	**<value>**: Location index of a measurement	
Response	N/A	
Example	:MEAS:EYE:LIST:REM 13	

10.9.6 Build math waveforms

Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.

Index <m>: 1-based index of math node, default is 1

Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.

:FUNCtion[n]?

Command	**:FUNCtion[n]?** Summary >>
Syntax	:FUNCtion[n]?
Description	Query the math data source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.
Parameters	N/A
Response	
Example	:FUNC3? -> MATH-1 Index Primary Secondary 1 YOFFset INVert 2 INVert 4 AMPLify 5 AVALue 1 ALIGn 2 CTLequalizer 3 FFEQualizer 4 DIFFerence 5 CONVolve 6 DDEConvolve

:FUNCtion<n>:ADD

Command	**:FUNCtion<n>:ADD**	Summary >>
Syntax	:FUNCtion<n>:ADD<wsp><"name">,<wsp><m>[,<wsp><k>]	
Description	Create a math data source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.	
Parameters	**name**: Name of the math data source	
Response	N/A	
Example	:FUNC3:ADD "MATH-1", 1, 2	

:FUNCtion<n>:FOPerator[m]

Command	:FUNCtion<n>:FOPerator[m]	Summary >>
Syntax	:FUNCtion<n>:FOPerator[m]<wsp> <ADD|SUBTract|YOFFset|MULTiply|CMODe|INVert|AMPLify|SQUare|SROot|AVALue| AVERage|MEDian|MAX|MIN|DELay|ALIGn|CTLequalizer|FFEQualizer|DIFFerence| SUMMation|TEQualizer|BESSel|BUTTerworth|GAUSsian|RCOSine|RRCoSine|INTerpolate| CONVolve|DDEConvolve|RANDom|FFT|NONE>[,Level]	
Description	Create a math operator in a given math data source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1	
Parameters	**ADD**:	
	SUBTract:	
	YOFFset:	
	MULTiply:	
	CMODe:	
	INVert:	

Command	:FUNCtion<n>:FOPerator[m]	Summary >>
	AMPLify:	
	SQUare:	
	SROot:	
	AVALue:	
	AVERage:	
	MEDian:	
	MAX:	
	MIN:	
	DELay:	
	ALIGn:	
	CTLequalizer:	
	FFEQualizer:	
	DIFFerence:	
	SUMMation:	
	TEQualizer:	
	BESSel:	
	BUTTerworth:	
	GAUSsian:	
	RCOSine:	
	RRCoSine:	
	INTerpolate:	
	CONVolve:	
	DDEConvolve:	
	RANDom:	
	FFT:	
	NONE:	
	Level: Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.	
Response	N/A	
Example	:FUNC6:FOP2 INV, 1	

:FUNCtion<n>:FOPerator<m>?

Command	**:FUNCtion<n>:FOPerator<m>?**	Summary >>
Syntax	:FUNCtion<n>:FOPerator<m>?[<wsp><k>]	
Description	Query the math operator of the given math data source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.	
Parameters	**level**: Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.	
Response		
Example		

:FUNCtion[n]:FOPerator[m]:INFO?

Command	**:FUNCtion[n]:FOPerator[m]:INFO?**	Summary >>
Syntax	:FUNCtion[n]:FOPerator[m]:INFO?	
Description	Query all supported math operators Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1	
Parameters	N/A	
Response		
Example		

:FUNCtion<n>:OPERand1

Command	**:FUNCtion<n>:OPERand1** Summary >>
Syntax	:FUNCtion<n>:OPERand1<wsp><SOURce<m>>
Description	Set the primary input source of the math data source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	**SOURce<m>**: this defines the primary input source, either a waveform file, a QCA channel or a math waveform: WMEMory<n>| CHANnel<SCOPE&CHANNEL nN>| FUNCtion<n>)
Response	N/A
Example	

:FUNCtion<n>:OPERand1?

Command	**:FUNCtion<n>:OPERand1?** Summary >>
Syntax	:FUNCtion<n>:OPERand1?
Description	Query the primary input source of the math data source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.
Parameters	N/A
Response	
Example	:FUNC3:OPER1?

:FUNCtion<n>:OPERand2

Command	**:FUNCtion<n>:OPERand2** Summary >>
Syntax	:FUNCtion<n>:OPERand2<wsp><n>|<<SOURce<m>|NONE>
Description	Set the secondary input source of the math data source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	**SOURce<m>**: this defines the secondary input source, either a waveform file, a QCA channel or a math waveform: WMEMory<n>| CHANnel<SCOPE&CHANNEL nN>| FUNCtion<n>)
	NONE:
Response	N/A
Example	

:FUNCtion<n>:OPERand2?

Command	**:FUNCtion<n>:OPERand2?** Summary >>
Syntax	:FUNCtion<n>:OPERand2?
Description	Query the secondary input source of the math data source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.
Parameters	N/A
Response	
Example	:FUNC3:OPER2?

:FUNCtion<n>:REMOve

Command	**:FUNCtion<n>:REMOve**	Summary >>
Syntax	`:FUNCtion<n>:REMOve`	
Description	Remove a math data source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.	
Parameters	N/A	
Response	N/A	
Example	`:FUNC5:REMO`	

:FUNCtion<n>:UNAMe

Command	**:FUNCtion<n>:UNAMe**	Summary >>
Syntax	`:FUNCtion<n>:UNAMe<wsp><name>`	
Description	Set the name of the math data source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.	
Parameters	**name**: Name of the math data source	
Response	N/A	
Example		

:FUNCtion<n>:UNAMe?

Command	**:FUNCtion<n>:UNAMe?**	Summary >>
Syntax	`:FUNCtion<n>:UNAMe?`	
Description	Query the name of the math data source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument.	
Parameters	N/A	
Response		
Example		

:SPRocess<n>:AMPLify[m]:GAIN

Command	**:SPRocess<n>:AMPLify[m]:GAIN** Summary >>
Syntax	`:SPRocess<n>:AMPLify[m]:GAIN<wsp><value|MIN|MAX|DEF>[,<wsp><k>]`
Description	Set the Gain value of the Amplify operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of `k` is `1`, it refers to the primary data source. If a secondary data source is added to the math waveform, `2` refers to the secondary data source, `3` refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value.
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	`:SPR3:AMPL4:GAIN DEF, 1`

:SPRocess<n>:AMPLify[m]:GAIN?

Command	**:SPRocess<n>:AMPLify[m]:GAIN?** Summary >>
Syntax	:SPRocess<n>:AMPLify[m]:GAIN?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query the Gain value of the Amplify operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	:SPR3:AMPL4:GAIN? ALL, 1 -> -1.7977e+308,1.7977e+308,1.0000e+00,1.0000e+00

:SPRocess<n>:CONVolve[m]:ALIGn

Command	**:SPRocess<n>:CONVolve[m]:ALIGn** Summary >>
Syntax	:SPRocess<n>:CONVolve[m]:ALIGn<wsp><OFF|ON>[,<wsp><k>]
Description	Set the Align input and output waveforms value of the Apply s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**OFF**: Switches OFF
	ON: Switches ON
Response	
Example	

:SPRocess<n>:CONVolve[m]:ALIGn?

Command	**:SPRocess<n>:CONVolve[m]:ALIGn?** Summary >>
Syntax	:SPRocess<n>:CONVolve[m]:ALIGn?<wsp>[k]
Description	Query the Align input and output waveforms value of the Apply s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	
Response	
Example	:SPR6:CONV5:ALIGn? 3 -> ON

:SPRocess<n>:CONVolve[m]:ALIGn:INFO?

Command	**:SPRocess<n>:CONVolve[m]:ALIGn:INFO?** Summary >>
Syntax	:SPRocess<n>:CONVolve[m]:ALIGn:INFO?
Description	Query supported values Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	:SPR6:CONV5:ALIG:INFO? -> ON

:SPRocess<n>:CONVolve[m]:FNAMe

Command	**:SPRocess<n>:CONVolve[m]:FNAMe** Summary >>
Syntax	:SPRocess<n>:CONVolve[m]:FNAMe<wsp>"<filepathname>"[,<wsp><k>]
Description	Set the S parameter file name of the Apply s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	**filepathname**:
Response	
Example	SPR6:CONV5:FNAM "C:\Users\qpuser\Desktop\s2pexample.s2p", 3

:SPRocess<n>:CONVolve[m]:FNAMe?

Command	**:SPRocess<n>:CONVolve[m]:FNAMe? 3** Summary >>
Syntax	:SPRocess<n>:CONVolve[m]:FNAMe?[<wsp><k>]
Description	Query the S parameter file name of the Apply s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	:SPR6:CONV5:FNAMe? 3 -> C:\Users\qpuser\Desktop\s2pexample.s2p

:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT

Command	**:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT** Summary >>
Syntax	:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set the Freq upper limit value of the Apply s2p operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT?

Command	**:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT?** Summary >>
Syntax	:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT?<wsp>[MIN|MAX|DEF|SET|ALL|UNITs][,<wsp><k>]
Description	Query Freq upper limit value of the Apply s2p operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
	UNITs: Returns the default unit
Response	
Example	

:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT:AUTo

Command	**:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT:AUTo** Summary >>
Syntax	:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT:AUTo<wsp><OFF|ON>[,<wsp><k>]
Description	Set auto upper limit for frequency of the Apply s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**OFF**: Switches auto upper limit OFF
	ON: Switches auto upper limit ON
Response	
Example	:SPR5:CONV6:FREQ:LMT:AUT ON, 3

:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT:AUTo?

Command	**:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT:AUTo?** Summary >>
Syntax	:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT:AUTo?[<wsp><k>]
Description	Query auto upper limit for frequency of the Apply s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	:SPR6:CONV5:FREQuency:LiMiT:AUTo? 3 -> ON

:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT:AUTo:INFO?

Command	**:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT:AUTo:INFO?** Summary >>
Syntax	:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT:AUTo:INFO?
Description	Query supported auto upper limit for frequency settings Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	:SPR6:CONV5:FREQ:LMT:AUT:INFO? -> ON

:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT:UNITs?

Command	**:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT:UNITs?** Summary >>
Syntax	:SPRocess<n>:CONVolve[m]:FREQuency:LiMiT:UNITs?[<wsp><k>]
Description	Query Freq upper limit unit Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:CTLequalizer[m]:GAIN

Command	**:SPRocess<n>:CTLequalizer[m]:GAIN** Summary >>
Syntax	:SPRocess<n>:CTLequalizer[m]:GAIN<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set the Gain value of the CTLE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	:SPR3:CTL7:GAIN DEF, 1

:SPRocess<n>:CTLequalizer[m]:GAIN?

Command	:SPRocess<n>:CTLequalizer[m]:GAIN? Summary >>
Syntax	:SPRocess<n>:CTLequalizer[m]:GAIN?<wsp>[MIN|MAX|DEF|SET|ALL|UNITs][,<wsp><k>]
Description	Query the Gain value of the CTLE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	:SPR3:CTL7:GAIN? SET, 1

:SPRocess<n>:CTLequalizer[m]:GAIN:UNITs?

Command	:SPRocess<n>:CTLequalizer[m]:GAIN:UNITs? Summary >>
Syntax	:SPRocess<n>:CTLequalizer[m]:GAIN:UNITs?[<wsp><k>]
Description	Query Gain unit Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	:SPR3:CTL7:GAIN? UNIT, 1 -> dB

:SPRocess<n>:CTLequalizer[m]:PEAK

Command	**:SPRocess<n>:CTLequalizer[m]:PEAK** Summary >>
Syntax	:SPRocess<n>:CTLequalizer[m]:PEAK<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set the Peak frequency value of the CTLE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	:SPR3:CTL7:PEAK DEF, 1

:SPRocess<n>:CTLequalizer[m]:PEAK?

Command	**:SPRocess<n>:CTLequalizer[m]:PEAK?** Summary >>
Syntax	:SPRocess<n>:CTLequalizer[m]:PEAK?<wsp>[MIN|MAX|DEF|SET|ALL|UNITs][,<wsp><k>]
Description	Query the Peak frequency value of the CTLE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	:SPR3:CTL7:PEAK? ALL, 1 -> 5.0000e+08,1.7977e+308,1.3000e+10,1.3000e+10

:SPRocess<n>:CTLequalizer[m]:PEAK:UNITs?

Command	**:SPRocess<n>:CTLequalizer[m]:PEAK:UNITs?** Summary >>
Syntax	:SPRocess<n>:CTLequalizer[m]:PEAK:UNITs?[<wsp><k>]
Description	Query Peak frequency unit Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	:SPR3:CTL7:PEAK? UNIT, 1 -> Hz

:SPRocess<n>:DEConvolve[m]:ALIGn

Command	**:SPRocess<n>:DEConvolve[m]:ALIGn** Summary >>
Syntax	`:SPRocess<n>:DEConvolve[m]:ALIGn<wsp><OFF|ON>[,<wsp><k>]`
Description	Set the Align input and output waveforms value of the Remove s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**OFF**: Switches OFF
	ON: Switches ON
Response	
Example	

:SPRocess<n>:DEConvolve[m]:ALIGn?

Command	**:SPRocess<n>:DEConvolve[m]:ALIGn?** Summary >>
Syntax	`:SPRocess<n>:DEConvolve[m]:ALIGn?[<wsp><k>]`
Description	Query the Align input and output waveforms value of the Remove s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	`:SPR6:DEC6]:ALIG? 3 -> ON`

:SPRocess<n>:DEConvolve[m]:ALIGn:INFO?

Command	**:SPRocess<n>:DEConvolve[m]:ALIGn:INFO?** Summary >>
Syntax	`:SPRocess<n>:DEConvolve[m]:ALIGn:INFO?`
Description	Query supported values Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	`:SPR6:DEC6:ALIG:INFO? -> ON`

:SPRocess<n>:DEConvolve[m]:FNAMe

Command	**:SPRocess<n>:DEConvolve[m]:FNAMe** Summary >>
Syntax	`:SPRocess<n>:DEConvolve[m]:FNAMe<wsp>"<filepathname>"[,<wsp><k>]`
Description	Set the S parameter file name of the Remove s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of `k` is `1`, it refers to the primary data source. If a secondary data source is added to the math waveform, `2` refers to the secondary data source, `3` refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**`filepathname`**:
Response	
Example	`:SPR6:DEC6:FNAM "C:\Users\qpuser\Desktop\s2pexample.s2p", 3`

:SPRocess<n>:DEConvolve[m]:FNAMe?

Command	**:SPRocess<n>:DEConvolve[m]:FNAMe?** Summary >>
Syntax	:SPRocess<n>:DEConvolve[m]:FNAMe?[<wsp><k>]
Description	Query the S parameter file name of the Remove s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	:SPR6:DEC6:FNAM? 3 -> C:\Users\qpuser\Desktop\s2pexample.s2p

:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT

Command	**:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT** Summary >>
Syntax	:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set the Freq upper limit value of the Remove s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT?

Command	**:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT?** Summary >>
Syntax	:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT?<wsp>[MIN|MAX|DEF|SET|ALL|UNITs][,<wsp><k>]
Description	Query Freq upper limit level of the Remove s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
	UNITs: Returns the default unit
Response	
Example	

:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT:AUTo

Command	**:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT:AUTo** Summary >>
Syntax	:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT:AUTo<wsp><OFF|ON>[,<wsp><k>]
Description	Set auto upper limit for frequency of the Remove s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**OFF**: Switches auto upper limit OFF
	ON: Switches auto upper limit ON
Response	
Example	

:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT:AUTo?

Command	**:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT:AUTo?** Summary >>
Syntax	:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT:AUTo?[<wsp><k>]
Description	Query auto upper limit for frequency of the Remove s2p file operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	:SPR6:DEC6:FREQ:LMT:AUT? 3 -> ON

:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT:AUTo:INFO?

Command	:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT:AUTo:INFO?	Summary >>
Syntax	:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT:AUTo:INFO?	
Description	Query supported auto upper limit for frequency settings Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1	
Parameters	N/A	
Response		
Example	:SPR6:DEC6:FREQ:LMT:AUT:INFO? -> ON	

:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT:UNITs?

Command	:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT:UNITs?	Summary >>
Syntax	:SPRocess<n>:DEConvolve[m]:FREQuency:LiMiT:UNITs?[<wsp><k>]	
Description	Query Freq upper limit unit Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.	
Parameters		
Response		
Example		

:SPRocess<n>:FFEQualizer[m]:NPRecursors

Command	**:SPRocess<n>:FFEQualizer[m]:NPRecursors** Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:NPRecursors<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set the Precursors value of the FFE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	:SPR3:FFEQ8:NPR DEF, 1

:SPRocess<n>:FFEQualizer[m]:NPRecursors?

Command	:SPRocess<n>:FFEQualizer[m]:NPRecursors? Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:NPRecursors?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query the Precursors value of the FFE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	:SPR3:FFEQ8:NPR? ALL, 1 -> 1,30,2,2

:SPRocess<n>:FFEQualizer[m]:SIGNal:FORMat

Command	:SPRocess<n>:FFEQualizer[m]:SIGNal:FORMat Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:SIGNal:FORMat<wsp><PAM4|NRZ>[,<wsp><k>]
Description	Set the Signal type of the FFE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**PAM4**: Sets the parameter to PAM4
	NRZ: Sets the parameter to NRZ
Response	
Example	:SPR3:FFEQ8:SIGN:FORM PAM4, 1

:SPRocess<n>:FFEQualizer[m]:SIGNal:FORMat?

Command	**:SPRocess<n>:FFEQualizer[m]:SIGNal:FORMat?** Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:SIGNal:FORMat?[<wsp><k>]
Description	Query the Signal type of the FFE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	:SPR3:FFEQ8:SIGN:FORM? 1 -> PAM4

:SPRocess<n>:FFEQualizer[m]:SIGNal:FORMat:INFO?

Command	**:SPRocess<n>:FFEQualizer[m]:SIGNal:FORMat:INFO?** Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:SIGNal:FORMat:INFO?
Description	Query supported Signal types Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	:SPR3:FFEQ8:SIGN:FORM:INFO? -> PAM4

:SPRocess<n>:FFEQualizer[m]:TAPS

Command	**:SPRocess<n>:FFEQualizer[m]:TAPS** Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:TAPS<wsp><taps>[,<wsp><k>]
Description	Set Taps value parameter of FFE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:FFEQualizer[m]:TAPS?

Command	**:SPRocess<n>:FFEQualizer[m]:TAPS?** Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:TAPS?[<wsp><k>]
Description	Query Tap values parameter of FFE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	:SPR3:FFEQ8:TAPS? 1 -> -0.020786, -0.005901, 1.026687

:SPRocess<n>:FFEQualizer[m]:TAPS:AUTo

Command	**:SPRocess<n>:FFEQualizer[m]:TAPS:AUTo** Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:TAPS:AUTo<wsp><OFF|ON>[,<wsp><k>]
Description	Set the Automatic taps value of the FFE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**OFF**: Switches Automatic taps OFF
	ON: Switches Automatic taps ON
Response	
Example	:SPR3:FFEQ8:TAPS:AUT ON, 1

:SPRocess<n>:FFEQualizer[m]:TAPS:AUTo?

Command	**:SPRocess<n>:FFEQualizer[m]:TAPS:AUTo?** Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:TAPS:AUTo?[<wsp><k>]
Description	Query the Automatic taps value of the FFE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	:SPR3:FFEQ8:TAPS:AUT? 1 -> ON

:SPRocess<n>:FFEQualizer[m]:TAPS:AUTo:INFO?

Command	**:SPRocess<n>:FFEQualizer[m]:TAPS:AUTo:INFO?** Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:TAPS:AUTo:INFO?
Description	Query supported Automatic taps values Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	

:SPRocess<n>:FFEQualizer[m]:TAPS:COUNt

Command	**:SPRocess<n>:FFEQualizer[m]:TAPS:COUNt** Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:TAPS:COUNt<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set the Number of taps value of the FFE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	:SPR3:FFEQ8:TAPS:COUN MIN, 1

:SPRocess<n>:FFEQualizer[m]:TAPS:COUNt?

Command	**:SPRocess<n>:FFEQualizer[m]:TAPS:COUNt?** Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:TAPS:COUNt?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query the Number of taps value of the FFE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

:SPRocess<n>:FFEQualizer[m]:TSPacing:TPUI?

Command	**:SPRocess<n>:FFEQualizer[m]:TSPacing:TPUI?** Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:TSPacing:TPUI?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query the Taps per UI value of the FFE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	:SPR3:FFEQ8:TSP:TPUI? ALL, 1 -> 1,99,1,1

:SPRocess<n>:FFEQualizer[m]:TSPacing:TPUI

Command	**:SPRocess<n>:FFEQualizer[m]:TSPacing:TPUI** Summary >>
Syntax	:SPRocess<n>:FFEQualizer[m]:TSPacing:TPUI<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set the Taps per UI value of the FFE operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	:SPR3:FFEQ8:TSP:TPUI DEF, 1

:SPRocess<n>:TEQualizer[m]:BIN:COUNt

Command	**:SPRocess<n>:TEQualizer[m]:BIN:COUNt** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:BIN:COUNt<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set Number of Bins Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:BIN:COUNt?

Command	**:SPRocess<n>:TEQualizer[m]:BIN:COUNt?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:BIN:COUNt?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query Number of Bins Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

:SPRocess<n>:TEQualizer[m]:HWIDth

Command	**:SPRocess<n>:TEQualizer[m]:HWIDth** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:HWIDth<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set HistWidth Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:HWIDth?

Command	**:SPRocess<n>:TEQualizer[m]:HWIDth?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:HWIDth?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query HistWidth Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

:SPRocess<n>:TEQualizer[m]:LHTime

Command	**:SPRocess<n>:TEQualizer[m]:LHTime** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:LHTime<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set LeftHistPosition Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:LHTime?

Command	**:SPRocess<n>:TEQualizer[m]:LHTime?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:LHTime?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query LeftHistPosition Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

:SPRocess<n>:TEQualizer[m]:MNPRecursors

Command	**:SPRocess<n>:TEQualizer[m]:MNPRecursors** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:MNPRecursors<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set Number of Precursors Max Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:MNPRecursors?

Command	**:SPRocess<n>:TEQualizer[m]:MNPRecursors?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:MNPRecursors?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query Number of Precursors Max Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

:SPRocess<n>:TEQualizer[m]:NPRecursors

Command	**:SPRocess<n>:TEQualizer[m]:NPRecursors** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:NPRecursors<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set Number of Precursors Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:NPRecursors?

Command	**:SPRocess<n>:TEQualizer[m]:NPRecursors?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:NPRecursors?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query Number of Precursors Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

:SPRocess<n>:TEQualizer[m]:NPRecursors:AUTo

Command	**:SPRocess<n>:TEQualizer[m]:NPRecursors:AUTo** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:NPRecursors:AUTo<wsp><OFF|ON>[,<wsp><k>]
Description	Set Auto Precursors settings Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**OFF**: Switches auto setting OFF
	ON: Switches auto setting ON
Response	
Example	

:SPRocess<n>:TEQualizer[m]:NPRecursors:AUTo?

Command	**:SPRocess<n>:TEQualizer[m]:NPRecursors:AUTo?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:NPRecursors:AUTo?[<wsp><k>]
Description	Query Auto Precursors setting Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:TEQualizer[m]:NPRecursors:AUTo:INFO?

Command	**:SPRocess<n>:TEQualizer[m]:NPRecursors:AUTo:INFO?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:NPRecursors:AUTo:INFO?
Description	Query supported settings Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	

:SPRocess<n>:TEQualizer[m]:OHSeparation

Command	**:SPRocess<n>:TEQualizer[m]:OHSeparation** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:OHSeparation<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set HistSpacing Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:OHSeparation?

Command	**:SPRocess<n>:TEQualizer[m]:OHSeparation?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:OHSeparation?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query HistSpacing Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

:SPRocess<n>:TEQualizer[m]:OHTHresholds

Command	**:SPRocess<n>:TEQualizer[m]:OHTHresholds** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:OHTHresholds<wsp><OFF|ON>[,<wsp><k>]
Description	Set ThresholdOptimization setting Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**OFF**: Switches setting OFF
	ON: Switches setting ON
Response	
Example	

:SPRocess<n>:TEQualizer[m]:OHTHresholds?

Command	**:SPRocess<n>:TEQualizer[m]:OHTHresholds?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:OHTHresholds?[<wsp><k>]
Description	Query ThresholdOptimization setting Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:TEQualizer[m]:OHTHresholds:INFO?

Command	**:SPRocess<n>:TEQualizer[m]:OHTHresholds:INFO?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:OHTHresholds:INFO?
Description	Query supported settings Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	

:SPRocess<n>:TEQualizer[m]:OHTime

Command	**:SPRocess<n>:TEQualizer[m]:OHTime** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:OHTime<wsp><OFF|ON>[,<wsp><k>]
Description	Set HistOptimization Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**OFF**: Switches auto setting OFF
	ON: Switches auto setting ON
Response	
Example	

:SPRocess<n>:TEQualizer[m]:OHTime?

Command	**:SPRocess<n>:TEQualizer[m]:OHTime?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:OHTime?[<wsp><k>]
Description	Query HistOptimization Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:TEQualizer[m]:OHTime:INFO?

Command	**:SPRocess<n>:TEQualizer[m]:OHTime:INFO?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:OHTime:INFO?
Description	Query supported settings Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	

:SPRocess<n>:TEQualizer[m]:OHTLimit

Command	**:SPRocess<n>:TEQualizer[m]:OHTLimit** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:OHTLimit<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set HistAdjustLimit Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:OHTLimit?

Command	**:SPRocess<n>:TEQualizer[m]:OHTLimit?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:OHTLimit?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query HistAdjustLimit Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:FILE:FORMat

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:FILE:FORMat** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:FILE:FORMat<wsp><BINary|TeXT>[,<wsp><k>]
Description	Select Source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**BINary**: Binary file
	TeXT: Text file
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:FILE:FORMat?

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:FILE:FORMat?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:FILE:FORMat?[<wsp><k>]
Description	Query Source Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:FILE:FORMat:INFO?

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:FILE:FORMat:INFO?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:FILE:FORMat:INFO?
Description	Query supported settings Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:FILE:NAME

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:FILE:NAME** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:FILE:NAME<wsp><FilePath>[k]
Description	Set the File name Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**filepathname**:
Response	
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:FILE:NAME?

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:FILE:NAME?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:FILE:NAME?[<wsp><k>]
Description	Query the File name Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:KPATtern

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:KPATtern** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:KPATtern<wsp><QSSPr|PRBS9|PRBS13|PRBS15>[,<wsp><k>]
Description	Set Pattern Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**QSSPr**:
	PRBS9:
	PRBS13:
	PRBS15:
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:KPATtern?

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:KPATtern?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:KPATtern?[<wsp><k>]
Description	Query Pattern Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:KPATtern:INFO?

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:KPATtern:INFO?**	Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:KPATtern:INFO?	
Description	Query supported settings Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1	
Parameters	N/A	
Response		
Example		

:SPRocess<n>:TEQualizer[m]:PATTern:MODE

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:MODE**	Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:MODE<wsp><AUTodetect|KPATtern|PFILe|PRBS}> [,<wsp><k>]	
Description	Set Reference type Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.	
Parameters	**AUTodetect**:	
	KPATtern:	
	PFILe:	
	PRBS:	
Response	N/A	
Example		

:SPRocess<n>:TEQualizer[m]:PATTern:MODE?

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:MODE?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:MODE?[<wsp><k>]
Description	Query Reference type Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:MODE:INFO?

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:MODE:INFO?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:MODE:INFO?
Description	Query supported settings Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ENCode

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ENCode** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ENCode<wsp><AUTo|BINary|GRAY>[,<wsp><k>]
Description	Set Encoding Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**AUTo**:
	BINary:
	GRAY:
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ENCode?

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ENCode?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ENCode?[<wsp><k>]
Description	Query Encoding Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ENCode:INFO?

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ENCode:INFO?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ENCode:INFO?
Description	Query supported settings Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:MODE

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:MODE** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:MODE<wsp><AUTo|ODD|EVEN>[,<wsp><k>]
Description	Select even/odd
Parameters	**AUTo**:
	ODD:
	EVEN:
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:MODE?

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:MODE?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:MODE?[<wsp><k>]
Description	Query Reference type Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:MODE:INFO?

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:MODE:INFO?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:MODE:INFO?
Description	Query supported settings Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ORDer

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ORDer** Summary >>
Syntax	:SPRocess<n>:TEQualizer [m]:PATTern:PRBS:ORDer<wsp><AUTo|6|7|8|9|10|11|12|13|14|15|16|20|23|31>[,<wsp><k>]
Description	Set PRBS order Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**AUTo**:
	6:
	7:
	8:
	9:
	10:
	11:
	12:
	13:
	14:
	15:
	16:
	20:
	23:
	31:
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ORDer?

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ORDer?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ORDer?[<wsp><k>]
Description	Query PRBS order Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ORDer:INFO?

Command	**:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ORDer:INFO?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:PATTern:PRBS:ORDer:INFO?
Description	Query supported settings Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	

:SPRocess<n>:TEQualizer[m]:RHTime

Command	**:SPRocess<n>:TEQualizer[m]:RHTime** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:RHTime<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set RightHistPosition Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:RHTime?

Command	**:SPRocess<n>:TEQualizer[m]:RHTime?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:RHTime?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query RightHistPosition Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

:SPRocess<n>:TEQualizer[m]:TALimit

Command	**:SPRocess<n>:TEQualizer[m]:TALimit** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:TALimit<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set ThresholdsAdjLimit Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:TALimit?

Command	**:SPRocess<n>:TEQualizer[m]:TALimit?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:TALimit?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query ThresholdsAdjLimit Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

:SPRocess<n>:TEQualizer[m]:TAPS

Command	**:SPRocess<n>:TEQualizer[m]:TAPS** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:TAPS<wsp><taps>[,<wsp><k>]
Description	Set Taps of the TDECQ Reference Equalizer operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**taps**:
Response	
Example	

:SPRocess<n>:TEQualizer[m]:TAPS?

Command	**:SPRocess<n>:TEQualizer[m]:TAPS?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:TAPS?[<wsp><k>]
Description	Query Taps of the TDECQ Reference Equalizer operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:TEQualizer[m]:TAPS:AUTo

Command	**:SPRocess<n>:TEQualizer[m]:TAPS:AUTo** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:TAPS:AUTo<wsp><OFF|ON>[,<wsp><k>]
Description	Set Auto Precursors setting of the TDECQ Reference Equalizer operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**OFF**: Switches auto setting OFF
	ON: Switches auto setting ON
Response	
Example	

:SPRocess<n>:TEQualizer[m]:TAPS:AUTo?

Command	**:SPRocess<n>:TEQualizer[m]:TAPS:AUTo?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:TAPS:AUTo?[<wsp><k>]
Description	Query Auto Precursors setting of the TDECQ Reference Equalizer operator Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:TEQualizer[m]:TAPS:AUTo:INFO?

Command	**:SPRocess<n>:TEQualizer[m]:TAPS:AUTo:INFO?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:TAPS:AUTo:INFO?
Description	Query supported Auto Precursors settings Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1
Parameters	N/A
Response	
Example	

:SPRocess<n>:TEQualizer[m]:TAPS:COUNt

Command	**:SPRocess<n>:TEQualizer[m]:TAPS:COUNt** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:TAPS:COUNt<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set Number of Taps Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:TAPS:COUNt?

Command	**:SPRocess<n>:TEQualizer[m]:TAPS:COUNt?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:TAPS:COUNt?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query Number of Taps Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

:SPRocess<n>:TEQualizer[m]:TSER

Command	**:SPRocess<n>:TEQualizer[m]:TSER** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:TSER<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set TargetSER Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:TEQualizer[m]:TSER?

Command	**:SPRocess<n>:TEQualizer[m]:TSER?** Summary >>
Syntax	:SPRocess<n>:TEQualizer[m]:TSER?<wsp>[MIN|MAX|DEF|SET|ALL][,<wsp><k>]
Description	Query TargetSER Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

:SPRocess<n>:YOFFset[m]:UNITs?

Command	**:SPRocess<n>:YOFFset[m]:UNITs?** Summary >>
Syntax	:SPRocess<n>:YOFFset[m]:UNITs?[<wsp><k>]
Description	Query Offset unit Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	
Response	
Example	

:SPRocess<n>:YOFFset[m]:VALue

Command	**:SPRocess<n>:YOFFset[m]:VALue** Summary >>
Syntax	:SPRocess<n>:YOFFset[m]:VALue<wsp><value|MIN|MAX|DEF>[,<wsp><k>]
Description	Set Offset value Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

:SPRocess<n>:YOFFset[m]:VALue?

Command	**:SPRocess<n>:YOFFset[m]:VALue?** Summary >>
Syntax	:SPRocess<n>:YOFFset[m]:VALue?<wsp>[MIN|MAX|DEF|SET|ALL|UNITs][,<wsp><k>]
Description	Query Offset value Index <n>: Data source ID, this is an integer <1 to 8>. This represents the location of the data source in the virtual instrument. Index <m>: 1-based index of math node, default is 1 Index <k>: Refers to the data source. The default value of k is 1, it refers to the primary data source. If a secondary data source is added to the math waveform, 2 refers to the secondary data source, 3 refers to the combined data source, where the primary and secondary data sources have merged.
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	
Example	

10.9.7 Manage VISEYE data

:DISK:SETup:RECall

Command	**:DISK:SETup:RECall** Summary >>
Syntax	:DISK:SETup:RECall<wsp><FilePath>
Description	Open a project from the specified file path
Parameters	**FilePath**: file path to the project settings file
Response	N/A
Example	

:DISK:SETup:SAVE

Command	**:DISK:SETup:SAVE** Summary >>
Syntax	:DISK:SETup:SAVE<wsp><FilePath>
Description	Save the current project in the specified file
Parameters	**FilePath**: Saves the current project in this file and location
Response	N/A
Example	

:DISK:WAVeform<n>:SAVE

Command	**:DISK:WAVeform<n>:SAVE** Summary >>
Syntax	:DISK:WAVeform<n>:SAVE<wsp><FilePath>
Description	Save the current waveform in the specified file
Parameters	**FilePath**: Saves the current waveform as a file in this location
Response	N/A
Example	

10.10 SCPI commands descriptions - Eye Measurements

10.10.1 Average

Command	**:MEASure:EYE:APOWer?** Summary >>
Syntax	:MEASure:EYE:APOWer?<wsp><CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt|UNIT>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
	UNIT: Measurement unit
Response	A single value
Example	:MEAS:EYE:APOW? CUR -> 3.4601e-04 :MEAS:EYE:APOW? UNIT -> V

Command	**:MEASure:EYE:APOWer** Summary >>
Syntax	:MEASure:EYE:APOWer
Description	Perform measurement on the current data source
Parameters	N/A
Response	N/A
Example	:MEAS:EYE:APOW

Command	**:MEASure:EYE:APOWer:SOURce?** Summary >>
Syntax	:MEASure:EYE:APOWer:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	:MEAS:EYE:APOW:SOUR? -> DataSource1

Command	**:MEASure:EYE:APOWer:SOURce**	Summary >>
Syntax	:MEASure:EYE:APOWer:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:APOW:SOUR 1	

Command	**:MEASure:EYE:APOWer:LOCation?**	Summary >>
Syntax	:MEASure:EYE:APOWer:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:APOWer:UNITs?**	Summary >>
Syntax	:MEASure:EYE:APOWer:UNITs?	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example		

10.10.2 Amplitude Peak-Peak

Command	**:MEASure:EYE:PAM:PPAMplitude?** Summary >>
Syntax	:MEASure:EYE:PAM:PPAMplitude?<wsp><CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt|UNIT>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
	UNIT: Measurement unit
Response	A single value
Example	:MEAS:EYE:PAM:PPAM? CUR -> 4.4842e-01 :MEAS:EYE:PAM:PPAM? UNIT -> V

Command	**:MEASure:EYE:PAM:PPAMplitude** Summary >>
Syntax	:MEASure:EYE:PAM:PPAMplitude
Description	Perform measurement on the current data source
Parameters	N/A
Response	N/A
Example	:MEAS:EYE:PAM:PPAM

Command	**:MEASure:EYE:PAM:PPAMplitude:SOURce?** Summary >>
Syntax	:MEASure:EYE:PAM:PPAMplitude:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	:MEAS:EYE:PAM:PPAM:SOUR? -> DataSource1

Command	**:MEASure:EYE:PAM:PPAMplitude:SOURce** Summary >>
Syntax	:MEASure:EYE:PAM:PPAMplitude:SOURce<wsp><SOURce<n>>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	**<SOURce<n>>**: data source ID
Response	N/A
Example	:MEAS:EYE:PAM:PPAM:SOUR 1

Command	**:MEASure:EYE:PAM:PPAMplitude:LOCation?**	Summary >>
Syntax	:MEASure:EYE:PAM:PPAMplitude:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	N/A	
Example		

Command	**:MEASure:EYE:PAM:PPAMplitude:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:PPAMplitude:UNITs?	
Description	Query the measurement unit	
Parameters	N/A	
Response	N/A	
Example		

10.10.3 NRZ Extinction Ratio

Command	**:MEASure:EYE:ERATio?**	Summary >>
Syntax	:MEASure:EYE:ERATio?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example		

Command	**:MEASure:EYE:ERATio**	Summary >>
Syntax	:MEASure:EYE:ERATio	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:ERATio:SOURce?**	Summary >>
Syntax	:MEASure:EYE:ERATio:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:ERATio:SOURce**	Summary >>
Syntax	:MEASure:EYE:ERATio:SOURce<wsp>SOURce<n>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:ERATio:LOCation?**	Summary >>
Syntax	`:MEASure:EYE:ERATio:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:ERATio:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:ERATio:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:ERATio:EBOundary?**	Summary >>
Syntax	`:MEASure:EYE:ERATio:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example		

Command	**:MEASure:EYE:ERATio:EBOundary**	Summary >>
Syntax	`:MEASure:EYE:ERATio:EBOundary<wsp><value|MIN|MAX|DEF>`	
Description	Set the horizontal boundary of the measurement	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example		

Command	**:MEASure:EYE:ERATio:EBOundary:UNITs?** Summary >>
Syntax	:MEASure:EYE:ERATio:EBOundary:UNITs?
Description	Query the horizontal boundary unit
Parameters	N/A
Response	
Example	

10.10.4 Eye Amplitude NRZ

Command	**:MEASure:EYE:AMPLitude?**	Summary >>
Syntax	:MEASure:EYE:AMPLitude?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example		

Command	**:MEASure:EYE:AMPLitude**	Summary >>
Syntax	:MEASure:EYE:AMPLitude	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:AMPL	

Command	**:MEASure:EYE:AMPLitude:SOURce?**	Summary >>
Syntax	:MEASure:EYE:AMPLitude:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:AMPL:SOUR? -> DataSource1	

Command	**:MEASure:EYE:AMPLitude:SOURce**	Summary >>
Syntax	:MEASure:EYE:AMPLitude:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:AMPL:SOUR 1	

Command	**:MEASure:EYE:AMPLitude:LOCation?**	Summary >>
Syntax	`:MEASure:EYE:AMPLitude:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:AMPLitude:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:AMPLitude:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example	`:MEAS:EYE:AMPL:UNIT? -> V`	

Command	**:MEASure:EYE:AMPLitude:EBOundary?**	Summary >>
Syntax	`:MEASure:EYE:AMPLitude:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**`MIN`**: Returns the minimum value	
	`MAX`: Returns the maximum value	
	`DEF`: Returns the default value	
	`SET`: Returns the set value	
	`ALL`: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	`UNIT`: Returns the default unit	
Response	N/A	
Example	`:MEAS:EYE:AMPL:EBO? SET -> 2.500000`	

Command	**:MEASure:EYE:AMPLitude:EBOundary**	Summary >>
Syntax	:MEASure:EYE:AMPLitude:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:AMPL:EBO 2.5	

Command	**:MEASure:EYE:AMPLitude:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:AMPLitude:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response		
Example	:MEAS:EYE:AMPL:EBO:UNIT? -> %	

10.10.5 Eye Amplitudes PAM

Command	**:MEASure:EYE:PAM:AMPLitude?**	Summary >>
Syntax	:MEASure:EYE:PAM:AMPLitude?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example		

Command	**:MEASure:EYE:PAM:AMPLitude**	Summary >>
Syntax	:MEASure:EYE:PAM:AMPLitude	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:PAM:AMPL	

Command	**:MEASure:EYE:PAM:AMPLitude:SOURce?**	Summary >>
Syntax	:MEASure:EYE:PAM:AMPLitude:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:AMPL:SOUR? -> DataSource1	

Command	**:MEASure:EYE:PAM:AMPLitude:SOURce**	Summary >>
Syntax	:MEASure:EYE:PAM:AMPLitude:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:PAM:AMPL:SOUR 1	

Command	**:MEASure:EYE:PAM:AMPLitude:EYE?**	Summary >>
Syntax	:MEASure:EYE:PAM:AMPLitude:EYE?	
Description	Query the eye to be measured	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:AMPL:EYE? -> EYE0	

Command	**:MEASure:EYE:PAM:AMPLitude:EYE**	Summary >>
Syntax	:MEASure:EYE:PAM:AMPLitude:EYE<wsp><EYE0|EYE1|EYE2>	
Description	Select the eye to be measured	
Parameters	**EYE0**:	
	EYE1:	
	EYE2:	
Response	N/A	
Example	:MEAS:EYE:PAM:AMPL:EYE EYE0	

Command	**:MEASure:EYE:PAM:AMPLitude:LOCation?**	Summary >>
Syntax	:MEASure:EYE:PAM:AMPLitude:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:AMPL:LOC? ->	

Command	**:MEASure:EYE:PAM:AMPLitude:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:AMPLitude:UNITs?	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:AMPL:UNIT? ->	

Command	**:MEASure:EYE:PAM:AMPLitude:EBOundary?**	Summary >>
Syntax	:MEASure:EYE:PAM:AMPLitude:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:PAM:AMPL:EBO? SET -> 2.5	

Command	**:MEASure:EYE:PAM:AMPLitude:EBOundary**	Summary >>
Syntax	:MEASure:EYE:PAM:AMPLitude:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:PAM:AMPL:EBO 2.5	

Command	**:MEASure:EYE:PAM:AMPLitude:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:AMPLitude:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:AMPL:EBO:UNIT? -> V	

10.10.6 Eye Center Voltage NRZ

Command	**:MEASure:EYE:ELEVel?**	Summary >>
Syntax	:MEASure:EYE:ELEVel?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example		

Command	**:MEASure:EYE:ELEVel**	Summary >>
Syntax	:MEASure:EYE:ELEVel	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:ELEV	

Command	**:MEASure:EYE:ELEVel:SOURce?**	Summary >>
Syntax	:MEASure:EYE:ELEVel:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:ELEV:SOUR? -> DataSource1	

Command	**:MEASure:EYE:ELEVel:SOURce**	Summary >>
Syntax	:MEASure:EYE:ELEVel:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEASure:EYE:ELEVel:SOURce 1	

Command	**:MEASure:EYE:ELEVel:LOCation?**	Summary >>
Syntax	`:MEASure:EYE:ELEVel:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:ELEVel:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:ELEVel:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example	`:MEAS:EYE:ELEV:UNIT? -> V`	

Command	**:MEASure:EYE:ELEVel:EBOundary?**	Summary >>
Syntax	`:MEASure:EYE:ELEVel:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:EYE:ELEV:EBO? SET -> 2.500000`	

Command	**:MEASure:EYE:ELEVel:EBOundary**	Summary >>
Syntax	:MEASure:EYE:ELEVel:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:ELEV:EBO 2.5	

Command	**:MEASure:EYE:ELEVel:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:ELEVel:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response		
Example	:MEAS:EYE:ELEV:EBO:UNIT? -> %	

Command	**:MEASure:EYE:ELEVel:VBOundary?**	Summary >>
Syntax	:MEASure:EYE:ELEVel:VBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the vertical boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:ELEV:VBO? SET -> 5.000000	

Command	**:MEASure:EYE:ELEVel:VBOundary**	Summary >>
Syntax	:MEASure:EYE:ELEVel:VBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the vertical boundary of the measurement This defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:ELEV:VBO 5.0	

Command	**:MEASure:EYE:ELEVel:VBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:ELEVel:VBOundary:UNITs?	
Description	Query the vertical boundary unit	
Parameters	N/A	
Response		
Example	:MEAS:EYE:ELEV:VBO:UNIT? -> %	

Command	**:MEASure:EYE:ELEVel:DEFine:EOPening:PROBability?**	Summary >>
Syntax	:MEASure:EYE:ELEVel:DEFine:EOPening:PROBability?<wsp>[MIN|MAX|DEF|SET|ALL]	
Description	Query the Probability value	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example	:MEAS:EYE:ELEV:DEF:EOP:PROB? SET -> 0.001000	

Command	**:MEASure:EYE:ELEVel:DEFine:EOPening:PROBability**	Summary >>
Syntax	:MEASure:EYE:ELEVel:DEFine:EOPening:PROBability<wsp><value|MIN|MAX|DEF>	
Description	Set the Probability value This defines the time or amplitude key points for eye metric calculation so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:ELEV:DEF:EOP:PROB 1e-3	

10.10.7 Eye Center Voltages PAM

Command	**:MEASure:EYE:PAM:ELEVel?**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example		

Command	**:MEASure:EYE:PAM:ELEVel**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:PAM:ELEV	

Command	**:MEASure:EYE:PAM:ELEVel:SOURce?**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:ELEV:SOUR? -> DataSource1	

Command	**:MEASure:EYE:PAM:ELEVel:SOURce**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEASure:EYE:PAM:ELEVel:SOURce 1	

Command	**:MEASure:EYE:PAM:ELEVel:EYE?**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel:EYE?	
Description	Query the eye to be measured	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:ELEV:EYE? -> EYE0	

Command	**:MEASure:EYE:PAM:ELEVel:EYE**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel:EYE<wsp><EYE0|EYE1|EYE2>	
Description	Select the eye to be measured	
Parameters	**EYE0**:	
	EYE1:	
	EYE2:	
Response	N/A	
Example	:MEAS:EYE:PAM:ELEV:EYE EYE0	

Command	**:MEASure:EYE:PAM:ELEVel:LOCation?**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:PAM:ELEVel:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel:UNITs?	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:ELEV:UNIT? -> V	

Command	**:MEASure:EYE:PAM:ELEVel:EBOundary?**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:PAM:ELEV:EBO? SET -> 2.500000	

Command	**:MEASure:EYE:PAM:ELEVel:EBOundary**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query MIN and MAX values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:PAM:ELEV:EBO 2.5	

Command	**:MEASure:EYE:PAM:ELEVel:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:ELEV:EBO:UNIT? -> %	

Command	**:MEASure:EYE:PAM:ELEVel:VBOundary?**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel:VBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the vertical boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:PAM:ELEV:VBO? SET -> 5.000000	

Command	**:MEASure:EYE:PAM:ELEVel:VBOundary**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel:VBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the vertical boundary of the measurement This defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:PAM:ELEV:VBO 5.0	

Command	**:MEASure:EYE:PAM:ELEVel:VBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:ELEVel:VBOundary:UNITs?	
Description	Query the vertical boundary unit	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:ELEV:VBO:UNIT? -> %	

Command	**:MEASure:EYE:PAM:ELEVel:DEFine:EOPening:PROBability?**	Summary >>
Syntax	`:MEASure:EYE:PAM:ELEVel:DEFine:EOPening:PROBability?<wsp>[MIN|MAX|DEF|SET|ALL]`	
Description	Query the Probability value	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example	`:MEAS:EYE:PAM:ELEV:DEF:EOP:PROB? SET -> 0.001000`	

Command	**:MEASure:EYE:PAM:ELEVel:DEFine:EOPening:PROBability**	Summary >>
Syntax	`:MEASure:EYE:PAM:ELEVel:DEFine:EOPening:PROBability<wsp><value|MIN|MAX|DEF>`	
Description	Set the Probability value This defines the time or amplitude key points for eye metric calculation so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:EYE:PAM:ELEV:DEF:EOP:PROB 1e-3`	

10.10.8 Eye Crossing Percentage

Command	**:MEASure:EYE:CROSsing?** Summary >>
Syntax	:MEASure:EYE:CROSsing?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	:MEAS:EYE:CROS? CUR -> 4.9637e+01

Command	**:MEASure:EYE:CROSsing** Summary >>
Syntax	:MEASure:EYE:CROSsing
Description	Perform measurement on the current data source
Parameters	N/A
Response	N/A
Example	:MEAS:EYE:CROS

Command	**:MEASure:EYE:CROSsing:SOURce?** Summary >>
Syntax	:MEASure:EYE:CROSsing:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	:MEAS:EYE:CROS:SOUR? -> DataSource1

Command	**:MEASure:EYE:CROSsing:SOURce** Summary >>
Syntax	:MEASure:EYE:CROSsing:SOURce<wsp><SOURce<n>>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	**<SOURce<n>>**: data source ID
Response	N/A
Example	:MEAS:EYE:CROS:SOUR 1

Command	**:MEASure:EYE:CROSsing:LOCation?** Summary >>
Syntax	`:MEASure:EYE:CROSsing:LOCation?`
Description	Query the location of the measurement in the current data source
Parameters	N/A
Response	**<n>**: Location value of the measurement in the current data source
	-1: The measurement does not exist in the data source
Example	

Command	**:MEASure:EYE:CROSsing:UNITs?** Summary >>
Syntax	`:MEASure:EYE:CROSsing:UNITs?`
Description	Query the measurement unit
Parameters	N/A
Response	A single value
Example	`:MEAS:EYE:CROS:UNIT? -> %`

Command	**:MEASure:EYE:CROSsing:EBOundary?** Summary >>
Syntax	`:MEASure:EYE:CROSsing:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`
Description	Query the horizontal boundary of the measurement
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
	UNIT: Returns the default unit
Response	N/A
Example	`:MEAS:EYE:CROS:EBO? SET -> 2.500000`

Command	**:MEASure:EYE:CROSsing:EBOundary**	Summary >>
Syntax	:MEASure:EYE:CROSsing:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:CROS:EBO 2.5	

Command	**:MEASure:EYE:CROSsing:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:CROSsing:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:CROS:EBO:UNIT? -> %	

10.10.9 Eye Height NRZ

Command	**:MEASure:EYE:EHEight?** Summary >>
Syntax	:MEASure:EYE:EHEight?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	

Command	**:MEASure:EYE:EHEight** Summary >>
Syntax	:MEASure:EYE:EHEight
Description	Perform measurement on the current data source
Parameters	N/A
Response	N/A
Example	:MEAS:EYE:EHE

Command	**:MEASure:EYE:EHEight:SOURce?** Summary >>
Syntax	:MEASure:EYE:EHEight:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	:MEAS:EYE:EHE:SOUR? -> DataSource1

Command	**:MEASure:EYE:EHEight:SOURce** Summary >>
Syntax	:MEASure:EYE:EHEight:SOURce<wsp><SOURce<n>>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	**<SOURce<n>>**: data source ID
Response	N/A
Example	:MEAS:EYE:EHE:SOUR 1

Command	**:MEASure:EYE:EHEight:LOCation?**	Summary >>
Syntax	`:MEASure:EYE:EHEight:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:EHEight:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:EHEight:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example	`:MEAS:EYE:EHE:UNIT? -> V`	

Command	**:MEASure:EYE:EHEight:EBOundary?**	Summary >>
Syntax	`:MEASure:EYE:EHEight:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:EYE:EHE:EBO? SET -> 2.500000`	

Command	**:MEASure:EYE:EHEight:EBOundary**	Summary >>
Syntax	`:MEASure:EYE:EHEight:EBOundary<wsp><value|MIN|MAX|DEF>`	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query `MIN` and `MAX` values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:EYE:EHE:EBO 2.5`	

Command	**:MEASure:EYE:EHEight:EBOundary:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:EHEight:EBOundary:UNITs?`	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response		
Example	`:MEAS:EYE:EHE:EBO:UNIT? -> %`	

Command	**:MEASure:EYE:EHEight:DEFine:EOPening:PROBability?**	Summary >>
Syntax	`:MEASure:EYE:EHEight:DEFine:EOPening:PROBability?<wsp>[MIN|MAX|DEF|SET|ALL]`	
Description	Query the Probability value	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example	`:MEAS:EYE:EHE:DEF:EOP:PROB? SET -> 0.001000`	

Command	**:MEASure:EYE:EHEight:DEFine:EOPening:PROBability**	Summary >>
Syntax	:MEASure:EYE:EHEight:DEFine:EOPening:PROBability<wsp><value|MIN|MAX|DEF>	
Description	Set the Probability value This defines the time or amplitude key points for eye metric calculation so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:EHE:DEF:EOP:PROB 1e-3	

Command	**:MEASure:EYE:EHEight:ESTiming?**	Summary >>
Syntax	:MEASure:EYE:EHEight:ESTiming?	
Description	Query the eye the optimization is performed for	
Parameters	N/A	
Response		
Example	:MEAS:EYE:EHE:EST? ->	

Command	**:MEASure:EYE:EHEight:ESTiming**	Summary >>
Syntax	:MEASure:EYE:EHEight:ESTiming<wsp><CEYE|PELevel>	
Description	Define the eye the optimization is performed for	
Parameters	**CEYE**: Middle eye	
	PELevel: Independently for lower, middle and upper eyes	
Response	N/A	
Example	:MEAS:EYE:EHE:EST	

Command	**:MEASure:EYE:EHEight:ESTiming:INFO?**	Summary >>
Syntax	:MEASure:EYE:EHEight:ESTiming:INFO?	
Description	Query options	
Parameters	N/A	
Response		
Example	:MEAS:EYE:EHE:EST:INFO?	

Command	**:MEASure:EYE:EHEight:ELMethod?**	Summary >>
Syntax	:MEASure:EYE:EHEight:ELMethod?	
Description	Query the calculation mode	
Parameters	N/A	
Response		
Example	:MEAS:EYE:EHE:ELM? ->	

Command	**:MEASure:EYE:EHEight:ELMethod**	Summary >>
Syntax	:MEASure:EYE:EHEight:ELMethod<wsp><IEEE|MEWidth|MEHeight>	
Description	Define the calculation mode	
Parameters	**IEEE**: as defined in IEEE Std 802.3-2022 120E.4.2	
	MEWidth: Optimum Eye Width	
	MEHeight: Optimum Eye Height	
Response	N/A	
Example	:MEAS:EYE:EHE:ELM IEEE	

Command	**:MEASure:EYE:EHEight:ELMethod:INFO?**	Summary >>
Syntax	:MEASure:EYE:EHEight:ELMethod:INFO?	
Description	Query options	
Parameters	N/A	
Response		
Example	:MEAS:EYE:EHE:ELM:INFO? ->	

10.10.10 Eye Heights PAM

Command	**:MEASure:EYE:PAM:EHEight?**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:EYE:PAM:EHE? CUR -> 5.6654e-02	

Command	**:MEASure:EYE:PAM:EHEight**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:PAM:EHE	

Command	**:MEASure:EYE:PAM:EHEight:SOURce?**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:EHE:SOUR? -> DataSource1	

Command	**:MEASure:EYE:PAM:EHEight:SOURce**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:PAM:EHE:SOUR 1	

Command	**:MEASure:EYE:PAM:EHEight:EYE?**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:EYE?	
Description	Query the eye to be measured	
Parameters	N/A	
Response	**EYE0**: Lower eye	
	EYE1: Middle eye	
	EYE2: Upper eye	
Example	:MEAS:EYE:PAM:EHE:EYE?	

Command	**:MEASure:EYE:PAM:EHEight:EYE**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:EYE<wsp><EYE0|EYE1|EYE2>	
Description	Select the eye to be measured	
Parameters	**EYE0**:	
	EYE1:	
	EYE2:	
Response	N/A	
Example	:MEAS:EYE:PAM:EHE:EYE EYE0	

Command	**:MEASure:EYE:PAM:EHEight:LOCation?**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:PAM:EHEight:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:UNITs?	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:PAM:EHEight:EBOundary?**	Summary >>
Syntax	`:MEASure:EYE:PAM:EHEight:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:EYE:PAM:EHE:EBO? SET -> 2.500000`	

Command	**:MEASure:EYE:PAM:EHEight:EBOundary**	Summary >>
Syntax	`:MEASure:EYE:PAM:EHEight:EBOundary<wsp><value|MIN|MAX|DEF>`	
Description	Set the horizontal boundary of the measurement	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query `MIN` and `MAX` values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:EYE:PAM:EHE:EBO 2.5`	

Command	**:MEASure:EYE:PAM:EHEight:EBOundary:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:PAM:EHEight:EBOundary:UNITs?`	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response		
Example	`:MEAS:EYE:PAM:EHE:EBO:UNIT? -> %`	

Command	**:MEASure:EYE:PAM:EHEight:DEFine:EOPening:PROBability?**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:DEFine:EOPening:PROBability?<wsp>[MIN|MAX|DEF|SET|ALL]	
Description	Query the Probability value	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example	:MEAS:EYE:PAM:EHE:DEF:EOP:PROB? SET -> 0.001000	

Command	**:MEASure:EYE:PAM:EHEight:DEFine:EOPening:PROBability**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:DEFine:EOPening:PROBability<wsp><value|MIN|MAX|DEF>	
Description	Set the Probability value	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:PAM:EHE:DEF:EOP:PROB 1e-3	

Command	**:MEASure:EYE:PAM:EHEight:ESTiming?**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:ESTiming?	
Description	Query the eye the optimization is performed for	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:EHE:EST? ->	

Command	**:MEASure:EYE:PAM:EHEight:ESTiming**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:ESTiming<wsp><CEYE|PELevel>	
Description	Define the eye the optimization is performed for	
Parameters	**CEYE**: Middle eye	
	PELevel: Independently for lower, middle and upper eyes	
Response	N/A	
Example	:MEAS:EYE:PAM:EHE:EST	

Command	**:MEASure:EYE:PAM:EHEight:ESTiming:INFO?**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:ESTiming:INFO?	
Description	Query options	
Parameters	N/A	
Response		
Example	:MEASure:EYE:PAM:EHE:ESTiming:INFO?	

Command	**:MEASure:EYE:PAM:EHEight:ELMethod?**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:ELMethod?	
Description	Query the calculation mode	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:EHE:ELM? ->	

Command	**:MEASure:EYE:PAM:EHEight:ELMethod**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:ELMethod<wsp><IEEE|MEWidth|MEHeight>	
Description	Define the calculation mode	
Parameters	**IEEE**: as defined in IEEE Std 802.3-2022 120E.4.2	
	MEWidth: Optimum Eye Width	
	MEHeight: Optimum Eye Height	
Response	N/A	
Example	:MEAS:EYE:PAM:EHE:ELM	

Command	**:MEASure:EYE:PAM:EHEight:ELMethod:INFO?**	Summary >>
Syntax	:MEASure:EYE:PAM:EHEight:ELMethod:INFO?	
Description	Query options	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:EHE:ELM:INFO? ->	

10.10.11 Eye One Level

Command	**:MEASure:EYE:OLEVel?**	Summary >>
Syntax	:MEASure:EYE:OLEVel?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:EYE:OLEV? CUR -> 1.7868e-01	

Command	**:MEASure:EYE:OLEVel**	Summary >>
Syntax	:MEASure:EYE:OLEVel	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:OLEV	

Command	**:MEASure:EYE:OLEVel:SOURce?**	Summary >>
Syntax	:MEASure:EYE:OLEVel:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:OLEV:SOUR? -> DataSource1	

Command	**:MEASure:EYE:OLEVel:SOURce**	Summary >>
Syntax	:MEASure:EYE:OLEVel:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:OLEV:SOUR 1	

Command	**:MEASure:EYE:OLEVel:LOCation?** Summary >>
Syntax	`:MEASure:EYE:OLEVel:LOCation?`
Description	Query the location of the measurement in the current data source
Parameters	N/A
Response	**<n>**: Location value of the measurement in the current data source
	-1: The measurement does not exist in the data source
Example	

Command	**:MEASure:EYE:OLEVel:UNITs?** Summary >>
Syntax	`:MEASure:EYE:OLEVel:UNITs?`
Description	Query the measurement unit
Parameters	N/A
Response	A single value
Example	`:MEAS:EYE:OLEV:UNIT? -> V`

Command	**:MEASure:EYE:OLEVel:EBOundary?** Summary >>
Syntax	`:MEASure:EYE:OLEVel:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`
Description	Query the horizontal boundary of the measurement
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
	UNIT: Returns the default unit
Response	N/A
Example	`:MEAS:EYE:OLEV:EBO? SET -> 2.500000`

Command	**:MEASure:EYE:OLEVel:EBOundary**	Summary >>
Syntax	:MEASure:EYE:OLEVel:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:OLEV:EBO 2.5	

Command	**:MEASure:EYE:OLEVel:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:OLEVel:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:OLEV:EBO:UNIT? -> %	

10.10.12 Eye Zero Level

Command	**:MEASure:EYE:ZLEVel?**	Summary >>
Syntax	:MEASure:EYE:ZLEVel?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:EYE:ZLEV? CUR -> -1.7789e-01	

Command	**:MEASure:EYE:ZLEVel**	Summary >>
Syntax	:MEASure:EYE:ZLEVel	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:ZLEV	

Command	**:MEASure:EYE:ZLEVel:SOURce?**	Summary >>
Syntax	:MEASure:EYE:ZLEVel:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:ZLEV:SOUR? -> DataSource1	

Command	**:MEASure:EYE:ZLEVel:SOURce**	Summary >>
Syntax	:MEASure:EYE:ZLEVel:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:ZLEV:SOUR 1	

Command	**:MEASure:EYE:ZLEVel:LOCation?**	Summary >>
Syntax	`:MEASure:EYE:ZLEVel:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	**<n>**: Location value of the measurement in the current data source	
	-1: The measurement does not exist in the data source	
Example		

Command	**:MEASure:EYE:ZLEVel:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:ZLEVel:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:EYE:ZLEV:UNIT? -> V`	

Command	**:MEASure:EYE:ZLEVel:EBOundary?**	Summary >>
Syntax	`:MEASure:EYE:ZLEVel:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:EYE:ZLEV:EBO? SET -> 2.500000`	

Command	**:MEASure:EYE:ZLEVel:EBOundary**	Summary >>
Syntax	:MEASure:EYE:ZLEVel:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:ZLEV:EBO 2.5	

Command	**:MEASure:EYE:ZLEVel:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:ZLEVel:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:ZLEV:EBO:UNIT? -> %	

10.10.13 PAM Levels

Command	**:MEASure:EYE:PAM:LEVel?**	Summary >>
Syntax	:MEASure:EYE:PAM:LEVel?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:EYE:PAM:LEV? CUR -> 1.7852e-01	

Command	**:MEASure:EYE:PAM:LEVel**	Summary >>
Syntax	:MEASure:EYE:PAM:LEVel	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:PAM:LEV	

Command	**:MEASure:EYE:PAM:LEVel:SOURce?**	Summary >>
Syntax	:MEASure:EYE:PAM:LEVel:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:LEV:SOUR? -> DataSource1	

Command	**:MEASure:EYE:PAM:LEVel:SOURce**	Summary >>
Syntax	:MEASure:EYE:PAM:LEVel:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:PAM:LEV:SOUR 1	

Command	**:MEASure:EYE:PAM:LEVel:LEVel?**	Summary >>
Syntax	:MEASure:EYE:PAM:LEVel:LEVel?	
Description	Query the level to be measured	
Parameters	N/A	
Response	**LEVel0**: Level 0	
	LEVel1: Level 1	
	LEVel2: Level 2	
	LEVel3: Level 3	
Example	:MEAS:EYE:PAM:LEV:LEV? -> LEVel0	

Command	**:MEASure:EYE:PAM:LEVel:LEVel**	Summary >>
Syntax	:MEASure:EYE:PAM:LEVel:LEVel<wsp><LEVel0|LEVel1|LEVel2|LEVel3>	
Description	Select the level to be measured	
Parameters	**LEVel0**: Level 0	
	LEVel1: Level 1	
	LEVel2: Level 2	
	LEVel3: Level 3	
Response	N/A	
Example	:MEAS:EYE:PAM:LEV:LEV LEV0	

Command	**:MEASure:EYE:PAM:LEVel:LOCation?**	Summary >>
Syntax	:MEASure:EYE:PAM:LEVel:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	**<n>**: Location value of the measurement in the current data source	
	-1: The measurement does not exist in the data source	
Example	:MEAS:EYE:PAM:LEV:LOC? -> 12	

Command	**:MEASure:EYE:PAM:LEVel:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:LEVel:UNITs?	
Description	Query the measurement unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:PAM:LEV:UNIT? -> V	

Command	**:MEASure:EYE:PAM:LEVel:EBOundary?** Summary >>
Syntax	`:MEASure:EYE:PAM:LEVel:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`
Description	Query the horizontal boundary of the measurement
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
	UNIT: Returns the default unit
Response	N/A
Example	`:MEAS:EYE:PAM:LEV:EBO? SET -> 2.500000`

Command	**:MEASure:EYE:PAM:LEVel:EBOundary** Summary >>
Syntax	`:MEASure:EYE:PAM:LEVel:EBOundary<wsp><value|MIN|MAX|DEF>`
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query `MIN` and `MAX` values.
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	`:MEAS:EYE:PAM:LEV:EBO 2.5`

Command	**:MEASure:EYE:PAM:LEVel:EBOundary:UNITs?** Summary >>
Syntax	`:MEASure:EYE:PAM:LEVel:EBOundary:UNITs?`
Description	Query the horizontal boundary unit
Parameters	N/A
Response	A single value
Example	`:MEAS:EYE:PAM:LEV:EBO:UNIT? -> %`

10.10.14 Eye Skews

Command	**:MEASure:EYE:PAM:ESKew?** Summary >>
Syntax	:MEASure:EYE:PAM:ESKew?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	:MEAS:EYE:PAM:ESK? CUR -> 5.7956e-12

Command	**:MEASure:EYE:PAM:ESKew** Summary >>
Syntax	:MEASure:EYE:PAM:ESKew
Description	Perform measurement on the current data source
Parameters	N/A
Response	N/A
Example	:MEAS:EYE:PAM:ESK

Command	**:MEASure:EYE:PAM:ESKew:SOURce?** Summary >>
Syntax	:MEASure:EYE:PAM:ESKew:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	:MEAS:EYE:PAM:ESK:SOUR? -> DataSource1

Command	**:MEASure:EYE:PAM:ESKew:SOURce** Summary >>
Syntax	:MEASure:EYE:PAM:ESKew:SOURce<wsp><SOURce<n>>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	**<SOURce<n>>**: data source ID
Response	N/A
Example	:MEAS:EYE:PAM:ESK:SOUR 1

Command	**:MEASure:EYE:PAM:ESKew:EYE?**	Summary >>
Syntax	:MEASure:EYE:PAM:ESKew:EYE?	
Description	Query the eye to be measured	
Parameters	N/A	
Response	**EYE0**: Lower eye	
	EYE1: Middle eye	
	EYE2: Upper eye	
Example	:MEAS:EYE:PAM:ESK:EYE? -> EYE0	

Command	**:MEASure:EYE:PAM:ESKew:EYE**	Summary >>
Syntax	:MEASure:EYE:PAM:ESKew:EYE<wsp><EYE0|EYE1|EYE2>	
Description	Select the eye to be measured	
Parameters	**EYE0**: Lower eye	
	EYE1: Middle eye	
	EYE2: Upper eye	
Response	N/A	
Example	:MEAS:EYE:PAM:ESK:EYE EYE0	

Command	**:MEASure:EYE:PAM:ESKew:LOCation?**	Summary >>
Syntax	:MEASure:EYE:PAM:ESKew:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	**<n>**: Location value of the measurement in the current data source	
	-1: The measurement does not exist in the data source	
Example	:MEAS:EYE:PAM:ESK:LOC? -> 11	

Command	**:MEASure:EYE:PAM:ESKew:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:ESKew:UNITs?	
Description	Query the measurement unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:PAM:ESK:UNIT? -> s	

Command	**:MEASure:EYE:PAM:ESKew:EBOundary?**	Summary >>
Syntax	`:MEASure:EYE:PAM:ESKew:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:EYE:PAM:ESK:EBO? SET -> 2.500000`	

Command	**:MEASure:EYE:PAM:ESKew:EBOundary**	Summary >>
Syntax	`:MEASure:EYE:PAM:ESKew:EBOundary<wsp><value|MIN|MAX|DEF>`	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query `MIN` and `MAX` values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:EYE:PAM:ESK:EBO 2.5`	

Command	**:MEASure:EYE:PAM:ESKew:EBOundary:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:PAM:ESKew:EBOundary:UNITs?`	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:EYE:PAM:ESK:EBO:UNIT? -> %`	

Command	**:MEASure:EYE:PAM:ESKew:VBOundary?**	Summary >>
Syntax	:MEASure:EYE:PAM:ESKew:VBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the vertical boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returnsall the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:PAM:ESK:VBO? SET -> 2.500000	

Command	**:MEASure:EYE:PAM:ESKew:VBOundary**	Summary >>
Syntax	:MEASure:EYE:PAM:ESKew:VBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the vertical boundary of the measurement This defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query MIN and MAX values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:PAM:ESK:VBO 2.5	

Command	**:MEASure:EYE:PAM:ESKew:VBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:ESKew:VBOundary:UNITs?	
Description	Query the vertical boundary unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:PAM:ESK:VBO:UNIT? -> %	

Command	**:MEASure:EYE:PAM:ESKew:DEFine:EOPening:PROBability?** Summary >>
Syntax	`:MEASure:EYE:PAM:ESKew:DEFine:EOPening:PROBability?<wsp>[MIN|MAX|DEF|SET|ALL]`
Description	Query the Probability value
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	N/A
Example	`:MEAS:EYE:PAM:ESK:DEF:EOP:PROB? SET -> 0.001000`

Command	**:MEASure:EYE:PAM:ESKew:DEFine:EOPening:PROBability** Summary >>
Syntax	`:MEASure:EYE:PAM:ESKew:DEFine:EOPening:PROBability<wsp><value|MIN|MAX|DEF>`
Description	Set the Probability value This defines the time or amplitude key points for eye metric calculation so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query `MIN` and `MAX` values.
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	`:MEAS:EYE:PAM:ESK:DEF:EOP:PROB 1e-3`

10.10.15 Eye Width NRZ

Command	**:MEASure:EYE:EWIDth?**	Summary >>
Syntax	:MEASure:EYE:EWIDth?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:EYE:EWID? CUR -> 2.2545e-11	

Command	**:MEASure:EYE:EWIDth**	Summary >>
Syntax	:MEASure:EYE:EWIDth	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:EWID	

Command	**:MEASure:EYE:EWIDth:SOURce?**	Summary >>
Syntax	:MEASure:EYE:EWIDth:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:EWID:SOUR? -> DataSource1	

Command	**:MEASure:EYE:EWIDth:SOURce**	Summary >>
Syntax	:MEASure:EYE:EWIDth:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:EWID:SOUR 1	

Command	**:MEASure:EYE:EWIDth:LOCation?** Summary >>
Syntax	`:MEASure:EYE:EWIDth:LOCation?`
Description	Query the location of the measurement in the current data source
Parameters	N/A
Response	**<n>**: Location value of the measurement in the current data source
	-1: The measurement does not exist in the data source
Example	

Command	**:MEASure:EYE:EWIDth:UNITs?** Summary >>
Syntax	`:MEASure:EYE:EWIDth:UNITs?`
Description	Query the measurement unit
Parameters	N/A
Response	A single value
Example	`:MEAS:EYE:EWID:UNIT? -> s`

Command	**:MEASure:EYE:EWIDth:EBOundary?** Summary >>
Syntax	`:MEASure:EYE:EWIDth:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`
Description	Query the horizontal boundary of the measurement
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
	UNIT: Returns the default unit
Response	N/A
Example	`:MEAS:EYE:EWID:EBO? SET -> 2.500000`

Command	**:MEASure:EYE:EWIDth:EBOundary**	Summary >>
Syntax	:MEASure:EYE:EWIDth:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query MIN and MAX values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:EWID:EBO 2.5	

Command	**:MEASure:EYE:EWIDth:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:EWIDth:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:EWID:EBO:UNIT? -> %	

Command	**:MEASure:EYE:EWIDth:VBOundary?**	Summary >>
Syntax	:MEASure:EYE:EWIDth:VBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the vertical boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returnsall the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:EWID:VBO? SET -> 5.000000	

Command	**:MEASure:EYE:EWIDth:VBOundary**	Summary >>
Syntax	`:MEASure:EYE:EWIDth:VBOundary<wsp><value|MIN|MAX|DEF>`	
Description	Set the vertical boundary of the measurement This defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query `MIN` and `MAX` values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:EYE:EWID:VBO 5.0`	

Command	**:MEASure:EYE:EWIDth:VBOundary:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:EWIDth:VBOundary:UNITs?`	
Description	Query the vertical boundary unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:EYE:EWID:VBO:UNIT? -> %`	

Command	**:MEASure:EYE:EWIDth:DEFine:EOPening:PROBability?**	Summary >>
Syntax	`:MEASure:EYE:EWIDth:DEFine:EOPening:PROBability?<wsp>[MIN|MAX|DEF|SET|ALL]`	
Description	Query the Probability value	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example	`:MEAS:EYE:EWID:DEF:EOP:PROB? SET -> 0.001000`	

Command	**:MEASure:EYE:EWIDth:DEFine:EOPening:PROBability**	Summary >>
Syntax	:MEASure:EYE:EWIDth:DEFine:EOPening:PROBability<wsp><value|MIN|MAX|DEF>	
Description	Set the Probability value This defines the time or amplitude key points for eye metric calculation so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query MIN and MAX values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:EWID:DEF:EOP:PROB 1e-3	

Command	**:MEASure:EYE:EWIDth:ESTiming?**	Summary >>
Syntax	:MEASure:EYE:EWIDth:ESTiming?	
Description	Query the eye the optimization is performed for	
Parameters	N/A	
Response		
Example	:MEAS:EYE:EWID:EST? ->	

Command	**:MEASure:EYE:EWIDth:ESTiming**	Summary >>
Syntax	:MEASure:EYE:EWIDth:ESTiming<wsp><CEYE|PELevel>	
Description	Define the eye the optimization is performed for	
Parameters	**CEYE**: Middle eye	
	PELevel: Independently for lower, middle and upper eyes	
Response	N/A	
Example	:MEAS:EYE:EWID:EST CEYE	

Command	**:MEASure:EYE:EWIDth:ESTiming:INFO?**	Summary >>
Syntax	:MEASure:EYE:EWIDth:ESTiming:INFO?	
Description	Query options	
Parameters	N/A	
Response		
Example	:MEASure:EYE:EWIDth:ESTiming:INFO?	

Command	**:MEASure:EYE:EWIDth:ELMethod?**	Summary >>
Syntax	:MEASure:EYE:EWIDth:ELMethod?	
Description	Query the calculation mode	
Parameters	N/A	
Response		
Example	:MEAS:EYE:EWID:ELM? -> IEEE	

Command	**:MEASure:EYE:EWIDth:ELMethod**	Summary >>
Syntax	:MEASure:EYE:EWIDth:ELMethod<wsp><IEEE|MEWidth|MEHeight>	
Description	Define the calculation mode	
Parameters	**IEEE**: as defined in IEEE Std 802.3-2022 120E.4.2	
	MEWidth: Optimum Eye Width	
	MEHeight: Optimum Eye Height	
Response	N/A	
Example	:MEAS:EYE:EWID:ELM IEEE	

Command	**:MEASure:EYE:EWIDth:ELMethod:INFO?**	Summary >>
Syntax	:MEASure:EYE:EWIDth:ELMethod:INFO?	
Description	Query options	
Parameters	N/A	
Response		
Example	:MEAS:EYE:EWID:ELM:INFO?	

10.10.16 Eye Widths PAM

Command	**:MEASure:EYE:PAM:EWIDth?**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:EYE:PAM:EWID? CUR -> 5.7956e-12	

Command	**:MEASure:EYE:PAM:EWIDth**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:PAM:EWID	

Command	**:MEASure:EYE:PAM:EWIDth:SOURce?**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:EWID:SOUR? -> DataSource1	

Command	**:MEASure:EYE:PAM:EWIDth:SOURce**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:PAM:EWID:SOUR 1	

Command	**:MEASure:EYE:PAM:EWIDth:EYE?** Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:EYE?
Description	Query the eye to be measured
Parameters	N/A
Response	**EYE0**: Lower eye
	EYE1: Middle eye
	EYE2: Upper eye
Example	:MEAS:EYE:PAM:EWID:EYE? -> EYE0

Command	**:MEASure:EYE:PAM:EWIDth:EYE** Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:EYE<wsp><EYE0|EYE1|EYE2>
Description	Select the eye to be measured
Parameters	**EYE0**: Lower eye
	EYE1: Middle eye
	EYE2: Upper eye
Response	N/A
Example	:MEAS:EYE:PAM:EWID:EYE EYE0

Command	**:MEASure:EYE:PAM:EWIDth:LOCation?** Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:LOCation?
Description	Query the location of the measurement in the current data source
Parameters	N/A
Response	**<n>**: Location value of the measurement in the current data source
	-1: The measurement does not exist in the data source
Example	

Command	**:MEASure:EYE:PAM:EWIDth:UNITs?** Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:UNITs?
Description	Query the measurement unit
Parameters	N/A
Response	A single value
Example	:MEAS:EYE:PAM:EWID:UNIT? -> s

Command	**:MEASure:EYE:PAM:EWIDth:EBOundary?**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:PAM:EWID:EBO? SET -> 2.500000	

Command	**:MEASure:EYE:PAM:EWIDth:EBOundary**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query MIN and MAX values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:PAM:EWID:EBO 2.5	

Command	**:MEASure:EYE:PAM:EWIDth:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:PAM:EWID:EBO:UNIT? -> %	

Command	**:MEASure:EYE:PAM:EWIDth:VBOundary?**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:VBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the vertical boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returnsall the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:PAM:EWID:VBO? SET -> 5.000000	

Command	**:MEASure:EYE:PAM:EWIDth:VBOundary**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:VBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the vertical boundary of the measurement This defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query MIN and MAX values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:PAM:EWID:VBO 5.0	

Command	**:MEASure:EYE:PAM:EWIDth:VBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:VBOundary:UNITs?	
Description	Query the vertical boundary unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:PAM:EWID:VBO:UNIT? -> %	

Command	**:MEASure:EYE:PAM:EWIDth:DEFine:EOPening:PROBability?**	Summary >>
Syntax	`:MEASure:EYE:PAM:EWIDth:DEFine:EOPening:PROBability?<wsp>[MIN|MAX|DEF|SET|ALL]`	
Description	Query the Probability value	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example	`:MEAS:EYE:PAM:EWID:DEF:EOP:PROB? SET -> 0.001000`	

Command	**:MEASure:EYE:PAM:EWIDth:DEFine:EOPening:PROBability**	Summary >>
Syntax	`:MEASure:EYE:PAM:EWIDth:DEFine:EOPening:PROBability<wsp><value|MIN|MAX|DEF>`	
Description	Set the Probability value This defines the time or amplitude key points for eye metric calculation so that CDF(x) = P, where CDF is the cumulative distribution function of the data set calculated within specified boundaries; x is the key point; P is the specified probability value.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query `MIN` and `MAX` values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:EYE:PAM:EWID:DEF:EOP:PROB 1e-3`	

Command	**:MEASure:EYE:PAM:EWIDth:ESTiming?**	Summary >>
Syntax	`:MEASure:EYE:PAM:EWIDth:ESTiming?`	
Description	Query the eye the optimization is performed for	
Parameters	N/A	
Response		
Example	`:MEAS:EYE:PAM:EWID:EST? ->`	

Command	**:MEASure:EYE:PAM:EWIDth:ESTiming**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:ESTiming<wsp><CEYE|PELevel>	
Description	Define the eye the optimization is performed for	
Parameters	**CEYE**: Middle eye	
	PELevel: Independently for lower, middle and upper eyes	
Response	N/A	
Example	:MEAS:EYE:PAM:EWID:EST CEYE	

Command	**:MEASure:EYE:PAM:EWIDth:ESTiming:INFO?**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:ESTiming:INFO?	
Description	Query options	
Parameters	N/A	
Response		
Example	:MEASure:EYE:PAM:EWIDth:ESTiming:INFO?	

Command	**:MEASure:EYE:PAM:EWIDth:ELMethod?**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:ELMethod?	
Description	Query the calculation mode	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:EWID:ELM? -> IEEE	

Command	**:MEASure:EYE:PAM:EWIDth:ELMethod**	Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:ELMethod<wsp><IEEE|MEWidth|MEHeight>	
Description	Define the calculation mode	
Parameters	**IEEE**: as defined in IEEE Std 802.3-2022 120E.4.2	
	MEWidth: Optimum Eye Width	
	MEHeight: Optimum Eye Height	
Response	N/A	
Example	:MEAS:EYE:PAM:EWID:ELM IEEE	

Command	**:MEASure:EYE:PAM:EWIDth:ELMethod:INFO?** Summary >>
Syntax	:MEASure:EYE:PAM:EWIDth:ELMethod:INFO?
Description	Query options
Parameters	N/A
Response	
Example	:MEAS:EYE:PAM:EWID:ELM:INFO?

10.10.17 Eye Fall Time

Command	**:MEASure:EYE:FALLtime?**	Summary >>
Syntax	:MEASure:EYE:FALLtime?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:EYE:FALL? CUR -> 1.4563e-11	

Command	**:MEASure:EYE:FALLtime**	Summary >>
Syntax	:MEASure:EYE:FALLtime	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:FALL	

Command	**:MEASure:EYE:FALLtime:SOURce?**	Summary >>
Syntax	:MEASure:EYE:FALLtime:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:FALL:SOUR? -> DataSource1	

Command	**:MEASure:EYE:FALLtime:SOURce**	Summary >>
Syntax	:MEASure:EYE:FALLtime:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:FALL:SOUR 1	

Command	**:MEASure:EYE:FALLtime:LOCation?**	Summary >>
Syntax	`:MEASure:EYE:FALLtime:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	**<n>**: Location value of the measurement in the current data source	
	-1: The measurement does not exist in the data source	
Example	`:MEAS:EYE:FALL:LOC? -> 14`	

Command	**:MEASure:EYE:FALLtime:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:FALLtime:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:EYE:FALL:UNIT? -> s`	

Command	**:MEASure:EYE:FALLtime:STArtPercent?**	Summary >>
Syntax	`:MEASure:EYE:FALLtime:STArtPercent?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the start amplitude threshold	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:EYE:FALL:STAP? SET -> 20.000000`	

Command	**:MEASure:EYE:FALLtime:STArtPercent**	Summary >>
Syntax	:MEASure:EYE:FALLtime:STArtPercent<wsp><value|MIN|MAX|DEF>	
Description	Set the start amplitude threshold This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:FALL:STAP 20	

Command	**:MEASure:EYE:FALLtime:STArtPercent:UNITs?**	Summary >>
Syntax	:MEASure:EYE:FALLtime:STArtPercent:UNITs?	
Description	Query the start amplitude threshold unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:FALL:STAP:UNIT? -> %	

Command	**:MEASure:EYE:FALLtime:STOpPercent?**	Summary >>
Syntax	:MEASure:EYE:FALLtime:STOpPercent?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the stop amplitude threshold	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:FALL:STOP? SET -> 80.000000	

Command	**:MEASure:EYE:FALLtime:STOpPercent**	Summary >>
Syntax	:MEASure:EYE:FALLtime:STOpPercent<wsp><value|MIN|MAX|DEF>	
Description	Set the stop amplitude threshold This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query MIN and MAX values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:FALL:STOP 80	

Command	**:MEASure:EYE:FALLtime:STOpPercent:UNITs?**	Summary >>
Syntax	:MEASure:EYE:FALLtime:STOpPercent:UNITs?	
Description	Query the stop amplitude threshold unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:FALL:STOP:UNIT? -> %	

10.10.18 Eye Rise Time

Command	**:MEASure:EYE:RISetime?**	Summary >>
Syntax	:MEASure:EYE:RISetime?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:EYE:RIS? CUR -> 1.4047e-11	

Command	**:MEASure:EYE:RISetime**	Summary >>
Syntax	:MEASure:EYE:RISetime	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:RIS	

Command	**:MEASure:EYE:RISetime:SOURce?**	Summary >>
Syntax	:MEASure:EYE:RISetime:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:RIS:SOUR? -> DataSource1	

Command	**:MEASure:EYE:RISetime:SOURce**	Summary >>
Syntax	:MEASure:EYE:RISetime:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:RIS:SOUR 1	

Command	**:MEASure:EYE:RISetime:LOCation?**	Summary >>
Syntax	`:MEASure:EYE:RISetime:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	**<n>**: Location value of the measurement in the current data source	
	-1: The measurement does not exist in the data source	
Example	`:MEAS:EYE:RIS:LOC? -> 15`	

Command	**:MEASure:EYE:RISetime:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:RISetime:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:EYE:RIS:UNIT? -> s`	

Command	**:MEASure:EYE:RISetime:STArtPercent?**	Summary >>
Syntax	`:MEASure:EYE:RISetime:STArtPercent?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the start amplitude threshold	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:EYE:RIS:STAP? SET -> 20.000000`	

Command	**:MEASure:EYE:RISetime:STArtPercent**	Summary >>
Syntax	`:MEASure:EYE:RISetime:STArtPercent<wsp><value|MIN|MAX|DEF>`	
Description	Set the start amplitude threshold This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:EYE:RIS:STAP 20`	

Command	**:MEASure:EYE:RISetime:STArtPercent:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:RISetime:STArtPercent:UNITs?`	
Description	Query the start amplitude threshold unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:EYE:RIS:STAP:UNIT? -> %`	

Command	**:MEASure:EYE:RISetime:STOpPercent?**	Summary >>
Syntax	`:MEASure:EYE:RISetime:STOpPercent?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the stop amplitude threshold	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:EYE:RIS:STOP? SET -> 80.000000`	

Command	**:MEASure:EYE:RISetime:STOpPercent**	Summary >>
Syntax	:MEASure:EYE:RISetime:STOpPercent<wsp><value|MIN|MAX|DEF>	
Description	Set the stop amplitude threshold This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:RIS:STOP 80	

Command	**:MEASure:EYE:RISetime:STOpPercent:UNITs?**	Summary >>
Syntax	:MEASure:EYE:RISetime:STOpPercent:UNITs?	
Description	Query the stop amplitude threshold unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:RIS:STOP:UNIT? -> %	

10.10.19 Eye Jitter (Peak-Peak)

Command	**:MEASure:EYE:JITTer?**	Summary >>
Syntax	:MEASure:EYE:JITTer?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt|UNIT>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
	UNIT: Measurement unit	
Response	A single value	
Example	:MEAS:EYE:JITT? CUR -> 2.7970e-11 :MEAS:EYE:JITT? UNIT -> s	

Command	**:MEASure:EYE:JITTer**	Summary >>
Syntax	:MEASure:EYE:JITTer	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:JITT	

Command	**:MEASure:EYE:JITTer:SOURce?**	Summary >>
Syntax	:MEASure:EYE:JITTer:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:JITT:SOUR? -> DataSource1	

Command	**:MEASure:EYE:JITTer:SOURce**	Summary >>
Syntax	:MEASure:EYE:JITTer:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:JITT:SOUR 3	

Command	**:MEASure:EYE:JITTer:FORMAT?**	Summary >>
Syntax	:MEASure:EYE:JITTer:FORMAT?<wsp>[INFO]	
Description	Query measurement format	
Parameters	**INFO**:	
Response		
Example	:MEAS:EYE:JITT:FORMAT? -> RMS	

Command	**:MEASure:EYE:JITTer:FORMAT**	Summary >>
Syntax	:MEASure:EYE:JITTer:FORMAT<wsp><RMS|PP>	
Description	Set measurement format	
Parameters	**RMS**: Eye Jitter (RMS)	
	PP: Eye Jitter (Peak-Peak)	
Response	N/A	
Example	:MMEAS:EYE:JITT:FORMAT PP	

Command	**:MEASure:EYE:JITTer:VBOundary?**	Summary >>
Syntax	:MEASure:EYE:JITTer:VBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the vertical boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:JITT:VBO? SET -> 5.000000	

Command	**:MEASure:EYE:JITTer:VBOundary**	Summary >>
Syntax	:MEASure:EYE:JITTer:VBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the vertical boundary of the measurement This defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:JITT:VBO 5.0	

Command	**:MEASure:EYE:JITTer:VBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:JITTer:VBOundary:UNITs?	
Description	Query the vertical boundary unit	
Parameters	N/A	
Response		
Example	:MEAS:EYE:JITT:VBO:UNIT? -> %	

10.10.20 Eye Jitter (RMS)

Command	**:MEASure:EYE:JITTer?**	Summary >>
Syntax	:MEASure:EYE:JITTer?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example		

Command	**:MEASure:EYE:JITTer**	Summary >>
Syntax	:MEASure:EYE:JITTer	
Description	Perform measurement on the selected data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:JITT	

Command	**:MEASure:EYE:JITTer:SOURce?**	Summary >>
Syntax	:MEASure:EYE:JITTer:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:JITT:SOUR? -> DataSource1	

Command	**:MEASure:EYE:JITTer:SOURce**	Summary >>
Syntax	:MEASure:EYE:JITTer:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:JITT:SOUR 3	

Command	**:MEASure:EYE:JITTer:FORMAT?**	Summary >>
Syntax	:MEASure:EYE:JITTer:FORMAT?<wsp>[INFO]	
Description	Query measurement format	
Parameters	**INFO**:	
Response		
Example	:MEAS:EYE:JITT:FORMAT? -> RMS	

Command	**:MEASure:EYE:JITTer:FORMAT**	Summary >>
Syntax	:MEASure:EYE:JITTer:FORMAT<wsp><RMS|PP>	
Description	Set measurement format	
Parameters	**RMS**: Eye Jitter (RMS)	
	PP: Eye Jitter (Peak-Peak)	
Response	N/A	
Example	:MMEAS:EYE:JITT:FORMAT RMS	

Command	**:MEASure:EYE:JITTer:VBOundary?**	Summary >>
Syntax	:MEASure:EYE:JITTer:VBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the vertical boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:JITT:VBO? SET -> 5.000000	

Command	**:MEASure:EYE:JITTer:VBOundary**	Summary >>
Syntax	:MEASure:EYE:JITTer:VBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the vertical boundary of the measurement This defines the section of the eye diagram that is used for the measurement as a percentage of the vertical eye amplitude.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query MIN and MAX values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:JITT:VBO 5.0	

Command	**:MEASure:EYE:JITTer:VBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:JITTer:VBOundary:UNITs?	
Description	Query the vertical boundary unit	
Parameters	N/A	
Response		
Example	:MEAS:EYE:JITT:VBO:UNIT? -> %	

10.10.21 Overshoot NRZ

Command	**:MEASure:EYE:OVERshoot?** Summary >>
Syntax	:MEASure:EYE:OVERshoot?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	

Command	**:MEASure:EYE:OVERshoot** Summary >>
Syntax	:MEASure:EYE:OVERshoot
Description	Perform measurement on the current data source
Parameters	N/A
Response	N/A
Example	:MEAS:EYE:OVER

Command	**:MEASure:EYE:OVERshoot:SOURce?** Summary >>
Syntax	:MEASure:EYE:OVERshoot:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	:MEAS:EYE:OVER:SOUR? -> DataSource1

Command	**:MEASure:EYE:OVERshoot:SOURce** Summary >>
Syntax	:MEASure:EYE:OVERshoot:SOURce<wsp><SOURce<n>>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	**<SOURce<n>>**: data source ID
Response	N/A
Example	:MEAS:EYE:OVER:SOUR 1

Command	**:MEASure:EYE:OVERshoot:LOCation?**	Summary >>
Syntax	:MEASure:EYE:OVERshoot:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	**<n>**: Location value of the measurement in the current data source	
	-1: The measurement does not exist in the data source	
Example	:MEAS:EYE:OVER:LOC? -> 15	

Command	**:MEASure:EYE:OVERshoot:UNITs?**	Overshoot NRZ
Syntax	:MEASure:EYE:OVERshoot:UNITs?	
Description	Query the measurement unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:OVER:UNIT? -> %	

Command	**:MEASure:EYE:OVERshoot:EBOundary?**	Summary >>
Syntax	:MEASure:EYE:OVERshoot:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:OVER:EBO? SET -> 2.500000	

Command	**:MEASure:EYE:OVERshoot:EBOundary**	Summary >>
Syntax	:MEASure:EYE:OVERshoot:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:OVER:EBO 2.5	

Command	**:MEASure:EYE:OVERshoot:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:OVERshoot:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:OVER:EBO:UNIT? -> %	

10.10.22 Overshoot PAM

Command	**:MEASure:EYE:PAM:OVERshoot?** Summary >>
Syntax	:MEASure:EYE:PAM:OVERshoot?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	:MEAS:EYE:PAM:OVER? CUR -> 1.2770e+01

Command	**:MEASure:EYE:PAM:OVERshoot** Summary >>
Syntax	:MEASure:EYE:PAM:OVERshoot
Description	Perform measurement on the current data source
Parameters	N/A
Response	N/A
Example	:MEAS:EYE:PAM:OVER

Command	**:MEASure:EYE:PAM:OVERshoot:SOURce?** Summary >>
Syntax	:MEASure:EYE:PAM:OVERshoot:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	:MEAS:EYE:PAM:OVER:SOUR? -> DataSource1

Command	**:MEASure:EYE:PAM:OVERshoot:SOURce** Summary >>
Syntax	:MEASure:EYE:PAM:OVERshoot:SOURce<wsp><SOURce<n>>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	**<SOURce<n>>**: data source ID
Response	N/A
Example	:MEAS:EYE:PAM:OVER:SOUR 1

Command	**:MEASure:EYE:PAM:OVERshoot:LOCation?**	Summary >>
Syntax	:MEASure:EYE:PAM:OVERshoot:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	**<n>**: Location value of the measurement in the current data source	
	-1: The measurement does not exist in the data source	
Example	:MEAS:EYE:PAM:OVER:LOC? -> 15	

Command	**:MEASure:EYE:PAM:OVERshoot:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:OVERshoot:UNITs?	
Description	Query the measurement unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:PAM:OVER:UNIT? -> %	

Command	**:MEASure:EYE:PAM:OVERshoot:EBOundary?**	Summary >>
Syntax	:MEASure:EYE:PAM:OVERshoot:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:PAM:OVER:EBO? SET -> 2.500000	

Command	**:MEASure:EYE:PAM:OVERshoot:EBOundary**	Summary >>
Syntax	:MEASure:EYE:PAM:OVERshoot:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:PAM:OVER:EBO 2.5	

Command	**:MEASure:EYE:PAM:OVERshoot:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:OVERshoot:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:PAM:OVER:EBO:UNIT? -> %	

10.10.23 Undershoot

Command	**:MEASure:EYE:UNDershoot?** Summary >>
Syntax	:MEASure:EYE:UNDershoot?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	:MEAS:EYE:PAM:UND? CUR -> 1.5436e+01

Command	**:MEASure:EYE:UNDershoot** Summary >>
Syntax	:MEASure:EYE:UNDershoot
Description	Perform measurement on the current data source
Parameters	N/A
Response	N/A
Example	:MEAS:EYE:UND

Command	**:MEASure:EYE:UNDershoot:SOURce?** Summary >>
Syntax	:MEASure:EYE:UNDershoot:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	:MEAS:EYE:UND:SOUR? -> DataSource1

Command	**:MEASure:EYE:UNDershoot:SOURce** Summary >>
Syntax	:MEASure:EYE:UNDershoot:SOURce<wsp><SOURce<n>>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	**<SOURce<n>>**: data source ID
Response	N/A
Example	:MEAS:EYE:PAM:UND:SOUR 3

Command	**:MEASure:EYE:UNDershoot:LOCation?** Summary >>
Syntax	:MEASure:EYE:UNDershoot:LOCation?
Description	Query the location of the measurement in the current data source
Parameters	N/A
Response	**<n>**: Location value of the measurement in the current data source
	-1: The measurement does not exist in the data source
Example	:MEAS:EYE:UND:LOC? -> 11

Command	**:MEASure:EYE:UNDershoot:UNITs?** Summary >>
Syntax	:MEASure:EYE:UNDershoot:UNITs?
Description	Query the measurement unit
Parameters	N/A
Response	A single value
Example	:MEAS:EYE:UND:UNIT? -> s

Command	**:MEASure:EYE:UNDershoot:EBOundary?** Summary >>
Syntax	:MEASure:EYE:UNDershoot:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]
Description	Query the horizontal boundary of the measurement
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
	UNIT: Returns the default unit
Response	N/A
Example	:MEAS:EYE:UND:EBO? SET -> 2.500000

Command	**:MEASure:EYE:UNDershoot:EBOundary**	Summary >>
Syntax	:MEASure:EYE:UNDershoot:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:UND:EBO 2.5	

Command	**:MEASure:EYE:UNDershoot:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:UNDershoot:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:UND:EBO:UNIT? -> %	

Command	**:MEASure:EYE:PAM:UNDershoot?**	Summary >>
Syntax	:MEASure:EYE:PAM:UNDershoot?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:EYE:PAM:UND? CUR -> 5.7956e-12	

Command	**:MEASure:EYE:PAM:UNDershoot**	Summary >>
Syntax	:MEASure:EYE:PAM:UNDershoot	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:PAM:UND	

Command	**:MEASure:EYE:PAM:UNDershoot:SOURce?**	Summary >>
Syntax	:MEASure:EYE:PAM:UNDershoot:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:UND:SOUR? -> DataSource1	

Command	**:MEASure:EYE:PAM:UNDershoot:SOURce**	Summary >>
Syntax	:MEASure:EYE:PAM:UNDershoot:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:PAM:UND:SOUR 3	

Command	**:MEASure:EYE:PAM:UNDershoot:LOCation?**	Summary >>
Syntax	:MEASure:EYE:PAM:UNDershoot:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	**<n>**: Location value of the measurement in the current data source	
	-1: The measurement does not exist in the data source	
Example	:MEAS:EYE:PAM:UND:LOC? -> 11	

Command	**:MEASure:EYE:PAM:UNDershoot:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:UNDershoot:UNITs?	
Description	Query the measurement unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:PAM:UND:UNIT? -> s	

Command	**:MEASure:EYE:PAM:UNDershoot:EBOundary?**	Summary >>
Syntax	`:MEASure:EYE:PAM:UNDershoot:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:EYE:PAM:UND:EBO? SET -> 2.500000`	

Command	**:MEASure:EYE:PAM:UNDershoot:EBOundary**	Summary >>
Syntax	`:MEASure:EYE:PAM:UNDershoot:EBOundary<wsp><value|MIN|MAX|DEF>`	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:EYE:PAM:UND:EBO 2.5`	

Command	**:MEASure:EYE:PAM:UNDershoot:EBOundary:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:PAM:UNDershoot:EBOundary:UNITs?`	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:EYE:PAM:UND:EBO:UNIT? -> %`	

10.10.24 Ratio Level Mismatch (Annex 120D, Clause 94)

Command	**:MEASure:EYE:PAM:LINearity?**	Summary >>
Syntax	:MEASure:EYE:PAM:LINearity?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:EYE:PAM:LIN? CUR -> 9.6386e-01	

Command	**:MEASure:EYE:PAM:LINearity**	Summary >>
Syntax	:MEASure:EYE:PAM:LINearity	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:PAM:LIN	

Command	**:MEASure:EYE:PAM:LINearity:DEFinition?**	Summary >>
Syntax	:MEASure:EYE:PAM:LINearity:DEFinition?	
Description	Query the measurement method	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:LIN:DEF? -> RLMA120	

Command	**:MEASure:EYE:PAM:LINearity:DEFinition**	Summary >>
Syntax	:MEASure:EYE:PAM:LINearity:DEFinition<wsp><RLMA120|RLMC94>	
Description	Set the measurement method	
Parameters	**RLMA120**: Ratio Level Mismatch (Annex 120D)	
	RLMC94: Ratio Level Mismatch (Clause 94)	
Response	N/A	
Example	:MEAS:EYE:PAM:LIN:DEF RLM120 :MEAS:EYE:PAM:LIN:DEF RLM94	

Command	**:MEASure:EYE:PAM:LINearity:DEFinition:INFO?**	Summary >>
Syntax	:MEASure:EYE:PAM:LINearity:DEFinition:INFO?	
Description	Query the set measurement method	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:LIN:DEF:INFO? -> RLMA120	

Command	**:MEASure:EYE:PAM:LINearity:SOURce?**	Summary >>
Syntax	:MEASure:EYE:PAM:LINearity:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:PAM:LINearity:SOUR? -> DataSource1	

Command	**:MEASure:EYE:PAM:LINearity:SOURce**	Summary >>
Syntax	:MEASure:EYE:PAM:LINearity:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:PAM:LIN:SOUR 1	

Command	**:MEASure:EYE:PAM:LINearity:LOCation?**	Summary >>
Syntax	:MEASure:EYE:PAM:LINearity:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	**<n>**: Location value of the measurement in the current data source	
	-1: The measurement does not exist in the data source	
Example	:MEAS:EYE:PAM:LIN:LOC? -> 13	

Command	**:MEASure:EYE:PAM:LINearity:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:LINearity:UNITs?	
Description	Query the measurement unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:PAM:LINearity:UNIT? -> NONE	

Command	**:MEASure:EYE:PAM:LINearity:EBOundary?**	Summary >>
Syntax	:MEASure:EYE:PAM:LINearity:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	:MEAS:EYE:PAM:LIN:EBO? CUR -> 2.500000	

Command	**:MEASure:EYE:PAM:LINearity:EBOundary**	Summary >>
Syntax	:MEASure:EYE:PAM:LINearity:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:EYE:PAM:LINearity:EBO 2.5	

Command	**:MEASure:EYE:PAM:LINearity:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:PAM:LINearity:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:PAM:LIN:EBO:UNIT? -> %	

10.10.25 Signal to Noise Ratio

Command	**:MEASure:EYE:ESN?**	Summary >>
Syntax	:MEASure:EYE:ESN?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:EYE:ESN? CUR -> 1.1633e+01	

Command	**:MEASure:EYE:ESN**	Summary >>
Syntax	:MEASure:EYE:ESN	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:EYE:ESN	

Command	**:MEASure:EYE:ESN:SOURce?**	Summary >>
Syntax	:MEASure:EYE:ESN:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:EYE:ESN:SOUR? -> DataSource1	

Command	**:MEASure:EYE:ESN:SOURce**	Summary >>
Syntax	:MEASure:EYE:ESN:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:EYE:ESN:SOUR 1	

Command	**:MEASure:EYE:ESN:LOCation?**	Summary >>
Syntax	`:MEASure:EYE:ESN:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example	`:MEAS:EYE:ESN:LOC? ->`	

Command	**:MEASure:EYE:ESN:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:ESN:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example	`:MEAS:EYE:ESN:UNIT? ->`	

Command	**:MEASure:EYE:ESN:EBOundary?**	Summary >>
Syntax	`:MEASure:EYE:ESN:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:EYE:ESN:EBO? SET -> 2.500000`	

Command	**:MEASure:EYE:ESN:EBOundary**	Summary >>
Syntax	`:MEASure:EYE:ESN:EBOundary<wsp><value|MIN|MAX|DEF>`	
Description	Set the horizontal boundary of the measurement	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:EYE:ESN:EBO 2.5`	

Command	**:MEASure:EYE:ESN:EBOundary:UNITs?** Summary >>
Syntax	:MEASure:EYE:ESN:EBOundary:UNITs?
Description	Query the horizontal boundary unit
Parameters	N/A
Response	
Example	:MEAS:EYE:ESN:EBO:UNIT? -> %

10.10.26 Symbol Period

Command	**:MEASure:EYE:BITRate?** Summary >>
Syntax	:MEASure:EYE:BITRate?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	:MEAS:EYE:BITR? CUR -> 3.5556e-11

Command	**:MEASure:EYE:BITRate** Summary >>
Syntax	:MEASure:EYE:BITRate
Description	Perform measurement on the current data source
Parameters	N/A
Response	N/A
Example	:MEAS:EYE:BITR

Command	**:MEASure:EYE:BITRate:SOURce?** Summary >>
Syntax	:MEASure:EYE:BITRate:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	:MEAS:EYE:BITR:SOUR? -> DataSource1

Command	**:MEASure:EYE:BITRate:SOURce** Summary >>
Syntax	:MEASure:EYE:BITRate:SOURce<wsp><SOURce<n>>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	**<SOURce<n>>**: data source ID
Response	N/A
Example	:MEAS:EYE:BITR:SOUR 1

Command	**:MEASure:EYE:BITRate:LOCation?**	Summary >>
Syntax	:MEASure:EYE:BITRate:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	**<n>**: Location value of the measurement in the current data source	
	-1: The measurement does not exist in the data source	
Example	:MEAS:EYE:BITR:LOC? -> 19	

Command	**:MEASure:EYE:BITRate:UNITs?**	Summary >>
Syntax	:MEASure:EYE:BITRate:UNITs?	
Description	Query the measurement unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:EYE:BITRate:UNIT? -> s	

10.10.27 Transmitter and Dispersion Eye Closure Quaternary (TDECQ)

Command	**:MEASure:EYE:PAM:TDEQ?** Summary >>
Syntax	:MEASure:EYE:PAM:TDEQ?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	

Command	**:MEASure:EYE:PAM:TDEQ:SOURce?** Summary >>
Syntax	:MEASure:EYE:PAM:TDEQ:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:PAM:TDEQ:SOURce** Summary >>
Syntax	:MEASure:EYE:PAM:TDEQ:SOURce<wsp>SOURce<n>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:PAM:TDEQ:UNITs?** Summary >>
Syntax	:MEASure:EYE:PAM:TDEQ:UNITs?
Description	Query the measurement unit
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:PAM:TDEQ:CEQ?** Summary >>
Syntax	:MEASure:EYE:PAM:TDEQ:CEQ?
Description	Query CEQ
Parameters	N/A
Response	
Example	

10.10.28 Vertical Eye Closure

Command	**:MEASure:EYE:PAM:VECLosure?**	Summary >>
Syntax	:MEASure:EYE:PAM:VECLosure?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:PAM:VECLosure**	Summary >>
Syntax	:MEASure:EYE:PAM:VECLosure	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:PAM:VECLosure:SOURce?**	Summary >>
Syntax	:MEASure:EYE:PAM:VECLosure:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:PAM:VECLosure:SOURce**	Summary >>
Syntax	:MEASure:EYE:PAM:VECLosure:SOURce<wsp>SOURce<n>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:PAM:VECLosure:EYE?**	Summary >>
Syntax	:MEASure:EYE:PAM:VECLosure:EYE?	
Description	Query the eye to be measured	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example		

Command	**:MEASure:EYE:PAM:VECLosure:EYE**	Summary >>
Syntax	:MEASure:EYE:PAM:VECLosure:EYE<wsp><EYE0|EYE1|EYE2>	
Description	Select the eye to be measured	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:PAM:VECLosure:LOCation?**	Summary >>
Syntax	:MEASure:EYE:PAM:VECLosure:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example		

Command	**:MEASure:EYE:PAM:VECLosure:UNITs?** Summary >>
Syntax	:MEASure:EYE:PAM:VECLosure:UNITs?
Description	Query the measurement unit
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
	UNIT: Returns the default unit
Response	N/A
Example	

Command	**:MEASure:EYE:PAM:VECLosure:EBOundary?** Summary >>
Syntax	:MEASure:EYE:PAM:VECLosure:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]
Description	Query the horizontal boundary of the measurement
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

Command	**:MEASure:EYE:PAM:VECLosure:EBOundary** Summary >>
Syntax	:MEASure:EYE:PAM:VECLosure:EBOundary<wsp><value|MIN|MAX|DEF>
Description	Set the horizontal boundary of the measurement
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:PAM:VECLosure:EBOundary:UNITs?** Summary >>
Syntax	`:MEASure:EYE:PAM:VECLosure:EBOundary:UNITs?`
Description	Query the horizontal boundary unit
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	N/A
Example	

Command	**:MEASure:EYE:PAM:VECLosure:DEFine:EOPening:PROBability?** Summary >>
Syntax	`:MEASure:EYE:PAM:VECLosure:DEFine:EOPening:PROBability?<wsp>[MIN|MAX|DEF|SET|ALL]`
Description	Query the Probability value
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
Response	N/A
Example	

Command	**:MEASure:EYE:PAM:VECLosure:DEFine:EOPening:PROBability** Summary >>
Syntax	`:MEASure:EYE:PAM:VECLosure:DEFine:EOPening:PROBability<wsp><value|MIN|MAX|DEF>`
Description	Set the Probability value
Parameters	**<value>**: Sets this value
	MIN: Sets the minimum value
	MAX: Sets the maximum value
	DEF: Sets the default value
Response	N/A
Example	

10.11 SCPI commands descriptions - Waveform Measurements

10.11.1 RMS

Command	**:MEASure:WAVeform:RMS?** Summary >>
Syntax	:MEASure:WAVeform:RMS?<wsp><CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt|UNIT>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
	UNIT: Measurement unit
Response	A single value
Example	

Command	**:MEASure:WAVeform:RMS** Summary >>
Syntax	:MEASure:WAVeform:RMS
Description	Perform measurement on the current data source
Parameters	N/A
Response	N/A
Example	:MEAS:WAV:RMS

Command	**:MEASure:WAVeform:RMS:SOURce** Summary >>
Syntax	:MEASure:WAVeform:RMS:SOURce<wsp><SOURce<n>>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	**<SOURce<n>>**: data source ID
Response	N/A
Example	:MEAS:WAV:RMS:SOUR 1

Command	**:MEASure:WAVeform:RMS:LOCation?**	Summary >>
Syntax	:MEASure:WAVeform:RMS:LOCation?	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example	:MEAS:WAV:RMS:LOC? ->	

Command	**:MEASure:WAVeform:RMS:UNITs?**	Summary >>
Syntax	:MEASure:WAVeform:RMS:UNITs?	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example	:MEAS:WAV:RMS:UNIT? ->	

10.11.2 One/Zero Levels

Command	**:MEASure:WAVeform:ZLEVel?** Summary >>
Syntax	:MMEASure:WAVeform:ZLEVel?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	:MEAS:WAV:ZLEV? CUR -> -1.7934e-01

Command	**:MEASure:WAVeform:ZLEVel** Summary >>
Syntax	:MEASure:WAVeform:ZLEVel
Description	Perform measurement on the current data source
Parameters	N/A
Response	N/A
Example	:MEAS:WAV:ZLEV

Command	**:MEASure:WAVeform:ZLEVel:SOURce?** Summary >>
Syntax	:MEASure:WAVeform:ZLEVel:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	:MEAS:WAV:ZLEV:SOUR? -> DataSource1

Command	**:MEASure:WAVeform:ZLEVel:SOURce** Summary >>
Syntax	:MEASure:WAVeform:ZLEVel:SOURce<wsp><SOURce<n>>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	**<SOURce<n>>**: data source ID
Response	N/A
Example	:MEAS:WAV:ZLEV:SOUR 1

Command	**:MEASure:WAVeform:ZLEVel:LOCation?** Summary >>
Syntax	:MEASure:WAVeform:ZLEVel:LOCation?
Description	Query the location of the measurement in the current data source
Parameters	N/A
Response	**<n>**: Location value of the measurement in the current data source
	-1: The measurement does not exist in the data source
Example	:MEAS:WAV:ZLEV:LOC? -> 18

Command	**:MEASure:WAVeform:ZLEVel:UNITs?** Summary >>
Syntax	:MEASure:WAVeform:ZLEVel:UNITs?
Description	Query the measurement unit
Parameters	N/A
Response	A single value
Example	:MEAS:WAV:ZLEV:UNIT? -> V

Command	**:MEASure:WAVeform:ZLEVel:EBOundary?** Summary >>
Syntax	:MEASure:WAVeform:ZLEVel:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]
Description	Query the horizontal boundary of the measurement
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
	UNIT: Returns the default unit
Response	N/A
Example	:MEAS:WAV:ZLEV:EBO? SET -> 2.500000

Command	**:MEASure:WAVeform:ZLEVel:EBOundary**	Summary >>
Syntax	:MEASure:WAVeform:ZLEVel:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:WAV:ZLEV:EBO 2.5	

Command	**:MEASure:WAVeform:ZLEVel:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:WAVeform:ZLEVel:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:WAV:ZLEV:EBO:UNIT? -> %	

Command	**:MEASure:WAVeform:OLEVel?**	Summary >>
Syntax	:MMEASure:WAVeform:OLEVel?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:WAV:OLEV?	

Command	**:MEASure:WAVeform:OLEVel**	Summary >>
Syntax	`:MEASure:WAVeform:OLEVel`	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	`:MEAS:WAV:OLEV`	

Command	**:MEASure:WAVeform:OLEVel:SOURce?**	Summary >>
Syntax	`:MEASure:WAVeform:OLEVel:SOURce?`	
Description	Query the data source	
Parameters	N/A	
Response	A single value. <n> is an integer 1 to 8, it indicates a slot in the virtual instrument.	
Example	`:MEAS:WAV:OLEV:SOUR? -> 1`	

Command	**:MEASure:WAVeform:OLEVel:SOURce**	Summary >>
Syntax	`:MEASure:WAVeform:OLEVel:SOURce<wsp>SOURce<n>`	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**SOURce<n>**: <n> is an integer 1 to 8, it indicates a slot in the virtual instrument.	
Response	N/A	
Example	`:MEAS:WAV:OLEV:SOUR`	

Command	**:MEASure:WAVeform:OLEVel:LOCation?**	Summary >>
Syntax	`:MEASure:WAVeform:OLEVel:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	**<n>**: Location value of the measurement in the current data source	
	-1: The measurement does not exist in the data source	
Example	`:MEAS:WAV:OLEV:LOC? -> 11`	

Command	**:MEASure:WAVeform:OLEVel:UNITs?**	Summary >>
Syntax	`:MEASure:WAVeform:OLEVel:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:WAV:OLEV:UNIT? -> s`	

Command	**:MEASure:WAVeform:OLEVel:EBOundary?**	Summary >>
Syntax	`:MEASure:WAVeform:OLEVel:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:WAV:OLEV:EBO? ALL -> 0.000000,100.000000,10.000000,10.000000`	

Command	**:MEASure:WAVeform:OLEVel:EBOundary**	Summary >>
Syntax	`:MEASure:WAVeform:OLEVel:EBOundary<wsp><value|MIN|MAX|DEF>`	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query `MIN` and `MAX` values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:WAV:OLEV:EBO DEF`	

Command	**:MEASure:WAVeform:OLEVel:EBOundary:UNITs?**	Summary >>
Syntax	`:MEASure:WAVeform:OLEVel:EBOundary:UNITs?`	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:WAV:OLEV:EBO:UNIT? -> %`	

10.11.3 Optical Modulation Amplitude (OMA)

Command	**:MEASure:EYE:OMA?** Summary >>
Syntax	:MEASure:EYE:OMA?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	

Command	**:MEASure:EYE:OMA** Summary >>
Syntax	:MEASure:EYE:OMA
Description	Add this measurement to the specified data source and switch to this data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:OMA:SOURce?** Summary >>
Syntax	:MEASure:EYE:OMA:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:OMA:SOURce** Summary >>
Syntax	:MEASure:EYE:OMA:SOURce<wsp>SOURce<n>
Description	Query the data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:OMA:LOCation?**	Summary >>
Syntax	`:MEASure:EYE:OMA:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:OMA:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:OMA:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:OMA:EBOundary?**	Summary >>
Syntax	`:MEASure:EYE:OMA:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example		

Command	**:MEASure:EYE:OMA:EBOundary**	Summary >>
Syntax	`:MEASure:EYE:OMA:EBOundary<wsp><value|MIN|MAX|DEF>`	
Description	Set the horizontal boundary of the measurement	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example		

Command	**:MEASure:EYE:OMA:EBOundary:UNITs?** Summary >>
Syntax	:MEASure:EYE:OMA:EBOundary:UNITs?
Description	Query the horizontal boundary unit
Parameters	N/A
Response	
Example	

10.11.4 PAM Outer Extinction Ratio

Command	**:MEASure:EYE:OER?** Summary >>
Syntax	:MEASure:EYE:OER?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	

Command	**:MEASure:EYE:OER** Summary >>
Syntax	:MEASure:EYE:OER
Description	Perform measurement on the current data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:OER:SOURce?** Summary >>
Syntax	:MEASure:EYE:OER:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:OER:SOURce** Summary >>
Syntax	:MEASure:EYE:OER:SOURce<wsp>SOURce<n>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:OER:LOCation?**	Summary >>
Syntax	`:MEASure:EYE:OER:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:OER:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:OER:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:OER:EBOundary?**	Summary >>
Syntax	`:MEASure:EYE:OER:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example		

Command	**:MEASure:EYE:OER:EBOundary**	Summary >>
Syntax	`:MEASure:EYE:OER:EBOundary<wsp><value|MIN|MAX|DEF>`	
Description	Set the horizontal boundary of the measurement	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example		

Command	**:MEASure:EYE:OER:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:OER:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:OER:THReeSymbol?**	Summary >>
Syntax	:MEASure:EYE:OER:THReeSymbol?<wsp>[MIN|MAX|DEF|SET|ALL]	
Description	Query the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example		

Command	**:MEASure:EYE:OER:THReeSymbol**	Summary >>
Syntax	:MEASure:EYE:OER:THReeSymbol<wsp><value|MIN|MAX|DEF>	
Description	Set the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example		

Command	**:MEASure:EYE:OER:ZERoSymbol?**	Summary >>
Syntax	:MEASure:EYE:OER:ZERoSymbol?<wsp>[MIN|MAX|DEF|SET|ALL]	
Description	Query the minimum number of consecutive logic 0 symbols	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example		

Command	**:MEASure:EYE:OER:ZERoSymbol**	Summary >>
Syntax	:MEASure:EYE:OER:ZERoSymbol<wsp><value|MIN|MAX|DEF>	
Description	Set the minimum number of consecutive logic 0 symbols	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example		

10.11.5 Outer OMA

Command	**:MEASure:EYE:OOMA?** Summary >>
Syntax	:MEASure:EYE:OOMA?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	

Command	**:MEASure:EYE:OOMA** Summary >>
Syntax	:MEASure:EYE:OOMA
Description	Perform measurement on the current data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:OOMA:SOURce?** Summary >>
Syntax	:MEASure:EYE:OOMA:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:OOMA:SOURce** Summary >>
Syntax	:MEASure:EYE:OOMA:SOURce<wsp>SOURce<n>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:OOMA:LOCation?**	Summary >>
Syntax	`:MEASure:EYE:OOMA:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:OOMA:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:OOMA:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:OOMA:EBOundary?**	Summary >>
Syntax	`:MEASure:EYE:OOMA:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example		

Command	**:MEASure:EYE:OOMA:EBOundary**	Summary >>
Syntax	`:MEASure:EYE:OOMA:EBOundary<wsp><value|MIN|MAX|DEF>`	
Description	Set the horizontal boundary of the measurement	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example		

Command	**:MEASure:EYE:OOMA:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:EYE:OOMA:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:OOMA:THReeSymbol?**	Summary >>
Syntax	:MEASure:EYE:OOMA:THReeSymbol?<wsp>[MIN|MAX|DEF|SET|ALL]	
Description	Query the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example		

Command	**:MEASure:EYE:OOMA:THReeSymbol**	Summary >>
Syntax	:MEASure:EYE:OOMA:THReeSymbol<wsp><value|MIN|MAX|DEF>	
Description	Set the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example		

Command	**:MEASure:EYE:OOMA:ZERoSymbol?**	Summary >>
Syntax	`:MEASure:EYE:OOMA:ZERoSymbol?<wsp>[MIN|MAX|DEF|SET|ALL]`	
Description	Query the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example		

Command	**:MEASure:EYE:OOMA:ZERoSymbol**	Summary >>
Syntax	`:MEASure:EYE:OOMA:ZERoSymbol<wsp><value|MIN|MAX|DEF>`	
Description	Set the minimum number of consecutive logic 0 symbols	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example		

10.11.6 Signal to Noise Distortion Ratio

Command	**:MEASure:WAVeform:PAM:SNDR?**	Summary >>
Syntax	:MEASure:WAVeform:PAM:SNDR?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:WAV:PAM:SNDR? CUR -> 2.4502e+01	

Command	**:MEASure:WAVeform:PAM:SNDR**	Summary >>
Syntax	:MEASure:WAVeform:PAM:SNDR	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:WAV:PAM:SNDR	

Command	**:MEASure:WAVeform:PAM:SNDR:SOURce?**	Summary >>
Syntax	:MEASure:WAVeform:PAM:SNDR:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:WAV:PAM:SNDR:SOUR? -> DataSource1	

Command	**:MEASure:WAVeform:PAM:SNDR:SOURce**	Summary >>
Syntax	:MEASure:WAVeform:PAM:SNDR:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:WAV:PAM:SNDR:SOUR 1	

Command	**:MEASure:WAVeform:PAM:SNDR:LOCation?**	Summary >>
Syntax	`:MEASure:WAVeform:PAM:SNDR:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:WAVeform:PAM:SNDR:UNITs?**	Summary >>
Syntax	`:MEASure:WAVeform:PAM:SNDR:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example	`:MEAS:WAV:PAM:SNDR:UNIT? ->`	

Command	**:MEASure:WAVeform:PAM:SNDR:EBOundary?**	Summary >>
Syntax	`:MEASure:WAVeform:PAM:SNDR:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:WAV:PAM:SNDR:EBO? CUR -> 2.500000`	

Command	**:MEASure:WAVeform:PAM:SNDR:EBOundary**	Summary >>
Syntax	`:MEASure:WAVeform:PAM:SNDR:EBOundary<wsp><value|MIN|MAX|DEF>`	
Description	Set the horizontal boundary of the measurement	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:WAV:PAM:SNDR:EBO 2.5`	

Command	**:MEASure:WAVeform:PAM:SNDR:EBOundary:UNITs?** Summary >>
Syntax	:MEASure:WAVeform:PAM:SNDR:EBOundary:UNITs?
Description	Query the horizontal boundary unit
Parameters	N/A
Response	
Example	:MEAS:WAV:PAM:SNDR:EBO:UNIT? -> %

10.11.7 SNR Inter-Symbol Interference

Command	**:MEASure:WAVeform:PAM:SNRIsi?**	Summary >>
Syntax	:MEASure:WAVeform:PAM:SNRIsi?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:WAV:PAM:SNRI? CUR -> 3.0118e+01	

Command	**:MEASure:WAVeform:PAM:SNRIsi**	Summary >>
Syntax	:MEASure:WAVeform:PAM:SNRIsi	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:WAV:PAM:SNRI	

Command	**:MEASure:WAVeform:PAM:SNRIsi:SOURce?**	Summary >>
Syntax	:MEASure:WAVeform:PAM:SNRIsi:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:WAV:PAM:SNRI:SOUR? -> DataSource1	

Command	**:MEASure:WAVeform:PAM:SNRIsi:SOURce**	Summary >>
Syntax	:MEASure:WAVeform:PAM:SNRIsi:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:WAV:PAM:SNRI:SOUR 1	

Command	**:MEASure:WAVeform:PAM:SNRIsi:LOCation?**	Summary >>
Syntax	`:MEASure:WAVEform:PAM:SNRIsi:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	**<n>**: Location value of the measurement in the current data source	
	-1: The measurement does not exist in the data source	
Example	`:MEAS:WAV:PAM:SNRI:LOC? -> 16`	

Command	**:MEASure:WAVeform:PAM:SNRIsi:UNITs?**	Summary >>
Syntax	`:MEASure:WAVeform:PAM:SNRIsi:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:WAV:PAM:SNRI:UNIT? -> dB`	

Command	**:MEASure:WAVeform:PAM:SNRIsi:EBOundary?**	Summary >>
Syntax	`:MEASure:WAVeform:PAM:SNRIsi:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:WAV:PAM:SNRI:EBO? SET -> 2.500000`	

Command	**:MEASure:WAVeform:PAM:SNRIsi:EBOundary**	Summary >>
Syntax	:MEASure:WAVeform:PAM:SNRIsi:EBOundary<wsp><value|MIN|MAX|DEF>	
Description	Set the horizontal boundary of the measurement This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	:MEAS:WAV:PAM:SNRI:EBO 2.5	

Command	**:MEASure:WAVeform:PAM:SNRIsi:EBOundary:UNITs?**	Summary >>
Syntax	:MEASure:WAVeform:PAM:SNRIsi:EBOundary:UNITs?	
Description	Query the horizontal boundary unit	
Parameters	N/A	
Response	A single value	
Example	:MEAS:WAVeform:PAM:SNRI:EBO:UNIT? -> %	

10.11.8 Wfm Fall Time

Command	**:MEASure:WAVeform:FALLtime?** Summary >>
Syntax	:MEASure:WAVeform:FALLtime?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	:MEAS:WAV:FALL? CUR -> 1.4686e-11

Command	**:MEASure:WAVeform:FALLtime** Summary >>
Syntax	:MEASure:WAVeform:FALLtime
Description	Perform measurement on the current data source
Parameters	N/A
Response	N/A
Example	:MEAS:WAV:FALL

Command	**:MEASure:WAVeform:FALLtime:SOURce?** Summary >>
Syntax	:MEASure:WAVeform:FALLtime:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	:MEAS:WAV:FALL:SOUR? -> DataSource1

Command	**:MEASure:WAVeform:FALLtime:SOURce** Summary >>
Syntax	:MEASure:WAVeform:FALLtime:SOURce<wsp><SOURce<n>>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	**<SOURce<n>>**: data source ID
Response	N/A
Example	:MEAS:WAV:FALL:SOUR 1

Command	**:MEASure:WAVeform:FALLtime:LOCation?** Summary >>
Syntax	:MEASure:WAVeform:FALLtime:LOCation?
Description	Query the location of the measurement in the current data source
Parameters	N/A
Response	**<n>**: Location value of the measurement in the current data source
	-1: The measurement does not exist in the data source
Example	:MEAS:WAV:FALL:LOC? -> 16

Command	**:MEASure:WAVeform:FALLtime:UNITs?** Summary >>
Syntax	:MEASure:WAVeform:FALLtime:UNITs?
Description	Query the measurement unit
Parameters	N/A
Response	A single value
Example	:MEAS:WAV:FALL:UNIT? -> s

Command	**:MEASure:WAVeform:FALLtime:STArtPercent?** Summary >>
Syntax	:MEASure:WAVeform:FALLtime:STArtPercent?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]
Description	Query the start amplitude threshold
Parameters	**MIN**: Returns the minimum value
	MAX: Returns the maximum value
	DEF: Returns the default value
	SET: Returns the set value
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET
	UNIT: Returns the default unit
Response	N/A
Example	:MEAS:WAV:FALL:STAP? SET -> 20.000000

Command	**:MEASure:WAVeform:FALLtime:STArtPercent**	Summary >>
Syntax	`:MEASure:WAVeform:FALLtime:STArtPercent<wsp><value|MIN|MAX|DEF>`	
Description	Set the start amplitude threshold This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:WAV:FALL:STAP 20`	

Command	**:MEASure:WAVeform:FALLtime:STArtPercent:UNITs?**	Summary >>
Syntax	`:MEASure:WAVeform:FALLtime:STArtPercent:UNITs?`	
Description	Query the start amplitude threshold unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:WAV:FALL:STAP:UNIT? -> %`	

Command	**:MEASure:WAVeform:FALLtime:STOpPercent?**	Summary >>
Syntax	`:MEASure:WAVeform:FALLtime:STOpPercent?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the stop amplitude threshold	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:WAV:FALL:STOP? SET -> 80.000000`	

Command	**:MEASure:WAVeform:FALLtime:STOpPercent**	Summary >>
Syntax	`:MEASure:WAVeform:FALLtime:STOpPercent<wsp><value|MIN|MAX|DEF>`	
Description	Set the stop amplitude threshold This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query `MIN` and `MAX` values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:WAV:FALL:STOP 80`	

Command	**:MEASure:WAVeform:FALLtime:STOpPercent:UNITs?**	Summary >>
Syntax	`:MEASure:WAVeform:FALLtime:STOpPercent:UNITs?`	
Description	Query the stop amplitude threshold unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:WAV:FALL:STOP:UNIT? -> %`	

Command	**:MEASure:WAVeform:FALLtime:THReeSymbol?**	Summary >>
Syntax	`:MEASure:WAVeform:FALLtime:THReeSymbol?<wsp>[MIN|MAX|DEF|SET|ALL]`	
Description	Query the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example	`:MEAS:WAV:FALL:THRS? SET -> 3`	

Command	**:MEASure:WAVeform:FALLtime:THReeSymbol**	Summary >>
Syntax	`:MEASure:WAVeform:FALLtime:THReeSymbol<wsp><value|MIN|MAX|DEF>`	
Description	Set the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:WAV:FALL:THRS 3`	

Command	**:MEASure:WAVeform:FALLtime:ZERoSymbol?**	Summary >>
Syntax	`:MEASure:WAVeform:FALLtime:ZERoSymbol?<wsp>[MIN|MAX|DEF|SET|ALL]`	
Description	Query the minimum number of consecutive logic 0 symbols	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example	`:MEAS:WAV:FALL:ZERS? SET -> 3`	

Command	**:MEASure:WAVeform:FALLtime:ZERoSymbol**	Summary >>
Syntax	`:MEASure:WAVeform:FALLtime:ZERoSymbol<wsp><value|MIN|MAX|DEF>`	
Description	Set the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:WAV:FALL:ZERS DEF`	

10.11.9 Wfm Rise Time

Command	**:MEASure:WAVeform:RISetime?**	Summary >>
Syntax	:MEASure:WAVeform:RISetime?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>	
Description	Query measurement results	
Parameters	**CURrent**: Current value	
	MEAN: Mean value	
	MINimum: Minimum value	
	MAXimum: Maximum value	
	SDEViation: Standard deviation	
	COUNt: Number of acquisitions executed	
Response	A single value	
Example	:MEAS:WAV:RIS? CUR -> 1.4249e-11	

Command	**:MEASure:WAVeform:RISetime**	Summary >>
Syntax	:MEASure:WAVeform:RISetime	
Description	Perform measurement on the current data source	
Parameters	N/A	
Response	N/A	
Example	:MEAS:WAV:RIS	

Command	**:MEASure:WAVeform:RISetime:SOURce?**	Summary >>
Syntax	:MEASure:WAVeform:RISetime:SOURce?	
Description	Query the data source	
Parameters	N/A	
Response		
Example	:MEAS:WAV:RIS:SOUR? -> DataSource1	

Command	**:MEASure:WAVeform:RISetime:SOURce**	Summary >>
Syntax	:MEASure:WAVeform:RISetime:SOURce<wsp><SOURce<n>>	
Description	Add this measurement to the specified data source and switch to this data source	
Parameters	**<SOURce<n>>**: data source ID	
Response	N/A	
Example	:MEAS:WAV:RIS:SOUR 1	

Command	**:MEASure:WAVeform:RISetime:LOCation?**	Summary >>
Syntax	`:MEASure:WAVeform:RISetime:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response	**<n>**: Location value of the measurement in the current data source	
	-1: The measurement does not exist in the data source	
Example	`:MEAS:WAV:RIS:LOC? -> 17`	

Command	**:MEASure:WAVeform:RISetime:UNITs?**	Summary >>
Syntax	`:MEASure:WAVeform:RISetime:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:WAV:RIS:UNIT? -> s`	

Command	**:MEASure:WAVeform:RISetime:STArtPercent?**	Summary >>
Syntax	`:MEASure:WAVeform:RISetime:STArtPercent?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the start amplitude threshold	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:WAV:RIS:STAP? SET -> 20.000000`	

Command	**:MEASure:WAVeform:RISetime:STArtPercent**	Summary >>
Syntax	`:MEASure:WAVeform:RISetime:STArtPercent<wsp><value|MIN|MAX|DEF>`	
Description	Set the start amplitude threshold This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query `MIN` and `MAX` values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:WAV:RIS:STAP 20`	

Command	**:MEASure:WAVeform:RISetime:STArtPercent:UNITs?**	Summary >>
Syntax	`:MEASure:WAVeform:RISetime:STArtPercent:UNITs?`	
Description	Query the start amplitude threshold unit	
Parameters	N/A	
Response	A single value	
Example	`:MEAS:WAV:RIS:STAP:UNIT? -> %`	

Command	**:MEASure:WAVeform:RISetime:STOpPercent?**	Summary >>
Syntax	`:MEASure:WAVeform:RISetime:STOpPercent?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the stop amplitude threshold	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	UNIT: Returns the default unit	
Response	N/A	
Example	`:MEAS:WAV:RIS:STOP? SET -> 80.000000`	

Command	**:MEASure:WAVeform:RISetime:STOpPercent**	Summary >>
Syntax	`:MEASure:WAVeform:RISetime:STOpPercent<wsp><value|MIN|MAX|DEF>`	
Description	Set the stop amplitude threshold This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query `MIN` and `MAX` values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:WAV:RIS:STOP 80`	

Command	**:MEASure:WAVeform:RISetime:STOpPercent:UNITs?**	Summary >>
Syntax	`:MEASure:WAVeform:RISetime:STOpPercent:UNITs?`	
Description	Query the stop amplitude threshold unit	
Parameters	N/A	
Response		
Example	`:MEAS:WAV:RIS:STOP:UNIT? -> %`	

Command	**:MEASure:WAVeform:RISetime:THReeSymbol?**	Summary >>
Syntax	`:MEASure:WAVeform:RISetime:THReeSymbol?<wsp>[MIN|MAX|DEF|SET|ALL]`	
Description	Query the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example	`:MEAS:WAV:RIS:THRS? SET -> 3`	

Command	**:MEASure:WAVeform:RISetime:THReeSymbol**	Summary >>
Syntax	`:MEASure:WAVeform:RISetime:THReeSymbol<wsp><value|MIN|MAX|DEF>`	
Description	Set the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:WAV:RIS:THRS 3`	

Command	**:MEASure:WAVeform:RISetime:ZERoSymbol?**	Summary >>
Syntax	`:MEASure:WAVeform:RISetime:ZERoSymbol?<wsp>[MIN|MAX|DEF|SET|ALL]`	
Description	Query the minimum number of consecutive logic 0 symbols	
Parameters	**MIN**: Returns the minimum value	
	MAX: Returns the maximum value	
	DEF: Returns the default value	
	SET: Returns the set value	
	ALL: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
Response	N/A	
Example	`:MEAS:WAV:RIS:ZERS? SET -> 3`	

Command	**:MEASure:WAVeform:RISetime:ZERoSymbol**	Summary >>
Syntax	`:MEASure:WAVeform:RISetime:ZERoSymbol<wsp><value|MIN|MAX|DEF>`	
Description	Set the minimum number of consecutive logic 1 (NRZ) or logic 3 (PAM4) symbols This defines the section of the eye diagram that is used for the measurement as percentage of UI around the eye center. For example, 100% is the entire eye width, 1% is a narrow vertical slice of the eye diagram.	
Parameters	**<value>**: Sets this value in the default unit. Specify non-default units if used. To determine the valid range of values, query `MIN` and `MAX` values.	
	MIN: Sets the minimum value	
	MAX: Sets the maximum value	
	DEF: Sets the default value	
Response	N/A	
Example	`:MEAS:WAV:RIS:ZERS 3`	

10.11.10 Vertical Eye Closure Penalty (VECP)

Command	**:MEASure:EYE:VECP?** Summary >>
Syntax	:MEASure:EYE:VECP?<CURrent|MEAN|MINimum|MAXimum|SDEViation|COUNt>
Description	Query measurement results
Parameters	**CURrent**: Current value
	MEAN: Mean value
	MINimum: Minimum value
	MAXimum: Maximum value
	SDEViation: Standard deviation
	COUNt: Number of acquisitions executed
Response	A single value
Example	

Command	**:MEASure:EYE:VECP** Summary >>
Syntax	:MEASure:EYE:VECP
Description	Perform measurement on the current data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:VECP:SOURce?** Summary >>
Syntax	:MEASure:EYE:VECP:SOURce?
Description	Query the data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:VECP:SOURce** Summary >>
Syntax	:MEASure:EYE:VECP:SOURce<wsp>SOURce<n>
Description	Add this measurement to the specified data source and switch to this data source
Parameters	N/A
Response	
Example	

Command	**:MEASure:EYE:VECP:LOCation?**	Summary >>
Syntax	`:MEASure:EYE:VECP:LOCation?`	
Description	Query the location of the measurement in the current data source	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:VECP:UNITs?**	Summary >>
Syntax	`:MEASure:EYE:VECP:UNITs?`	
Description	Query the measurement unit	
Parameters	N/A	
Response		
Example		

Command	**:MEASure:EYE:VECP:EBOundary?**	Summary >>
Syntax	`:MEASure:EYE:VECP:EBOundary?<wsp>[MIN|MAX|DEF|SET|ALL|UNIT]`	
Description	Query the horizontal boundary of the measurement	
Parameters	**`MIN`**: Returns the minimum value	
	`MAX`: Returns the maximum value	
	`DEF`: Returns the default value	
	`SET`: Returns the set value	
	`ALL`: Returns all the above parameters in a comma separated string: MIN, MAX, DEF, SET	
	`UNIT`: Returns the default unit	
Response	N/A	
Example		

Command	**:MEASure:EYE:VECP:EBOundary**	Summary >>
Syntax	`:MEASure:EYE:VECP:EBOundary<wsp><value|MIN|MAX|DEF>`	
Description	Set the horizontal boundary of the measurement	
Parameters	**`<value>`**: Sets this value	
	`MIN`: Sets the minimum value	
	`MAX`: Sets the maximum value	
	`DEF`: Sets the default value	
Response	N/A	
Example		

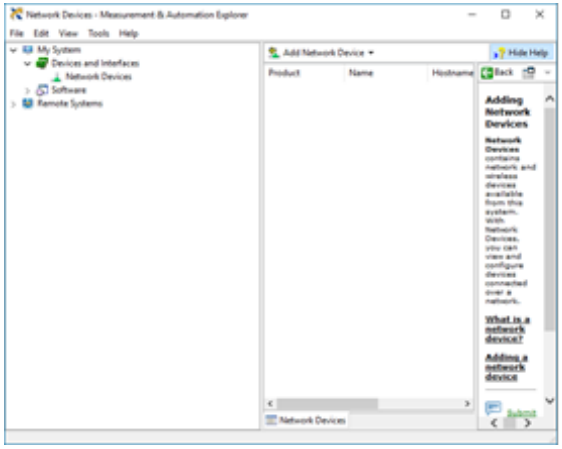
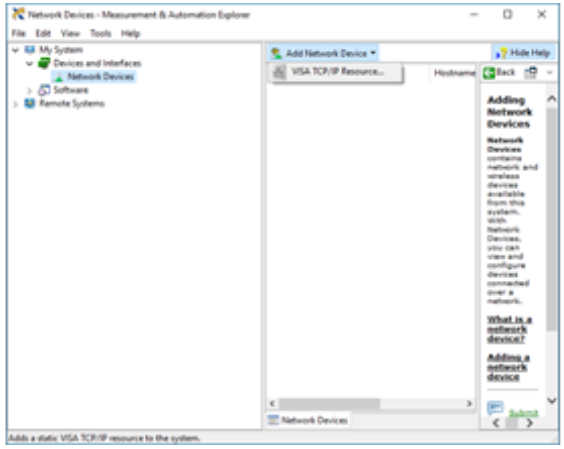
Command	**:MEASure:EYE:VECP:EBOundary:UNITs?** Summary >>
Syntax	:MEASure:EYE:VECP:EBOundary:UNITs?
Description	Query the horizontal boundary unit
Parameters	N/A
Response	
Example	

10.12 Programming examples and applications

10.12.1 Setting up NI-MAX application

To communicate with any Quantifi Photonics product, the chassis / benchtop product must first be setup as a TCP/IP instrument.

1. After installing NI-MAX, launch the application. In the left side panel of the window, click the **Devices and Interfaces** option. A drop down of available instruments detected will show up.
2. Click on **Network Devices**, then click **Add Network Devices** and select **VISA TCP/IP Resource**.

3. Select **Manual Entry of LAN Instrument**. Enter in the Hostname or IP Address.
   Note when operating locally, enter in the localhost IP address of **127.0.0.1**. Click **Finish** to end the setup process.

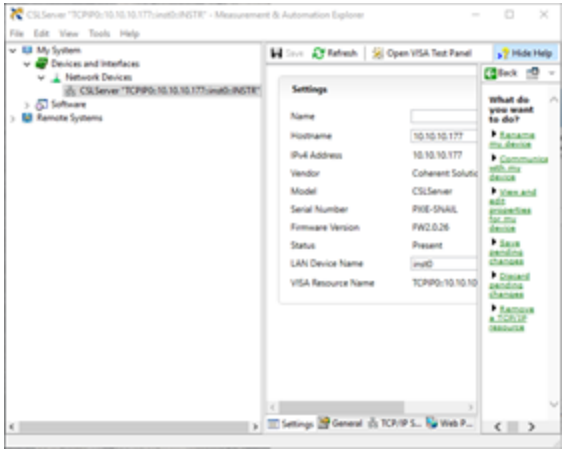




10.12.2 Setting up NI-VISA application

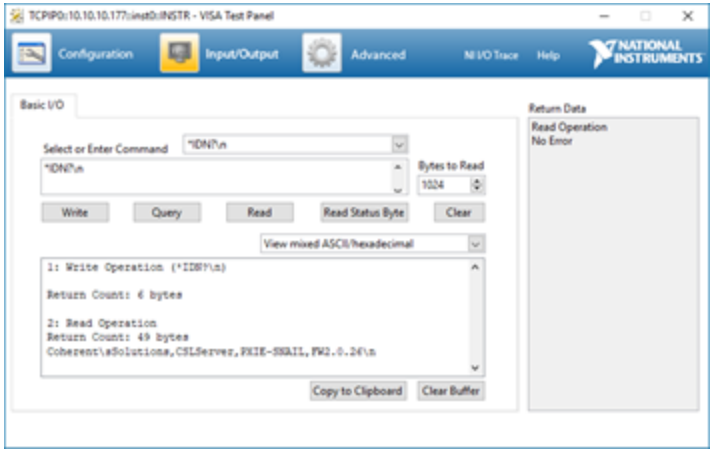
NI-VISA is used to communicate with the PXIe chassis or installed modules / instruments. The above steps must be completed before attempting to communicate using NI-VISA.

1. Launch NI-MAX. In the left-hand side menu, select an instrument from the **Network Devices** list.



2. On the right-hand side panel, select **Open VISA Test Panel**. A new window will popup. Click the **Input / Output** button from the window menu.

   Valid chassis and module commands can be entered in, and their returns queried



10.12.3 Python® code example

The following example shows how to communicate with the Quantifi Photonics product using Python code.

```
# You can get VXI11 from pip:
# pip install python-vxi11==0.9
import vxi11
from vxi11.vxi11 import Vxi11Exception
# replace this with the IP of your device
ip = "127.0.0.1"
try:
    print("connecting to " + ip + " ... ")
    instrument = vxi11.Instrument(ip)
    print("connected")
    print("checking IDN...")
    command = "*IDN?"
    data = instrument.ask(command)
    print("IDN: " + data)
    print("checking OPT...")
    command = "*OPT?"
    data = instrument.ask(command)
    print("OPT: " + data)
    # replace this with a valid command for your device (read # the programming guide section for examples)
    command = ""
    print("writing a specific command")
    instrument.write(command)
    print("checking ESR")
    command = "*ESR?"
    data = instrument.ask(command)
    print("*ESR?: " + data)
except Vxi11Exception as e:
    # pass
    print("ERROR" + str(e) + ", command: " + str(command))
```

10.12.4 MATLAB® code example

To communicate with the Quantifi Photonics product in MATLAB® the installation of a VISA IO driver is required. These drivers enable the creation of the Interface Object for instrument communication.

If developing locally on the PXIE Platform, then these will already be installed. However, if development is on a remotely connected system the VISA Libraries, e.g. National Instruments NI-VISA will have to be installed.

> **NOTE**
>
> MATLAB 2010x or later with the Instrument Control Toolbox is required to execute the code detailed in this section.

The following example shows how to communicate with a Quantifi Photonics product using MATLAB code.

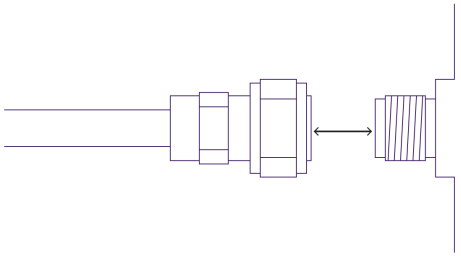
```
% Find a VISA-TCPIP object. This is if the VISA object has already been
% created with tmtool or has been removed from the workspace without
% first being closed (cleanly disconnected).
PXIE_Chassis = instrfind('Type', 'visa-tcpip', ...
'RsrcName', 'TCPIP0::10.10.10.89::inst0::INSTR', 'Tag', '');
% Create the 'agilent' VISA-TCPIP object if it does not exist
% otherwise use the object that was found.
if isempty(PXIE_Chassis)
    PXIE_Chassis = visa('agilent', 'TCPIP0::10.10.10.89::inst0::INSTR');
else
    fclose(PXIE_Chassis);
    PXIE_Chassis = PXIE_Chassis (1);
end
% Open the connection to the VISA object.
fopen(PXIE_Chassis);
% Query the PXIE_Chassis.
response = query(PXIE_Chassis, '*IDN?');
disp('The *IDN query response:');
disp(response);
response = query(PXIE_Chassis, '*OPT?');
disp('The *OPT query response:');
disp(response);
% Replace this with a valid command for your device (read the programming
% guide section for examples)
command = ''
% Close the connection to the object.
```

11 RF electrical connections

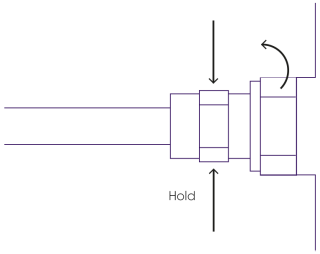
Handle connectors with care at all times to ensure accuracy and repeatability of measurements, and maximize the lifetime of connectors:

> **CAUTION**
>
> Use electrostatic discharge (ESD) protection at all times, especially when handling RF connectors.

- Wear a grounded wrist strap.
- Use phase-matched high-quality RF cables.
- Do not bend or deform the rigid cables, as this will cause damage.
- Inspect, clean, and gauge connectors. All connectors must be undamaged, clean, and within mechanical specification.
- Align connectors orthogonal to each other, straight and without skew - do not come in at an angle. Always hold on to the cable/component while tightening the hex nut to prevent the center pin from twisting inside the female connector.



- Rotate only the connector nut — NOT THE DEVICE OR CONNECTOR BODY — until finger-tight. Be careful not to cross the threads. Damage to both connectors will occur if the male center pin is allowed to rotate in the female contact fingers!



- Use a calibrated torque wrench to control the tightening pressure on all RF connections.

12 System requirements

Computer running VISEYE - minimum requirements:

- Operating system: Microsoft Windows® 11 (64-bit)
- Processor: Intel® Core™ i9 or faster CPU
- Memory: 32 GB of RAM or greater

13 Maintenance

To help ensure long, trouble-free operation:

- Always inspect cable connectors before using and clean them if necessary.
- Keep the unit free of dust.
- Always cover unused RF input connectors with the supplied anti-static plastic covers or with 50Ω terminators to prevent accidental ESD or EOS damage.
- Store the unit at room temperature in a clean and dry area. Keep the unit out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.
- If any liquids are spilled on or into the unit, power off the chassis immediately. Remove the unit and allow to dry completely.
- To allow for sufficient air flow and avoid thermal issues, set up your instrument with a minimum clearance of 2 inches (50.8mm) around it and do not block any ventilation fans.

WARNING

The use of controls, adjustments, and procedures other than those specified herein may result in exposure to hazardous situations or impair the protection provided by this unit.

13.1 Annual calibration schedule

To ensure that the unit is performing within specification, we recommend it is re-calibrated every 12 months.

All Quantifi Photonics products are calibrated during manufacture, and each product is shipped to the customer with a Calibration Certificate. On this certificate, the calibration date, as well as the next calibration due date are mentioned.

We recommend your product is returned for re-calibration before the listed due date, to ensure continued performance of the product. For re-calibration service information, or to send in a product for re-calibration service, email support@quantifiphotonics.com.

If the Calibration Certificate has been misplaced, or the calibration due date is not known, email support@quantifiphotonics.com.

14 Technical Support

14.1 Contacting the Technical Support Group

To obtain after-sales service or technical support for this product, contact Quantifi Photonics:

support@quantifiphotonics.com

To accelerate the process, please provide information such as the name and the serial number of the product (see the product identification label), as well as a description of your problem.

For VISEYE software support, please confirm that your setup meets the minimum system requirements (refer to System requirements) and provide all relevant information, including:

- VISEYE version number and license type
- Hardware ID
  This is the hardwareid.hid file that you have generated when activating VISEYE.
- A description of the issue, including the project file and relevant screen captures if possible.

14.2 Transportation

Maintain a temperature range within specifications when transporting the unit.

Transportation damage can occur from improper handling.

The following steps are recommended to minimize the possibility of damage:

- Pack the product in its original packing material when shipping. If the original packaging is unavailable, use appropriate foam packaging to provide shock absorption and avoid displacement of the product inside the shipping box. Please keep all input connectors covered with the supplied anti-static plastic covers during transport and avoid any shipping material making contact with the sensitive connectors of the product.
- Avoid high humidity or large temperature fluctuations.
- Keep the product out of direct sunlight.
- Avoid unnecessary shocks and vibrations.

15 Warranty Information

The following warranty information should be read in conjunction with the VISEYE End User Licence Agreement (EULA). For complete details, please refer to the EULA in the VISEYE software.

15.1 General information

Quantifi Photonics Ltd (Quantifi Photonics) warrants from the date of the original shipment (the Warranty Period) that this product will conform to specifications and will be free from defects in material and workmanship for the applicable Warranty Period. Quantifi Photonics also warrants that the equipment will meet applicable specifications under normal use.

NOTE

The warranty can become null and void if:

- The unit has been tampered with, repaired, or worked upon by unauthorized individuals or non-Quantifi Photonics personnel.
- The warranty sticker has been removed.
- The unit has been opened, other than as explained in this guide.
- The unit serial number has been altered, erased, or removed.
- The unit has been misused, neglected, or damaged by accident.
- The unit has been used with an external power supply not supplied by Quantifi Photonics with the unit.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL QUANTIFI PHOTONICS BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

For full warranty terms and conditions, please visit quantifiphotonics.com.

15.2 Liability

Quantifi Photonics shall not be liable for damages resulting from the use of the product, nor shall be responsible for any failure in the performance of other items to which the product is connected or the operation of any system of which the product may be a part.

Quantifi Photonics shall not be liable for damages resulting from improper usage, transportation or unauthorized modification of the product, its accompanying accessories and software.

The external power supply that has been supplied by Quantifi Photonics with the unit can only be used with that unit, do not use it with any other product.

15.3 Exclusions

Quantifi Photonics reserves the right to make changes in the design or construction of any of its products at any time without incurring obligation to make any changes whatsoever on units purchased. Accessories, including but not limited to fuses, pilot lamps, batteries and universal interfaces (EUI) used with Quantifi Photonics products are not covered by this warranty.

This warranty excludes failure resulting from: Improper use or installation, normal wear and tear, accident, abuse, neglect, fire, water, lightning or other acts of nature, causes external to the product or other factors beyond the control of Quantifi Photonics.

15.4 Certification

Quantifi Photonics certifies that this equipment met its published specifications at the time of shipment from the factory.

15.5 Service and repairs

To send any equipment for service, repair or calibration please contact the Technical Support Group: support@quantifiphotonics.com.

QUANTIFI PHOTONICS®
A Teradyne Company

Test. Measure. Solve.™

Quantifi Photonics is transforming the world of photonics test and measurement. Our portfolio of optical and electrical test instruments is rapidly expanding to meet the needs of engineers and scientists around the globe. From enabling ground-breaking experiments to driving highly efficient production testing, you'll find us working with customers to solve complex problems with optimal solutions.

To find out more, get in touch with us today.

General Enquiries	sales@quantifiphotonics.com
Technical Support	support@quantifiphotonics.com
Phone	+64 9 478 4849
North America	+1-800-803-8872

quantifiphotonics.com