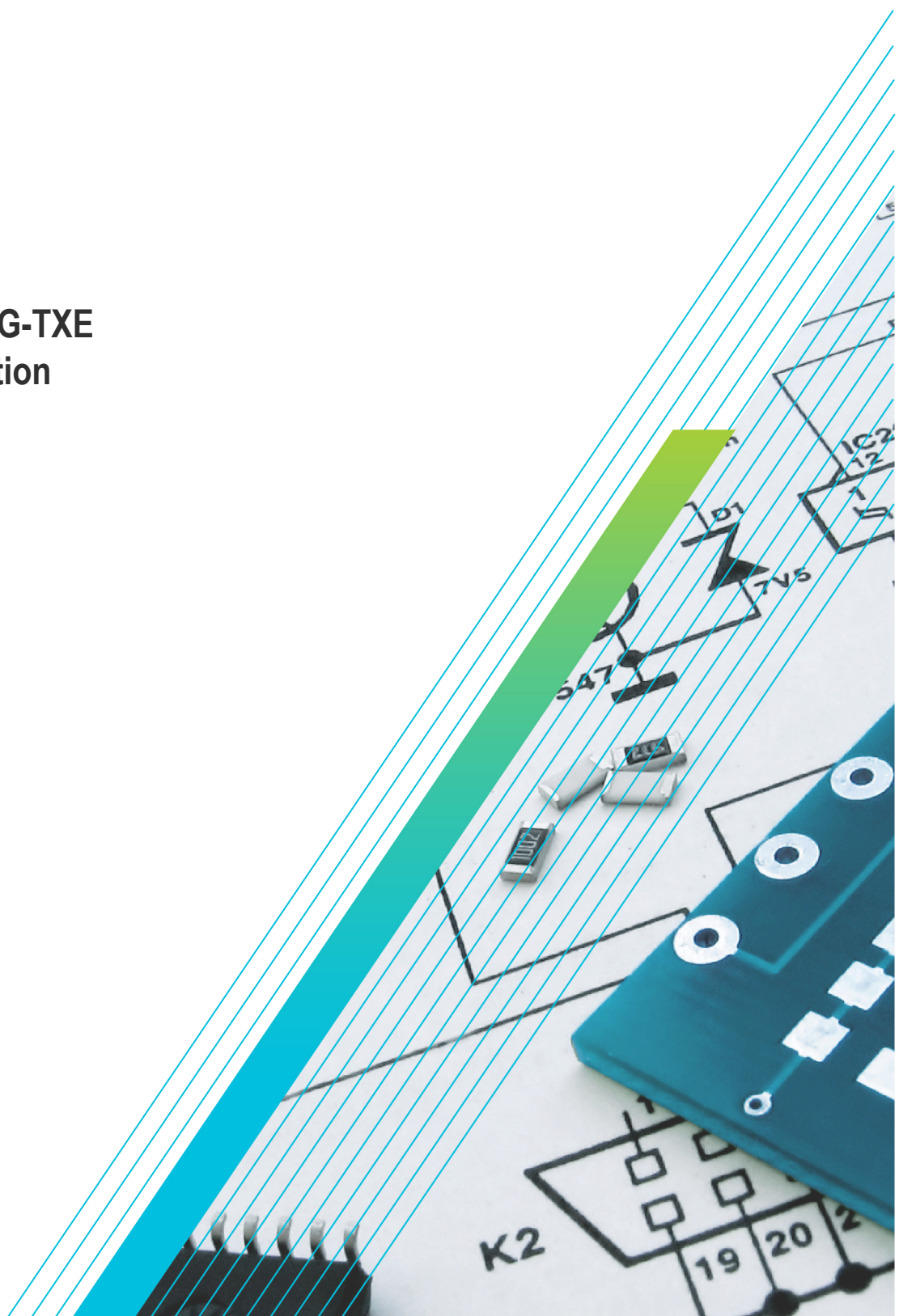




**TekExpress® 100G-TXE**  
**Compliance Solution**  
**Application Help**



077-1298-04







**TekExpress® 100G-TXE**  
**Compliance Solution**  
**Application Help**

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- In North America, call 1-800-833-9200.
- Worldwide, visit to [www.tek.com](http://www.tek.com) find contacts in your area.

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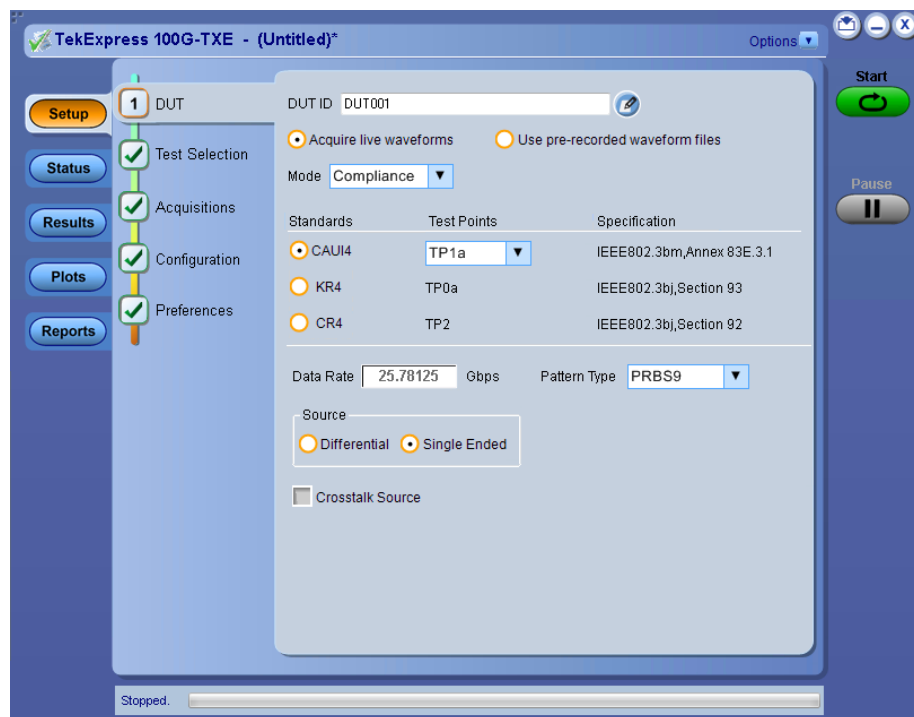
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# Welcome



Welcome to the Tektronix 100G-TXE, an Tektronix oscilloscope application software that addresses 100GBASE-CR4, 100GBASE-KR4, and CAUI-4 standards of IEEE. These three electrical standards make up the backbone of the current 100G Ethernet industry, and the TekExpress 100G-TXE automation test solution facilitates turnkey electrical transmitter validation of most 100G Ethernet systems today.

The 100G-TXE solution specifically targets Annex 83 of the IEEE 802.3bm standard as well as sections 92 and 93 of the IEEE 802.3bj specification. These tools allow quick verification to these IEEE electrical standards, while offering comprehensive test automation, results margining, data logging, and results reporting in an advanced testing framework.

## Key features of TekExpress 100G-TXE include:

- 100G-TXE offers Transmitter 100GBASE-CR4 time domain transmitter characterization, tracking Table 92-6 Transmitter characteristics at TP2 from the IEEE 802.3bj cabled I/O specification. This offers a checklist approach to performing all jitter, Linear impulse response pulse peak and Signal to Noise and Distortion Ratio measurements, as well as basic AC parametric and timing operations.
- 100G-TXE also incorporates 100GBASE-KR4 time domain transmitter characterization, tracking Table 93-4 Transmitter characteristics at TP0a from the IEEE 802.3bj backplane specification. While the measurements are identical to 100GBASE-CR4, the electrical limits for 100GBASE-KR4 are more stringent.
- 100G-TXE includes a third electrical test suite, for Annex 83 of IEEE 802.3bm, tracking Chip-to-module 100 Gb/s four-lane Attachment Unit Interface (CAUI-4), Table 83E-1 at TP1a and TP4. The user can characterize the DUT for Host output and Module output by selecting the required test points. The CAUI-4 support offers advance CTLE scanning provisions to find optimal eye opening/width.



# Getting help and support

## Product documents

Use the product documents for more information on the application functions, understand the theory of operation, how to remotely program or operate the application, and do other tasks.

**Table 1: TekExpress Application documents**




To learn about	Use this document
How to use the application	TekExpress <Application Name> Help
How to remotely control the instrument	PDF version of this document can be downloaded from <a href="http://www.tek.com/downloads">www.tek.com/downloads</a> Compiled HTML (CHM) version is integrated with the application. Press <b>F1</b> key from the keyboard to start the help. Tektronix Part Number: 077-xxxx-xx

## Conventions

This application help uses the following conventions:

- The term "Application," and "Software" refers to the TekExpress Application.
- The term "DUT" is an abbreviation for Device Under Test.
- The term "select" is a generic term that applies to the two methods of choosing a screen item (button control, list item): using a mouse or using the touch screen.
- A **Note** identifies important information.

**Table 2: Icons used in the help**

Icon	Description
	This icon identifies important information
	This icon identifies conditions or practices that could result in loss of data.
	This icon identifies additional information that will help you use the application more efficiently.

## Technical support

Tektronix values your feedback on our products. To help us serve you better, please send us your suggestions, ideas, or comments on your application or oscilloscope. Contact Tektronix through mail, telephone, or the Web site. See [Contacting Tektronix](#) at the front of this document for contact information.

When you contact Tektronix Technical Support, please include the following information (be as specific as possible):

### General information

- All instrument model numbers
- Hardware options, if any
- Modules used
- Your name, company, mailing address, phone number, FAX number
- Please indicate if you would like to be contacted by Tektronix about your suggestion or comments.

### Application specific information

- Software version number
- Description of the problem such that technical support can duplicate the problem
- If possible, save the setup files for all the instruments used and the application
- If possible, save the TekExpress setup files, log.xml, \*.TekX (session files and folders), and status messages text file

# Getting started

## Hardware requirements

### Minimum system requirements

The following table shows the minimum system requirements to install and run the TekExpress 100G-TXE solution.

**Table 3: System requirements**

Component	Description
<b>Oscilloscope</b>	<ul style="list-style-type: none"> <li>• Tektronix DPO70K series scope</li> <li>• Opt DJA and DJAN</li> </ul>
<b>Processor</b>	Same as the oscilloscope
<b>Operating System</b>	Same as the oscilloscope:
<b>Memory</b>	Same as the oscilloscope
<b>Hard Disk</b>	Same as the oscilloscope
<b>Display</b>	Super VGA resolution or higher video adapter (800 x 600 minimum video resolution for small fonts or 1024 x 768 minimum video resolution for large fonts). The application is best viewed at 96 dpi display settings <sup>1</sup>
<b>Firmware</b>	<ul style="list-style-type: none"> <li>• Firmware Version: 10.6.0 or above</li> </ul>
<b>Software</b>	<ul style="list-style-type: none"> <li>• IronPython 2.7.3 installed</li> <li>• PyVisa 1.0.0.25 installed</li> <li>• Microsoft .NET 4.0 Framework</li> <li>• Microsoft Internet Explorer 7.0 SP1 or greater, or other Web browser for viewing reports</li> <li>• Adobe Reader software 7.0 or greater for viewing portable document format (PDF) files</li> </ul>

### Instruments and accessories required

TekExpress100G-TXE application is launched on DPO70K series scope. The following table lists the instruments and accessories required for this application.

<sup>1</sup> If TekExpress is running on an instrument that has a video resolution less than 800x600, connect and configure a second monitor to the instrument.

**Table 4: Instruments and accessories required for 100G-TXE application**

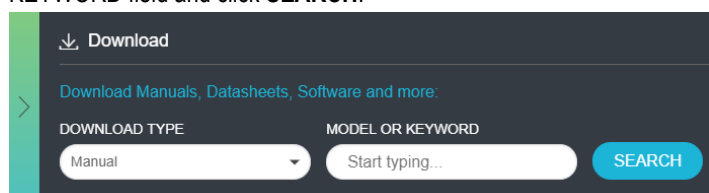
Instrument/Accessory	Model number	Quantity
Oscilloscope	DPO72304SX, DPO72304DX, MSO72304DX, DPO72504DX, MSO72504DX, DPO73304SX, DPO73304DX, MSO73304DX, DPO72504SX, DPO75002SX, DPO75902SX, DPO77002SX, DPS75004SX, DPS75904SX, DPS77004SX	1
Adapter <sup>2</sup>	Broadband Balun with bandwidth $\geq 40$ GHz	1
Cables	Compatible SMA cables with bandwidth greater than 40 GHz for connecting single ended sources ATI channel.	1
Fixtures	<ul style="list-style-type: none"> <li>Host compliance board for CAUI4 at TP1a and CR4 at TP2</li> <li>Module compliance board for CAUI4 at TP4</li> <li>Transmitter test fixture for KR4 at TP0a <sup>3</sup></li> </ul>	1
DC Blocks	Compatible DC block with bandwidth range 50 KHz to 65 GHz	2
Attenuator	3, 6, or 10 dB attenuators	2
Probes <sup>4</sup>	Tektronix P7600 or P7700 series	1

## Software requirements

### Downloading and installing the software

Complete the following steps to download and install the latest TekExpress <Application Name> application.

1. Go to [www.tek.com](http://www.tek.com).
2. Click **Downloads**. In the Downloads menu, select DOWNLOAD TYPE as Software and enter the application name in the MODEL OR KEYWORD field and click **SEARCH**.



3. Select the latest version of software and follow the instructions to download the software. Copy the executable file into the oscilloscope.
4. Double-click the executable and follow the on-screen instructions.

The software is installed at C:\Program Files\Tektronix\TekExpress\TekExpress <Application Name>.

5. Select from the Oscilloscope menu, to open the application.

<sup>2</sup> Required to operate in differential mode for single stack ATI scopes.

<sup>3</sup> If required, De-Embed the fixtures using filter files.

<sup>4</sup> Required to acquire signal at TP0a test point for KR4 suite.

## Activate the license

Activate the license using the **Option Installation** wizard in the TekScope application:

1. In the **TekScope** application menu bar, click **Utilities > Option Installation**. The TekScope Option Installation wizard opens.
2. Push the **F1** key on the oscilloscope keyboard to open the Option Installation help topic.
3. Follow the directions in the help topic to activate the license.

## View software version and license key details

To view version information of the application, click **Options > About TekExpress**.



# Setting up the test environment

## Compensate the signal path

Use the following procedure to compensate the internal signal acquisition path. Perform this procedure if the ambient temperature has changed more than 5 °C (9 °F) since you performed the last signal path compensation. Perform the signal path compensation once a week. Failure to do so may result in the instrument not meeting warranted performance levels.

1. Power on and wait for the instrument to complete its warm up period before continuing with this procedure.
2. Disconnect any probes you have connected to the input channels.
3. Set the instrument to Menu mode.
4. Select Instrument Calibration from the Utilities menu.
5. Note any instructions that appear in the resulting control window.
6. Click Run SPC to begin the procedure. The procedure may take several minutes to complete.
7. Verify that the Status changes to Compensated after the procedure is complete. If the Calibration Status field indicates anything other than Compensated, see Signal Path Compensation Status for information on the readout and recommended action.



**Note:** When making measurements at vertical scale settings less than or equal to 5 mV, you should perform the signal path compensation at least once a week. Failure to do so may result in the instrument not meeting warranted performance levels at those volts/div settings.

## Equipment connection diagram

Click **Setup** > **Test Selection** > **Schematic** to view the equipment setup diagram(s).

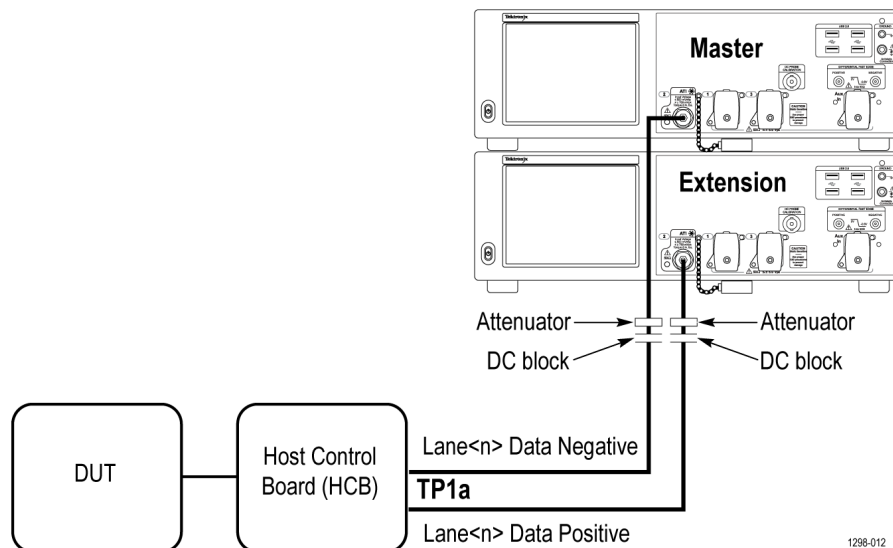


Figure 1: CAUI4 TP1a (Single ended)

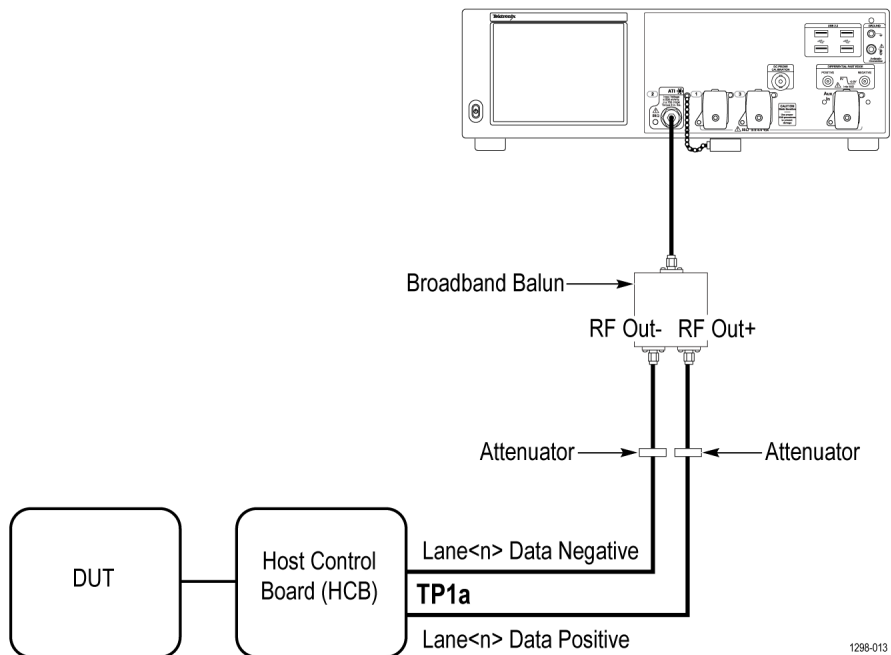


Figure 2: CAUI4 TP1a (Differential)

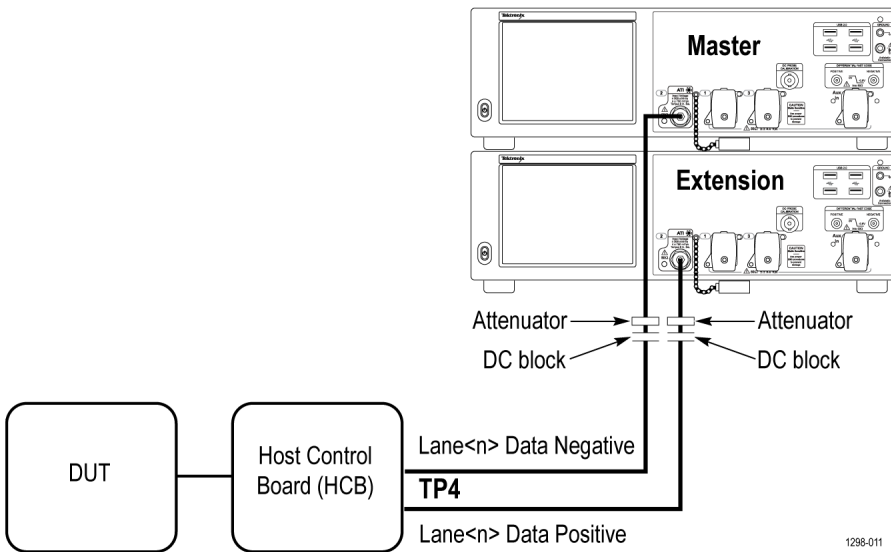
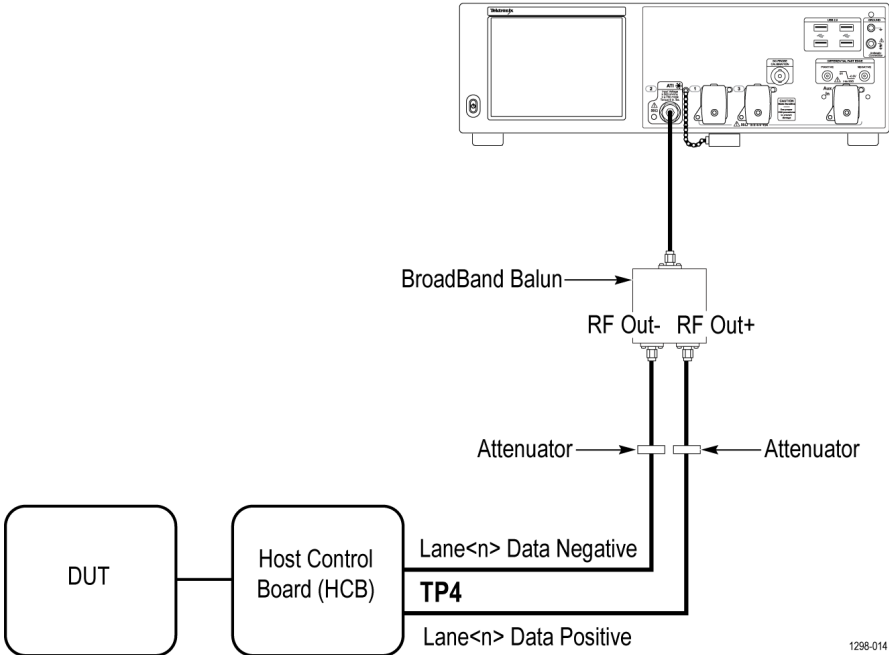
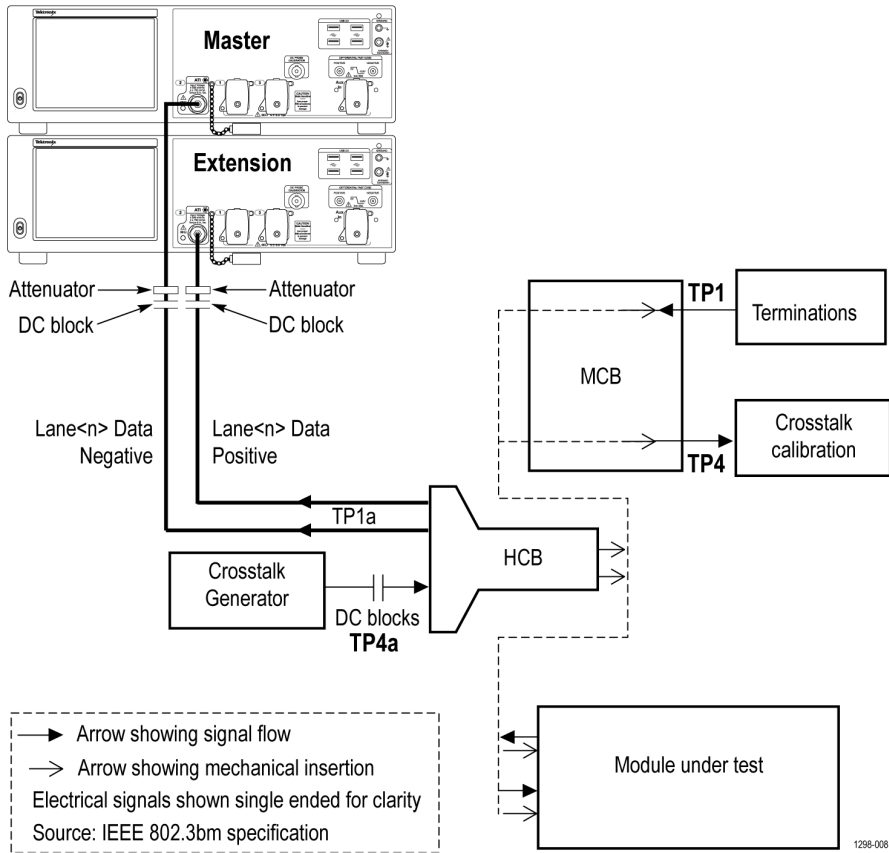


Figure 3: CAUI4 TP4 (Single ended)



1298-014

Figure 4: CAUI4 TP4 (Differential)



1298-008

Figure 5: CAUI4 Eye Width / Eye Height TP1a (Single ended)





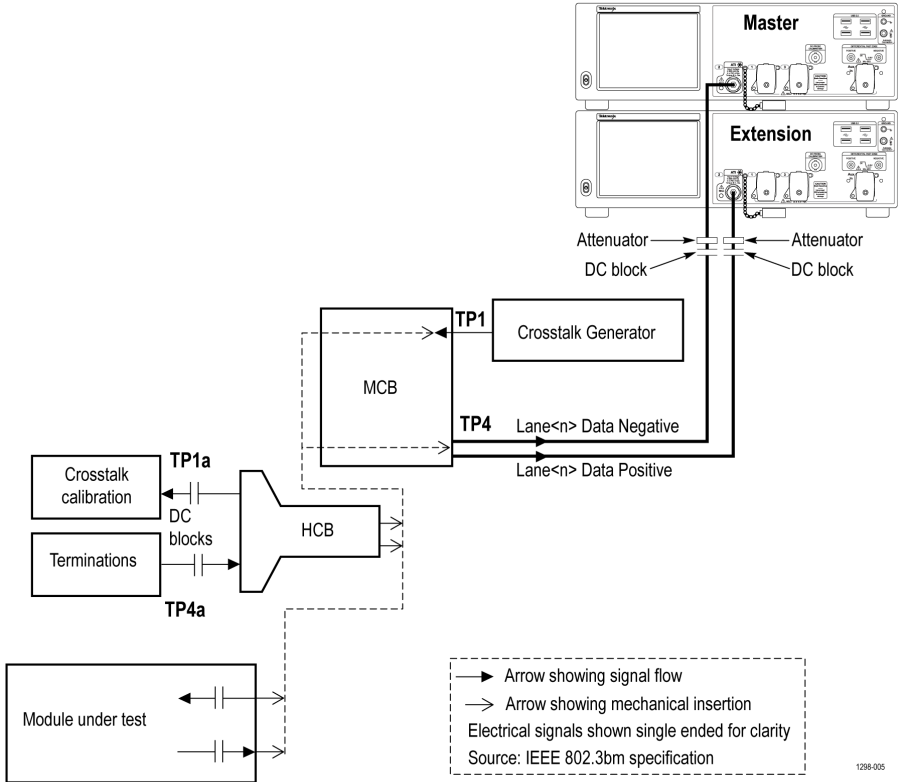


Figure 7: CAUI4 Eye Width / Eye Height TP4 (Single ended)

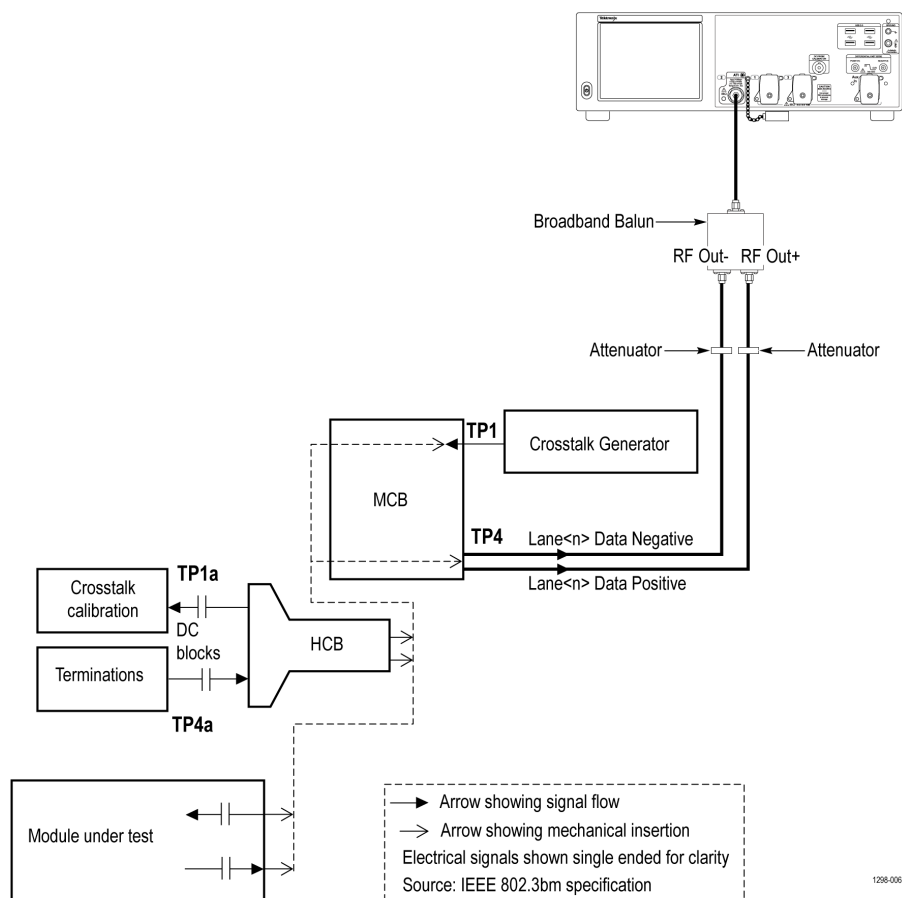


Figure 8: CAUI4 Eye Width / Eye Height TP4 (Differential)

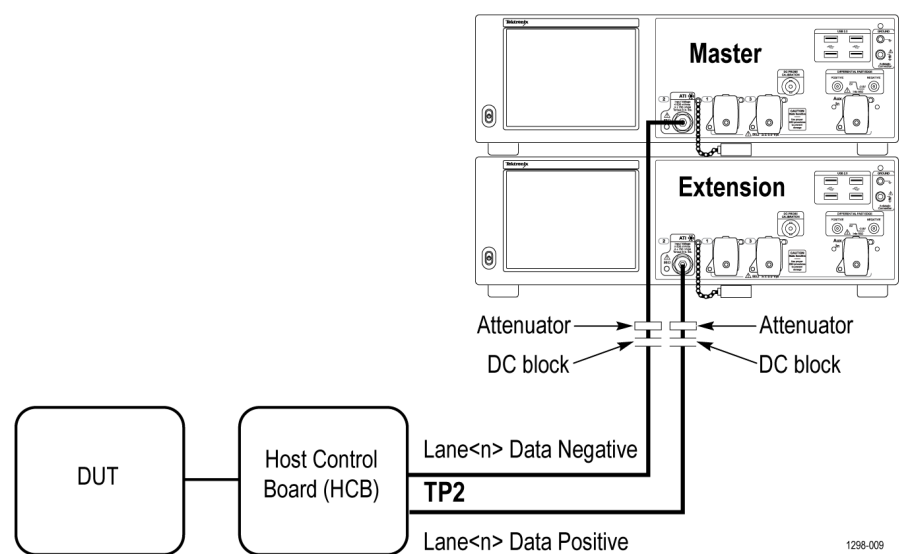


Figure 9: CR4 TP2 (Single ended)

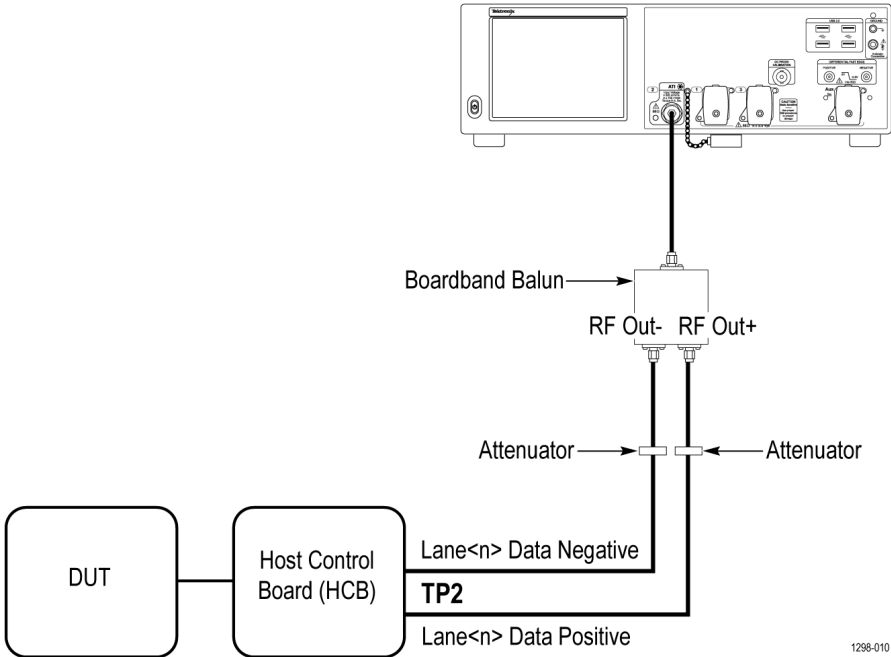


Figure 10: CR4 TP2 (Differential)

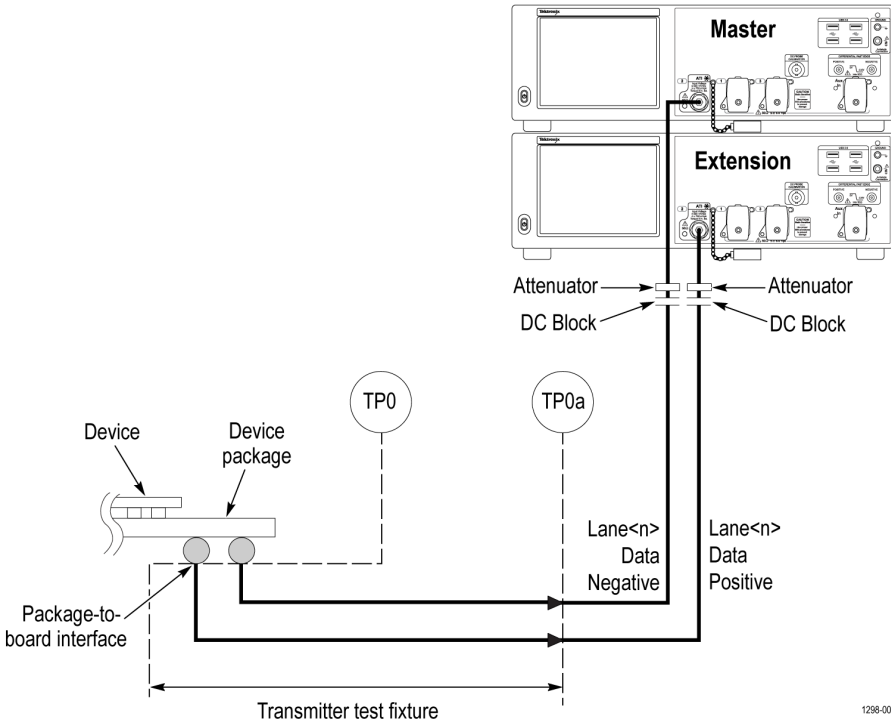


Figure 11: KR4 TP0a (Single ended)

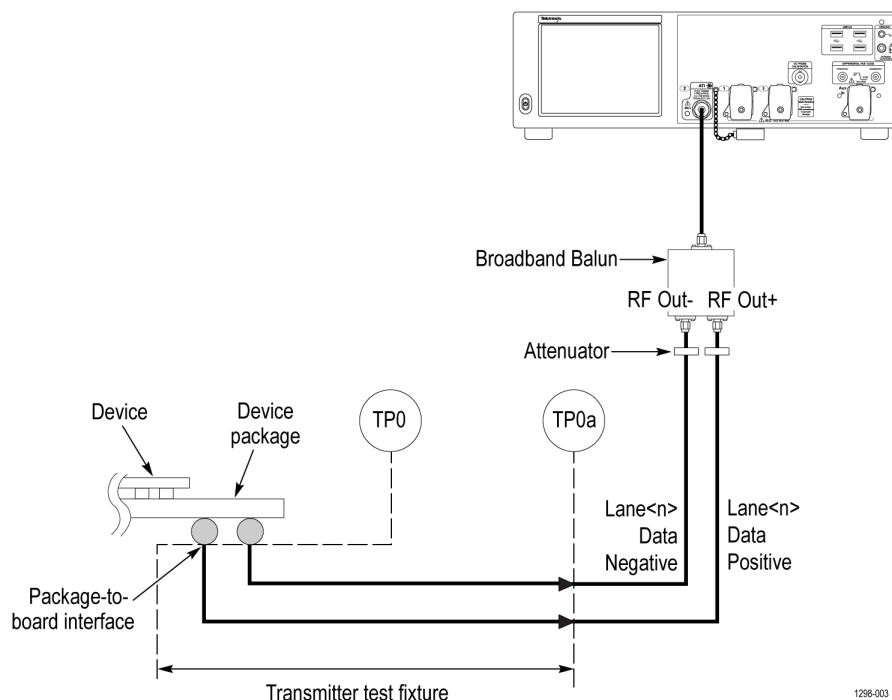


Figure 12: KR4 TP0a (Differential)

## Deskew

If skew is present between positive and negative channels, then the channels need to be deskewed before being used for waveform measurements. TekExpress 100G-TXE provides support for channel deskew and attenuation using the following method:

1. Determine what the skew is for each channel.
2. From the TekScope menu, select Vertical > Deskew.
3. In the Deskew/Attenuation window, click the channel (1 – 4) button for the first channel to be deskewed.
4. Click in the Ch(x) Deskew Time entry field and enter the skew. The skew can be +ve or –ve.
5. Click the channel button for the next channel and repeat step 4.
6. After entering the skew for all the channels that require it, from the Options menu in TekExpress 100G-TXE, select Deskew.
7. In the Deskew dialog box, select the desired level:
  - Less than 100 mV signal amplitude: Select this if the signal amplitude is such that the oscilloscope's vertical setting is less than 100 mV/division.
  - 100 mV or greater signal amplitude: Select this if the signal amplitude is such that the oscilloscope's vertical setting is greater than 100 mV/division.

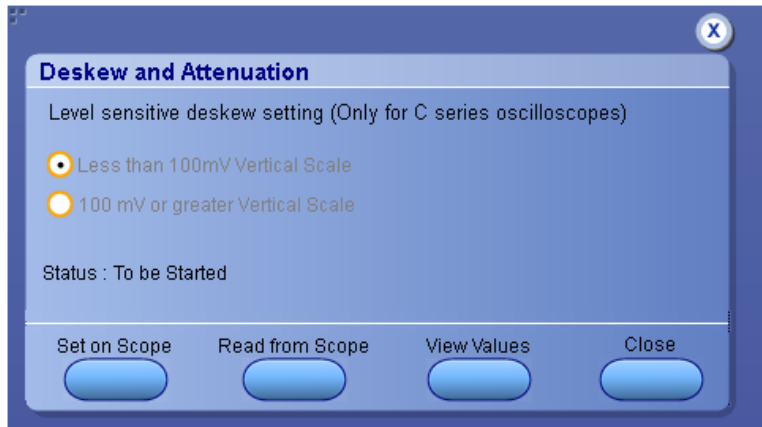


Figure 13: Deskew

8. Click **Set on Scope** to set the stored deskew and attenuation values on oscilloscope.
9. Click **Read from Scope** to read the deskew and attenuation values from the oscilloscope.
10. Click **View values** to view the deskew, attenuation, and bandwidth values.
11. When the status in the dialog box indicates the deskew is finished, click **Close**.

Description	CH1	CH2	CH3	CH4
Deskew: Current	0.000000	0.000000	0.000000	0.000000
Deskew: Stored	0.000000	0.000000	0.000000	0.000000
Attenuation: Current	0.0	0.0	0.0	0.0
Attenuation: Stored	0.0	0.0	0.0	0.0
Bandwidth: Current	16.0000E+9	16.0000E+9	16.0000E+9	16.0000E+9
Bandwidth: Stored	16.0000E+9	16.0000E+9	16.0000E+9	16.0000E+9

Figure 14: Deskew-View values

Each input channel has its own deskew settings. Deskew compensates individual channels for probes or cables of different lengths. The instrument applies the delay values after each completed acquisition. The deskew values are saved as part of the instrument setup. The deskew values for the selected channel are retained until you change the probe, you restore a saved setup, or you recall the factory setup.



**Note:** If you perform the de-embed settings, then performing the Deskew and Attenuation settings are not required.

## Search instruments connected to the application

Use the TekExpress Instrument Control Settings dialog box to search the instruments (resources) connected to the application. The application uses TekVISA to discover the connected instruments.



**Note:** The instruments required for the test setup must be connected and detected by the application, before running the test.

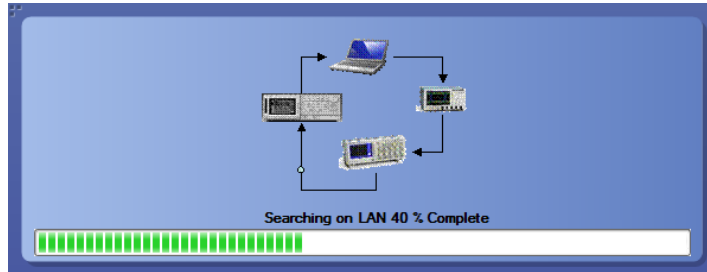
To refresh the list of connected instruments:

1. Select **Options > Instrument Control Settings**.
2. In the **Search Criteria** section of the **Instrument Control Settings** dialog box, select the connection types of the instruments to search. Instrument search is based on the VISA layer, but different connections determine the resource type, such as LAN, GPIB, and

USB. For example, if you choose LAN, the search will include all the instruments supported by the TekExpress that are communicating over the LAN.

3. Click **Refresh**. The TekExpress application searches for the connected instruments.

#### Search status of the instruments connected to LAN



4. When the search is complete, a dialog box lists the instrument-related details based on the search criteria. For example, for the Search Criteria as GPIB, the application displays all the GPIB instruments connected to the application.

#### TekExpress Instrument Control Settings window.



The details of the instruments are displayed in the Retrieved Instruments table. The time and date of instrument refresh is displayed in the Last Updated field.

## Running tests

[Select tests](#), [set acquisition parameters](#), [set configuration parameters](#), [set preferences parameters](#), and click **Start** to run the tests. While tests are running, you cannot access the Setup or Reports panels. To monitor the test progress, switch between the Status panel and the Results panel.

While the tests are running, other applications may display windows in the background. The TekScope application takes precedence over other applications, but you can switch to other applications by using **Alt + Tab** key combination. To keep the TekExpress 100G-TXE application on top, select **Keep On Top** from the TekExpress Options menu.

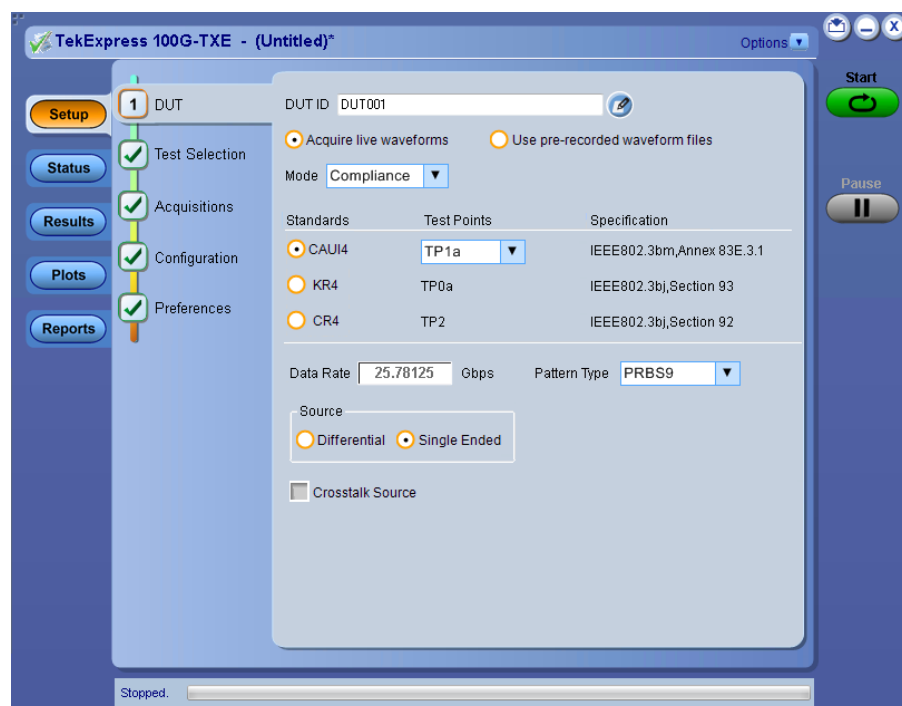
The application displays report when the tests execution is complete.

### Prerun checklist

1. Make sure that the instruments are warmed up (approximately 20 minutes) and stabilized.
2. Perform compensation: In the oscilloscope main menu, select **Utilities > Instrument Compensation**. Click **Help** in the compensation window for steps to perform instrument compensation.

## Starting the application

To start the TekExpress 100G-TXE, select **Analyze > TekExpress 100G-TXE** from the oscilloscope menu bar.



During start, a "My TekExpress" folder is created in the Documents folder of the current user and gets mapped to "X" drive. When the application is closed properly, the "X" drive gets unmapped. Session files are then stored inside the X : \100G-TXE folder. If this file is not found, the application runs an instrument discovery program to detect connected instruments before starting TekExpress 100G-TXE.

To keep the TekExpress 100G-TXE application on top of any application, select **Keep On Top** from the [options menu](#). If the application goes behind the oscilloscope application, select **Analyze > TekExpress 100G-TXE** to bring the application to the front.

## Application panels overview

TekExpress 100G-TXE solution uses panels to group Configuration, Results, and Reports settings. Click any button to open the associated panel. A panel may have one or more tabs that list the selections available in that panel. Controls in a tab can change depending on settings made in the same tab or another tab.



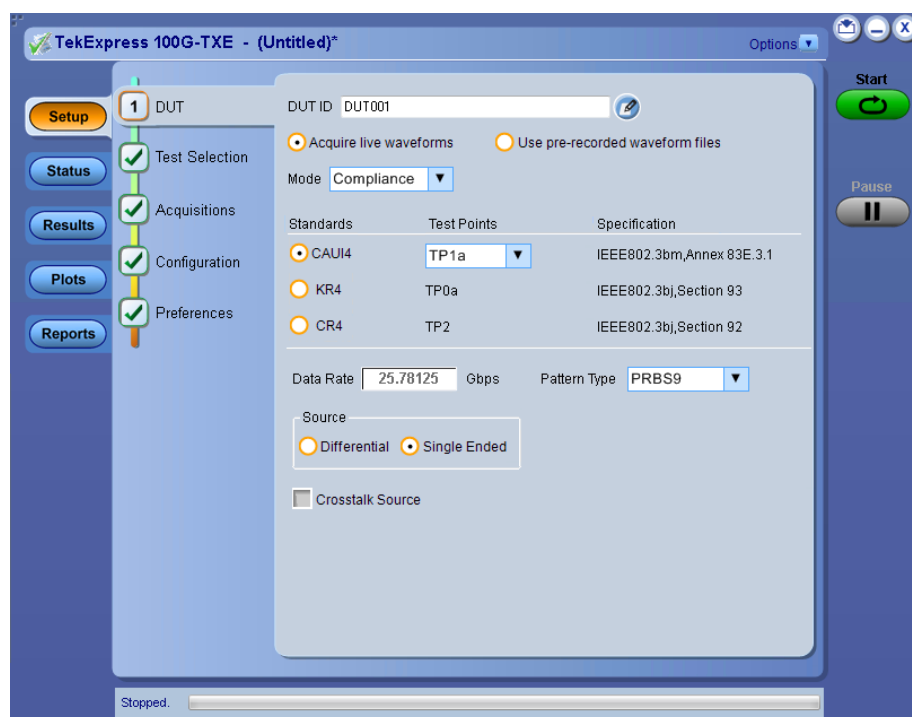



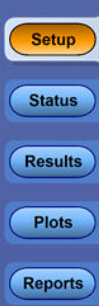








Table 5: Application panels overview



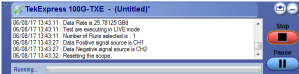
Panel Name	Purpose
<a href="#">Setup panel</a>	<p>The Setup panel shows the test setup controls. Click the <b>Setup</b> button to open this panel.</p> <p>Use this panel to:</p> <ul style="list-style-type: none"> <li>• <a href="#">Set DUT tab parameters</a></li> <li>• <a href="#">Select tests</a></li> <li>• <a href="#">Set acquisition tab parameters</a></li> <li>• <a href="#">Set configuration tab parameters</a></li> <li>• <a href="#">Set preferences tab parameters</a></li> </ul>
<a href="#">Status panel</a>	View the progress and analysis status of the selected tests, and view test logs.
<a href="#">Results panel</a>	View the summary of test results and select result viewing preferences.
<a href="#">Reports panel</a>	Browse for reports, save reports as specific file types, specify report naming conventions, select report content to include (summary information, detailed information, user comments, setup configuration, application configuration), and select report viewing options.

## Application controls


This section describes the application controls.

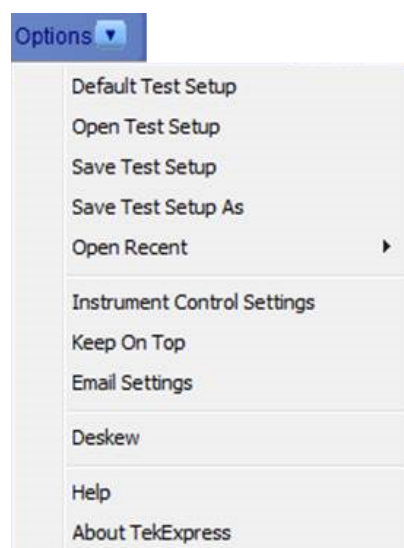
Table 6: Application control description

Item	Description
<i>Options menu</i> 	Menu to display global application controls.
Test panel 	Controls that open tabs for configuring test settings and options.
Start / Stop button  	<p>Use the <b>Start</b> button to start the test run of the measurements in the selected order. If prior acquired measurements are not cleared, then new measurements are added to the existing set.</p> <p>The button toggles to the Stop mode while tests are running. Use the <b>Stop</b> button to abort the test.</p>
Pause / Continue button 	Use the <b>Pause</b> button to pause the acquisition. When a test is paused, this button changes as <b>Continue</b> .
Clear button 	<p>Use the <b>Clear</b> button to clear all existing measurement results. Adding or deleting a measurement, or changing a configuration parameter of an existing measurement, also clears measurements. This is to prevent the accumulation of measurement statistics or sets of statistics that are not coherent. This button is available only on <a href="#">Results panel: View summary of test results</a> on page 42.</p> <p> <b>Note:</b> This button is visible only when there are results data on the panel.</p>
Application window move icon 	Place the cursor over the top of the application window to move the application window to the desired location
Minimize icon 	Minimizes the application.
Close icon 	Close the application.
Table continued...	

Item	Description
Mini view / Normal view  	<p>Toggles the application between mini view and normal view.</p> <p>Mini view displays the run messages with the time stamp, progress bar, Start / Stop button, and Pause / Continue button.</p> <p>The application moves to mini view when you click the <b>Start</b> button.</p> 

## Options menu functions

To access the **Options** menu, click  in the upper-right corner of the application. It has the following selections:



**Table 7: Options menu settings**

Menu	Function
Default Test Setup	Opens a new test setup with default configurations.
Open Test Setup	Opens a previously saved test setup. Displays the list of previously saved test setup file names. Make the selection and click <b>OK</b> to open the test setup.
Save Test Setup	Saves the current test configurations with the specified file name.
Save Test Setup As	Saves the current test setup with a different file name or file type.
Open Recent	Displays the recently opened test setup file names. Make the selection and click <b>OK</b> to open the test setup.
<i>Instrument Control Settings</i>	Detects, lists, and refreshes the connected instruments found on the specified connections (LAN, GPIB, USB, Serial, Non-VISA Resources, TekLink, and VXI).
Keep On Top	Always keeps the TekExpress application on top of all the applications.
<i>Email Settings</i>	Configures email options for test run and result notifications.

Table continued...

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Menu	Function
Deskew	Loads oscilloscope channel deskew settings into the application.
Help	Displays the help.
About TekExpress	Displays the application name, version, and hyperlink to end the user license agreement.

## Configure email settings

Use the **Email Settings** utility to get notified by email when a measurement completes or produces any error condition. Follow the steps to configure email settings:

Figure 15: Email settings window

1. Select **Options > Email Settings** to open the Email Settings dialog box.
2. (Required) For **Recipient email Address(es)**, enter one or more recipient email addresses. To include multiple addresses, separate the addresses with commas.
3. (Required) For **Sender's Address**, enter the email address used by the instrument. This address consists of the instrument name, followed by an underscore, followed by the instrument serial number, then the @ symbol, and the email server ID. For example: user@yourcompany.com.
4. (Required) In the **Server Configuration** section, type the SMTP Server address of the Mail server configured at the client location, and the SMTP Port number, in the corresponding fields.

If this server requires password authentication, enter a valid login name, password, and host name in the corresponding fields.



**Note:** If any of the above required fields are left blank, the settings will not be saved, and email notifications will not be sent.

5. In the **Email Attachments** section, select from the following options:
  - **Reports:** Select to receive the test report with the notification email.
  - **Status Log:** Select to receive the test status log with the notification email. If you select this option, then also select whether you want to receive the full log or just the last 20 lines.
6. In the **Email Configuration** section:
  - Enter a maximum file size for the email message. Messages with attachments larger than this limit will not be sent. The default is 5 MB.
  - Enter the number in the Number of Attempts to Send field, to limit the number of attempts that the system makes to send a notification. The default is 1. You can also specify a timeout period.
7. Select the **Email Test Results When complete or on error** check box. Use this check box to quickly enable or disable email notifications.
8. To test your email settings, click **Test Email**.
9. To apply your settings, click **Apply**.
10. Click **Close** when finished.

## TekExpress instrument control settings

Use the **TekExpress Instrument Control Settings** dialog box to search the instruments (resources) connected to the application. You can use the **Search Criteria** options to search the connected instruments depending on the connection type. The details of the connected instrument is displayed in the Retrieved Instruments window.

To access, click **Options > Instrument Control Settings**. Select **GPIO** as search criteria for TekExpress application and click **Refresh**. The connected instruments displayed in the Retrieved Instruments window and can be selected for use under Global Settings in the test configuration section.

Figure 16: TekExpress Instrument Control Settings window

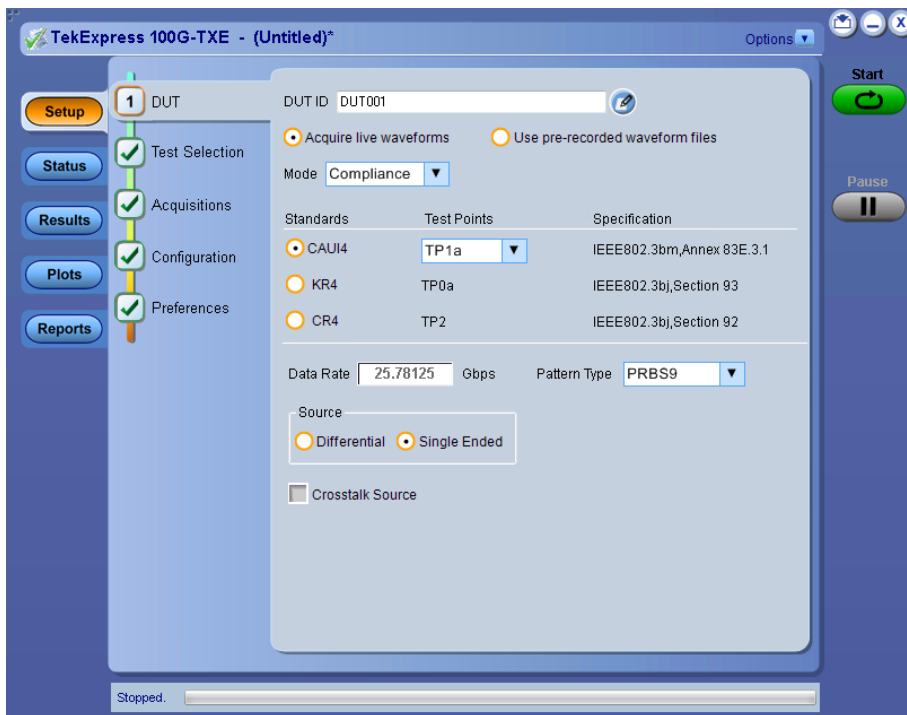


### See also

[Options menu functions](#) on page 27

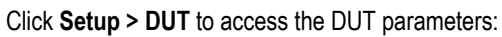
# Setup panel overview

The Setup panel contains sequentially ordered tabs that help you guide through the test setup and execution process.



## Set DUT parameters

Use the DUT tab to select parameters for the device under test. These settings are global and apply to all tests of current session. DUT settings also affect the list of available tests in the Test Selection tab.




Setting	Description	
DUT ID	<p>Adds an optional text label for the DUT to reports. The default value is DUT001. The maximum number of characters is 32.</p> <p>You cannot use the following characters in an ID name: (, ), ., . . ., \, /, : ? " &lt; &gt;   *</p>	
 Comments icon (to the right of the DUT ID field)	<p>Opens Comments dialog box to enter text to add to the report. Maximum size is 256 characters. To enable or disable comments appearing on the test report, see <a href="#">Select report options</a>.</p>	
Acquire live waveforms	Perform analysis on live waveforms.	
Use pre-recorded waveform files	Perform analysis on pre-recorded waveforms.	
Mode	<ul style="list-style-type: none"> <li>Compliance</li> <li>User Defined</li> </ul>	
Standards	Test Points	Specification
CAUI4 <sup>5</sup>	TP1a	IEEE802.3bm, Annex 83E.3.1
	TP4	IEEE802.3bm, Annex 83E.3.2
KR4 <sup>6</sup>	TP0a	IEEE802.3bj, Section 93

Table continued...

TekExpress® 100G-TXE Compliance Solution Application Help



Setting	Description	
CR4 <sup>7</sup>	TP2	IEEE802.3bj, Section 92
Data Rate	Set the data rate to be tested within the range 18 to 28.05. The default value is 25.78125	
Pattern Type	Select the pattern type. The available options are PRBS7, 9, 11, and 15. By default, it is PRBS9.	
Source	<ul style="list-style-type: none"> <li>• <b>Differential</b> - Source as differential signal</li> <li>• <b>Single Ended</b> -Source as single-ended signals</li> </ul>	
Crosstalk Source	Select crosstalk source when cross talk generator is connected. This is applicable for Eye width and Eye height measurements only.	

## See also

[Select tests](#)

## Select tests

Use the Test Selection tab to select the tests. The test measurements available depends on the standards selected in the DUT tab.

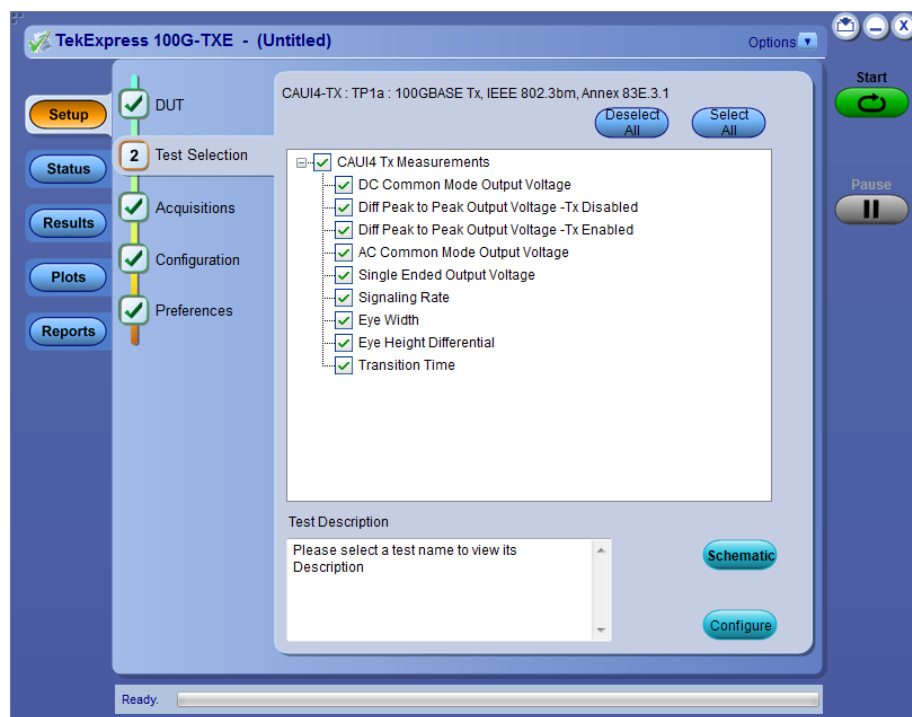


Figure 17: CAUI4 TX measurements

<sup>6</sup> KR4 (100GBASE-KR4) is an Ethernet IEEE 802.3bj standard for 100G backplanes.

<sup>7</sup> CR4 (100GBASE-CR4) is an Ethernet IEEE802.3bj standard for 100G over twin-axial cables.

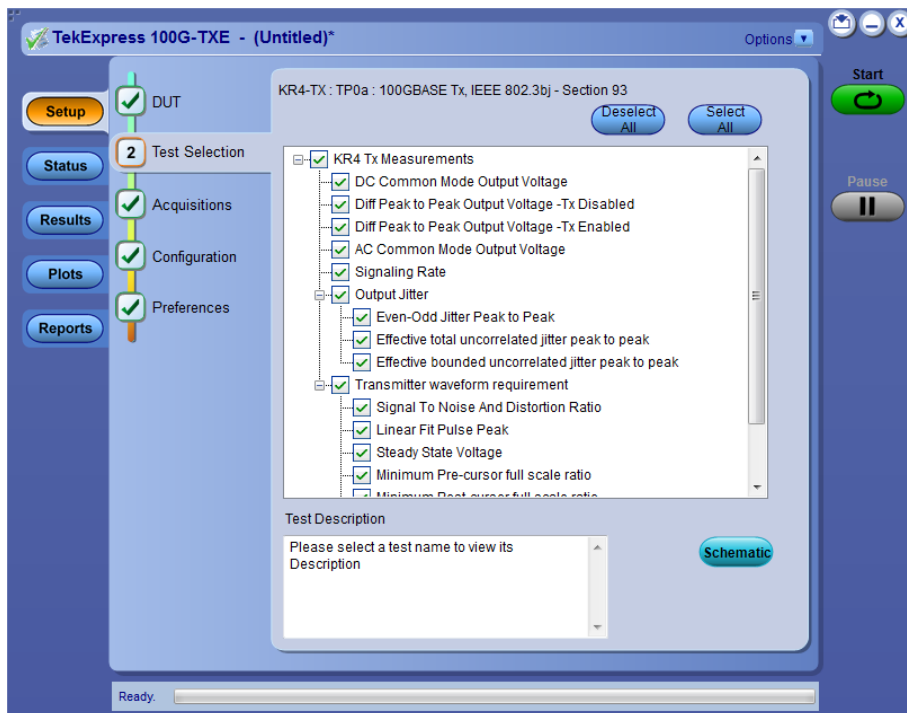


Figure 18: KR4 TX measurements

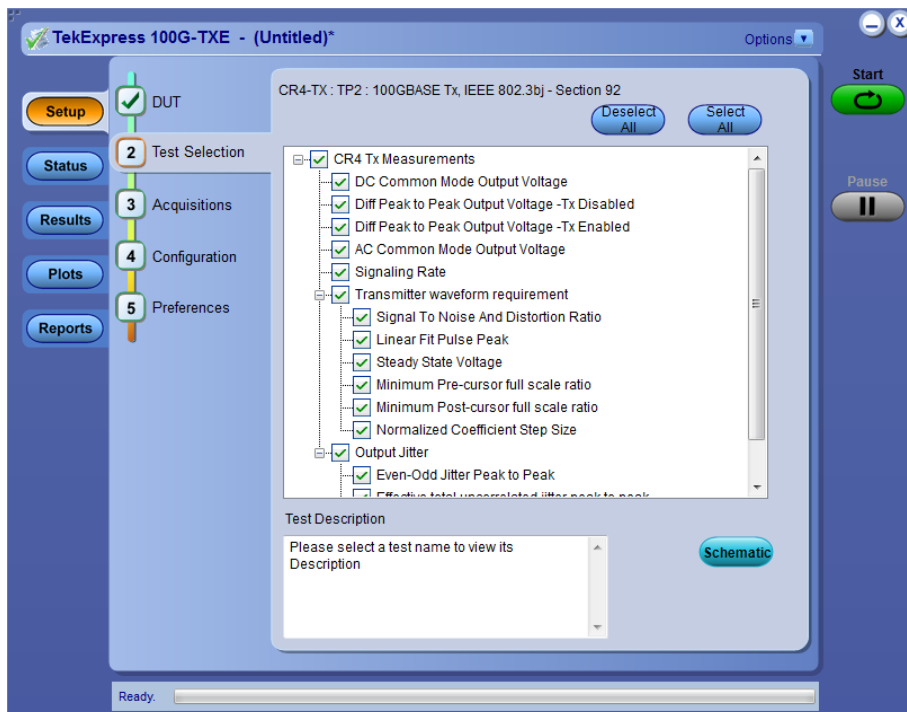


Figure 19: CR4 TX measurements

Table 9: Test Selection tab settings

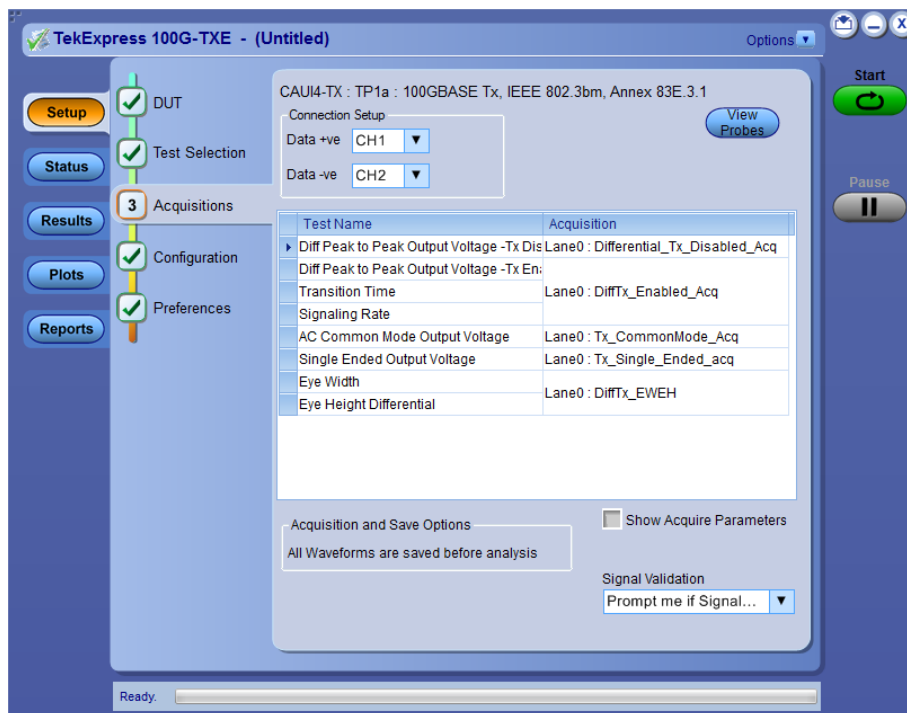
Setting	Description
Tests	Click on a test to select or unselect. Highlight a test to show details in the Test Description pane.
Test Description	Shows brief description of the highlighted test in the Test field.

## See also

[Set acquisition tab parameters](#)

## Set acquisition tab parameters

Use Acquisitions tab to view the test acquisition parameters. The contents displayed on this tab depends on the DUT type and the tests selected.



**Note:** 100G-TXE application acquires all waveforms needed by each test group before performing analysis.

Table 10: Acquisitions tab settings

Setting	Description
Show Acquire Parameters	Select to view the acquisition parameters.
Signal Validation	Sets the application to validate acquisition signals and perform the specified action to take when acquired signals do not meet requirements. Select the action from the list.

TekExpress 100G-TXE saves all acquisition waveforms to files by default. Waveforms are saved in a unique folder for each session (a session is started when you click the Start button). The folder path is X:\100G-TXE\Untitled Session\<dutid>\<date>\_<time>. Images created for each analysis, CSV files with result values, reports, and other information specific to that particular execution are also saved in this folder.

Saving a session moves the session file contents from the Untitled Session folder to the specified folder name, and changes the session name to the specified name.

## Set configuration tab parameters

Use Configuration tab to view and configure the Global Settings and the measurement configurations. The Global Settings and the measurements with configurations available in this tab depends on the Standards selected in the DUT tab.

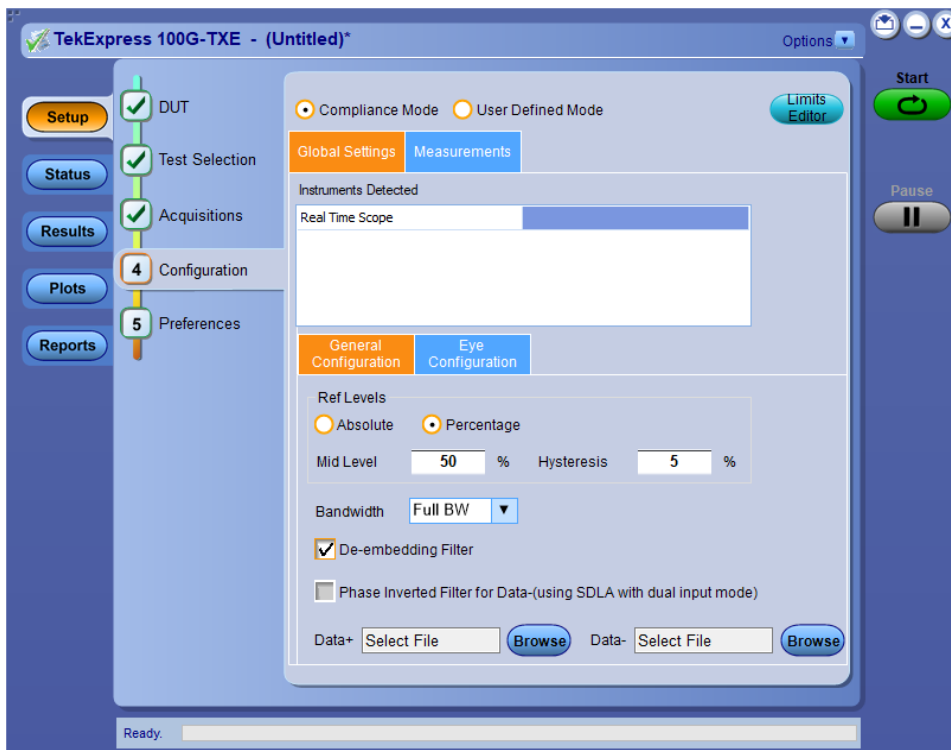









Figure 20: Configuration tab: Global Settings

Table 11: Configuration tab settings

Setting	Description
Compliance Mode	Select compliance mode. By default Compliance Mode is selected.
User Defined Mode	Select user defined mode
<b>Global Settings</b>	
Table continued...	

Setting	Description
Instruments Detected	<p>Displays the instruments connected to this application. Click on the instrument name to open a list of available (detected) instruments.</p> <p>Select <b>Options &gt; Instrument Control Settings</b> and click Refresh to update the instrument list.</p> <p> <b>Note:</b> Verify that the <b>GPIO</b> search criteria (default setting) in the Instrument Control Settings is selected when using TekExpress 100G-TXE application.</p>
<b>General Configuration</b>	
<b>Ref Levels</b>	
Absolute	Select to set the Ref Levels in Absolute
Percentage	Select to set the Ref Levels in Percentage
Mid Level	Select the mid level in absolute or percentage
Hysteresis	Select the hysteresis in absolute or percentage
Bandwidth	Select the bandwidth as Full BW or 50 GHz. By default Full BW is selected.
De-Embedding Filter	<p>Select to apply the de-embed filter file. Click Browse and select the de-embedding filter files (.flt).</p> <p>For single ended mode, select filter file for Data Positive and Data Negative.</p> <ul style="list-style-type: none"> <li>• Source file name for data Positive</li> <li>• Source file name for data negative</li> </ul> <p>For Differential mode, select differential filter file.</p> <ul style="list-style-type: none"> <li>• Differential source filter file name</li> </ul> <p> <b>Note:</b> <b>Browse</b> option is enabled only when you select <b>Use filter file for de-embedding</b>.</p>
Phase Inverted Filter for Data- (using SDLA with dual input mode)	Select this option if the filter is created from SDLA using Dual input option. The negative channel filter must be phase inverted when you select this option.
<b>Eye Configuration</b>	
Table continued...	

Setting	Description
CTLE Filter File	<p>Select the CTLE Filter File.</p> <p><b>Compliance mode</b></p> <ul style="list-style-type: none"> <li>All: Application will run through all CTLE filters from 1 dB - 9 dB (at TP1a) and 1 dB - 2 dB (at TP4)</li> <li>Best CTLE: After the first run, Best CTLE filter option gets enabled. User can run the measurement with Best CLTE instead of looping through all CTLE filters in the specification.</li> </ul> <p><b>User Defined mode</b></p> <ul style="list-style-type: none"> <li>User can run the measurement with any specified CTLE filter. The application provides CTLE filters from 0 dB - 9 dB for data rate of 25.78125 Gbps. It is recommended to create custom CTLE filter files for any other data rates.</li> </ul> <p>Select the CTLE filters from the drop-down list or Custom to browse and select the custom CTLE filter files.</p> <p> <b>Note:</b> Custom CTLE filter files is to be named in the format &lt;user defined name&gt;_ndB.flit, where n is the gain of the filter.</p>
Record Length for Eye measurements	<p>Select the record length for eye measurements. The available values are 20 M, 30 M, 40 M. By default 40 M is selected.</p> <p> <b>Note:</b> This configuration is applicable for eye measurements only.</p>
Target BER (1e-)	<p>Support the eye measurements at target BER other than 1e-15 in user-defined mode.</p> <p> <b>Note:</b> This configuration is applicable for eye measurements only.</p>
<b>Jitter Configuration</b>	
Record Length for Jitter measurements	<p>Select the record length for jitter measurements. The available values are 20 M, 30 M, 40 M. By default 40 M is selected.</p> <p> <b>Note:</b> This configuration is applicable for jitter measurements only.</p>
<b>Measurements - CAUI4 TXE</b>	
Analyze	<p>Measurement Range - 20%-80%</p> <p> <b>Note:</b> This setting is applicable only for Transition time measurement.</p>

## Set preferences tab parameters

Use Preferences tab to set the application action on completion of a measurement.

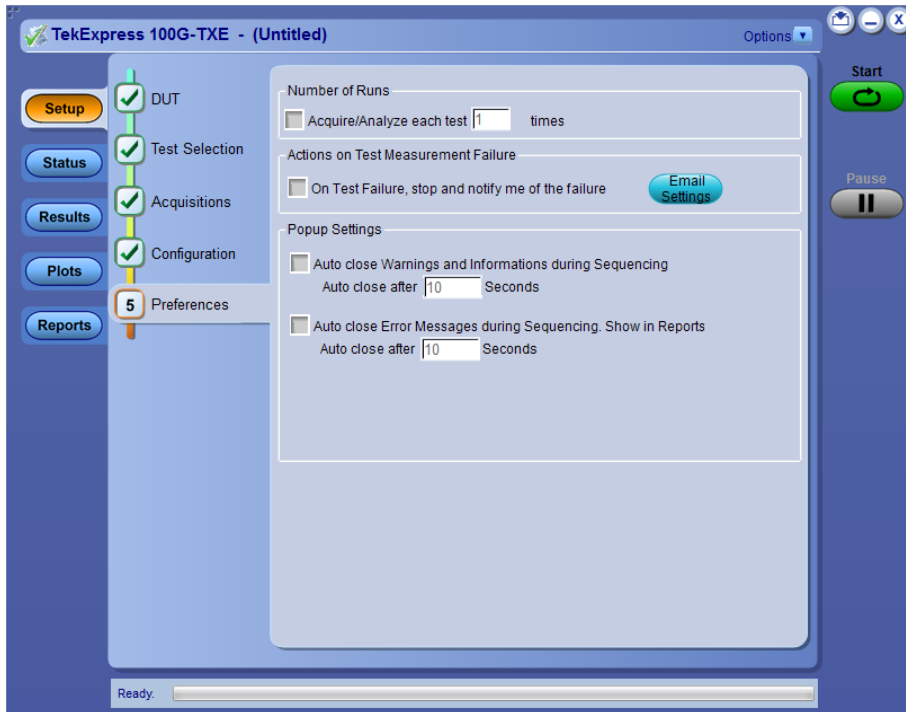


Table 12: Preferences tab settings

Setting	Description
<b>Number of Runs</b>	
Acquire/Analyze each test <no> times (not applicable to Custom Tests)	Select to repeat the test run by setting the number of times. By default, it is selected with 1 run.
<b>Actions on Test Measurement Failure</b>	
On Test Failure, stop and notify me of the failure	Select to stop the test run on Test Failure, and to get notified via email. By default, it is unselected. Click Email Settings to configure.
<b>Popup Settings</b>	
Auto close Warnings and Informations during Sequencing Auto close after <no> Seconds	Select to auto close warnings/informations during sequencing. Set the Auto close time. By default it is unselected.
Auto close Error Messages during Sequencing. Show in Reports Auto close after <no> Seconds	Select to auto close Error Messages during Sequencing. Set the Auto close time. By default it is unselected.

# Status panel: View the test execution status

The Status panel contains the **Test Status** and **Log View** tabs, which provides status on the test acquisition and analysis (Test Status) and listing of test tasks performed (Log View tab). The application opens the **Test Status** tab when you start to execute the test. Select the **Test Status** or the **Log View** tab to view these items while the test execution is in progress.

## View test execution status

The tests are grouped and displayed based on the Clock and Data lane. It displays the tests along with the acquisition type, acquire, and analysis status of the tests. In pre-recorded mode, **Acquire Status** is not valid.

The **Test Status** tab presents a collapsible table with information about each test as it is running. Use the symbols to expand (+) and collapse (-) the table rows.

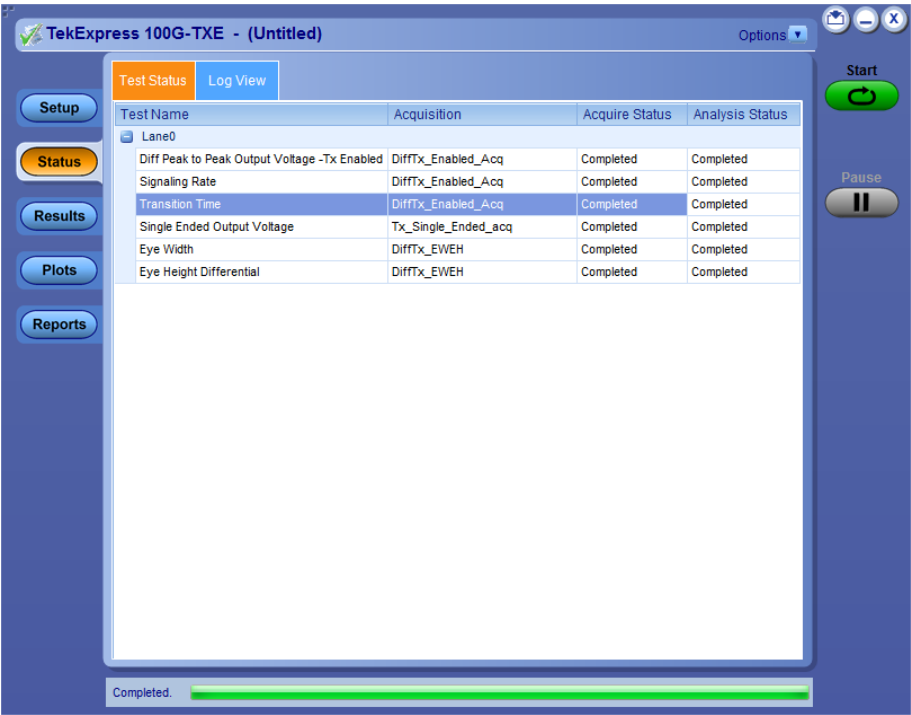


Figure 21: Test execution status view in Status panel

Table 13: Test execution status table headers

Table Header	Description
Test Name	Displays the measurement name.
Acquisition	Describes the type of data being acquired.
Acquire Status	Displays the progress state of the acquisition: <ul style="list-style-type: none"><li>To be started</li><li>Started Acquisition</li><li>Completed Acquisition</li></ul>

Table continued...



Table Header	Description
Analysis Status	<p>Displays the progress state of the analysis:</p> <ul style="list-style-type: none"> <li>To be started</li> <li>In Progress</li> <li>Completed</li> </ul>

## View test execution logs

The Test Status tab displays the detailed execution status of the tests. Also, displays each and every execution step in detail with its timestamp information. The log details can be used to troubleshoot and resolve any issue/bug which is blocking the test execution process.

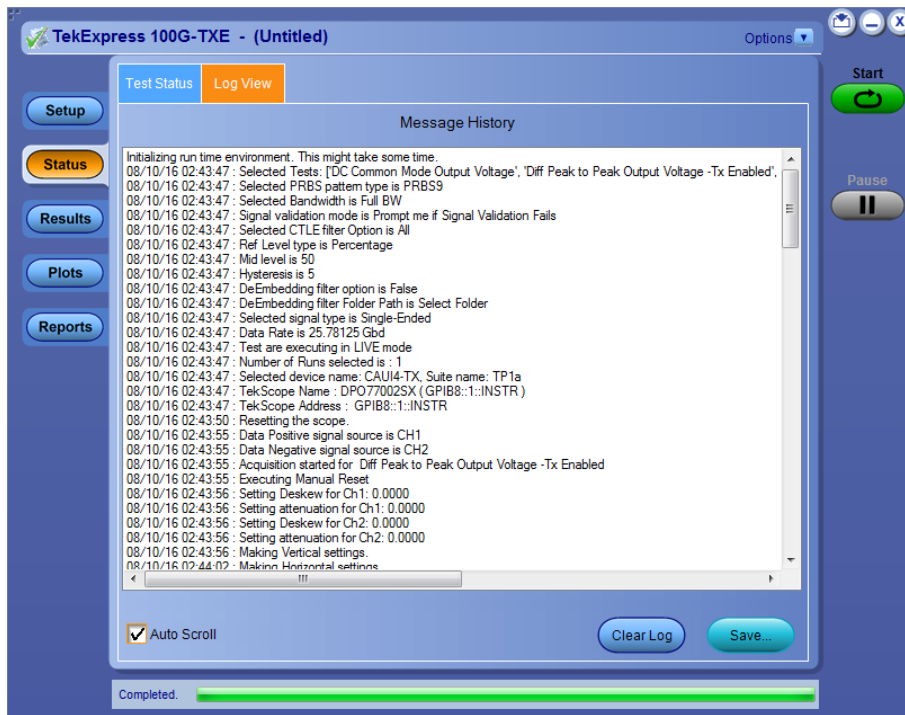


Figure 22: Log view in Status panel

Table 14: Status panel settings

Control	Description
Message History	Lists all the executed test operations and timestamp information.
Auto Scroll	Enables automatic scrolling of the log view as information is added to the log during the test execution.
Clear Log	Clears all the messages from the log view.
Save	Saves the log file into a text file format. Use the standard Save File window to navigate to and specify the folder and file name to save the log text.

# Results panel: View summary of test results

When a test execution is complete, the application automatically opens the **Results** panel to display a summary of test results.

In the Test Result table, each test result occupies a row. By default, results are displayed in summary format with the measurement details collapsed and with the Pass/Fail column visible.

Test Name	Details	Pass/Fail	Lane	Value	Units	Margin
Diff Peak to Peak Output Voltage -Tx Enabled	Diff Peak to Peak Output Voltage -Tx Enabled	Pass		363.61990	mV	H:536.3801
Single Ended Output Voltage	Single Ended Positive Max	Pass		1.09733	V	L:1.4973 H:2.2027
Single Ended Output Voltage	Single Ended Positive Min	Pass		0.90082	V	L:1.3008 H:2.3992
Single Ended Output Voltage	Single Ended Negative Max	Pass		1.09476	V	L:1.4948 H:2.2052
Single Ended Output Voltage	Single Ended Negative	Pass		0.90169	V	L:1.3017 H:2.3983
Signaling Rate	Signaling Rate	Pass		25.78130	Gbd	L:0.0026 H:0.0025
Eye Width	Eye Width	Pass		0.66839	UI	L:0.2084
Eye Height Differential	Eye Height A, Differential	Pass		157.54745	mV	L:62.5474
Eye Height Differential	Eye Height B, Differential	Pass		157.54745 150.71665	mV	L:77.5474 L:70.7166
Transition Time	Rise Time	Pass		24.97407	ps	L:14.9741
Transition Time	Fall Time	Pass		23.60025	ps	L:13.6002

Figure 23: Results panel with measurement results

Click icon on each measurement in the row to expand and to display the minimum and maximum parameter values of the measurement.

## Filter the test results

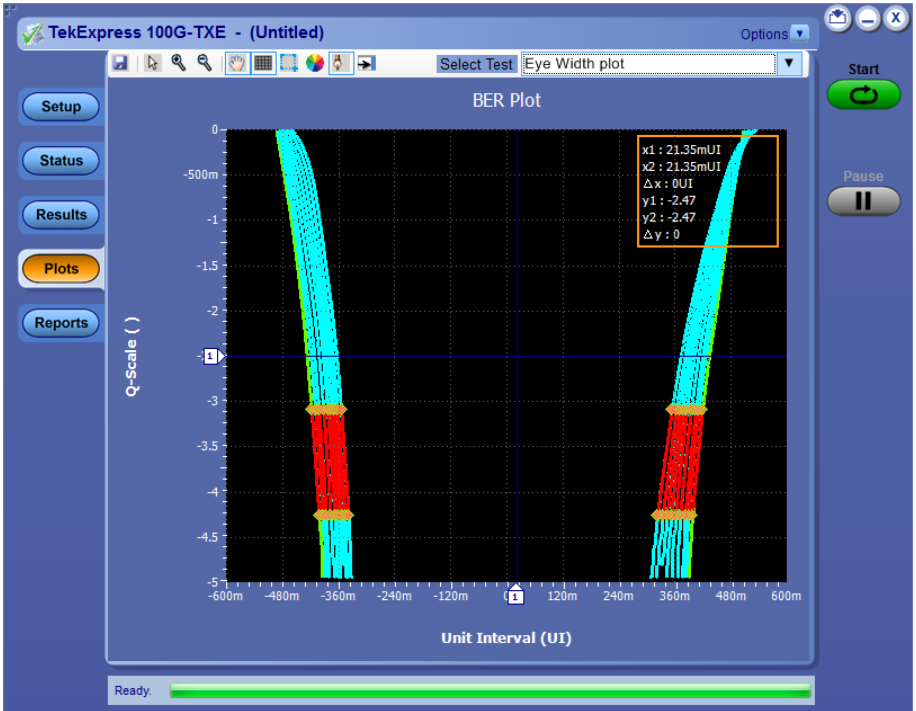
Each column in the result table can be customized and displayed by enabling or disabling any column as per your requirement. You can change the view in the following ways:

- To remove or restore the Pass/Fail column, select **Preferences > Show Pass/Fail**.
- To collapse all expanded tests, select **Preferences > View Results Summary**.
- To expand all the listed tests, select **View Results Details** from the **Preferences** menu in the upper right corner.
- To enable or disable the wordwrap feature, select **Preferences > Enable Wordwrap**.
- To view the results grouped by lane or test, select the corresponding item from the **Preferences** menu.
- To expand the width of a column, place the cursor over the vertical line that separates the column from the column to the right. When the cursor changes to a double-ended arrow, hold down the mouse button and drag the column to the desired width.
- To clear all test results displayed, click **Clear**.

# Plots panel

## Plots panel overview

The Plots panel displays the result as a two-dimensional plot for additional measurement analysis. The plots are displayed only during run and only for the measurements which supports plots.



## Toolbar functions in plot windows

The Plot Toolbar window includes the following functions:











Icon	Functions
 Save	Saves the plot.
 Select & Zoom	Expands the selected plot area. Left-click and drag the mouse to mark the region on the plot to zoom.
 Zoom In	Expands part of the plot (Horizontal and Vertical); the data appears in more detail.
 Zoom Out	Contracts part of the plot (Horizontal and Vertical); the data appears in less detail.
 Pan	Moves the plot anywhere within the scale.
 Hide Gridlines	Hides the gridlines.

Table continued...

Icon	Functions
 <b>Reset</b>	Resets the zoom to 100%.
 <b>Choose Waveform Colors</b>	Sets the plot color. Click and select the color in the Color window and click OK. Click in the plot area to apply the color.
 <b>Show/Hide Markers</b>	Displays or hides the markers
 <b>UnDock/Dock</b>	Click to undock/dock the plot window.
<b>Select Test</b>	Select the measurement.

# Reports panel: Configure report generation settings

Click **Reports** panel to configure the report generation settings and select the test result information to include in the report. You can use the Reports panel to configure report generation settings, select test content to include in reports, generate the report, view the report, browse for reports, name and save reports, and select report viewing options.

## Select report generation options

This section describes the report generation settings you can configure in the Reports panel. Select report settings before running a test or when creating and saving test setups. Report settings configured are included in saved test setups.

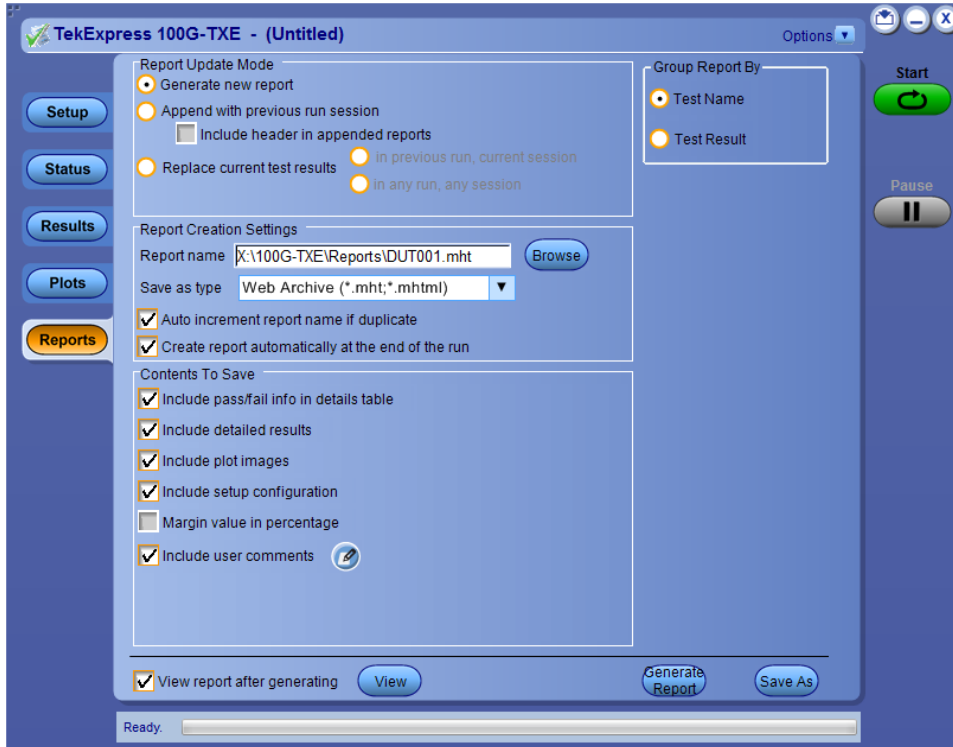


Figure 24: Reports panel

## Report Update Mode Settings

Table 15: Report Update Mode Settings

Control	Description
Generate new report	Each time when you click <b>Run</b> and when the test execution is complete, it will create a new report. The report can be in either .mht, .pdf, or .csv file formats.
Append with previous run session	Appends the latest test results to the end of the current test results report. Each time when you click this option and run the tests, it will run the previously failed tests and replace the failed test result with the new pass test result in the same report.
Include header in appended reports	Select to include header in appended reports.

Table continued...



Control	Description
Replace current test in previous run session	Replaces the previous test results with the latest test results. Results from newly added tests are appended to the end of the report.
In previous run, current session	Select to replace current test results in the report with the test result(s) of previous run in the current session.
In any run, any session	Select to replace current test results in the report with the test result(s) in the selected run session's report. Click and select test result of any other run session.
<b>Report Creation Settings</b>	
Report name	<p>Displays the name and path of the &lt;Application Name&gt; report. The default location is at \My Documents&gt;\My TekExpress\&lt;Application Name&gt;\Reports. The report file in this folder gets overwritten each time you run a test unless you specify a unique name or select to auto increment the report name.</p> <p><b>To change the report name or location, do one of the following:</b></p> <ul style="list-style-type: none"> <li>In the Report Path field, type the current folder path and name.</li> <li>Double-click in the Report Path field and then make selections from the popup keyboard and click <b>Enter</b>.</li> </ul> <p>Be sure to include the entire folder path, the file name, and the file extension. For example: C:\Documents and Settings\your user name\My Documents\My TekExpress\&lt;Application Name&gt; \DUT001.mht.</p> <p> <b>Note:</b> You cannot set the file location using the Browse button.</p> <p><b>Open an existing report</b></p> <p>Click <b>Browse</b>, locate and select the report file and then click <b>View</b> at the bottom of the panel.</p>
Save as type	<p>Saves a report in the specified file type, selected from the drop-down list. The report is saved in .csv, .pdf, or .mht.</p> <p><b>Note:</b></p> <p> If you select a file type different from the default, be sure to change the report file name extension in the Report Name field to match.</p>
Auto increment report name if duplicate	Sets the application to automatically increment the name of the report file if the application finds a file with the same name as the one being generated. For example: DUT001, DUT002, DUT003. This option is enabled by default.
Create report automatically at the end of the run	Select to create the report with the settings configured, at the end of run.

Table continued...

Control	Description
<b>Contents To Save Settings</b>	
Include pass/fail info in details table	Select to include pass/fail information in the details table of the report.
Include detailed results	Select to include detailed results in the report.
Include plot images	Select to include the plot images in the report.
Include setup configuration	Sets the application to include hardware and software information in the summary box at the top of the report. Information includes: the oscilloscope model and serial number, the oscilloscope firmware version, and software versions for applications used in the measurements.
Include complete application configuration	Select to include the complete application configuration in the report.
Include user comments	Select to include any comments about the test that you or another user have added in the DUT tab of the Setup panel. Comments appear in the Comments section, below the summary box at the beginning of each report.
Include statics table	Select to include test run statistics in the report. This is enabled when you run any test for more than once. Set <b>Acquire/Analyze each test</b> in the Preferences tab to more than one, to run any test for multiple times.
<b>Other settings in report panel</b>	
View report after generating	Automatically opens the report in a Web browser when the test execution is complete. This option is selected by default.
View	Click to view the most current report.
Generate Report	Generates a new report based on the current analysis results.
<b>Group Report By</b>	
Test Name	Select to group the test results based on the test name in the report.
Test Result	Select to group the test results based on the test result in the report.

## View a generated report

### Sample report and its contents

A report shows detailed results and plots, as set in the Reports panel.


<div>  <div> <b>TekExpress 100G-TXE</b>            Test Report CAUI4-TX (TP1a)         </div> </div>			
Setup Information			
DUT ID	CAUI4_TP1a	Master Scope Information	DPO77002SX , 8300140
Date/Time	2017-06-02 15:18:32	Master Scope F/W Version	10.7.0 Build 8
TekExpress 100G-TXE Version	1.2.0.10	Master Scope SPC Status	PASS
TekExpress Framework Version	4.2.5.7	Extension-1 Scope Information	DPO77002SX , 8300159
Specification Version	IEEE 802.3bm, Annex 83E.3.1	Extension-1 Scope F/W Version	10.7.0 Build 8
Probing Type	Single-Ended	Extension-1 Scope SPC Status	PASS
Compliance Mode	True	Pattern Type	PRBS9
Execution Mode	Live	Bandwidth	Full BW
Overall Test Result	Pass	DPOJET version	10.0.5.1
Overall Execution Time	0:05:43		
DUT COMMENT: 100G-TXE CAUI4			
Test Name Summary Table			
DC Common Mode Output Voltage		Pass	
Diff Peak to Peak Output Voltage – Tx Enabled		Pass	
Single Ended Output Voltage		Pass	
Signaling Rate		Pass	
Eye Width		Pass	
Eye Height Differential		Pass	
Transition Time		Pass	

Figure 25: Report from 100G-TXE

#### Setup Information

The summary box at the beginning of the report lists setup configuration information. This information includes the oscilloscope model and serial number, optical module model and serial number, and software version numbers of all associated applications.

#### Test Name Summary Table

The test summary table lists all the tests which are executed with its result status.

#### Measurement

The measurement table displays the measurement related details with its parameter value.

#### User comments

If you had selected to include comments in the test report, any comments you added in the DUT tab are shown at the top of the report.



# Saving and recalling test setup

## Overview

You can save the test setup and recall it later for further analysis. Saved setup includes the selected oscilloscope, general parameters, acquisition parameters, measurement limits, waveforms (if applicable), and other configuration settings. The setup files are saved under the setup name at X:\

Name	Date modified	Type
1-LP_20210331_210911	3/31/2021 9:06 PM	File folder
1-LP_20210331_220738	3/31/2021 10:05 PM	File folder
1-LP_20210331_223715	3/31/2021 10:35 PM	File folder
1-LP_20210331_224851	3/31/2021 10:48 PM	File folder
1-LP_20210331_230337	3/31/2021 11:02 PM	File folder
1-LP_20210331_230921	3/31/2021 11:08 PM	File folder

Figure 26: Example of Test Setup File

Use test setups to:

- Recall a saved configuration.
- Run a new session or acquire live waveforms.
- Create a new test setup using an existing one.
- View all the information associated with a saved test, including the log file, the history of the test status as it executed, and the results summary.
- Run a saved test using saved waveforms.

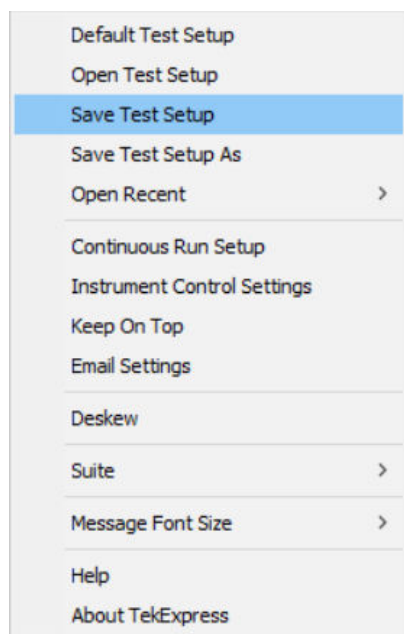


**Note:** Images that are shown in this Saving and recalling test setup chapter are for illustration purpose only and it may vary depending on the TekExpress application.

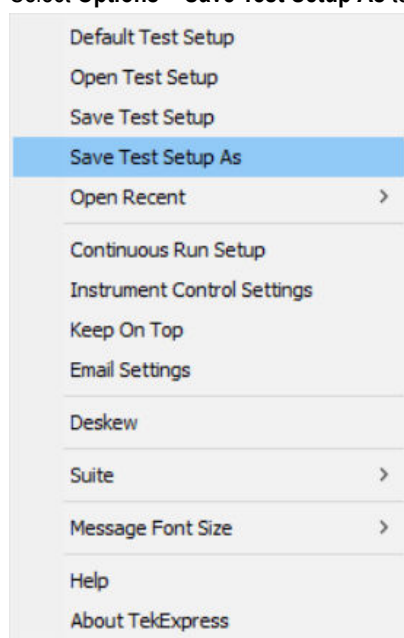
## Save the configured test setup

You can save a test setup before or after running a test. You can create a test setup from already created test setup or using a default test setup. When you save a setup, all the parameters, measurement limits, waveform files (if applicable), test selections, and other configuration settings are saved under the setup name. When you select the default test setup, the parameters are set to the application's default value.

- Select **Options > Save Test Setup** to save the opened setup.



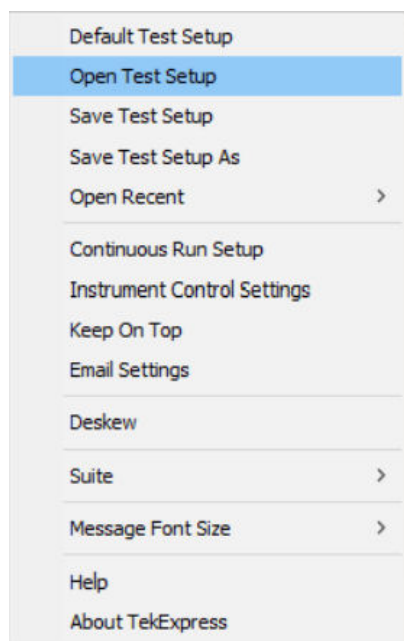
- Select **Options > Save Test Setup As** to save the setup with different name.



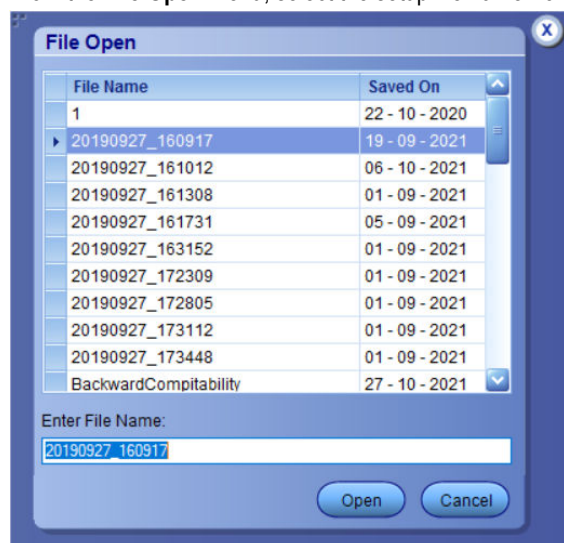
## Load a saved test setup

To open (load) a saved test setup, do the following:

- Select **Options > Open Test Setup**.



- From the **File Open** menu, select the setup file name from the list and click **Open**.

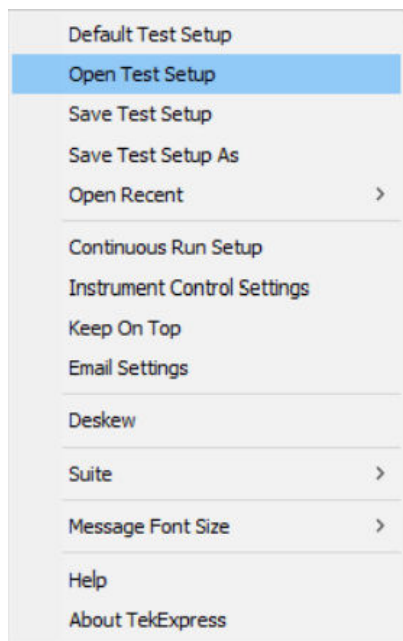


**Note:** Parameters that are set for the respective test setup will enable after opening the file.

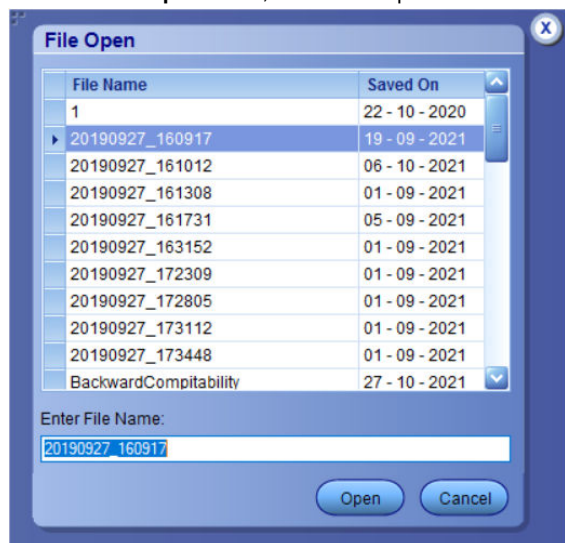
## Perform a test using pre-run session files

Complete the following steps to load a test setup from a pre-run session:

1. Select **Options > Open Test Setup**.

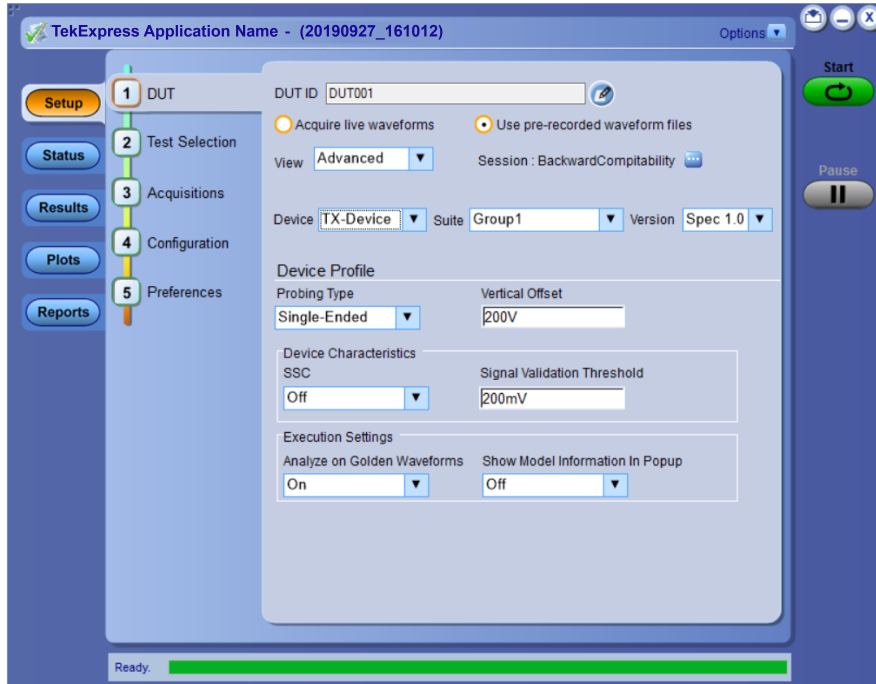


2. From the **File Open** menu, select a setup from the list and then click **Open**.

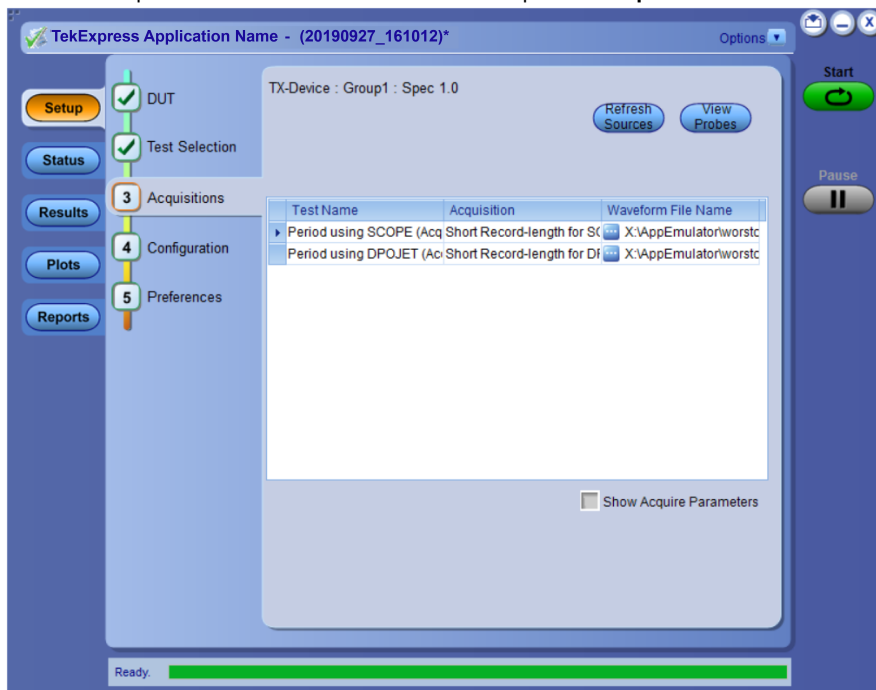



**Note:** Parameters that are set for the respective test setup will enable after opening the file.

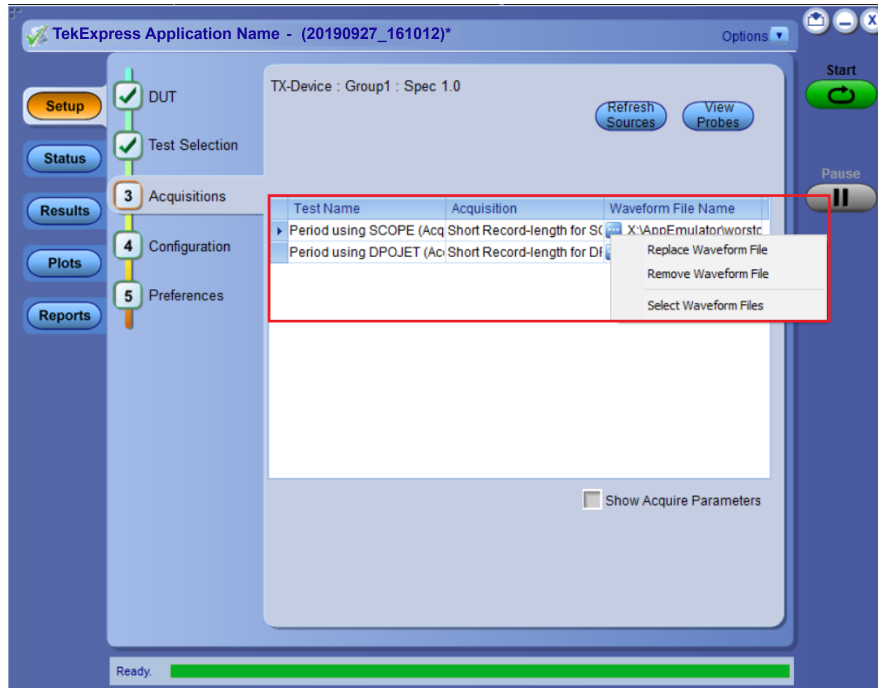
3. Switch the mode to **Use Pre-recorded waveform files** in the DUT panel.



4. Select the required waveforms from the selected setup in the **Acquisitions** tab and click **Start**.



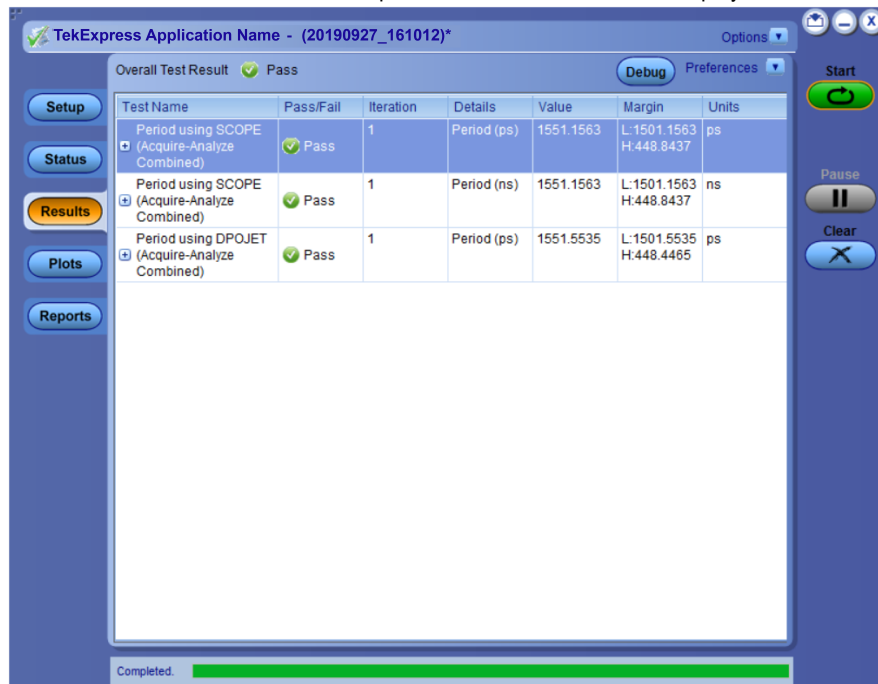
5. The selected waveform file can be removed/replaced by clicking on the (  ) icon.



6. After successful completion of the test, the waveform report files are stored at X:\<Application Name>\Reports.

Name	Date modified	Type
DUT001_2266.mht	10/27/2021 4:25 AM	MHTML Document
DUT001_2265.mht	10/27/2021 1:24 AM	MHTML Document
DUT001_2264.mht	10/6/2021 2:58 AM	MHTML Document
DUT001_2263.mht	10/6/2021 2:40 AM	MHTML Document
DUT001_2262.mht	10/6/2021 2:35 AM	MHTML Document
DUT001_2261.mht	10/6/2021 2:23 AM	MHTML Document

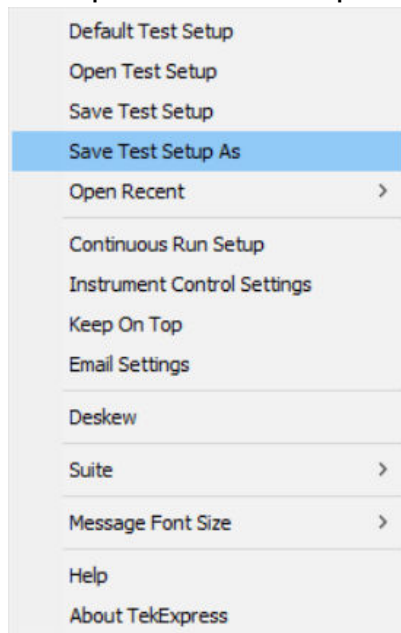
7. The overall test result status after completion of the test execution is displayed in the Results Panel.



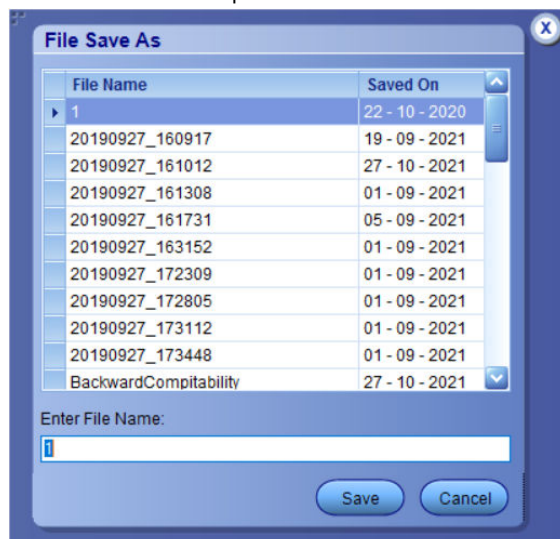
## Save the test setup with a different name

To save a test setup with a different name, follow the steps:

1. Select **Options > Save Test Setup As**.



2. Enter the new test setup name and click **Save**.



# CAUI4 TXE compliance measurements

## DC common mode output voltage

This section verifies that the mean of the common mode signal is within the conformable limits according to the specification.

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

Standards	Test points	Specification
CAUI4	TP1a	IEEE 802.3bm, Section 83E.3.1.2, Table 83E-1
	TP4	IEEE 802.3bm, Section 83E.3.1.2, Table 83E-3

### Measurement procedure

The supported voltage range of ATI channel of the scope is  $\pm 0.3$  V and the DC voltage of the DUT can be beyond the supported voltage limits. Hence, use external digital multimeter to measure the voltage and enter it in the application.

### Limits

At TP1a: -0.3 V to 2.8 V

At TP4: -0.35 V to 2.85 V

## Diff peak-to-peak output voltage - Tx disabled

This section verifies that the peak-to-peak differential output voltage when the transmitter is disabled is within the conformable limits according to the specification.

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

Standards	Test points	Specification
CAUI4	TP1a	IEEE 802.3bm, Section 83E.3.1.2, Table 83E-1

### Inputs

- Differential signal created using two single ended sources (Positive and Negative) without any filtering.

### Measurement procedure

- Add Peak-to-Peak measurement.
- The value of the pk-pk voltage is the differential output voltage (pk-pk).

### Limits

At TP1a:

- Lower limit: NA
- Higher limit: 35 mV



## Diff peak-to-peak output voltage - Tx enabled

This section verifies that the peak-to-peak differential output voltage is within the conformable limits according to the specification.

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

Standards	Test points	Specification
CAUI4	TP1a	IEEE 802.3bm, Section 83E.3.1.2, Table 83E-1
	TP4	IEEE 802.3bm, Section 83E.3.1.2, Table 83E-3

### Inputs

- Differential signal created using two single ended sources (Positive and Negative) and filtered through fourth order 33 GHz Bessel Thomson filter.

### Measurement procedure

- Add Peak-to-Peak measurement.
- The value of the pk-pk voltage is the differential output voltage (pk-pk).

### Limits

At TP1a and TP4:

- Lower limit: NA
- Higher limit: 900 mV

## AC common mode output voltage

This section verifies that the RMS value of the common mode signal is within the conformable limits according to the specification.

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

Standards	Test points	Specification
CAUI4	TP1a	IEEE 802.3bm, Section 83E.3.1.2, Table 83E-1
	TP4	IEEE 802.3bm, Section 83E.3.1.2, Table 83E-3

### Inputs

- Differential signal created using two single ended sources (Positive and Negative) and filtered through fourth order 33 GHz Bessel Thomson filter.

### Measurement procedure

- Create a common mode signal using  $\text{Math} = (\text{Data Positive} + \text{Data Negative}) / 2$ .
- Create Vertical histogram on the common mode signal.
- Add Standard deviation measurement.
- Standard deviation of the signal is measured as AC common mode voltage.

### Limits

At TP1a and TP4:

- Lower limit: NA
- Higher limit: 17.5 mV

## Single ended output voltage

This section verifies that the max and min of data positive and negative signals are within conformable limits as per the specification.

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

Standards	Test points	Specification
CAUI4	TP1a	IEEE 802.3bm, Section 83E.3.1.2, Table 83E-1

### Inputs

- Two single ended sources (Positive and Negative) filtered through fourth order 33 GHz Bessel Thomson filter.

### Measurement procedure

1. Find the max and min of the signal using base scope measurement option (select **Measure > Amplitude**. Select Maximum and Minimum).
2. Single Ended output voltage (max) = [DC Common mode voltage](#) + Max of Single Ended signal (without DC).
3. Single Ended output voltage (min) = [DC Common mode voltage](#) + Min of Single Ended signal (without DC).
4. Perform Step 2 on page 58 and 3 on page 58 on single ended data positive and data negative signals.

### Limits

At TP1a:

- Lower limit: -0.4 V
- Higher limit: 3.3 V

## Signaling rate

This section verifies that the signaling rate (data rate) of the DUT per lane is within the conformable limits according to the specification.

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

Standards	Test points	Specification
CAUI4	TP1a	IEEE 802.3bm, Section 83E.3.1.1, Table 83E-1
	TP4	IEEE 802.3bm, Section 83E.3.1.1, Table 83E-3

### Inputs

- Differential signal created using two single ended sources (Positive and Negative) and filtered through fourth order 33 GHz Bessel Thomson filter.

### Measurement procedure

1. This measurement is performed using DPOJET Period measurement as prerequisite.

2. Period is found edge to edge which gives the Unit interval (UI) of the signal.
3. The result of the period measurement (UI) is used to find the data rate of the signal. Data Rate = 1/Unit interval.

### Limits

At TP1a and TP4:

- Lower limit: Configured Date Rate - 100 ppm
- Higher limit: Configured Date Rate + 100 ppm

## Eye width and Eye height

This section verifies that the eye width and eye height are within the conformable limits according to the specification.

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

Standards	Test points	Specification
CAUI4	TP1a	IEEE 802.3bm, Section 83E.3.1.6, Table 83E-1
	TP4	IEEE 802.3bm, Section 83E.3.2.1, Table 83E-3

### Inputs

- Differential signal created using two single ended sources (Positive and Negative) and filtered through fourth order 33 GHz Bessel Thomson filter.

### Calibration:

Before running the Eye width / Eye height measurement, the below setup has to be calibrated with a crosstalk generator, as mentioned in the following settings:

- For Host (TP1a): Calibrate the crosstalk generator at TP4 with target differential peak-to-peak amplitude of 900 mV and target transition time of 12 ps (section 83E.3.1.6).
- For Module (TP4): Calibrate the crosstalk generator at TP1a with target differential peak-to-peak amplitude of 900 mV and target transition time of 19 ps (section 83E.3.2.1).

### Measurement procedure

#### Eye width and Eye height calculation

Signal is captured such that it has more than 1e6 edges. Measurements are done using Dual-Dirac jitter model as specified in section 83E.4.

$$EW15 = EW6 - 3.19 \cdot (RJR + RJL)$$

Where,

EW15 is the eye width extrapolated to 10<sup>-15</sup> probability

EW6 is the eye width at 10<sup>-6</sup> probability

RJL is the RMS value of the jitter estimated from CDFL

RJR is the RMS value of the jitter estimated from CDFR

$$EH15 = EH6 - 3.19 \cdot (RN0 + RN1)$$

Where,

EH15 is the eye width extrapolated to 10<sup>-15</sup> probability

EH6 is the eye width at 10<sup>-6</sup> probability

RN1 is the RMS value of the jitter estimated from CDF1

RN0 is the RMS value of the jitter estimated from CDF0

### Compliance method to find Eye width and Eye height results

The signal filtered through Bessel Thomson filter is equalized using different CTLE filters (1 dB - 9 dB for Host) and (1 dB - 2 dB for Module). CTLE filter result which has the maximum Eye area (Eye width \* Eye height) and passing both Eye height and Eye width results is chosen as reference CTLE filter.

**Host (TP1a):** The CTLE peaking in the reference receiver shall be set to three values:

1. The recommended CTLE peaking value provided by the host (CTLE 1 dB to 9 dB)
2. The value 1 dB higher if present
3. The value 1 dB lower if present

A compliant host should pass both the eye width and eye height A limit using at least one of the settings and passes eye height B in two or three settings.

**Module (TP4):** A compliant module has to pass both eye width and eye height at least one of the CTLE settings (CTLE 1 dB to 2 dB).

### Limits

At TP1a:

- Eye Width: LL: 0.46 UI and UL: NA
- Eye Height A: LL: 95 mV and UL: NA
- Eye Height B: LL: 80 mV and UL: NA

At TP4:

- Eye Width: LL: 0.57 UI and UL: NA
- Eye Height: LL: 228 mV and UL: NA

## Vertical eye closure

This section verifies that the vertical eye closure of the signal is within the conformable limits according to the specification IEEE 802.3bm, and Section 83E.4.2.1.

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

Standards	Test points	Specification
CAUI4	TP4	IEEE 802.3bm, Section 83E.4.2.1, Table 83E-3

### Inputs

- Differential signal created using two single ended sources (Positive and Negative) and filtered through fourth order 33 GHz Bessel Thomson filter.

### Measurement procedure

1. The filtered signal is equalized using reference or best CTLE filter. If reference CTLE filter is not present, the application will loop through required CTLE filters to find the reference CTLE filter.

2. Eye height@BER of 1e-15 and Eye amplitude are calculated for the equalized signal using Dual-Dirac jitter separation model as explained section 83E.3.2.1.
3. Vertical eye closure is calculated using the following formula:

$$VEC = 20\log(AV/EH15)$$

Where,

VEC is vertical eye closure in dB

AV is the eye amplitude of the equalized waveform. Eye amplitude is defined as the mean value of logic one minus the mean value of logic zero in the central 5% of the eye

EH15 is the eye height at BER of 1e-15

### Limits

At TP4:

- Lower limit: NA
- Higher limit: 5.5 dB

## Transition time

This section verifies that the transition time of the DUT is within the conformable limits according to the specification.

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

Standards	Test points	Specification
CAUI4	TP1a	IEEE 802.3bm, Section 83E.3.1.5, Table 83E-1
	TP4	IEEE 802.3bm, Section 83E.3.1.5, Table 83E-3

### Inputs

- Differential signal created using two single ended sources (Positive and Negative) and filtered through fourth order 33 GHz Bessel Thomson filter.

### Measurement procedure

1. Measure the nominal Unit interval of the filtered signal.
2. For PRBS9, measure Voltage High in region 000001111 for Rise Time and Voltage Low in region 1111111100000 for fall time. Within these regions, take average amplitude in -3 UI to -2 UI range from edge for finding voltage low. Also take average amplitude in 2 UI to 3 UI range from edge for finding voltage high.
3. Find the transition time in search patterns (000001111 for Rise and 1111111100000 for Fall) by taking difference in time from 20% to 80% of the signal amplitude.

### Limits

At TP1a:

- Lower limit: 10 ps
- Higher limit: NA

At TP4:

- Lower limit: 12 ps

- Higher limit: NA

# CR4 / KR4 TXE compliance measurements

## DC common mode output voltage

This section verifies that the mean of the common mode signal is within the conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.1, Table 92-6
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.3, Table 93-4

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

### Measurement procedure

The supported voltage range of the scope is  $\pm 0.3$  V and the DC voltage of the DUT can be beyond the supported voltage limits. Hence, use external digital multimeter to measure the voltage and enter it in the application.

### Limits

CR4	0 V to 1.9 V
KR4	0 V to 1.9 V

## Diff peak-to-peak output voltage - Tx disabled

This section verifies that the peak to peak differential output voltage when transmitter is disabled is within the conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.1, Table 92-6
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.3, Table 93-4

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

### Inputs

- Differential signal created using two single ended sources (Positive and Negative) without any filtering.

### Measurement procedure

- Add Peak to Peak measurement.
- The value of the pk-pk voltage is measured as differential output voltage (pk-pk).

### Limits

CR4	Peak-to-Peak Differential output (Tx Disabled) $\leq 35$ mV
KR4	Peak-to-Peak Differential output (Tx Disabled) $\leq 30$ mV

## Diff peak-to-peak output voltage - Tx enabled

This section verifies that the peak to peak differential output voltage is within the conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.1, Table 92-6
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.3, Table 93-4

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

### Inputs

- Differential signal created using two single ended sources (Positive and Negative) and filtered through fourth order 33 GHz Bessel Thomson filter.

### Measurement procedure

- Add Peak to Peak measurement.
- The value of the pk-pk voltage is measured as differential output voltage (pk-pk).

### Limits

CR4	Peak-to-Peak Differential output <= 1200 mV
KR4	Peak-to-Peak Differential output <= 1200 mV

## AC common mode output voltage

This section verifies that the RMS value of the common mode signal is within the conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.1, Table 92-6
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.3, Table 93-4

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

### Inputs

- Differential signal created using two single ended sources (Positive and Negative) and filtered through fourth order 33 GHz Bessel Thomson filter.

### Measurement procedure

- Create a common mode signal using  $\text{Math} = (\text{Data Positive} + \text{Data Negative}) / 2$ .
- Create Vertical histogram on the common mode signal.
- Add Standard deviation measurement.
- Standard deviation of the signal is measured as AC common mode voltage.

### Limits



CR4	AC Common mode output voltage $\leq$ 30 mV RMS with respect to ground
KR4	AC Common mode output voltage $\leq$ 12 mV RMS with respect to ground

## Signaling rate

This section verifies that the signaling rate (data rate) of the DUT per lane is within the conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.9, Table 92-6
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.2, Table 93-4

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

### Inputs

- Differential signal created using two single ended sources (Positive and Negative) and filtered through fourth order 33 GHz Bessel Thomson filter.

### Measurement procedure

- This measurement is performed using DPOJET Period measurement as prerequisite.
- Period is found edge to edge which gives the Unit interval (UI) of the signal.
- The result of the period measurement (UI) is used to find the data rate of the signal. Data Rate = 1/Unit interval.

### Limits

CR4	At TP1a and TP4: <ul style="list-style-type: none"> <li>Lower limit: Configured Date Rate - 100 ppm</li> <li>Higher limit: Configured Date Rate + 100 ppm</li> </ul>
KR4	At TP1a and TP4: <ul style="list-style-type: none"> <li>Lower limit: Configured Date Rate - 100 ppm</li> <li>Higher limit: Configured Date Rate + 100 ppm</li> </ul>

## Output Jitter

### Even-odd jitter peak to peak

This section verifies that the value of the even odd jitter is within the conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.8, Table 92-6
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.7, Table 93-4

### Required test equipment

[Minimum system requirements](#)[Equipment connection diagram](#)**Inputs**

- Differential signal created using two single ended sources (Positive and Negative) and filtered through fourth order 33 GHz Bessel Thomson filter.

**Measurement procedure**

- Capture a long sequence of PRBS pattern.
- Even Odd Jitter is measured as the magnitude of the difference between the average deviation of all even numbered transitions and the average deviation of all odd numbered transitions, where even odd transitions are not possible transitions, but actual transitions.
- The Even Odd Jitter is carried out by DPOJET using F/n measurement with n being set to 2.

**Limits**

CR4	Even Odd Jitter <= 0.035 UI
KR4	Even Odd Jitter <= 0.035 UI

**Effective bounded and total uncorrelated jitter peak-to-peak**

This section verifies that the jitter components are within the conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.8, Table 92-6
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.7, Table 93-4

**Required test equipment**[Minimum system requirements](#)[Equipment connection diagram](#)**Inputs**

- Differential signal created using two single ended sources (Positive and Negative) and filtered through fourth order 33 GHz Bessel Thomson filter.

**Measurement procedure**

- Capture PRBS signal with minimum of 2e3 edges present in the signal.
- For calculating jitter application, consider the edges attached with long sequence of ones and zeros. This makes sure that the only uncorrelated jitter is measured. Application performs this measurement with longer record length to get more accurate results.
- EBUJ (Effective bounded uncorrelated jitter) and ERJ (Effective random jitter) are calculated from the signal using dual-dirac jitter analysis as given in specification section 92.8.3.8.2.

Effective total uncorrelated jitter is calculated using the equation  $\text{Effective total uncorrelated jitter} = 7.9 \times \text{ERJ} + \text{EBUJ}$ .

**Limits**

CR4 and KR4	Effective bounded uncorrelated jitter <= 0.1 UI peak-to-peak
	Effective total uncorrelated jitter <= 0.18 UI peak-to-peak

## Signal to noise and distortion ratio

This section verifies that the signal to noise and distortion ratio of the DUT is within the conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.7, Table 92-6
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.6, Table 93-4

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

### Inputs

- Differential signal created using two single ended sources (Positive and Negative) and filtered through fourth order 33 GHz Bessel Thomson filter.

### Measurement procedure

- Configure the DUT in OPTIMAL state and capture the signal for measurement.
- Compute the Linear fit pulse response (Pmax) and the RMS value of the linear fit error  $\sigma(e)$  from the signal.
- Measure the RMS deviation of voltage from the mean and denote it as  $\sigma(n)$ . This has to be measured at the flat portion of the waveform where the slope is close to zero.
- Signal to Noise and Distortion ratio is measured using below equation:

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

### Limits

CR4	SNDR > 26 dB
KR4	SNDR > 27 dB

## Transmitter waveform requirements

### Common procedure for transmitter waveform requirements

This section describes the general procedure to be performed for Transmitter output waveform measurements. Perform the general procedure and the measurement specific procedure for each sub-measurements.

### Required test equipment

[Minimum system requirements](#)

[Equipment connection diagram](#)

### Inputs

- Differential signal created using two single ended sources (Positive and Negative) and filtered through fourth order 33 GHz Bessel Thomson filter.

### Common procedure for transmitter waveform requirements

- Configure the DUT to transmit the PRBS 7, 9, 11, or 15 signal continuously at the specified data rate.

2. Acquire the signal at a sampling rate of 200 Gbps and record length of 5M samples.
3. Oversample the signal to get more than 32 samples per bit and average the signal across the PRBS patterns.
4. Process the signal using steps as per specification section 92.8.3.5 to measure the various Transmitter waveform parameters.

## Linear fit pulse peak

This section verifies that the linear fit pulse peak value is within the conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.5.2, Table 92-6
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.5.2, Table 93-4

### Measurement procedure

1. Set the DUT in PRESET mode by setting the coefficients C(-1), C(0) and C(1) to zero.
2. Capture the signal and calculate linear fit filter coefficients of the signal. The peak value of the linear fit curve is measured as Linear Fit pulse peak.

### Limits

CR4	Linear Fit Pulse Peak > 0.45 * Steady state voltage
KR4	Linear Fit Pulse Peak > 0.71 * Steady state voltage

## Steady state voltage

This section verifies that the steady state voltage is within the conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.5.2, Table 92-6
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.5.2, Table 93-4

### Measurement procedure

1. Set the DUT in PRESET mode by setting coefficients C(-1), C(0) and C(1) to zero.
2. Capture the signal and calculate linear fit pulse of the signal. The average value of the linear fit curve is measured as Steady state output voltage (DC voltage) of the signal.

### Limits

CR4	<ul style="list-style-type: none"> <li>• Min: 0.34 V</li> <li>• Max: 0.6 V</li> </ul>
KR4	<ul style="list-style-type: none"> <li>• Min: 0.4 V</li> <li>• Max: 0.6 V</li> </ul>

## Minimum pre-cursor full scale ratio

This section verifies that the minimum pre-cursor equalization ratio is within the conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.5.5, Table 92-6
Table continued...		

Standards	Test points	Specification
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.5.5, Table 93-4

#### Measurement procedure

1. Set the DUT in PRESET mode and compute the filter coefficients.
2. Calculate equalizer coefficients C(-1), C(0) and C(1). Minimum pre-cursor equalization ratio is calculated as below:

$$\text{Min Pre-Cursor Eq Ratio} = [C(0) - C(-1)] / [C(0) + C(-1)]$$

#### Limits

CR4	Minimum pre cursor equalization ratio $\geq 1.54$
KR4	Minimum pre cursor equalization ratio $\geq 1.54$

### Minimum post-cursor full scale ratio

This section verifies that the minimum pre-cursor equalization ratio is within the conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.5.5, Table 92-6
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.5.5, Table 93-4

#### Measurement procedure

1. Set the DUT in PRESET mode and compute the filter coefficients.
2. Calculate equalizer coefficients C(-1), C(0) and C(1). Minimum Post cursor equalization ratio is calculated as below:

$$\text{Min Post-Cursor Eq Ratio} = [C(0) - C(1)] / [C(0) + C(1)]$$

#### Limits

CR4	Minimum post cursor equalization ratio $\geq 4$
KR4	Minimum post cursor equalization ratio $\geq 4$

### Normalized coefficient step size

This section verifies that the increment and decrement step size of transmitter equalizer coefficients (C(-1), C(0) and C(1)) of the DUT are in conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.5.4, Table 92-6
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.5.4, Table 93-4

#### Measurement procedure

C(-1) Increment step size and C(-1) Decrement step size:

1. Set the DUT in PRESET state; acquire the signal and calculate the filter coefficients.
2. Configure all the DUT's transmitter equalizer coefficients to INITIALIZE state.
3. Measure the C(-1) coefficient value and denote as C(-1)\_Initilaize
4. Configure the DUT's transmitter equalizer coefficient C(-1) to INCREMENT, C(0) and C(1) to HOLD state.

5. Measure the C(-1) coefficient value and denote as C(-1)\_Increment
6. C(-1) Increment step size is calculated as:  $\Delta c = C(-1)\_Increment - C(-1)\_Initialize$
7. Configure the DUT's transmitter equalizer coefficient C(-1) to DECREMENT, C(0) and C(1) to HOLD state.
8. Measure the C(-1) coefficient value and denote as C(-1)\_Decrement
9. C(-1) Increment step size is calculated as:  $\Delta c = C(-1)\_Decrement - C(-1)\_Increment$

C(0) Increment step size and C(0) Decrement step size:

1. Set the DUT in PRESET state; acquire the signal and calculate the filter coefficients.
2. Configure all the DUT's transmitter equalizer coefficients to INITIALIZE state.
3. Measure the C(0) coefficient value and denote as C(0)\_Initilaize
4. Configure the DUT's transmitter equalizer coefficient C(0) to INCREMENT, C(-1) and C(1) to HOLD state.
5. Measure the C(0) coefficient value and denote as C(0)\_Increment
6. C(0) Increment step size is calculated as:  $\Delta c = C(0)\_Increment - C(0)\_Initialize$
7. Configure the DUT's transmitter equalizer coefficient C(0) to DECREMENT, C(-1) and C(1) to HOLD state.
8. Measure the C(0) coefficient value and denote as C(0)\_Decrement
9. C(0) Increment step size is calculated as:  $\Delta c = C(0)\_Decrement - C(0)\_Increment$

C(1) Increment step size and C(1) Decrement step size:

1. Set the DUT in PRESET state; acquire the signal and calculate the filter coefficients.
2. Configure all the DUT's transmitter equalizer coefficients to INITIALIZE state.
3. Measure the C(1) coefficient value and denote as C(1)\_Initilaize
4. Configure the DUT's transmitter equalizer coefficient C(1) to INCREMENT, C(-1) and C(0) to HOLD state.
5. Measure the C(1) coefficient value and denote as C(1)\_Increment
6. C(1) Increment step size is calculated as:  $\Delta c = C(1)\_Increment - C(1)\_Initialize$
7. Configure the DUT's transmitter equalizer coefficient C(1) to DECREMENT, C(-1) and C(0) to HOLD state.
8. Measure the C(1) coefficient value and denote as C(1)\_Decrement
9. C(1) Increment step size is calculated as:  $\Delta c = C(1)\_Decrement - C(1)\_Increment$

#### Limits

CR4	<ul style="list-style-type: none"> <li>• Min: 0.0083</li> <li>• Max: 0.05</li> </ul>
KR4	<ul style="list-style-type: none"> <li>• Min: 0.0083</li> <li>• Max: 0.05</li> </ul>

## Coefficient initialization ratio

This section verifies that the equalizer coefficient initialization ratios (Initialization Ratio1 and Initialization Ratio2) of the DUT are within the conformable limits according to the specification.

Standards	Test points	Specification
CR4	TP2	IEEE 802.3bj, Section 92.8.3.5.3
KR4	TP0a	IEEE 802.3bj, Section 93.8.1.5.3

#### Measurement procedure

1. Set the DUT in PRESET mode and compute the linear fit pulse.
2. Set the DUT in INITIALIZE mode and compute the linear fit pulse.
3. Compute the equalizer coefficients  $C(-1)$ ,  $C(0)$ , and  $C(1)$  using linear fit impulse responses of PRESET and INITIALIZE modes.
4. Coefficient Initialization Ratio1 is calculated by the following formula:

$$\text{Initialization Ratio1} = (c(0) + c(1) - c(-1)) / (c(0) + c(1) + c(-1))$$

5. Coefficient Initialization Ratio2 is calculated by the following formula:

$$\text{Initialization Ratio2} = (c(0) - c(1) + c(-1)) / (c(0) + c(1) + c(-1))$$

#### Limits

CR4 and KR4	Coefficient Initialization Ratio1	1.29±10%
	Coefficient Initialization Ratio2	2.57±10%

# SCPI Commands

## About SCPI command

You can use the Standard Commands for Programmable Instruments (SCPI) to communicate remotely with the TekExpress application. Complete the TCPIP socket configuration and the TekVISA configuration in the oscilloscope or in the device where you are executing the script.



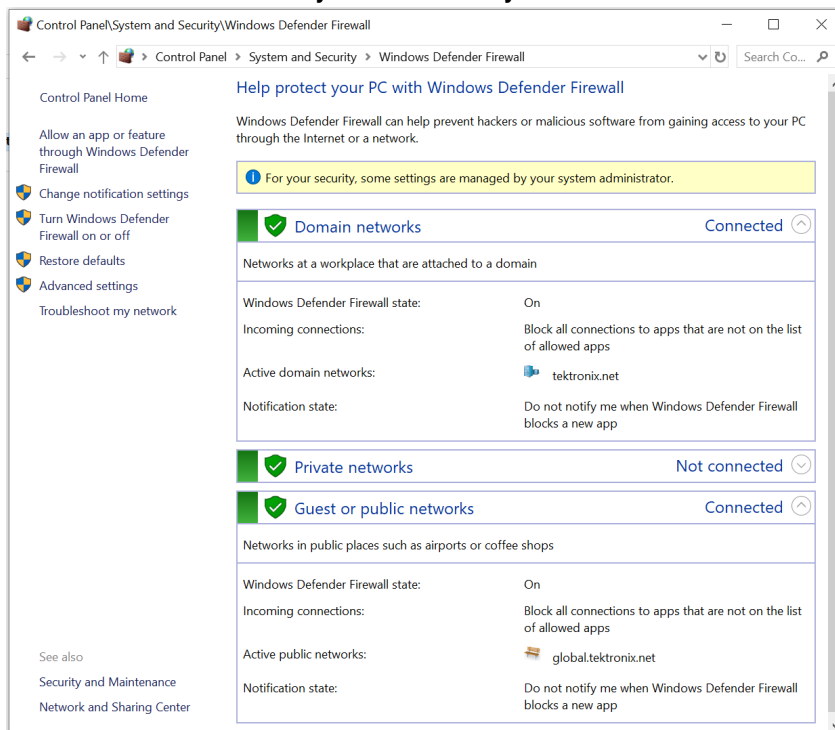
**Note:** If you are using an external PC to execute the remote interface commands, then install TekVISA in the PC to make the configurations.

## Socket configuration for SCPI commands

This section describes the steps to configure the TCPIP socket configuration in your script execution device and the steps to configure the TekVISA configuration in the oscilloscope to execute the SCPI commands.

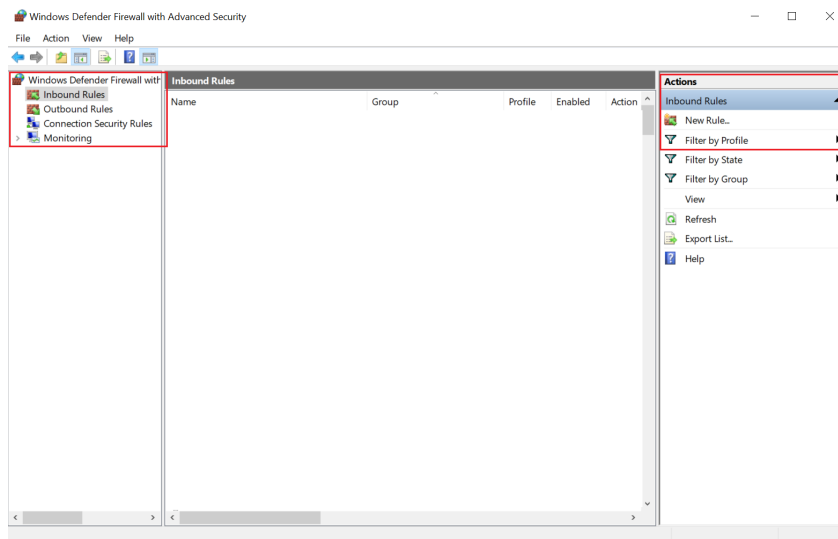
### TCPIP socket configuration

1. Click **Start > Control Panel > System and Security > Windows Firewall > Advanced settings**.



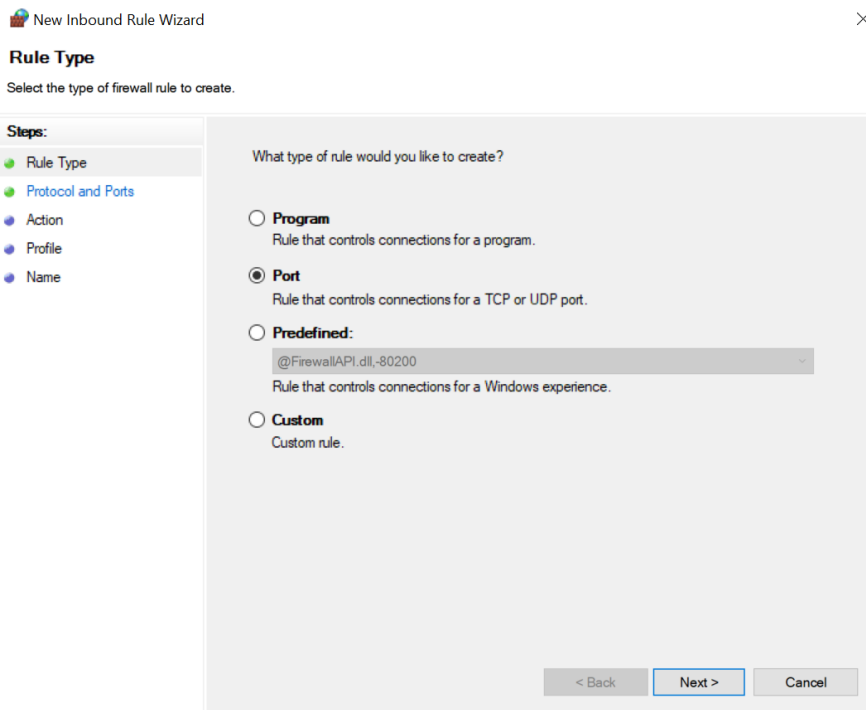
2. In Windows Firewall with Advanced Security menu, select **Windows Firewall with Advanced Security on Local Computer > Inbound Rules** and click **New Rule...**





### 3. In New Inbound Rule Wizard menu

#### a. Select **Port** and click **Next**.



#### b. Select **TCP** as rule apply, enter 5000 for **Specific local ports** and click **Next**.

New Inbound Rule Wizard ×

### Protocol and Ports

Specify the protocols and ports to which this rule applies.

**Steps:**

- Rule Type
- Protocol and Ports**
- Action
- Profile
- Name

Does this rule apply to TCP or UDP?

☒ TCP  
☐ UDP

Does this rule apply to all local ports or specific local ports?

☐ All local ports  
☒ Specific local ports:

Example: 80, 443, 5000-5010

- c. Select **Allow the connection** and click **Next**.

New Inbound Rule Wizard ×

### Action

Specify the action to be taken when a connection matches the conditions specified in the rule.

**Steps:**

- Rule Type
- Protocol and Ports
- Action**
- Profile
- Name

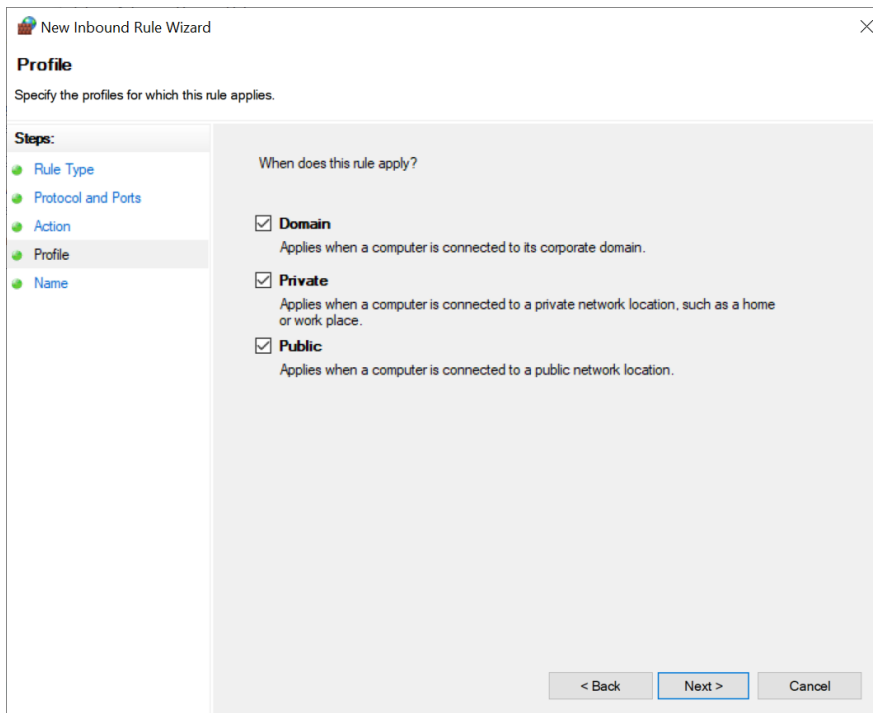
What action should be taken when a connection matches the specified conditions?

☒ **Allow the connection**  
 This includes connections that are protected with IPsec as well as those are not.

☐ **Allow the connection if it is secure**  
 This includes only connections that have been authenticated by using IPsec. Connections will be secured using the settings in IPsec properties and rules in the Connection Security Rule node.

☐ **Block the connection**

- d. Select **Domain, Private, Public** checkbox and click **Next**.



New Inbound Rule Wizard

**Profile**

Specify the profiles for which this rule applies.

**Steps:**

- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

When does this rule apply?

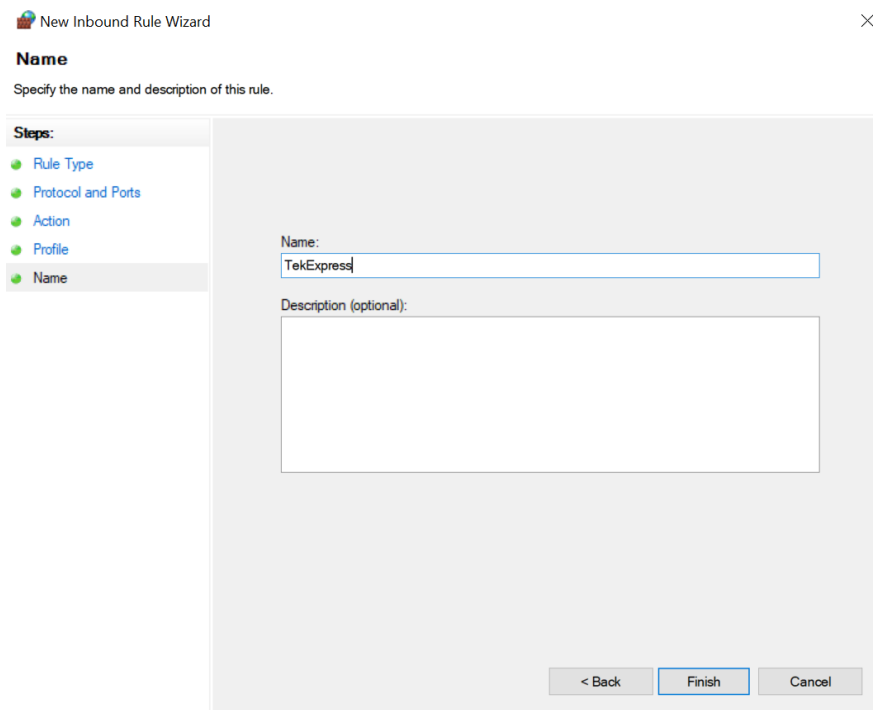
☒ **Domain**  
Applies when a computer is connected to its corporate domain.

☒ **Private**  
Applies when a computer is connected to a private network location, such as a home or work place.

☒ **Public**  
Applies when a computer is connected to a public network location.

< Back   Next >   Cancel

- e. Enter **Name**, Description (optional), and click **Finish**.



New Inbound Rule Wizard

**Name**

Specify the name and description of this rule.

**Steps:**

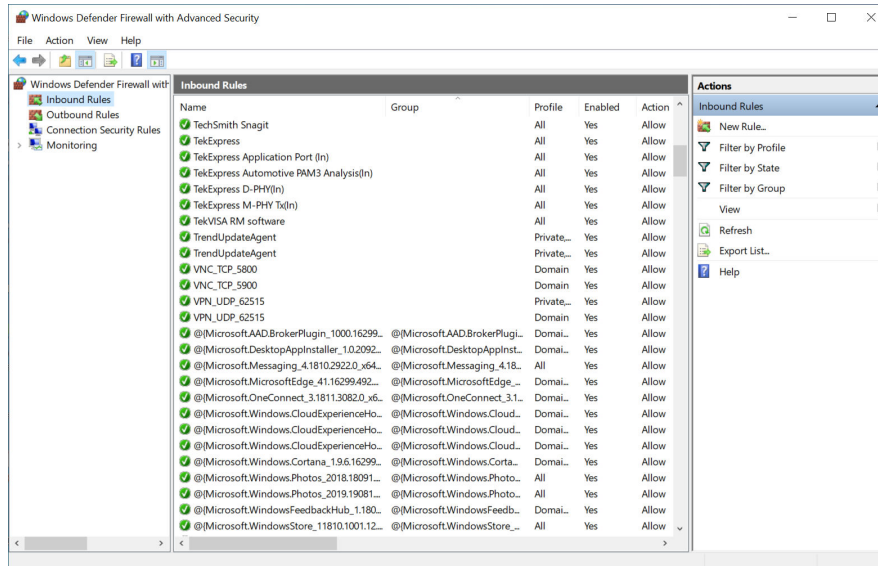
- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

Name:  
TekExpress

Description (optional):

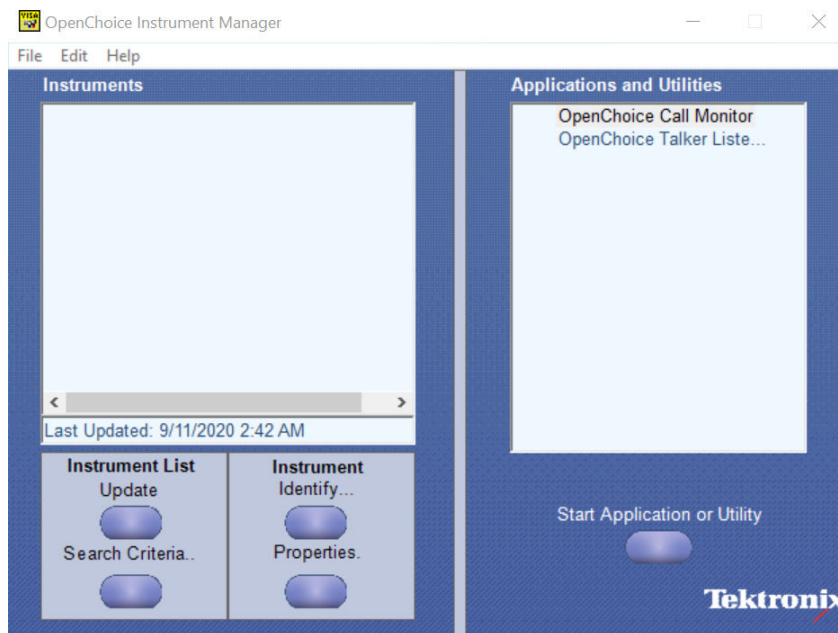
< Back   Finish   Cancel

4. Check whether the Rule name is displayed in **Windows Firewall with Advanced Security** menu > **Inbound Rules**.




## TekVISA configuration

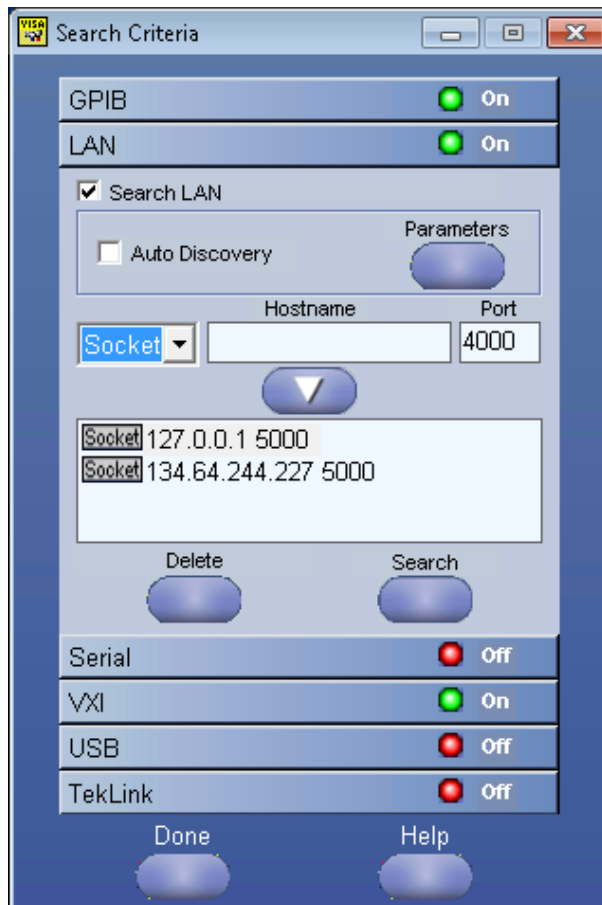
1. Click **Start > All Programs > TekVISA > OpenChoice Instrument Manager**.



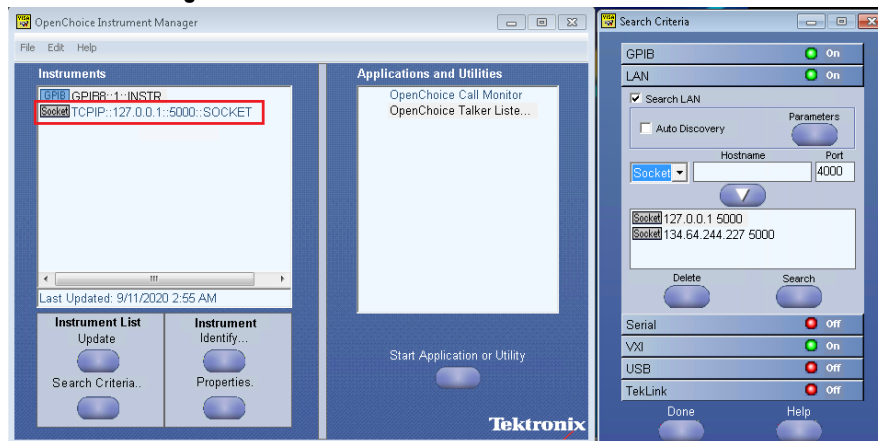
2. Click **Search Criteria**. In **Search Criteria** menu, click **LAN** to Turn-on. Select **Socket** from the drop-down list, enter the IP address of

the TekExpress device in **Hostname** and type **Port** as 5000. Click  to configure the IP address with Port.

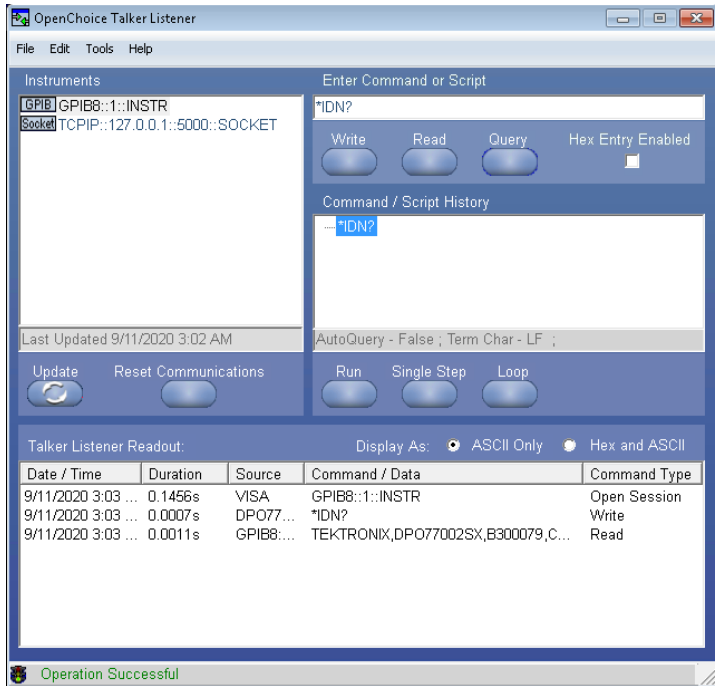
Enter the Hostname as 127.0.0.1 if the TekVISA and TekExpress application are in the same system, else enter the IP address of the oscilloscope where the TekExpress application is running.



3. Click **Search** to setup the TCPIP connection with the host. Check whether the TCPIP host name is displayed in **OpenChoice Instrument Manager > Instruments**.



4. Double-click **OpenChoice Talker Listener** and enter the Command **\*IDN?** in command entry field and click **Query**. Check that the Operation is successful and Talker Listener Readout displays the Command / Data.



Set or query the device name of application

This command sets or queries the device name of the application.

Syntax

```
TEKEXP:SELECT DEVICE, "<DeviceName>" (Set)
TEKEXP:SELECT? DEVICE (Query)
```

Command arguments

Argument Name	Argument Type
<DeviceName>	<String>

Returns

<String>

Examples

```
TEKEXP:SELECT DEVICE, "<DUT001>" command sets the device name of the application to DUT001.
TEKEXP:SELECT? DEVICE command returns the selected device name of the application.
```

Set or query the DUTID of application

This command sets or queries the DUTID of the application.

Syntax

```
TEKEXP:VALUE DUTID, "<Value>" (Set)
TEKEXP:VALUE? DUTID (Query)
```

## Command arguments

Argument Name	Argument Type
<Value>	<String>

## Returns

<String>

## Examples

TEKEXP:VALUE DUTID, "DUT001" command sets the DUTID of the application to DUT001.

TEKEXP:VALUE? DUTID command returns the DUTID of the application.

## Set or query the suite name of the application

This command sets or queries the suite name of the application.

## Syntax

TEKEXP:SELECT SUITE, "<SuiteName>" (Set)

TEKEXP:SELECT? SUITE (Query)

## Command arguments

<SuiteName>
<ul style="list-style-type: none"><li>TP1a, TP4 for CAUI4</li><li>TP0a for CR4</li><li>TP2 for KR4</li></ul>

## Returns

<String>

## Examples

TEKEXP:SELECT SUITE, "<SuiteName>" command sets the suite name of the application.

TEKEXP:SELECT? SUITE command returns the selected suite of the application.

## Set or query the test name of the application

This command selects or deselects the specified test name of the application.

## Syntax

TEKEXP:SELECT TEST, "<TestName>", <Value> (Set)

TEKEXP:SELECT TEST, "<ALL>" (Set)

TEKEXP:SELECT? TEST (Query)

## Command arguments

TestName	Value
<b>CAUI4</b> <ul style="list-style-type: none"> <li>• DC Common Mode Output Voltage</li> <li>• Diff Peak to Peak Output Voltage -Tx Disabled</li> <li>• Diff Peak to Peak Output Voltage -Tx Enabled</li> <li>• AC Common Mode Output Voltage</li> <li>• Single Ended Output Voltage</li> <li>• Signaling Rate</li> <li>• Eye Width</li> <li>• Eye Height Differential</li> <li>• Transition Time</li> <li>• Vertical Eye closure</li> </ul>	{True   False} or {1   0} It represents selected or unselected. Where, True or 1 - Selected False or 0 - Unselected
<b>KR4</b> <ul style="list-style-type: none"> <li>• DC Common Mode Output Voltage</li> <li>• Diff Peak to Peak Output Voltage -Tx Disabled</li> <li>• Diff Peak to Peak Output Voltage -Tx Enabled</li> <li>• AC Common Mode Output Voltage</li> <li>• Single Ended Output Voltage</li> <li>• Signaling Rate</li> <li>• Linear Fit Pulse Peak</li> <li>• Minimum Pre-cursor full scale ratio</li> <li>• Minimum Post-cursor full scale ratio</li> <li>• Normalized Coefficient Step Size</li> <li>• Coefficient Initialization Ratio</li> <li>• Signal To Noise And Distortion Ratio</li> <li>• Steady State Voltage</li> <li>• Even-Odd Jitter Peak to Peak</li> <li>• Effective total uncorrelated jitter peak to peak</li> <li>• Effective bounded uncorrelated jitter peak to peak</li> </ul>	

Table continued...



TestName	Value
<b>CR4</b> <ul style="list-style-type: none"> <li>• DC Common Mode Output Voltage</li> <li>• Diff Peak to Peak Output Voltage -Tx Disabled</li> <li>• Diff Peak to Peak Output Voltage -Tx Enabled</li> <li>• AC Common Mode Output Voltage</li> <li>• Single Ended Output Voltage</li> <li>• Signaling Rate</li> <li>• Linear Fit Pulse Peak</li> <li>• Minimum Pre-cursor full scale ratio</li> <li>• Minimum Post-cursor full scale ratio</li> <li>• Normalized Coefficient Step Size</li> <li>• Coefficient Initialization Ratio</li> <li>• Signal To Noise And Distortion Ratio</li> <li>• Steady State Voltage</li> <li>• Even-Odd Jitter Peak to Peak</li> <li>• Effective total uncorrelated jitter peak to peak</li> <li>• Effective bounded uncorrelated jitter peak to peak</li> </ul>	

## Returns

{True | False} or {1 | 0}

## Examples

TEKEXP:SELECT TEST, "<TestName>", 1 command selects the specified test in the Test Panel.

TEKEXP:SELECT TEST, "<ALL>" command select all the tests in the Test Panel.

TEKEXP:SELECT? TEST command returns the list of selected tests.

## Set or query the version name of the application

This command sets or queries the version name of the application.

## Syntax

TEKEXP:SELECT VERSION, "<VersionName>" (Set)

TEKEXP:SELECT? VERSION (Query)

## Command arguments

Argument Name	Argument Type	Valid Values
<VersionName>	<String>	It is the name of the version on the DUT panel of the application.

## Returns

<String>

## Examples

TEKEXP:SELECT VERSION, "<VersionName>" command sets the version name of application.

TEKEXP:SELECT? VERSION command returns the version name of application.

## Set or query the general parameter values

This command sets or queries the general parameter values of the application.

### Syntax

TEKEXP:VALUE GENERAL, "<ParameterName>", "<Value>" (Set)

TEKEXP:VALUE? GENERAL, "<ParameterName>" (Query)

### Command arguments

**Table 16: Report panel command parameters**

<ParameterName>	<Value>
On Test Failure, stop and notify me of the failure	{True   False} or {1   0} It represents selected or unselected. Where, <ul style="list-style-type: none"> <li>• True or 1 - Selected</li> <li>• False or 0 - Unselected</li> </ul>
Report Update Mode	<ul style="list-style-type: none"> <li>• New</li> <li>• Append</li> <li>• Replace</li> </ul>
Report Path	X:\<application name>\Reports\DUT001.mht
Save As Type	<ul style="list-style-type: none"> <li>• Web Archive (*.mht;*.mhtml)</li> <li>• PDF (*.pdf;)</li> <li>• CSV (*.csv;)</li> </ul>
Auto increment report name if duplicate	{True   False} or {1   0} It represents selected or unselected. Where, <ul style="list-style-type: none"> <li>• True or 1 - Selected</li> <li>• False or 0 - Unselected</li> </ul>

Table continued...

<ParameterName>	<Value>
Create report at the end	{True   False} or {1   0} It represents selected or unselected. Where, <ul style="list-style-type: none"> <li>• True or 1 - Selected</li> <li>• False or 0 - Unselected</li> </ul>
Upload logo	{True   False} or {1   0} It represents selected or unselected. Where, <ul style="list-style-type: none"> <li>• True or 1 - Selected</li> <li>• False or 0 - Unselected</li> </ul>
Include Pass/Fail Results Summary	{True   False} or {1   0} It represents selected or unselected. Where, <ul style="list-style-type: none"> <li>• True or 1 - Selected</li> <li>• False or 0 - Unselected</li> </ul>
Include Detailed Results	{True   False} or {1   0} It represents selected or unselected. Where, <ul style="list-style-type: none"> <li>• True or 1 - Selected</li> <li>• False or 0 - Unselected</li> </ul>
Include Plot Images	{True   False} or {1   0} It represents selected or unselected. Where, <ul style="list-style-type: none"> <li>• True or 1 - Selected</li> <li>• False or 0 - Unselected</li> </ul>
Include Setup Configuration	{True   False} or {1   0} It represents selected or unselected. Where, <ul style="list-style-type: none"> <li>• True or 1 - Selected</li> <li>• False or 0 - Unselected</li> </ul>
Table continued...	

<ParameterName>	<Value>
Include Complete Application Configuration	{True   False} or {1   0} It represents selected or unselected. Where, <ul style="list-style-type: none"> <li>• True or 1 - Selected</li> <li>• False or 0 - Unselected</li> </ul>
Include User Comments	{True   False} or {1   0} It represents selected or unselected. Where, <ul style="list-style-type: none"> <li>• True or 1 - Selected</li> <li>• False or 0 - Unselected</li> </ul>
Report Settings:Include Header In Appended Reports	{True   False} or {1   0} It represents selected or unselected. Where, <ul style="list-style-type: none"> <li>• True or 1 - Selected</li> <li>• False or 0 - Unselected</li> </ul>
View Report After Generating	{True   False} or {1   0} It represents selected or unselected. Where, <ul style="list-style-type: none"> <li>• True or 1 - Selected</li> <li>• False or 0 - Unselected</li> </ul>
Report Group Mode	<ul style="list-style-type: none"> <li>• Test Name</li> <li>• Test Result</li> <li>• Measurement Group</li> </ul>
Append Report	{True   False} or {1   0} It represents selected or unselected. Where, <ul style="list-style-type: none"> <li>• True or 1 - Selected</li> <li>• False or 0 - Unselected</li> </ul>

## Returns

<NRf> or <String>

## Examples

TEKEXP:VALUE GENERAL, "<ParameterName>", "<Value>" command set the value for the specified general parameter.

TEKEXP:VALUE? GENERAL, "<ParameterName>" command returns the value for the specified general parameter.

## Set or query the acquire parameter values

This command sets or queries the acquire parameter values of the application.

### Syntax

TEKEXP:VALUE

ACQUIRE, "<TestName>", "<AcquireType>", "<ParameterName>", "<ParameterValue>" (Set)

TEKEXP:VALUE? ACQUIRE, "<TestName>", "<AcquireType>", "<ParameterName>" (Query)

### Command arguments

Argument Name	Argument Type	Valid Values
<TestName>	<String>	It is the test name.
<AcquireType>	<String>	It is the acquire type.
<ParameterName>	<String>	It is the acquire parameter name.
<ParameterValue>	<Nrf>	It is the acquire parameter value.

### Returns

<Nrf>

### Examples

TEKEXP:VALUE

ACQUIRE, "<TestName>", "<AcquireType>", "<ParameterName>", "<ParameterValue>" command sets the value for the specified test and its acquire parameter.

TEKEXP:VALUE? ACQUIRE, "<TestName>", "<AcquireType>", "<ParameterName>" command returns the value for the specified test and its acquire parameter.

## Set or query the analyze parameter values

This command sets or queries the analyze parameter values of the application.

### Syntax

TEKEXP:VALUE ANALYZE, "<TestName>", "<ParameterName>", "<ParameterValue>" (Set)

TEKEXP:VALUE? ANALYZE, "<TestName>", "<ParameterName>" (Query)

### Command arguments

Test Name	Parameter Name	Parameter Value
Transition Time	Measurement Range	10% - 90%

### Returns

<Nrf>

### Examples

TEKEXP:VALUE ANALYZE, "<TestName>", "<ParameterName>", "<ParameterValue>" command set the value for the specified test and its analyze parameter.

TEKEXP:VALUE? ANALYZE,"<TestName>","<ParameterName>" command returns the value for the specified test and its analyze parameter.

## Query the available devices in the DUT panel of the application

This command queries the list of available devices on the DUT panel as comma separated values.

### Syntax

TEKEXP:LIST? DEVICE (Query)

### Command arguments

Device	Device Type and value	Description
<Device>	<String>	It is the name of the device on the DUT panel of the application.

### Returns

<String>

### Examples

TEKEXP:LIST? DEVICE command returns the list of available devices.

## Query the available suites for the selected device

This command queries the list of available suites for the selected device as comma separated values.

### Syntax

TEKEXP:LIST? SUITE (Query)

### Returns

<String>

### Examples

TEKEXP:LIST? SUITE command returns the list of available suites for the selected device.

## Query the list of available tests of the application

This command queries the list of available tests of the application for the selected device as comma separated values.

### Syntax

TEKEXP:LIST? TEST (Query)

## Command arguments

TestName	String
CAUI4	<ul style="list-style-type: none"> <li>• DC Common Mode Output Voltage</li> <li>• Diff Peak to Peak Output Voltage -Tx Disabled</li> <li>• Diff Peak to Peak Output Voltage -Tx Enabled</li> <li>• AC Common Mode Output Voltage</li> <li>• Single Ended Output Voltage</li> <li>• Signaling Rate</li> <li>• Eye Width</li> <li>• Eye Height Differential</li> <li>• Transition Time</li> <li>• Vertical Eye closure</li> </ul>
KR4	<ul style="list-style-type: none"> <li>• DC Common Mode Output Voltage</li> <li>• Diff Peak to Peak Output Voltage -Tx Disabled</li> <li>• Diff Peak to Peak Output Voltage -Tx Enabled</li> <li>• AC Common Mode Output Voltage</li> <li>• Single Ended Output Voltage</li> <li>• Signaling Rate</li> <li>• Linear Fit Pulse Peak</li> <li>• Minimum Pre-cursor full scale ratio</li> <li>• Minimum Post-cursor full scale ratio</li> <li>• Normalized Coefficient Step Size</li> <li>• Coefficient Initialization Ratio</li> <li>• Signal To Noise And Distortion Ratio</li> <li>• Steady State Voltage</li> <li>• Even-Odd Jitter Peak to Peak</li> <li>• Effective total uncorrelated jitter peak to peak</li> <li>• Effective bounded uncorrelated jitter peak to peak</li> </ul>
Table continued...	



TestName	String
CR4	<ul style="list-style-type: none"> <li>• DC Common Mode Output Voltage</li> <li>• Diff Peak to Peak Output Voltage -Tx Disabled</li> <li>• Diff Peak to Peak Output Voltage -Tx Enabled</li> <li>• AC Common Mode Output Voltage</li> <li>• Single Ended Output Voltage</li> <li>• Signaling Rate</li> <li>• Linear Fit Pulse Peak</li> <li>• Minimum Pre-cursor full scale ratio</li> <li>• Minimum Post-cursor full scale ratio</li> <li>• Normalized Coefficient Step Size</li> <li>• Coefficient Initialization Ratio</li> <li>• Signal To Noise And Distortion Ratio</li> <li>• Steady State Voltage</li> <li>• Even-Odd Jitter Peak to Peak</li> <li>• Effective total uncorrelated jitter peak to peak</li> <li>• Effective bounded uncorrelated jitter peak to peak</li> </ul>

## Returns

<String>

## Examples

TEKEXP:LIST? TEST command returns the list of available tests for the selected device.

## Query the available version names of the application

This command queries the list of available version names of the application for the selected device as comma separated values.

## Syntax

TEKEXP:LIST? VERSION (Query)

## Returns

<String>

## Examples

TEKEXP:LIST? VERSION command returns the list of version names for the selected device.

## Query the list of available instruments based on the specified instrument type

This command queries the list of available instruments based on the specified instrument type.

## Syntax

TEKEXP:LIST? INSTRUMENT, "<InstrumentType>" (Query)

**Command argument**

Argument Name	Argument value
<InstrumentType>	<String>

**Returns**

&lt;String&gt;

**Examples**

TEKEXP:LIST? INSTRUMENT, "Real Time Scope" command returns the list of available instruments based on the real time scope type.

## Set or query the IP address of the instrument based on the specified instrument type

This command sets or queries the IP address of the instrument based on the specified instrument type.

**Syntax**

TEKEXP:INSTRUMENT? "<InstrumentType>" (Query)

TEKEXP:INSTRUMENT, "<InstrumentType>", "<Value>" (Set)

**Command argument**

Argument Name	Argument Type
<InstrumentType>	<String>
<Value>	<String> TCPIP::XXX.XX.XXX.XXX::INSTR

**Returns**

&lt;String&gt;

**Examples**

TEKEXP:INSTRUMENT? "<InstrumentType>" command returns the IP address of the oscilloscope.

TEKEXP:INSTRUMENT, "<InstrumentType>", "<value>" command sets the oscilloscope to the specified IP address.

## Query the information of the generated report file

This command queries the information of the generated report file in the format "<FileSize>",<FileName>".

**Pre-requisite**

A session should be run earlier and the report should be generated to get the information of the report.

**Syntax**

TEKEXP:INFO? REPORT (Query)

## Returns

<FileSize>:: <String>

<FileName>:: <String>

## Examples

TEKEXP:INFO? REPORT command returns the information of the generated report in the format ("1215","DUT001.mht").

## Query the information of the generated waveform files

This command queries the information of the generated waveform files in the format.

<File1Size,"File1Name">.

If there are more than one waveform, the waveform file names are displayed with the comma separated values in the format

<File1Size,"File1Name">,<File2Size,"File2Name">.

## Syntax

TEKEXP:INFO? WFM (Query)

## Returns

<FileSize>:: <String>

<FileName>:: <String>

## Examples

TEKEXP:INFO? WFM command returns the information of the generated waveform in the format (20000858,"X:\<Application Name>\Untitled Session\DUT001\20200916\_041609\Iter1\_Short Record-length for SCOPE Period\_NoSSC\_DIFF.wfm").

## Query the information of the generated image files

This command queries the information of the generated image files in the format.

<File1Size,"File1Name">.

If there are more than one image, the image file names are displayed with the comma separated values in the format

<File1Size,"File1Name">,<File2Size,"File2Name">.

## Syntax

TEKEXP:INFO? IMAGE (Query)

## Returns

<FileSize>:: <String>

<FileName>:: <String>

## Examples

TEKEXP:INFO? IMAGE command returns the information of the generated image in the format (109058, "X:\<Application Name>\Untitled Session\DUT001\20200916\_041609\Iter1\_Short Record-length for SCOPE Period\_NoSSC\_DIFF.png";22794,"X:\<Application Name>\UntitledSession\DUT001\20200916\_041609\ScopePeriodPlot\_Iteration1WithCursor.png").

## Query the active TekExpress application name

This command queries the active TekExpress application name running on the oscilloscope.

### Syntax

TEKEXP: \*IDN? (Query)

### Returns

<String>

### Examples

TEKEXP: \*IDN? command returns the active TekExpress application name running on the oscilloscope.

## Sets or query the acquire mode status

This command sets or queries the acquire mode status.

### Syntax

TEKEXP: ACQUIRE\_MODE <Mode> (Set)

TEKEXP: ACQUIRE\_MODE? (Query)

### Command arguments

Argument Name	Argument value
<Mode>	<ul style="list-style-type: none"> <li>LIVE</li> <li>PRE-RECORDED</li> </ul>

### Returns

LIVE | PRE-RECORDED

### Examples

TEKEXP: ACQUIRE\_MODE LIVE command sets the acquire mode to the Live mode.

TEKEXP: ACQUIRE\_MODE? command returns the current acquire mode.

## Set or query the execution mode status

This command sets or queries the execution mode status.

### Syntax

TEKEXP: MODE <Mode> (Set)

TEKEXP: MODE? (Query)

### Command arguments

Argument Name	Argument value
<Mode>	<ul style="list-style-type: none"> <li>COMPLIANCE</li> <li>USER-DEFINED</li> </ul>

## Returns

COMPLIANCE | USER-DEFINED

## Examples

TEKEXP:MODE COMPLIANCE command sets the execution mode to the compliance mode.

TEKEXP:MODE? command returns the current execution mode.

## Generate the report for the current session

This command generates the report for the current session.

## Syntax

TEKEXP:REPORT GENERATE(Set)

## Arguments

N/A

## Examples

TEKEXP:REPORT GENERATE command generates the report for the current session.

## Query the value of specified report header field in the report

This command queries the value of specified report header field in the report.

## Syntax

TEKEXP:REPORT? "<Device Field>" (Query)

## Command arguments

Argument Name	Argument Type
<Device Field>  Device field is the header name of each field in the setup information section of the report.	<String>

## Returns

<String>

## Examples

TEKEXP:REPORT? "DUT ID" command returns the value of DUT ID field in the report.

## Query the value of specified result detail available in report summary/details table

This command queries the value of specified result detail available in report summary/details table.

### Syntax

TEKEXP:RESULT? "<TestName>" (Query)

TEKEXP:RESULT? "<TestName>", "<ColumnName>" (Query)

TEKEXP:RESULT? "<TestName>", "<ColumnName>", <RowNumber> (Query)

### Command arguments

Argument Name	Argument Type
<TestName> It is the test name of which the details are required in the report.	<String>
<ColumnName> It is the column header name of which the details are required in the report.	<String>
<RowNumber> It is the row number of which the details are required in the report.	<String>

### Returns

<String>

### Examples

TEKEXP:RESULT? "<TestName>" will return the pass fail status of test.

TEKEXP:RESULT? "<TestName>", "<ColumnName>" will return all the row values of specific column for the test with comma separated values.

TEKEXP:RESULT? "<TestName>", "<ColumnName>", <RowNumber> will return the column value of specified row number.

## Restore the setup to default settings

This command restores the setup to default settings.

### Syntax

TEKEXP:SETUP Default (Set)

### Arguments

N/A

### Examples

TEKEXP:SETUP Default command restores the setup to default settings.

## Save the settings to a specified session

This command saves the settings to a specified session.

### Syntax

```
TEKEXP:SETUP Save, "<SessionName>"
```

### Command arguments

Argument Name	Argument value
<SessionName>	<String>

### Examples

TEKEXP:SETUP Save, "<SessionName>" command saves the settings to a specified session.

## Open the setup from a specified session

This command opens the setup from a specified session.

### Syntax

```
TEKEXP:SETUP Open, "<SessionName>" (Set)
```

### Command arguments

Argument Name	Argument value
<SessionName>	<String>

### Examples

TEKEXP:SETUP Open, "<SessionName>" command opens the setup from a specified session.

## Query the current setup file name

This command queries the current setup file name.

### Syntax

```
TEKEXP:SETUP? CURRENT (Query)
```

### Returns

<String>

### Examples

TEKEXP:SETUP? CURRENT command returns the current setup file name.

## Run/stop/pause/resume the selected measurements execution in the application

This command run/stop/pause/resume the selected measurements execution in the application.

### Syntax

```
TEKEXP:STATE <operation mode> (Set)
```

## Command arguments

Argument Name	Argument value
<operation mode>	<ul style="list-style-type: none"> <li>• RUN</li> <li>• STOP</li> <li>• PAUSE</li> <li>• RESUME</li> </ul>

## Returns

RUN | STOP | PAUSE | RESUME

## Examples

TEKEXP : STATE RUN command runs the execution for the selected measurements.

## Query the current measurement execution status

This command queries the current measurement execution status.

## Syntax

TEKEXP : STATE? (Query)

## Returns

RUNNING | PAUSED | WAIT | ERROR | READY

## Examples

TEKEXP : STATE? command returns the current measurement execution status.

## Query whether the current setup is saved or not saved

This command queries whether the current setup is saved or not saved.

## Syntax

TEKEXP : STATE? SETUP (Query)

## Returns

Saved or Not-Saved

## Examples

TEKEXP : STATE? SETUP command returns whether the current setup is saved or not saved.

## Query the status of the previous command execution

This command queries whether the previous command execution is completed successfully.

## Syntax

TEKEXP : \*OPC? (Query)



## Returns

{0 | 1} or {True | False}

1 or True indicates that command execution is successful.

0 or False indicates that command execution is failed.

## Examples

TEKEXP : \*OPC? command returns whether the previous command operation is completed successfully.

## Query the last error occurred

This command queries the last error occurred.

### Syntax

TEKEXP : LASTERROR? (Query)

### Returns

<String>

### Examples

TEKEXP : LASTERROR? command returns the last error occurred.

## Set or query the popup details

This command sets or queries the popup details.

### Syntax

TEKEXP : POPUP? (Query)

TEKEXP : POPUP "<PopupResponse>" (Set)

### Command arguments

Argument Name	Argument value
<PopupResponse>	<ul style="list-style-type: none"><li>• Yes</li><li>• No</li></ul>

### Returns

The pop-up details return in the following format:

"<Tittle>","<message>","<response1>,<response2>".

Where,

<Tittle> :: <String>

<message> :: <String>

<response1>,<response2> :: <String>

## Examples

TEKEXP:POPUP? command returns the popup details in following format ": "Do you really want to exit TekExpress?";Responses: "Yes, No".

TEKEXP:POPUP "Yes" command sets the popup response to Yes.

## Query the enable or disable status of Continuous run function.

This command queries the enable or disable status of Continuous run function.

### Syntax

TEKEXP:VALUE? GENERAL, "Enable Continuous Run" (Query)

### Returns

{True | False} or {0 | 1}

Where,

1 or True indicates that the continuous run function is enabled.

0 or False indicates that the continuous run function is disabled.

### Examples

TEKEXP:VALUE? GENERAL, "Enable Continuous Run" command returns the enable or disable status of continuous run function.

## Set or query the enable/disable status of Continuous Run function

This command sets or queries the enable/disable status of Continuous Run function.

### Syntax

TEKEXP:VALUE ContinuousRun, "<Value>" (Set)

TEKEXP:VALUE? ContinuousRun (Query)

### Arguments

Argument Name	Argument value
<Value>	{True   False} or {1   0} It represents enabled or disabled. Where, <ul style="list-style-type: none"> <li>• True or 1 - enabled</li> <li>• False or 0 - disabled</li> </ul>

### Returns

{True | False} or {0 | 1}

### Examples

TEKEXP:VALUE? ContinuousRun command returns the enable or disable status of Continuous run function.

TEKEXP:VALUE ContinuousRun, "<Value>" command enable or disable the Continuous run function.

## Set or query the continuous run duration time value

This command sets or queries the continuous run duration time value.

### Syntax

TEKEXP:VALUE? ContinuousRun\_Duration (Query)

TEKEXP:VALUE ContinuousRun\_Duration, "<Value>" (Set)

### Arguments

Argument Name	Argument value
<Value>	Infinite   hh:mm  Infinite sets the radio on button to infinite.  hh:mm sets the continuous run duration to the specified time in hours and minutes. The minimum time duration you can set is 00:30.

### Returns

Infinite | hh:mm

### Examples

TEKEXP:VALUE? ContinuousRun\_Duration command returns the continuous run duration time value.

TEKEXP:VALUE ContinuousRun\_Duration, "<Value>" command sets the continuous run duration time value.

## Set or query the session create option in the continuous run function

This command sets or queries the option for session creation in the continuous run function.

### Syntax

TEKEXP:VALUE? ContinuousRun\_RunSessionOptions (Query)

TEKEXP:VALUE ContinuousRun\_RunSessionOptions, "Value" (Set)

### Arguments

Argument Name	Argument value
<Value>	NewSession   SameSession_ClearResults  NewSession - creates new session for each run.  SameSession_ClearResults - Clears the test results of the current session and starts the test execution. The session results will be added in the same session, by erasing the previous run results.

### Returns

NewSession | SameSession\_ClearResults

## Examples

TEKEXP:VALUE? ContinuousRun\_RunSessionOptions command returns the option for session creation in the continuous run function.

TEKEXP:VALUE ContinuousRun\_RunSessionOptions, "Value" command sets the option for session creation in the continuous run function.

## Set or query the View report after generating option status

This command sets or queries the enable/disable status of the View report after generating function.

### Syntax

TEKEXP:VALUE? GENERAL, "View Report After Generating" (Query)

TEKEXP:VALUE GENERAL, "View Report After Generating", <value> (Set)

### Arguments

Argument Name	Argument value
<Value>	{True   False} or {1   0} It represents enabled or disabled. Where, <ul style="list-style-type: none"> <li>True or 1 - enabled</li> <li>False or 0 - disabled</li> </ul>

### Returns

{True | False} or {0 | 1}

### Examples

TEKEXP:VALUE? GENERAL, "View Report After Generating" command returns the enable or disable status of view report after generating option.

TEKEXP:VALUE GENERAL, "View Report After Generating", <value> command enable or disable the view report after generating option.

## Set or query the waveform file recalled for the specified test name and acquire type

This command set or queries the waveform file recalled for the specified test name and acquire type.

If there are more than one waveform, the waveform file names are displayed with the symbol "\$" separated values in the format

<WaveformFileName1\$ WaveformFileName2>.

### Syntax

TEKEXP:VALUE WFMFILE, <TestName>, <AcquireType>, <WaveformFileName> (Set)

TEKEXP:VALUE? WFMFILE, <TestName>, <AcquireType> (Query)

### Returns

<String>

## Examples

TEKEXP:VALUE WFMFILE, <TestName>, <AcquireType>, <WaveformFileName> command recalls the specified waveform file for the specified testname and acquire type.

TEKEXP:VALUE? WFMFILE, <TestName>, <AcquireType> command returns the waveform file name recalled for the specified testname and acquire type.

## Set or query the enable/disable status of Verbose function

This command sets or queries the enable/disable status of Verbose function.

### Syntax

TEKEXP:VALUE VERBOSE, "<Value>" (Set)

TEKEXP:VALUE? VERBOSE (Query)

### Arguments

Argument Name	Argument value
<Value>	{True   False} or {1   0} It represents enabled or disabled. Where, <ul style="list-style-type: none"> <li>True or 1 - enabled</li> <li>False or 0 - disabled</li> </ul>

### Returns

{True | False} or {0 | 1}

### Examples

TEKEXP:VALUE VERBOSE, "<Value>" command enable or disable the Verbose function.

TEKEXP:VALUE? VERBOSE command returns the enable or disable status of Verbose function.

## Sets or query the limit values in the limits editor window

This command sets or queries the limit values in the limits editor window.

### Syntax

TEKEXP:VALUE LIMIT, <TestName>, <LimitHeader>, <Value1>, <CompareString>, <Value2> (Set)

TEKEXP:VALUE? LIMIT, <TestName>, <LimitHeader> (Query)

### Returns

<String> or <NRf>

### Examples

TEKEXP:VALUE LIMIT, <TestName>, <LimitHeader>, <Value1>, <CompareString>, <Value2> command sets the limits value for the specified testname and limit header.

TEKEXP:VALUE? LIMIT,<TestName>,<LimitHeader> command returns the limits value for the specified testname and limit header.

## Exit or close the application

The command exits or close the application

### Syntax

TEKEXP:EXIT(Set)

### Examples

TEKEXP:EXIT command close the application.

## Examples

This section provides the examples for the SCPI commands.

Example	Description
TEKEXP:*IDN?	It returns the active TekExpress application name running on the scope.
TEKEXP:*OPC?	It returns the last command execution status, if status is executed it returns "1" else "0".
TEKEXP:SELECT TEST	+ ParameterName+ "," + value
TEKEXP:ACQUIRE_MODE PRE-RECORDED	It sets the acquire mode as pre-recorded.
TEKEXP:ACQUIRE_MODE?	It returns LIVE when acquire mode is set to live or it returns pre-recorded when acquire mode is set to pre-recorded.
TEKEXP:EXPORT REPORT	It returns the report file in bytes. This can be written into another file for further analysis.
TEKEXP:INFO? REPORT	It returns "100,"ReportFileName.mht", when 100 is the file size in bytes for the filename ReportFileName.
TEKEXP:INFO? WFM	It returns "100,"WfmFileName1.wfm";"200, "WfmFileName2.wfm"" when 100 is the filesize in bytes for the filename WfmFileName1.wfm and 200 is the file size in bytes for the filename WfmFileName2.wfm.
TEKEXP:INSTRUMENT "Real Time Scope",DPO73304SX ( GPIB8::1::INSTR)	It sets the instrument value as DPO73304SX( GPIB8::1::INSTR ) for the selected instrument type Real Time Scope.
TEKEXP:INSTRUMENT? "Real Time Scope"	It returns "DPO73304SX ( GPIB8::1::INSTR ), when DPO73304SX ( GPIB8::1::INSTR )" is the selected instrument for the instrument type Real Time Scope.
TEKEXP:LASTERROR?	It returns ERROR: INSTRUMENT_NOT_FOUND, when no instrument is found.
TEKEXP:LIST? DEVICE	It returns "USB4" when TX-Device, RXDevice are the available device.
TEKEXP:LIST? INSTRUMENT,"Real Time Scope"	It returns "DPO73304SX ( GPIB8::1::INSTR ), DPO73304DX ( TCPIP::134.64.248.91::INSTR )" when DPO73304SX ( GPIB8::1::INSTR ), DPO73304DX ( TCPIP::134.64.248.91::INSTR ) are the list of available instruments.
TEKEXP:MODE COMPLIANCE	It sets the execution mode as compliance.
TEKEXP:MODE?	It returns COMPLIANCE when the execution mode is compliance or It returns USER-DEFINED when the execution mode is user defined.
TEKEXP:POPOP OK	It sets OK as the response to active popup in the application.

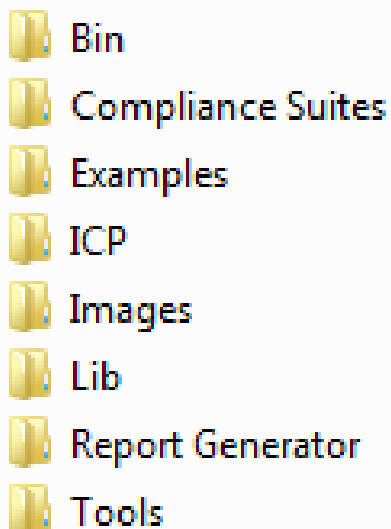
Table continued...

Example	Description
TEKEXP:POPOP?	It returns "OK", when OK is the active popup information shown in the application.
TEKEXP:REPORT GENERATE	It generates report for the current session.
TEKEXP:REPORT? "Scope Model Number"	Returns "DPO73304SX" when DPO73304SX is the scope model.
TEKEXP:REPORT? DUT ID	It returns "DUT001" when DNI_DUT001 is the DUT ID.
TEKEXP:RESULT? "Total Jitter"	It returns Pass when the test result is Pass.
TEKEXP:RESULT? "Total Jitter",1	It returns the 2nd Sub measurements Margin L and H values.
TEKEXP:SELECT DEVICE, USB4, TRUE	It selects USB4.
TEKEXP:SELECT? DEVICE	It returns USB4
TEKEXP:SETUP DEFAULT	It restores the application to default setup.
TEKEXP:STATE STOP	It stops the test execution.
TEKEXP:STATE?	It returns as READY when the application is ready to run next measurement.
TEKEXP:STATE? SETUP	It returns as NOT_SAVED when the current setup is not saved else it returns SAVED.
TEKEXP:VALUE GENERAL, "Test Method", "DPOJET"	It sets the Test Method parameter value to DPOJET.
TEKEXP:VALUE? GENERAL, "Test Method"	It returns "DPOJET" when DPOJET is the Test Method value.
TEKEXP:SELECT TEST , "Total Jitter", True	Execute this command to select an individual test. This command will select "Total Jitter" test in the Signal Test tab.

# References

## Application directories

You can find the application files at `C:\Program Files\Tektronix\<Application Name>`. The application directory and associated files are organized as follows:



The following table lists the default directory names and their usage:

**Table 17: Application directories and usage**

Directory names	Usage
Bin	Contains application libraries
Compliance Suites	Contains test suite specific files
Examples	Contains various support files
ICP	Contains instrument and application specific interface libraries
Images	Contains images of the application
Lib	Contains utility files specific to the application
Report Generator	Contains style sheets for report generation
Tools	Contains instrument and application specific files



## File name extensions

The TekExpress <Application Name> software uses the following file name extensions:

**Table 18: File name extension**

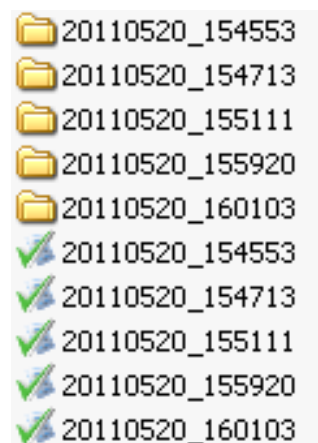
File name extension	Description
*.TekX	Application session files (the extensions may not be displayed)
*.py	Python sequence file.
*.xml	Test-specific configuration information (encrypted) files. Application log files
*.csv	Test result reports Plot data
*.mht	Test result reports (default) Test reports can also be saved in HTML format
*.pdf	Test result reports Application help document
*.xslt	Style sheet used to generate reports
*.png	Captured images

## View test-related files

Files related to tests are stored in My Documents\<Application Name>\Untitled session folder. Each test setup in this folder has both a test setup file and a test setup folder, both with the test setup name. The test setup file is preceded by the TekExpress icon.

Inside the test setup folder is another folder named for the DUT ID used in the test sessions. The default is DUT001.

Inside the DUT001 folder are the session folders and files. Each session also has a folder and file pair, both named for the test session using the naming convention (date)\_(time). Each session file is stored outside its matching session folder:



Each session folder contains image files of any plots generated from running the test session. If you selected to save all waveforms or ran tests using prerecorded waveform files, these are included here.

The first time you run a new, unsaved session, the session files are stored in the Untitled Session folder located at X: \<Application Name>. When you name and save the session, the files are placed in a folder with the name that you specify. A copy of the test files stay in the Untitled Session folder until you run a new test or until you close the application.

## Parameters

### About application parameters

This section describes the 100G-TXE application parameters, and includes the default menu settings.

The parameters for the menus, and options list the selections available for each and include the default values.

### Setup panel configuration parameters

#### DUT tab parameters

Parameters		Selection	Default Setting
DUTID		-	DUT001
Mode		Compliance, User defined	Compliance
Standard		CAUI4, KR4, CR4	CAUI4
Test Points	for CAUI4	TP1a, TP4	TP1a
	for KR4	TP0a	TP0a
	for KR4	TP2	TP2
Device Profile			
Data Rate		18 GBd to 28.05 Gbps	25.78125 Gbps
Pattern Type		PRBS7, PRBS9, PRBS11, PRBS15	PRBS9
Source		Differential, Single Ended	Single Ended
Crosstalk Source		Select, De-select	De-select

## Test Selection tab parameters

Parameters	Selection	Default Setting
CAUI4 Tx	<ul style="list-style-type: none"> <li>DC Common Mode Output Voltage</li> <li>Diff Peak to Peak Output Voltage Tx Disabled</li> <li>Diff Peak to Peak Output Voltage Tx Enabled</li> <li>AC Common Mode Output Voltage</li> <li>Single Ended Output Voltage</li> <li>Signaling Rate</li> <li>Transition Time</li> <li>Eye Width</li> <li>Eye Height Differential</li> </ul>	All measurements selected
KR4 Tx and CR4 Tx	<ul style="list-style-type: none"> <li>DC Common Mode Output Voltage</li> <li>Diff Peak to Peak Output Voltage -Tx Disabled</li> <li>Diff Peak to Peak Output Voltage -Tx Enabled</li> <li>AC Common Mode Output Voltage</li> <li>Single Ended Output Voltage</li> <li>Signaling Rate</li> <li>Linear Fit Pulse Peak</li> <li>Minimum Pre-cursor full scale ratio</li> <li>Minimum Post-cursor full scale ratio</li> <li>Normalized Coefficient Step Size</li> <li>Coefficient Initialization Ratio</li> <li>Signal To Noise And Distortion Ratio</li> <li>Steady State Voltage</li> <li>Even-Odd Jitter Peak to Peak</li> <li>Effective total uncorrelated jitter peak to peak</li> <li>Effective bounded uncorrelated jitter peak to peak</li> </ul>	All measurements selected

## Configuration tab parameters

Table 19: Global settings parameters

Parameters	Selection	Default Setting
Ref Levels		
Absolute, Percentage	Absolute, Percentage	Percentage

Table continued...

Parameters	Selection	Default Setting
Mid Level	-10 mV to 10 mV	0 mV, 50%
Hysteresis	0 mV to 5 mV	2 mV, 5%,
Bandwidth	Full BW, 50 GHz	Full BW
Record Length for Jitter measurements	20M, 30M, 40M	40 M
De-embedding Filter	Select, De-select	De-select

**Table 20: Measurement parameters**

Parameters				Selection	Default Setting
CAUI4 Tx	Transition Time	Analyze	Measurement Range	20%-80%, 10%-90%	20%-80%

**Preferences tab parameters**

Parameters	Selection	Default Setting
Acquire/Analyze each test X times	1 to 100	1
Auto close Warnings and Information during Sequencing	1 to 300	10
Auto close after X Seconds		
Auto close Error Messages during Sequencing, Show in Reports	1 to 300	10
Auto close after X Seconds		

**Reports panel parameters**

Parameters	Selection	Default Setting
Report name	-	X:\100G-TXE\Reports\DUT001.mht
Save as Type	PDF (*.pdf;), Web Archive (*.mht; *.mhtml), CSV (*.csv;)	Web Archive (*.mht; *.mhtml)

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