TekExpress[®] 10G-KR Compliance, Debug and Protocol Decode Solution Printable Online Help





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TekExpress 10G-KR Compliance and Debug Solution Online Help, 076-0279-01.

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- In North America, call 1-800-833-9200.
- = Worldwide, visit <u>www.tektronix.com</u> to find contacts in your area.

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Related documentation

The following manuals are available as part of the TekExpress 10G-KR Compliance and Debug Solution documentation set.

Table 1: Product documentation



See also

Technical support (see page 2)

Conventions used in help

Online Help uses the following conventions:

- The term "DUT" is an abbreviation for Device Under Test.
- The term "select" is a generic term that applies to the two mechanical methods of choosing an option: using a mouse or using the touch screen.

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 <u>Contacting Tektronix</u> for more 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
- Probes used
- Vour 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
- If possible, save the waveform on which you are performing the measurement as a .wfm file

Install the software

The software can be installed on any compatible instrument running Windows XP or Windows 7 (64-bit). See <u>Minimum System Requirements (see page 8)</u> for details.

- 1. Close all applications (including the TekScope application).
- 2. Go to the www.tek.com Web site and search for 10G-KR to locate the installation file. Download the file 10G-KRWebInstaller.exe.
- 3. Double-click the executable file to extract the installation files.

After extraction, the installer launches and displays the InstallShield Wizard.

- Check **DPOJET Plug-In** to install the 10G-KR option plug-in to the TekScope DPOJET application.
- Check TekExpress application for 10G-KR to install the TekExpress 10G-KR application.

TekExpress 10G-KR - InstallShie	ld Wizard	
Select Options Select the options you want coinsta		6
	To install a feature, click the check box next to it. If the check box is clear, that feature will no be installed.	ıt
	DPOJET Plug-In TekExpress application for 10G-KR	
	Tektroni	x
InstaliShield	< Back Next > Cancel	

- 4. The software installs in the following location:
 - Windows 7 location: C:\Program Files (x86)\Tektronix\TekExpress\TekExpress 10G-KR
 - Windows XP location: C:\Program Files\Tektronix\TekExpress\TekExpress 10G-KR
- 5. The installer updates the TekScope Analyze menu to include the installed options.



See also

<u>Minimum system requirements (see page 8)</u> <u>Compatibility (see page 7)</u> DPOJET option 10G-KR plug-in (see page 108)

Activate the license

The 10G-KR application runs in Evaluation mode if you do not provide a valid license key. You are allowed 10 free trials in Evaluation mode. Each time you open the application without supplying a valid license key, one free trial is used.

Activate the license using the Option Installation wizard on the oscilloscope. Instructions for using the Options Installation window to activate licenses for installed applications is provided in the oscilloscope online Help:

1. From the oscilloscope menu bar, click Utilities > Option Installation.

The TekScope Option Installation wizard opens.

2. Press the F1 key on the oscilloscope keyboard to open the Option Installation help topic. Follow the directions in the topic to activate the license.

See also

View version and license information (see page 6)

View software version and license information

Use the following instructions to view version information for the application and for the application modules such as the Programmatic Interface and the Programmatic Interface Client.

To view version information:

1. From the Options menu, select About TekExpress.



2. Click the View Version Details link to check the version numbers of the installed test suites.



To view license information:

1. From the oscilloscope Help menu, select About TekScope.

The Options section in the dialog box displays a list of installed options, including 10G-KR.

2. To view the Option key, look in the Option installation key section.

See also

Activate the license (see page 4) Options menu (see page 14)

10G-KR features and benefits

Welcome to the TekExpress® 10G-KR Transmitter Automated Solution application. 10G-KR provides an automated, simple, and efficient way to test 10G-KR Transmitter interfaces and devices consistent to the requirements of the IEEE 802.3ap-2007 specifications.

10G-KR is based on TekExpress version 2, the Tektronix Test Automation Framework, developed to support your current and future test automation needs. TekExpress uses a highly modular architecture that lets you deploy automated test solutions for various standards.

- Automates compliance measurements for IEEE 802.3ap-2007 specifications
- Automated test setup for measuring transmitter equalization levels generating 72 results, 12 results for each tap
- Provides both an automation solution (for compliance) and DPOJET (for debug)
- RF switch support for four lanes of KR4
- Reduces the time required to conduct testing
- Minimizes user intervention when conducting time-consuming testing
- Provision for entering filter files to de-embed the effects of backplane traces and any other components in the signal pathway
- Performs fully-automated testing for transmitter measurements
- Allows you to select individual tests or test groups in the tree-structure
- Built-in reporting features
 - Provides a Pass/Fail summary table
 - Provides margin details on each test
 - Provides a consolidated report for all tests
- Complete programmatic interface available; users can call 10G-KR functions using their automation scripts

Supported oscilloscopes

The TekExpress 10G-KR application runs on the following Tektronix oscilloscopes:

- DPO/DSA/MSO71604/B/C Series Digital Oscilloscopes
- DPO/DSA/MSO72004/B/C Series Digital Oscilloscopes
- DPO/DSA72504D and DPO/DSA73304D Series Digital Oscilloscopes

See also

Minimum system requirements (see page 8)

Minimum system requirements

The following table shows the minimum system requirements needed for an oscilloscope to run TekExpress.

Table 2: System requirements

Oscilloscope	See Supported oscilloscopes (see page 7)
Processor	Same as the oscilloscope
Operating System	Same as the oscilloscope:
	 Windows 7 (64-bit only)
	Windows XP (32-bit) SP2 and higher
Memory	Same as the oscilloscope
Hard Disk	Same as the oscilloscope
Display	Same as the oscilloscope ¹
Firmware	TekScope 5.3.4 (Windows XP)
	TekScope 6.1.4 and later (Windows 7)

Software	 DPOJET, Jitter and Eye Diagram Analysis Tool, 3.4.0.17 or later
	National Instruments LabVIEW Run-time Engine 9.0.1 or later
	National Instruments TestStand Engine 4.2.1
	Microsoft .NET 4.0 Framework
	Microsoft Excel 2002 or above
	 Microsoft Internet Explorer 6.0 SP1 or later
	 Microsoft Photo Editor 3.0 or equivalent software for viewing image files
	Adobe Reader 7.0 or equivalent software for viewing portable document format (PDF) files
Other Devices	 Microsoft compatible mouse or compatible pointing device
	 Four USB ports (two USB ports minimum)
	 PCI-GPIB or equivalent interface for instrument connectivity²

Table 2: System requirements (cont.)

1 If TekExpress is running on an instrument having a video resolution lower than 800x600 (for example, a sampling oscilloscope), it is recommended that you connect a secondary monitor, which must be enabled before launching the application.

If TekExpress is installed on a Tektronix oscilloscope, TekExpress will use the virtual GPIB port for communicating with oscilloscope applications. If external GPIB communication devices such as USB-GPIB-HS or equivalent are used for instrument connectivity, make sure that the Talker Listener utility is enabled in the GPIB menu of the DPO/DSA oscilloscope. For ease of use, connect to an external (secondary) monitor.

User Account Control

On Windows 7 instruments, set User Account Control Settings to Never Notify. To set User Account Control Settings, go to Control Panel > User Accounts > Change User Account Control settings and set it to Never Notify as shown in the image.

User Account Control Settings Choose when to b User Account Control h [Tell me more about Use	e notified about changes to your computer elps prevent potentially harmful programs from making changes to r Account Control setting	o your computer.
Always notify		
- [-	Never notify me when:	
	 Programs try to install software or make changes to my computer I make changes to Windows settings 	
	1 Not recommended. Choose this only if you need to use programs that are not certified for Windows 7 because they do not support User Account Control.	
Never notify		
		Canad

See also

Supported oscilloscopes (see page 7)

Application directories and usage

The application directory and associated files are organized as follows:

ACP
 Bin
 Compliance Suites
 Data Manager
 Data Storage
 Documents
 Examples
 ICP
 Lib
 Report Generator
 SCP
 Tools

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

Table 3: Application directories and usage

Directory names	Usage
InstallDir\TekExpress\TekExpress 10G-KR	Contains the application and associated files
TekExpress 10G-KR\ACP	Contains instrument and 10G-KR application-specific interface libraries
TekExpress 10G-KR\Bin	Contains miscellaneous 10G-KR application libraries
TekExpress 10G-KR\Compliance Suites	Contains compliance-specific files
TekExpress 10G-KR\Data Manager	Contains result management-specific libraries of the 10G-KR application
TekExpress 10G-KR\Data Storage	Contains libraries needed for storing data
TekExpress 10G-KR\Documents	Contains the technical documentation for the 10G-KR application
TekExpress 10G-KR\Examples	Contains various support files
TekExpress 10G-KR\ICP	Contains instrument and 10G-KR application-specific interface libraries
TekExpress 10G-KR\Lib	Contains utility files specific to the 10G-KR application
TekExpress 10G-KR\Report Generator	Contains Excel Active X interface Library for Report Generation
TekExpress 10G-KR\SCP	Contains instrument and 10G-KR application-specific interface libraries
TekExpress 10G-KR\Tools	Contains instrument and 10G-KR application-specific files

See also

View test-related files (see page 37) File name extensions (see page 12)

File name extensions

The TekExpress 10G-KR application uses the following file name extensions:

File name extension	Description
.TekX	Session files are saved in this format but the extensions may not be displayed.
.seq	The test sequence file
.xml	The encrypted XML file that contains the test-specific configuration information
	The log file extension is also xml
.wfm	The test waveform file
.mht	Test result reports are saved in this format by default. Test reports can also be saved in HTML format (see page 38).
.flt	The filter files.

See also

Select report options (see page 38) View test-related files (see page 37) Application directories and usage (see page 10) Before you click start (see page 49)

Run the application

To run the 10G-KR application, do either of the following:

- Select Analyze > TekExpress 10G-KR from the TekScope menu.
- Double-click any saved 10G-KR session file.

When you open the application after installation, the application checks for a file called Resources.xml located in the My TekExpress folder. If this file is not found, instrument discovery is performed before launching 10G-KR. The Resources.xml file contains information regarding instruments that are available on your network.

If the application license was not installed using the TekScope menu Utilities > Option Installation selection, you can open the application up to 10 times in evaluation mode. Each time you open the application without supplying a valid license key, one of the free trials is used.

To keep the application window on top, select Keep On Top from the Options menu (see page 14).

NOTE. If the application was not terminated properly during the last use, a dialog box asks to recall the previously unsaved session.

See also

Activate the license (see page 4)

Exit the application

Use the following method to exit the application:

NOTE. Using other methods to exit the application results in abnormal termination of the application.

1. Click On the application title bar.

- **2.** Do one of the following:
 - If you have an unsaved session or test setup open, you will be asked to save it before exiting. To save it, click Yes. Otherwise click No. The application closes.
 - A message box appears asking if you really want to exit TekExpress. To exit, click Yes.

Application controls

Table 4:	Application	controls	descriptions
----------	-------------	----------	--------------

Item	Description
Options menu (see page 14)	Opens the Options menu for access to global controls
Panels (see page 21)	Visual frames with sets of related options
Command buttons	Buttons that initiate an immediate action such as the Start, Stop, Pause, Continue, and Clear command buttons
Start button	Start
	Use the Start button to continuously acquire and accumulate measurements. If prior acquired measurements have not been cleared, the new measurements are added to the existing set.
Stop button	Stop
	Use the Stop button to abort the test.
Pause \ Continue button	Pause Continue
	Use the Pause button to temporarily interrupt the current acquisition. When a test is paused, the button name changes to "Continue."
Clear button	Clear
	Use the Clear 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 the <u>Results panel (see page 35)</u> .
Application window move icon	Tek
	Place the cursor over the three-dot pattern in the upper left corner of the application window. When the cursor changes to a hand, drag the window to the desired location.

Options menu overview

The Options menu is located in the upper right corner of the application.

The Options menu (see page 15) has the following selections:

Menu	Function
Default Test Setup	Opens an untitled test setup with defaults selected
Open Test Setup	Opens a saved test setup
Save Test Setup	Saves the current test setup selections
Save Test Setup As	Creates a new test setup based on an existing one
Open Recent	Displays a menu of recently opened test setups to select from
Instrument Control Settings (see page 16)	Shows the list of instruments connected to the test setup and allows you to locate and refresh connections to those instruments
Keep On Top	Keeps the TekExpress 10G-KR utility on top of other open windows on the desktop
Email Settings (see page 16)	Use to configure email options for test run and results notifications
Deskew (see page 107)	Use to deskew channels
Help	Displays TekExpress Help
About TekExpress	 Displays application details such as software name, version number, and copyright
	Provides access to <u>license information (see page 6)</u> for your 10G-KR installation

Provides a link to the Tektronix Web site

0	otions menu
0	ptions
	Default Test Setup
	Open Test Setup
	Save Test Setup
	Save Test Setup As
	Open Recent +
	Instrument Control Settings
	Keep On Top
	Email Settings
	Deskew
	Help
	About TekExpress

See also

Application controls (see page 14)

Instrument control settings

Use the TekExpress Instrument Control Settings dialog box to search for and list the connected resources (instruments) found on specified connections (LAN, GPIB, USB, and so on) and each instruments connection information. You access this dialog box from the Options menu.

LAN	🗸 GPIB	Serial	Non - VISA Res	ources	
TekLink	USB	🗖 vxi		Ret	TekVISA 300 Timeout
Retrieved In	strumen	ts (1)			
Connectio	n	Resource	Serial No	Options	Resource Addr
VISA-GPIB		DP072004C	B130233	20XL	

Use the Instrument Control Settings feature to <u>search for connected instruments (see page 46)</u> and view instrument connection details. Connected instruments displayed here can be selected for use under Global Settings in the test configuration section. See step 2 of <u>Configure tests (see page 30)</u> for details.

See also

Options menu overview (see page 14)

Email settings

Use the Email Settings utility to <u>configure email notifications (see page 17)</u> if you want to receive notifications when a test completes, produces an error, or fails. Select the type of test session information to include in the notification, such as test reports and test logs, the email message format, and the email message size limit.

NOTE. Recipient email address, sender's address, and SMTP Server are mandatory fields.

Email Settings	
Recipient e-mail Address(es)	
Note: Separate Email ad	ldresses with a comma
Sender's Address	
Email Attachments	Server Configuration
Reports	SMTP Server SMTP Port
ScoreCard	Login
Analysis Screenshot	Password
Status Log 💿 Last 20 Lines OFull Log	Host Name
Email Configuration	
Email Format 💿 HTML 💛 Plain Text	Number of Attempts to Send 1
Max Email Size (MB) 5	Timeout
	Test Email Apply Close
Email Test Results When complete or on error	

See also

<u>Configure email settings (see page 17)</u> <u>Options menu (see page 14)</u> Select test notification preferences (see page 29)

Configure email settings

To be notified by email when a test completes, fails, or produces an error, configure the email settings.

- 1. Options > Email Settings to open the Email Settings (see page 19) dialog box.
- 2. (Required) For Recipient email Address(es), enter one or more email addresses to which to send the test notification. 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 used. For example: DPO72016C_B130099@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:
 - Select the message file format to send: HTML (the default) or plain text.
 - 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.

Recipient e-mail Address(es)					1
	Note: Separate Email a	ddresses with a con	ima		
Sender's Address					
Email Attachments		Server Con	figuration		
✓ Reports		SMTP Server	smtpserver.tek.com	SMTP Port	
ScoreCard		Login			
Analysis Screenshot		Password			
Status Log OLast 20 Line	is 💽 Full Log	Host Name			
mail Configuration					
mail Format 💿 HTML	Plain Text	Number of Atten	npts to Send 1		
fax Email Size (MB) 5		Timeout			

Deskew

The Deskew utility reads the instrument configuration and channel deskew settings from the connected oscilloscope and stores them in a file. When you run a test (click the Start button), TekExpress 10G-KR resets the oscilloscope to the factory default settings, loads the instrument configuration and channel deskew settings with the saved values, and then starts running the test session. This is to make sure that the instrument is set to a known state before each test run.

NOTE. Make sure that you run the Deskew utility after you have finalized the DUT setup, oscilloscope settings, and channel deskew values, and before you run compliance tests with that test configuration. See your oscilloscope user documentation or online help for information on channel deskew procedures.

NOTE. You will need to run the Deskew utility whenever you change the oscilloscope settings or channel deskew values for a test setup.

NOTE. *TekExpress 10G-KR does not verify that the saved oscilloscope settings and deskew values are applicable to the current instrument attached to the application.*



- 1. In the TekExpress Thunderbolt application, select **Options > Deskew**.
- 2. Select the level sensitive deskew setting:
 - Less than 100 mV Vertical Scale: Select this if the oscilloscope vertical setting is less than 100 mV/division for the signal you are measuring.
 - **100 mV or greater Vertical Scale**: Select this if the oscilloscope vertical setting is greater than 100 mV/division for the signal you are measuring.
- 3. Click Read Deskew/Attn. The utility stores the instrument settings and deskew settings as follows:
 - <100 mV: C:\Program Files\Tektronix\TekExpress\TekExpress 10G-KR\ICP\Deskew-Attenuation.txt
 - = ≥100 mV: C:\Program Files\Tektronix\TekExpress\TekExpress 10G-KR\ICP\Deskew-Attenuation-GE100mV.txt
- 4. When the status in the dialog box indicates the deskew is finished, click Close.

Application panel overview

Panels group related configuration, test, and results settings.

The TekExpress 10G-KR panels are:

Table 5: Application panels

Panel Name	Purpose
Setup (see page 21)	Set the DUT, test, acquisition, and report parameters. The Setup panel allows you to configure the test setup. Use
	this panel to:
	Select device parameters (see page 22).
	Select the test(s) (see page 25).
	Select acquisitions parameters (see page 28) for selected tests.
	Configure the selected tests (see page 30)
	Select test notification preferences (see page 29).
Status (see page 33)	View the progress and analysis status of the selected tests, and view test logs.
Results (see page 35)	View a summary of test results and select result viewing preferences.
Reports (see page 37)	Browse for reports, save reports as specific file types, specify report naming conventions, select report content to include (such as summary information, detailed information, user comments, setup configuration, application configuration), and select report viewing options.

See also

Application controls (see page 14) about setting up tests (see page 43)

Setup panel overview

The <u>Setup panel (see page 22)</u> contains sequentially ordered tabs that help guide you through a typical test setup process.

Set the DUT parameters. (see page 22)

Select test(s). (see page 25)

Set lane acquisition source.

Select acquisitions (see page 28)

Configure tests (see page 30)

Select test notification preferences (see page 29)

		Start
Setup 1 DUT	DUTID DUT001	
2 Test Selection	• Acquire live waveforms • O Use pre-recorded waveform files	
Status 2 Test Selection	View Advanced	Dause
3 Acquisitions	DUT Type	
tesuits	🔵 10GBase-KR 📀 40GBase-KR4	
eports 4 Configuration		
	Number of Lanes to Test	
	1 Lane	
	Selected Test Lanes Setup	
	LaneO	

Set DUT parameters

Use the <u>Setup panel (see page 22)</u> DUT tab to select parameters for the device under test. The settings are global and apply to all tests for the current session. DUT settings also affect the list of available tests in the Test Selection tab.

- 1. Click Setup > DUT.
- **2.** (Optional) Enter the ID for the device. The default value is DUT001. The DUT ID parameter is added to reports.
- **3.** (Optional) To add comments to the test report, click the note pad icon () to the right of the DUT ID field. Enter comment text up to 256 characters. To enable or disable comments appearing on the test report, see Select report options (see page 38).)
- 4. Select from the following parameters. Settings that do not apply to compliance testing cannot be changed and are grayed out.

Table 6: DUT tab settings

Setting	Description	
Acquire live waveforms	Acquire active signals from the oscilloscope for testing.	
Use pre-recorded waveform files	Run tests on a saved run session file. Select a run session file from the list.	
View	Determines where to access the test configuration settings:	
	 Compliance: View configuration settings by clicking Setup > Test Selection > Configure 	
	 Advanced: Enables the Setup > Configuration tab in which to view configuration settings. 	
DUT Type	Select the device type.	
	10GBase-KR: used for single lane devices	
	 40GBase-KR4: used for multilane devices (up to four lanes). 	
The following selections are displayed when	the DUT Type is set to 40GBase-KR4.	

Description		
Select the desired number of test lanes to use for this test session. The lanes shown here determines the number of test lanes you can select.		
lays the test lanes selected for the test session.		
Setup to change lanes selected for testing.		
a. In the Test Lane Setup dialog box, select the desired number of lanes from the Link Width drop-down list.		
b. To select the lanes to use, click the corresponding lane buttons:		
 To select both lanes at once, click Select All. If you select this, select 2 Lanes from the Number of Lanes to Test drop-down list. 		
 To deselect all selected lanes, click Deselect All. 		
 If you select 1 Lane, select the Lane0 button. 		
 If you select 2 Lanes, select Lane0 and Lane1. 		
c. Click OK. selections display in the Link Width section of the DUT		
Select All Cancel OK		
Sel		

Table 6: DUT tab settings (cont.)

About setting up tests (see page 43) Select a test (see page 25)

Select tests

Use the Test Selection tab to select the tests to run on the connected DUT.

- 1. Click Setup > Test Selection.
- **2.** Select the test(s) to run:
 - Click one or more check boxes adjacent to each test.
 - Click **Deselect All** to deselect all tests. All tests are selected by default.
 - Click Select Required to select all tests that are required for compliance.
 - Click Select All to select all tests.
 - To select an entire test group, select the check box for the test group; tests listed under the group are automatically selected.
 - To select one or more, but not all, tests in a test group, select only the check boxes for the desired tests.

Test selection controls

Table 7: Setup panel test controls

Button	Description	
Configure	When the View type selected in the DUT tab is Compliance, this button opens the configuration section for the selected test. If the View type is Advanced, this button is not displayed.	
Schematic	Displays the schematic document for the selected test. Use to verify the test setup before running the test	
Deselect	Deselects all tests in the table	
Select Required	Selects tests required for compliance and deselects all other tests currently selected	
Select All	Selects all tests in the table	

See also

Select acquisitions (see page 28) About setting up tests (see page 43)

About acquisitions

Use the Acquisition tab in the Setup panel to view acquisition parameters for the tests. Options available on this tab depend on whether you selected to Acquire live waveforms or Use pre-recorded waveform files in the Setup > DUT tab.

When using pre-recorded waveform files, there are no acquisition selections to make. You can only select the source of the pre-recorded waveform file for each test.

	Spec: 10G Base-KR-IEEE 802.3ap, 40G Base-KR4-IEEE 802.3ba			
	Test Name Acquisition	WaveForm FileName		
Test Selection	Test 72.7.1.3_Signaling sp			
	Test 72.7.1.4_Differential p Lane0 : Pseudo-random p			
	Test 72.7.1.8_Max output jir			
3 Acquisitions	Test 72.7.1.4_Common-m Lane0 : Pseudo-random p	-		
Ī	Test 72.6.5_Differential pe: Lane0 : Pseudo-random p	-		
4 Preferences	Test 72.7.1.10_Transmitter	-		
	Test 72.7.1.7_Transition tir			
	Test 72.7.1.11b_Output wa Lane0 : Square pattern-Ou	-		
	Test 72.7.1.11a_Output wa Lane0 : Square pattern-Ou			

When acquiring live waveforms, the acquisition selections become available.

UT	Spec: 10G Base-KR-IEEE 802.3ap, 40G Base-KR4-IEEE 802.3ba			
Test Selection	Automate with RF Switch Setup			
	Lane Source Lane Source Refr	esh View Drobes		
3 Acquisitions	Lane0 CH1 Lane1 CH2	riones		
4 Preferences				
	Test Name Acquisition			
	Test 72 7 1 3 Signaling speed			
	Test 72 7.1.4 Differential neak-to-neak (Lanel) : Pseudo-ra	ndom nattern		
	Test 72 7 1 8 Max output litter (neak-ne:			
	Test 72 7 1 3 Signaling sheed			
	Test 72.7.1.3_Signaling speed			
	Test 72.7.1.4_Differential peak-to-peak (Lane1 : Pseudo-random pattern			
	Test 72.7.1.0_Max output liter (peak-per	ndom nottorn Com		
	Test 72.7.1.4_Common mode voltage in Lanco : P seddo-ra	ndom pattern-Com		
	Test 72.7.1.4_Common-mode voltage in Lane1 : Pseudo-ra	ndom pattern-Com		
		>		
	Acquisition and Save Options	Acquire Parameters		
	Save All Waveforms Before Analysis			
	Analyze Immediately - No Waveforms Saved			
	Signal Vali	dation		
	Prompt n	ne if signal f 🔻		

The top section of the Acquisitions tab is the source selection area. Here is where you assign the oscilloscope channels to the lanes.

The selections change depending on previous selections.

For example, The number of lanes displayed to assign to source channels changes depending on the Number of Lanes to Test selection made in the **Setup > DUT** tab.

If you are using an RF Switch setup, check the Automate with RF Switch check box. When checked, the lane assignments are removed and the RF Switch **Setup** button is enabled. Pressing the Setup button displays the <u>RF Switch setup (see page 27)</u> window. The RF Switch Setup allows you to map the lanes to the RF switch.



See also

Set acquisition parameters source (see page 28)

Set acquisition parameters source

Use the Acquisitions tab to set the signal source (channel) used to acquire data.

- 1. Click Setup > Acquisitions.
- 2. If you selected to use a pre-recorded waveform file, in the Acquisitions table, scroll to the Waveform FileName column. For each acquire type row, click the ellipsis button () and select the desired waveform file or files.
- **3.** If you selected to use live waveforms and no RF switch automation, then the **Lane** and **Source** selection tables are displayed near the top of the tab. The number of Lane and Source selections displayed depend on whether testing a 10GBase-KR or 40GBase-KR interface and the number of lanes selected for testing in the **Setup > DUT** tab.
 - To see which probes are connected to which channels, click View Probes.
 - To refresh the probe configuration information displayed after changing any probes, click View Probes and then click Refresh in the Probe Configuration dialog box.
 - To change a lane source, click in the Source column and select a channel from the drop-down list.
 - Click the **Refresh Sources** button to refresh the probe configuration. (This button performs the same function as the Refresh button in the View Probes dialog box.)
- 4. If you selected to use live waveforms with RF switch automation (checked the Automate with RF Switch check box), the Setup button will become active and the Lane and Source selection tables are removed. Map the lanes to the relay locations.
 - **a.** Click the Setup button.
 - b. In the RF Switch Setup dialog box, map the lanes to the Relay locations and then click OK.
- 5. Select an Acquisition and Save Options to determine the order in which waveforms are acquired and analyzed.
 - Select Save All Waveforms Before Analysis to save all acquired waveforms before analysis begins.
 - Select Analyze Immediately No Waveform Saved to perform an analysis without saving the waveform.
 - Select **Save and Analyze Acquisition in Sequence** to determine the order of acquisition and analysis during the test execution.
- 6. Select Show Acquire Parameters to show the acquisition parameters in the test list.
- 7. Select Acquire Step By Step to have the software prompt you to continue after each phase of the test completes.
- 8. Select a Signal Validation parameter:
 - Select Prompt me if signal fails to open a dialog box when the application fails to acquire a valid signal. Select one of the three options in the dialog box:
 - **Re-Acquire**: The application attempts to re-acquire the signal.
 - **Use Anyway:** Use the acquired signal for all applicable tests.
 - Skip Test: Skip (ignore) any test(s) that depend on this acquisition. Skipped tests are listed in the status panel and in the report.
 - Select Skip test if signal fails to automatically skip tests that use a particular signal if the signal validation fails. Skipped tests are listed in the status panel and in the report.
 - Select Use signal as is Don't Check to skip signal validation and use the signal as-is for testing. The test results may not be as expected.

See also

Select acquisitions (see page 28) About setting up tests (see page 43)

Set test notification preferences

Use the Preferences tab to set the application to send an email when a test measurement completes:

- 1. Click Setup > Preferences.
- 2. Select **Highlight yellow warning if measured value is within [xx}% of limit** check box to display a yellow warning if the measured value is within the percent of limit value.

If you select this option, enter the margin limit value.

3. Select the On Test Failure, send me an email check box to receive an email when a test fails.

If you select this option, select the **Email Test Results when complete or on error** check box in the **Email Settings** dialog box. Click **Email Settings** to <u>configure the email settings (see page 17)</u>.

See also

About setting up tests (see page 43) Select report options (see page 38)

About configuring test parameters

Use the configuration settings to view the measurement parameters for selected tests. How the test configurations are accessed depend on the View selected in the DUT tab.

- If you selected Compliance View in the DUT tab, then in the Test Selection tab, select the desired test in the list and then click the Configure button.
- If you selected Advanced View in the DUT tab, click the Configuration tab in the Setup panel.

See also

Configure test parameters (see page 30) About running tests (see page 49)

Configure test parameters

The Configuration parameters let you set global and individual test parameters. To return to test selection from the Configuration tab or panel, click the Test Selection button.

NOTE. You cannot change test parameters that are grayed out.

- 1. Modify Global settings (see page 30) as desired:
 - To select the instruments for testing, click Global Settings. In the Instruments Detected section, click in the shaded areas to activate the drop-down lists and select an instrument. If you do not see the desired instrument in the list, refresh the list (see page 46).
- 2. To modify any individual test measurement settings, click **Measurements**, select the test in the tree view, and change the settings.

See also

About setting up tests (see page 43)

Common test parameters

The following table lists the settings and parameters common to all tests.

Parameter Type	Parameter and Default Value
Mode	Determines whether test parameters are in compliance or can be edited (User Defined Mode).
	 Compliance: Most test parameter values cannot be edited.
	 User Defined: Most test parameter values can be edited.
Global Settings	These settings apply to all tests selected for the current session. You can change only some of these settings.
	Instruments Detected: Displays a list of the connected instruments found during the instrument discovery. Instrument types include equipment such as oscilloscopes, signal generators, and RF switches. Select Options > Instrument Control Settings to refresh the list (see page 16).
	 Sample Rate: Specifies the oscilloscope sample rate to use for all tests.
	Pattern Type: The global pattern type specifies the pattern type to use for all applicable measurements unless a different pattern type is selected for a test in the Measurements tab.
	 Record Length: Specifies the length of the record (5M is the default)
	 Analyze without de-embedding filter: All tests are performed without a de-embedding filter.
	Analyze with de-embedding filter: When selected, provides a browse button and field for selecting a filter to use to compensate for cable lengths.
	Analyze with and without de-embedding filter: When selected, provides a browse button and field for selecting a filter to use to compensate for cable lengths. The tests are performed twice, with and without the filter. Results are provided for both cases for comparative analysis.

Table 8: Common parameters and values

X

Parameter Type	Parameter and Default Value						
Measurements	Acquire:						
	Signal Type: Specifies the signal type of the acquisition for the test selected in the tree view of the Measurements tab. Running tests in User Defined Mode allows you to perform the tests on different types of signal. The default signal type varies by test. Not all tests support all the signal types. For each test, the application includes the signal type options that are best suited to the measurements						
Limits Editor	Shows the upper and lower limits for the applicable measurement using different types of comparisons.						
	In Compliance Mode, allows you to view the measurement high and low limits used for the test selected in the tree view of the Measurements tab						
	When running tests in User Defined Mode, you can edit the limit settings in the Limits Editor.						
	l inite Editor						
	Limits Earliers						
	A blank cell means no limit value is applied						
	Test Name Details Compare String I ow Limit Compare String High Limit						
	Test 72.6.5_Differential peak-pe Maximum differenti < Less Than 30 0						
	Positive steady stat >= Greater Than O 40 <= Less Than Or E 600						
	Positive voltage rip >= Greater Than O 0 <= Less Than Or E 40						
	Negative voltage ri >= Greater Than O 0 <= Less Than Or E 40						
	Test 72.7.1.10_Transmitter outp:						
	$(v_{2}^{2}+v_{3})v_{2}^{2}$ ratio $>=$ creater han 0 U <=Less han 0'F UUS						
	$(v_0 + v_0)_{v_0} + u_0 v_0$ = greater finant $(v_0, v_0)_{v_0} + u_0 v_0$ = Less finant $(v_0, v_0)_{v_0} + u_0 v_0$						
	Post-curso requilie >= Greater Than O 0.9 <= Less Than OF E 1.1						
	ОК						

Table 8: Common parameters and values (cont.)

When running tests in User Defined Mode, the cells in the Limits Editor table are active for editing so you can change parameters.

See also

Configure tests (see page 30) Set acquisition parameters source (see page 28) De-embed using filter files (see page 107)

Status panel overview

The Status panel provides status on test acquisition and analysis (<u>Test Status (see page 33)</u> tab) and a listing of test tasks performed (<u>Log View (see page 34)</u> tab). The application opens the Test Status tab when you start a test run. You can select the Test Status or the Log View tab to view these items while tests are running.

cos los lat (ondica)		options			
Test Status Log View				Start	
Test Name	Acquisition	Acquire Status	Analysis Status		
Lane0					
Test 72.7.1.3_Signaling speed	Pseudo-random pattern	Lane0~Complete	Completed Test 7		
Test 72.7.1.4_Differential peak-to-peak output voltage (max)	Pseudo-random pattern	Lane0~Complete		Pause	
Test 72.7.1.8_Max output jitter (peak-peak)	Pseudo-random pattern	Lane0~Complete			
Test 72.7.1.4_Common-mode voltage limits	Pseudo-random pattern-Common-mode				
Test 72.6.5_Differential peak-peak output voltage (max) with Tx disabled	Pseudo-random pattern-Tx-disabled				
Test 72.7.1.10_Transmitter output waveform characteristics	Square pattern				
Test 72.7.1.7_Transition time	Square pattern				
Test 72.7.1.11b_Output waveform coefficient status	Square pattern-Output waveform coefficient status acquisition				
Test 72.7.1.11a_Output waveform coefficient update	Square pattern-Output waveform coefficient update acquisition				

xpress 10G-KR - (Untitle	d)	Option	s 💌
Test Status Log View			Start
	Message History	Show Detailed Log	
Initializing run time environment. 6/28/2012 5:34:32 PW:: Test et 6/28/2012 5:34:48 PW:: No pro 6/28/2012 5:34:48 PW:: No pro 6/28/2012 5:34:48 PW:: Setting 6/28/2012 5:34:53 PW:: Setting 6/28/2012 5:34:53 PW:: Setting 6/28/2012 5:34:59 PW:: Setting 6/28/2012 5:35:15 PW:: Setting 6/28/2012 5:35:16 PW:: Analysis 6/28/2012 5:35:16 PW:: Analysis 6/28/2012 5:35:16 PW:: Analysis 6/28/2012 5:35:26 PW:: Setting 6/28/2012 5:35:26 PW:: Setting 6/28/2012 5:35:26 PW:: Entor in 6/28/2012 5:35:26 P	This might take some time, execution started ing to analyze tab bes connected. No acquisitions will be performed httpp, Value: PRBS11 up UDT: PRBS11, 10.3125G up scope horizontal parameters up scope horizontal parameters were, attenuation and bandwidth parameters if required varinels on and set scale to 10.0000E-3 single sequence on scope tequired waveforms required waveforms in gath wfm: X:\10G-KR\Untitled Session\DUT001 ng the acquire some scope required waveforms mg math wfm: X:\10G-KR\Untitled Session\DUT001120 ng ng analysis run state: Error analysis run state: Test 72.7.1.3, ting zoon factor zooned imane: LaneD. PERS11.5M	01\20120628_173425\Lane0 CH1 120628_173425\Lane0 CH1 PRBS nake sure that you are transmitting t S11, 10.3125G	Pause
Auto Scroll		Clear Log Save	

The Log View display has several viewing options:

- Message History: This window timestamps and displays all run messages.
- Show Detailed Log: Select this check box to record a detailed history of test execution.

This must be checked before starting a measurement.

- Auto Scroll: Select this check box to have the program automatically scroll down as information is added to the log during the test.
- Clear Log: Click this button to clear all messages from the display.
- Save: Click this button to save the log file as a text file for examination. A standard Save File window is displayed to name and save the file.

See also

Application panel overview (see page 21)

Results panel overview

When a test finishes, the application switches to the <u>Results panel (see page 35)</u> to display a summary of test results.

Set viewing preferences for this panel from the Preferences menu in the upper right corner. Viewing preferences include showing whether a test passed or failed, summary results or detailed results, and enabling wordwrap.

For information on using this panel, see View test results (see page 36).

Ilts	pan	iel						
TekExp	ress 10G-KR - (Untitled		Intitled)* Option		is 💌 🔍			
	Over	rall Test Result 🔞 Fail		Preferences 💌				Start
Setun	1	Test Name	Pass/Fail	Details	Value	Margin		(
etup	•	E Lane0						
tatus		Test	🥑 Pass	N1N0 5M-Rise time	30.3518	6.352, 16.648	=	
sults		Test Test 72.7.1.7_Transitio n time	🅑 Pass	N1N0 5M-Fall time	30.2546	6.255, 16.745		Clear
ports		Test 72.7.1.10_Transm itter output waveform	🥑 Pass	N1N0 5M-v2	184.1456	144.146, 415.854		×
		Test 72.7.1.10_Transm itter output waveform	🥑 Pass	N1N0 5M-deltav2	26.2012	26.201, 13.799		
		Test 72.7.1.10_Transm itter output waveform	🥑 Pass	N1NO 5M-deltav5	26.4267	26.427, 13.573		
		Test 72.7.1.10_Transm itter output waveform	🥑 Pass	N1N0 5M-(v1+v4)/v1	0.0096	0.01,0.04		
		Test + 72.7.1.10_Transm itter output waveform	😵 Fail	N1N0 5M-(v2+v5)/v2	-0.0046	0.005, 0.055		
		Test + 72.7.1.10_Transm	🕜 Pass	N1N0 5M-(v3+v6)∧3	0.0039	0.004, 0.046		
ronix	Statu	is Completed.					=	

See also

About panels (see page 21)

View test results

When a test finishes, the application switches to the <u>Results panel (see page 35)</u>, which displays a summary of test results. The Overall Test Result is displayed at the top left of the Results table. If all of the tests for the session pass, the overall test result will be Pass. If one or more tests fail, the overall test result will show Fail.

NOTE. NAN (Not A Number) is displayed in the test results if an invalid waveform was supplied for the test.

Each test result occupies a row in the Results table. By default, results are displayed in summary format with the measurement details collapsed and with the Pass/Fail column visible. Change the view in the following ways:

- To expand all tests listed, select View Results Details from the Preferences menu in the upper right corner.
- To expand and collapse tests, click the plus and minus buttons.
- To collapse all expanded tests, select **Preferences > View Results Summary**.
- To remove or restore the Pass/Fail column, select **Preferences > Show Pass/Fail**.
- To enable or disable the wordwrap feature, select **Preferences > Enable Wordwrap**.
- 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 sort the test information by column, click the column head. When sorted in ascending order, a small up arrow is displayed. When sorted in descending order, a small down arrow is displayed.
- To clear all test results displayed, click **Clear**.

See also

View a report (see page 40)

View test-related files

Files related to tests are stored in the My TekExpress\10G-KR folder. In the 10G-KR folder, each test setup has 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 and usually has no visible file extension.

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 ... My TekExpress\10G-KR. 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 10G-KR application.

See also

File name extensions (see page 12) Before you click start (see page 49)

Reports panel overview

Use the <u>Reports panel (see page 38)</u> to browse for reports, name and save reports, select report content to include, and select report viewing options.

For information on setting up reports, see <u>Select report options (see page 38)</u>. For information on viewing reports, see <u>View a Report (see page 40)</u>.

Report Name	Y-VIOC KR/DUT001 mbt		
	A.100-RR(001001.1111R	Start	S
Save As Type	Web Archive (*.mht;*.mhtml)		
Auto incremen	t report name if duplicate	Pause)
Contents To S	we		
s 🗸 Include Pass/F	ail Results Summary	ts	
✓ Include Plot Im	ages		
Include Setup	configuration		
View Report A	ter Generating View	_	

See also

About panels (see page 21)

Select report options

Use the <u>Reports panel (see page 37)</u> to select which test information to include in the report, and the naming conventions to use for the report. For example, always give the report a unique name or select to have the same name increment each time you run a particular test. Generally, you would select report options before running a test or when creating and saving test setups. Report settings are included in saved test setups.

In the Reports panel, select from the following report options:

Setting	Description
Report Name	Displays the name and location from which to open a report. The default location is at <i>Wy TekExpress\10G-KR\Untitled</i> <i>Session</i> . 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. Change the report name or location.
	Do one of the following:
	In the Report Name field, type over the current folder path and name.
	 Double-click in the Report Name field and then make selections from the popup keyboard and click the Enter button.
	and the file extension. For example: C:\Documents and Settings\your user name\My Documents\My TekExpress\10G-KR\DUT001_Test_72.7.1.3.mht.
	NOTE. You cannot set the file location using the Browse button.
	Open an existing report.
	Click Browse , locate and select the report file and then click View at the bottom of the panel.
Save As Type	Saves a report in the specified file type. Lists supported file types to choose from.
	NOTE. 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.
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.
Include Pass/Fail Results Summary	Sets the application to include the color block labeled Test Result (indicating whether the test passed or failed) in the report. For details, see Report Contents in <u>View a report</u> (see page 40).
Include Detailed Results	Sets the application to include parameter limits, execution time, and test-specific comments generated during the test.
Include Plot Images	Screen shots captured from the oscilloscope during test execution that show the waveform and measurement data will be included.

Table 9: Report options

Setting	Description
Include Setup Configuration	Sets the application to include information about hardware and software used in the test in the summary box at the top of the report. Information includes: the oscilloscope model and serial number, probe model and serial number, the oscilloscope firmware version, SPC and factory calibration status, and software versions for applications used in the measurements.
Include Complete Application Configuration	Sets the application to include a table listing general, common, and acquired parameters used in the test. This option is disabled by default.
Include User Comments	Select to include any comments about the test that you or another user added in the DUT tab of the Setup panel. Comments appear in the Comments section under the summary box at the beginning of each report.
Append Reports	This option adds new report data to the end of an existing report of the same name. This option is disabled by default. This option is not available if the Auto Increment Report Name if Duplicate option is selected.
View Report After Generating	Automatically opens the report in your Web browser when the test completes. This option is selected by default.

Table 9: Report options (cont.)

See also

View a report (see page 40) About setting up tests (see page 43)

View a report

The application automatically generates a report when test analysis is completed and displays the report in your default Web browser (unless you cleared the **View Report After Generating** check box in the Reports panel before running the test). If you cleared this check box, or if you want to view a different test report, do the following:

1. Click the **Browse > Reports** button and locate and select the report file to view.

NOTE. If you did not save the test setup after running the report and you either closed the application or you ran another report, the report file was not saved.

2. At the bottom of the Reports panel, click View.

For information on changing the file type, file name, and other report options, see <u>Select report options</u> (see page 38).

Report contents

A report shows specified test details, as defined in the Reports panel.

NOTE. NAN (Not A Number) is displayed in the report contents if an invalid waveform was supplied for the test.

Setup configuration information

Setup configuration information is listed in the summary box at the beginning of the report. This information includes the oscilloscope model and serial number, and software versions. To exclude this information from a report, clear the **Include Setup Configuration** check box in the Reports panel before running the test.

Tektronix	Teki Det	Express 10G-KR ailed Report	
enabling innovation	DUT ID: DUT001 Date/Time: July 03, 2012 / 11:52:23 CTS Version:CTS 0.9 Overall Compliance Mode:TRUE Overall Test Result:FALL	Execution Time: <u>1 Hrs 3 Min</u>	
	Scope Model: DSA/1604B Scope Serial Number/B110866 Probe Model (CH1):"X" Probe Serial Number (CH1):"N/A" Probe Model (CH2):N/A Probe Model (CH2):"N/A" Probe Model (CH3):"IX" Probe Serial Number (CH2):"N/A" Probe Model (CH4):N/A Probe Model (CH4):N/A	Scope F/W Version: SPC, Factory Calibration:PASS:PASS TekExpress Version (FW, App)Error : Versi DPOJET Version:"3.5.1 Build	5.3.4 BUILD 25 on information missing in SRM.XML, 4"
Comments			

User comments

If you selected to include comments in the test report, any comments you added in the DUT tab of the Setup panel appear in the Comments section directly below the summary box.

Comments	

Test result summary

The Test Result column indicates whether a test passed or failed. If the test passed, the column cell is green. If the test failed, it is red. To exclude this information from a report, clear the **Include Pass/Fail Results Summary** check box in the Reports panel before running the test.

Test Name	Pattern-Rec length	Lane	Measurement Details	Measured value	Units	Test Result	Margin
Test 72.7.1.3_Signaling speed	PRBS11 5M	LaneO	Speed	10.3122	Gbps	Pass	0.001, 0.001
Test 72.7.1.4 Differential peak-to-peak output voltage (max)	PRBS11 5M	LaneO	P2P-Tx enabled	663.0573	m∨	Pass	536.943
			DCD	0.0042	UI	Pass	0.031
	PRBS11.6M		Rj	0.0043	UI	Pass	0.146
	FRESH SM	Laneu	Dj	0.3015	UI	Fail	0.151
Test 72.7.1.8_Max output jitter (peak-peak)			T <u>jBER</u>	0.3405	UI	Fail	0.061
Test 72.7.1.4_Common-mode voltage limits	PRBS11 5M	LaneO	Common-mode P2P	94	m∨	Pass	94 , 1806
Test 72.6.5_Differential peak-peak output voltage (max) with Tx disabled	PRBS11-Tx- disabled 5M	LaneO	P2P-Tx disabled	806	m∨	Fail	776
Test 73 7 1 7 Transition time		Long	Rise time	33.2054	ps	Pass	9.205, 13.795
rescr2.r.r.r_mansition time	NI NO OM	Laneu	Fall time	33.1235	ps	Pass	9.123, 13.877

See also

View test results (see page 36) View test-related files (see page 37)

About setting up tests

Set up tests using the tabs in the <u>Setup panel (see page 21)</u>. Settings in the DUT tab use a top-down, left-to-right logic flow, so that any parameter that affects or acts as a filter for other parameters appears either to the top of or to the left of the affected parameters.

Tests are saved when you save a test setup. To avoid overwriting test results, remember to assign a unique name to the test either before running it or immediately after.

See also

Test setup overview (see page 48) Before you click start (see page 49) About test setups (see page 53) About running tests (see page 49)

Equipment connection setup

The following diagrams shows how to connect the DUT to the oscilloscope for the measurements.

Connection setup for differential tests



Connection setup for single ended tests



Connection setup for 40G-KR tests



See also

Minimum system requirements (see page 8) View connected instruments (see page 46) About setting up tests (see page 43)

View connected instruments

Use the Instrument Control Settings dialog box to view or search for connected instruments required for the tests. The application uses TekVISA to discover the connected instruments.

To refresh the list of connected instruments:

- 1. From the Options menu, select 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 for.

Instrument search is based on the VISA layer but different connected cables 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 TekExpress that are communicating over the LAN. If the search does not find any instruments that match a selected resource type, a message appears telling you that no such instruments were found.

3. Click Refresh. TekExpress searches for connected instruments.



4. After discovery, the dialog box lists the instrument-related details based on the search criteria you selected. For example, if you selected LAN and GPIB as the search criteria, the application checks for the availability of instruments over LAN, then GPIB.

1	LAN 🔽 GPI	B 🥅 Serial	Non - VISA Res	ources	
	TekLink 🔲 USI	B 🔽 VXI		Ret	fresh TekVISA 300 s Timeout
	Connection	Resource	Serial No	Options	Resource Addr
•	VISA-GPIB	MSO70604	CHR0007	MTH	
	VISA-LAN	DP05204	PQ000008	MTH	
	VISA-LAN	DP073304C	CHAR05	MTH	
	VISA-LAN	900029100	Q300002	MTH	
	VISA-LAN	DP070804	PQ204	MTH	

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.

See also

Configure tests (see page 30) Equipment connection setup (see page 44)

Test setup overview

Test setup includes acquisition and configuration parameters, but you can also select report options when setting up tests. Use the options in the <u>Setup panel (see page 21)</u> and <u>Reports panel (see page 37)</u> to select and configure tests.

- 1. <u>Set DUT parameters (see page 22)</u>.
- 2. Select one or more tests (see page 25).
- 3. <u>Select acquisitions (see page 28)</u>.
- 4. Configure tests (see page 30).
- 5. <u>Set test measurement notification options (see page 29)</u>.
- 6. <u>Select report options (see page 38)</u>.

See also

About test setups (see page 53) Pre-run checklist (see page 51) Before you click start (see page 49) About running tests (see page 49)

About running tests

After selecting and configuring tests, review the <u>pre-run checklist (see page 51)</u> and then click **Start** to run the tests. While tests are running, you cannot access the Setup or Reports panels. To monitor the test progress, switch back and forth between the Status panel and the Results panel.

The application displays a report when the tests are complete. 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 the Alt + Tab key combination. To keep the TekExpress 10G-KR application on top, select **Keep On Top** from the TekExpress Options menu.

See also

Before you click start (see page 49) About configuring tests (see page 30) About setting up tests (see page 43)

Before you click start

Before you run tests for the first time, do the following:

1. Understand where your test files are stored on the instrument.

After you install and launch TekExpress 10G-KR, it creates the following folders on the oscilloscope:

- My Documents\My TekExpress\10G-KR
- My Documents\My TekExpress\10G-KR\Untitled Session

Every time you launch TekExpress 10G-KR, an Untitled Session folder is created in the 10G-KR folder. The Untitled Session folder is automatically deleted when you exit the 10G-KR application. To preserve your test session files, save the test setup before exiting the TekExpress application.



CAUTION. Do not modify any of the session files or folders because this may result in loss of data or corrupted session files. Each session has multiple files associated with it. When you save a session, a .TekX file, and a folder named for the session that contains associated files, is created on the oscilloscope X: drive.

2. <u>Map the shared My TekExpress folder (see page 113)</u> as X: (X drive) on the instruments used in test setups running Microsoft Windows Operating System.

The My TekExpress folder has the share name format <domain><user ID>My TekExpress. Or, if the instrument is not connected to a domain, the share name format is <instrument name><user

ID>My TekExpress. This shared folder is used to save the waveform files and is used during other file transfer operations.

NOTE. If the X: drive is mapped to any other shared folder, the application will display a warning message asking you to disconnect the X: drive manually.

- **3.** Make sure that the My TekExpress folder has read and write access, and that the contents are not set to be encrypted:
 - a. Right-click the folder and select Properties.
 - b. Select the General tab and then click Advanced.
 - **c.** In the Advanced Attributes dialog box, make sure that the option **Encrypt contents to secure data** is NOT selected. Example.



4. See the pre-run checklist (see page 51) before you run a test.

See also

Configure tests (see page 30) View test-related files (see page 37) Application directories and usage (see page 10) File name extensions (see page 12)

Pre-run checklist

Do the following before you click Start to run a test. If this is the first time you are running a test on a setup, refer to the information in Before you click start (see page 49).

- 1. Make sure that all the required instruments are properly warmed up (approximately 20 minutes).
- 2. Perform Signal Path Compensation (SPC).
 - a. On the oscilloscope main menu, select the Utilities menu.
 - b. Select Instrument Calibration.
- **3.** <u>Deskew channels (see page 107)</u>.
- 4. Verify that the application is able to find the DUT. If it cannot, <u>perform a search for connected</u> instruments (see page 46).
 - a. In 10G-KR, select the Setup panel and then click the Test Selection tab.
 - b. Select any test and then click Configure.
 - c. In the Configuration section, click Global Settings.
 - **d.** In the Instruments Detected section, click the drop-down arrow to the right of Real Time Scope and make sure that the oscilloscope with the (GPIB8::1::INSTR) designation is in the list.

See also

Equipment connection setup (see page 44)

About test setups

TekExpress 10G-KR opens with the default setup selected. Run a test before or after saving a setup. When you save a setup, the test information, such as the selected oscilloscope, general parameters, acquisition parameters, measurement limits, waveforms (if applicable), and other configuration settings are all saved under the setup name. Use test setups to:

- Run a saved test in prerecorded mode.
- 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.
- Create a new test setup based on an existing one.
- Run a new session, acquiring live waveforms, using a saved test configuration.

See also

About setting up tests (see page 43) Save a test setup (see page 53) Recall a saved test setup (see page 54)

Save a test setup

Save a test setup before or after running a test using the parameters you want saved. Create a new test setup from any open setup or from the default setup. When you select the default test setup, all parameters are returned to their defaults.

The following instructions start from the default test setup:

- 1. Select Options > Default Test Setup.
- 2. Select Setup and set required options and parameters in the tabs (DUT, Test Selection, and so on).
- 3. Select Reports and set your report options (see page 38).
- 4. Optional: Click **Start** to run the test and verify that it runs correctly and captures the information you want. If it does not, edit the parameters and repeat this step until the test runs to your satisfaction.

Running the test helps verify that all parameters are set correctly, but it is not a necessary step.

5. Select **Options > Save Test Setup**. Enter the file name for the setup file. The application saves the file to X:\10G-KR\<*session_name*.

See also

About setting up tests (see page 43) Test setup overview (see page 48) View test-related files (see page 37) About configuring tests (see page 30)

Recall a saved test setup

These instructions are for recalling saved test setups.

- 1. Select Options > Open Test Setup.
- 2. Select the setup from the list and click **Open**.

See also

About test setups (see page 53) Create a new test setup based on an existing one (see page 54) Test setups overview (see page 48)

Create a new test setup based on an existing one

Use this method to create a variation on a test setup without having to create the setup from the beginning.

- 1. Select Options > Open Test Setup.
- 2. Select a setup from the list and then click Open.
- 3. Use the Setup and Reports panels to modify the parameters to meet your testing requirements.
- 4. Select Options > Save Test Setup As.
- 5. Enter a test setup name and click Save.

See also

About test setups (see page 53) Set DUT parameters (see page 22) Configure tests (see page 30) Select acquisitions (see page 28)

About the programmatic interface

The Programmatic interface allows you to seamlessly integrate the TekExpress test automation application with the high-level automation layer. This also allows you to control the state of the TekExpress application running on a local or a remote computer.

For simplifying the descriptions, the following terminologies are used in this section:

- TekExpress Client: A high-level automation application that communicates with TekExpress using TekExpress Programmatic Interface.
- **TekExpress Server:** The TekExpress application when being controlled by TekExpress Client.

TekExpress leverages .Net Marshalling to enable the Programmatic Interface for TekExpress Client. TekExpress provides a client library for TekExpress clients to use the programmatic interface. The TekExpress client library is inherited from .Net MarshalByRef class to provide the proxy object for the clients. The TekExpress client library maintains a reference to the TekExpress Server and this reference allows the client to control the server state.



See also

Requirements for Developing TekExpress Client (see page 55)

Requirements for developing TekExpress client

While developing TekExpress Client, use the TekExpressClient.dll. The client can be a VB .Net, C# .Net, TestStand or Web application. The examples for interfaces in each of these applications are in the Samples folder.

References required

- TekExpressClient.dll has an internal reference to IIdlglib.dll and IRemoteInterface.dll.
- IIdlglib.dll has a reference to TekDotNetLib.dll.
- **IRemoteInterface.dll** provides the interfaces required to perform the remote automations. It is an interface that forms the communication line between the server and the client.
- IIdlglib.dll provides the methods to generate and direct the secondary dialog messages at the client-end.

NOTE. The end-user client application does not need any reference to the above mentioned DLL files. It is essential to have these DLLs (IRemoteInterface.dll, IIdlglib.dll and TekDotNetLib.dll) in the same folder as that of TekExpressClient.dll.

Required steps for a client

The client uses the following steps to use TekExpressClient.dll to programmatically control the server:

Develop a client UI to access the interfaces exposed through the server. This client loads TekExpressClient.dll to access the interfaces. After TekExpressClient.dll is loaded, the client UI can call the specific functions to run the operations requested by the client. When the client is up and running, it does the following to run a remote operation:

- 1. To connect to the server, the client provides the IP address of the PC where the server is running.
- 2. The client locks the server application to avoid conflict with any other Client that may try to control the server simultaneously. "Lock" would also disable all user controls on the server so that server state cannot be changed by manual operation.

If any other client tries to access a server that is locked, it will receive a notification that the server is locked by another client.

- **3.** When the client has connected to and locked the server, the client can access any of the programmatic controls needed to run the remote automations.
- 4. After the client operations finish, the client unlocks the server.

See also

About 10G-KR Application Commands (see page 61)

Client programmatic interface example

An example of the client programmatic interface is described and shown as follows:

Process flowchart



- 1. Connect to a server or remote object using the programmatic interface provided.
- 2. Get the client ID that is created when connecting to the remote object. This client ID is one of the required parameters to communicate with the server.

NOTE. The server identifies the client with this ID only and rejects any request if the ID is invalid.

3. Lock the server for further operations. This disables the application interface.

NOTE. You can get values from the server or set values from the server to the client only if the application is locked.

4. Register for receiving notifications on status change events on the server. To register you need to give a handler as a parameter.

NOTE. Whenever there is a change in the status of the server, all the clients registered with the server receive a notification from the server.

- 5. Select the tests that you want to run through the programmatic interface.
- 6. Set the necessary parameters for each test.
- 7. Run the tests.
- **8.** Poll for the status of the application.

NOTE. Skip step 8 if you are registered for the status change notification and the status is Ready.

- 9. After completing the tests, get the results.
- 10. Create a report or display the results and verify or process the results.
- 11. Unlock the server after you complete all the tasks.
- **12.** Disconnect from the remote object.

Handler of Status Change Notification

- 1. Get the status. If the status is Wait or Error, get the information that contains the title, message description, and the expected responses for the status.
- 2. Perform the actions based on the status information.
- **3.** Set the response as expected.

See also

About 10G-KR application commands (see page 61) Program example (see page 59)

Program example

This program example shows how to communicate between a PC and TekExpress 10G-KR remotely.

A typical application does the following:

- 1. Start the application.
- **2.** Connect through an IP address.

m_Client.Connect("localhost") 'True or False

clientID = m_Client.getClientID

3. Lock the server.

m_Client.LockServer(clientID)

4. Disable the Popups.

m_Client.SetVerboseMode(clientID, false)

5. Set the Dut ID.

m_Client.SetDutId(clientID, "DUT_Name")

6. Select a measurement.

mClient.SelectTest(clientID, "Device", "Source", "Test72.7.1.3_Signaling speed", true) 'Measurement selected

7. Select a channel.

mClient.SetGeneralParameter(clientID, "Device", "Source", "Test72.7.1.3_Signaling speed", "Lane0 Connected to:Lane0:Differential\$CH1") 'Channel 1 selected for Lane 0

8. Configure the selected measurement.

mClient.SetAcquireParameter(clientID, "Device", "Source", "Test72.7.1.3_Signaling speed", "Pseudo-random pattern\$Signal type\$PRBs7") 'Signal type of Signaling speed set to PRBS7

9. Run with set configurations.

m_Client.Run(clientID)

10. Wait for the test to complete.

DO

Thread.Sleep(500)

m_Client.Application_Status(clientID)

Select Case status

Case "Wait"

'Get the Current State Information

mClient.GetCurrentStateInfo(clientID, WaitingMsbBxCaption, WaitingMsbBxMessage, WaitingMsbBxButtontexts)

'Send the Response

```
mClient.SendResponse(clientID, WaitingMsbBxCaption, WaitingMsbBxMessage,
WaitingMsbBxResponse)
```

End Select

Loop Until status = "Ready"

11. After the Test is Complete.

'Save all results values from folder for current run

m_Client.TransferResult(clientID, logDirname)

'Save all waveforms from folder for current run

m_Client.TransferWaveforms(clientID, logDirname)

'Save all images from folder for current run

m_Client.TransferImages(clientID, logDirname)

12. Unlock the server.

m_Client.UnlockServer(clientID)

13. Disconnect from server.

m_Client.Disconnect()

14. Exit the application.

NI TestStand client example

The following is an example for NI TestStand Client available in the path: C:\Program Files\Tektronix\TekExpress 10G-KR\Examples\Programmatic Interface\TestStand

🌠 TestStand - Sequence Editor [Edit] - [C:\\Exan	nples\Programmatic Interface\TestStand\	TekExpressClient	IS.seq [Read Only	11
File Edit View Execute Debug Configure Source Cor	itrol Tools Window Help			
D 🗃 🖬 % 🛍 🔋 🚺 🖺 🕀 (P	🗊 *{}	🧶 tê 👬 🖷	М 🔊 🛛	ť
Main Setup Cleanup Parameters Locals	View:	MainSequence		
Step	Description	Flow Properties	Requirements	Comment
W Connect	Action, Create TekExpressClient.Client; Call Te			Connect to the ser
Lock the sever so that other client object will have rea				
🛒 Locking the server	"Locking server"			
LockServer 😳	Action, Call TekExpressClient.Client.LockServer			Lock Server to bloc
📩 Demonstrating - Time Out feature of the client				
🚺 Get TimePeriod	Action, Get TekExpressClient.Client.TimeOut			Gets the Time Out
🕮 Show default time out	"Default timeout"			
Now setting user specified timeout	"Setting user specified timeout"			
🚺 Set TimePeriod	Action, Call TekExpressClient.Client.SetTimeOut			Sets the Time-out
🔀 Wait	TimeInterval(Parameters.TimeOut + 2)			Wait for the time p
🕮 Notice the change in UI after lock timesout	"Timeout"			
📩 Time Period Elapsed - Server unlocked. Lock server to				
📩 Need to lock the server again since it timed out				
1 LockServer	Action, Call TekExpressClient.Client.LockServer			Lock Server to bloc
Set TimePeriod	Action, Call TekExpressClient.Client.SetTimeOut			Sets the Time-out
📩 Demonstrating Save/Recall Session				
	Action, Call TekExpressClient.Client.GetDutId			Checking if DUT-id
騆 Show default DUT ID	"DUT ID"			
	Action, Call TekExpressClient.Client.SetDutId			Change the DUT id
SaveSession	Action, Call TekExpressClient.Client.SaveSession			Saves the current
Notice the saved session	"Session save"			
SaveSessionAs	Action, Call TekExpressClient.Client.SaveSessio			Saves the current
Notice the saved As	"Session save"			
RecallSession	Action, Call TekExpressClient.Client.RecallSession			Recall the saved s
Notice the recalled session	"Session save"			
📩 Demonstrating Run, Query results and Transfer results				
🕮 Run stop demo	"Run/Stop"			
1 WRun	Action, Call TekExpressClient.Client.Run			Run TekExpress re
🔀 Wait	TimeInterval(30)			Wait for the run to
1 Stop	Action, Call TekExpressClient.Client.Stop			Transfer the repor
Demo ends	"Demo ends"			
Disconnect	Action, Call TekExpressClient.Client.Disconnect			Disconnect the Ser
<end group=""></end>				

About 10G-KR application commands

Click a client action below to see the command name, description, parameters, return value, and an example, associated with the action.

Connect through an IP address (see page 68)

Lock the server (see page 69)

Disable the popups (see page 70)

Set or get the DUT ID (see page 71)

Set the configuration parameters for a suite or measurement (see page 72)

Query the configuration parameters for a suite or measurement (see page 74)

Select a measurement (see page 75)

Select a suite (see page 76)

Select a channel (see page 77)

Configure the selected measurement (see page 78)

Run with set configurations or stop the run operation (see page 79)

Handle Error Codes (see page 80)

Get or set the timeout value (see page 81)

Wait for the test to complete (see page 81)

After the test is complete (see page 84)

Save, recall, or check if a session is saved (see page 88)

Unlock the server (see page 89)

Disconnect from server (see page 90)

string id			
Name	Туре	Direction	Description
id	string	IN	Identifier of the client performing the remote function.
Ready: Test co	onfigured and ready to star	t	
Running: Test	running		
Paused: Test p	baused		
Wait: A popup	that needs your inputs		
Error: An erro	or is occurred		

string dutName			
Name	Туре	Direction	Description
dutName	string	IN	The new DUT ID of the setup

out bool saved	k		
Name	Туре	Direction	Description
saved	bool	OUT	Boolean representing whether the current session is saved
-			

This parameter is used as a check in SaveSession() and SaveSessionAs() functions.

string ipAddres	S		
Name	Туре	Direction	Description
ipAddress	string	IN	The ip address of the server to which the client is trying to connect to. This is required to establish the connection between the server and the client.
out string client	lD		
Name	Туре	Direction	Description
clientid	string	OUT	Identifier of the client that is connected to the server
			clientId = unique number + ipaddress of the client. For example, 1065–192.157.98.70

NOTE. If the dutName parameter is null, the client is prompted to provide a valid DUT ID.

NOTE. The server must be active and running for the client to connect to the server. Any number of clients can be connected to the server at a time.

NOTE. When the client is disconnected, it is unlocked from the server and then disconnected. The id is reused.

string dutld			
Name	Туре	Direction	Description
dutld	string	OUT	The DUT ID of the setup

The dutId parameter is set after the server processes the request.

string device			
Name	Туре	Direction	Description
device	string	IN	Specifies the name of the device
string suite			
Name	Туре	Direction	Description
suite	string	IN	Specifies the name of the suite
string test			
Name	Туре	Direction	Description
test	string	IN	Specifies the name of the test to obtain the pass or fail status
string parameterS	tring		
Name	Туре	Direction	Description
parameterString	string	IN	Selects or deselects a test
int rowNr			
Name	Туре	Direction	Description
rowNr	int	IN	Specifies the zero based row index of the sub-measurement for obtaining the result value

NOTE. When the client tries to lock a server that is locked by another client, the client gets a notification that the server is already locked and it must wait until the server is unlocked. If the client locks the server and is idle for a certain amount of time, then the server is unlocked automatically from that client.
out string[] sta	tus		
Name	Туре	Direction	Description
status	string array	OUT	The list of status messages generated during run
string name			
Name	Туре	Direction	Description
name	string	IN	The name of the session being recalled

The name parameter cannot be empty. If it is empty, the client is prompted to provide a valid name.

NOTE. When the run is performed, the status of the run is updated periodically using a timer.

string name			
Name	Туре	Direction	Description
name	string	IN	The name of the session being saved

The name parameter cannot be empty. If it is empty, the client is prompted to provide a valid name.

Once the session is saved under 'name' you cannot use this method to save the session in a different name. Use SaveSessionAs instead.

string name			
Name	Туре	Direction	Description
name	string	IN	The name of the session being recalled

The same session is saved under different names using this method. The name parameter cannot be empty. If it is empty, the client is prompted to provide a valid name.

bool isSelected			
Name	Туре	Direction	Description
isSelected	bool	IN	Selects or deselects a test

string time			
Name	Туре	Direction	Description
time	string	IN	The time in seconds which refers to the timeout period

The time parameter gives the timeout period, that is the time the client is allowed to be locked and idle. After the timeout period, if the client is still idle, it gets unlocked.

The time parameter should be a positive integer. Else, the client is prompted to provide a valid timeout period.

bool_verbose			
Name	Туре	Direction	Description
_verbose	bool	IN	Specifies whether the verbose mode should be turned ON or OFF

NOTE. When the session is stopped, the client is prompted to stop the session and is stopped at the consent.

Itallio	Type	Direction	Description
filePath	string	IN	The location where the report must be saved ir the client

NOTE. When the client is disconnected, the client is unlocked automatically.

out string caption	on		
Name	Туре	Direction	Description
caption	string	OUT	The wait state or error state message sent to you

out string mess	age		
Name	Туре	Direction	Description
message	string	OUT	The wait state/error state message to you
out string[] butt	onTexts		
Name	Туре	Direction	Description
buttonTexts	string array	OUT	An array of strings containing the possible response types that you can send
string response			
Name	Туре	Direction	Description
response	string	IN	A string containing the response type that can be selected (it must be one of the strings in the string array buttonTexts)

out string clier	tlD		
Name	Туре	Direction	Description
clientID	string	OUT	Identifier of the client that is connected to the server
			clientID = unique number + ipaddress of the client. For example, 1065–192.157.98.70

Connect through an IP address

Command name	Parameters	Description	Return Value	Example
Connect()	string ipAddress (see page 63) out string clientID (see page 63)	This method connects the client to the server. <u>Note (see page 63)</u> The client provides the IP address to connect to the server. The server provides a unique client identification number when connected to it.	Return value is either True or False.	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as boolean returnval = m_Client.Con- nect(ipad- dress,m_clientID)

NOTE. The Fail condition for PI commands occurs in any of the following cases:

The server is LOCKED and the message displayed is "Server is locked by another client".

The session is UNLOCKED and the message displayed is "Lock Session to execute the command".

The server is NOTFOUND and the message displayed is "Server not found...Disconnect!".

Command name	Parameters	Description	Return Value	Example
LockSession()	string clientID (see T page 68) th T T th ru ru ru ru ru ru ru ru ru ru ru ru ru	This method locks the server. <u>Note (see page 64)</u>	String value that gives the status of the operation after it is performed. The return value is "Session Locked" on success.	m_Client = new Client() //m_Client is a reference to the
		The client must call this method before running any of the remote automations. The server can be locked by only one client.		Client class in the Client DLL. returnval as string returnval = m_Client.Lock- Server(clientID)

Lock the server

NOTE. The Fail condition for PI commands occurs in any of the following cases: The server is LOCKED and the message displayed is "Server is locked by another client". The session is UNLOCKED and the message displayed is "Lock Session to execute the command". The server is NOTFOUND and the message displayed is "Server not found...Disconnect!". When none of these fail conditions occur, then the message displayed is "Failed...".

Disable the popups

Command name	Parameters	Description	Return Value	Example
SetVerboseMode()	string clientID (see page 68) bool _verbose (see page 66)	This method sets the verbose mode to either true or false. When the value is set to true, any message boxes appearing during the application will be routed to the client machine that is controlling TekExpress. When the value is set to false, all the message boxes are shown on the server machine.	String that gives the status of the operation after it is performed When Verbose mode is set to true, the return value is "Verbose mode turned on. All dialog boxes will be shown to client". When Verbose mode is set to false, the return value is "Verbose mode turned off. All dialog boxes will be shown to server".	<pre>m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string Verbose mode is turned on return=m_Client.Set- VerboseMode(clien- tID, true) Verbose mode is turned off returnval=m_Cli- ent.SetVerbose- Mode(clientID, false)</pre>

NOTE. The Fail condition for PI commands occurs in any of the following cases:

The server is LOCKED and the message displayed is "Server is locked by another client".

The session is UNLOCKED and the message displayed is "Lock Session to execute the command".

The server is NOTFOUND and the message displayed is "Server not found...Disconnect!".

Command name	Parameters	Description	Return Value	Example
SetDutId()	string clientID (see page 68) string dutName (see page 62)	This method changes the DUT ID of the set up. The client must provide a valid DUT ID.	String that gives the status of the operation after it is performed Return value is "DUT Id Changed" on success	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string return=m_Client.Set- Dutld(clientID,de- siredDutld) <u>Note (see page 63)</u>
GetDutId()	string clientID (see page 68) string dutId (see page 64)	This method gets the DUT ID of the current set up.	String that gives the status of the operation after it is performed	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string re-
				turn=m_Client.Get- Dutid(clientID, out DutId)

Set or get the DUT ID

NOTE. The Fail condition for PI commands occurs in any of the following cases:

The server is LOCKED and the message displayed is "Server is locked by another client".

The session is UNLOCKED and the message displayed is "Lock Session to execute the command".

The server is NOTFOUND and the message displayed is "Server not found...Disconnect!".

Set the Configuration Parameters for a suite or measurement

Command name	Parameters	Description	Return Value	Example
SetGeneralParame- ter	string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64) string parameterString (see page 64)	This method sets the number of video lanes for the selected measurement. NOTE. Use this command to select a lane, channel, or source type.	String that gives the status of the operation after it is performed The return value is "" (an empty String) on success.	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string <u>Select Channel (see page 73)</u> <u>Select Measurement</u> <u>Method (see page 73)</u>
SetAnalyzeParame- ter()	string clientID (see page 68)string device (see page 64)string suite (see page 64)string test (see page 64)string parameterString (see page 64)	This method sets the configuration parameters in the Analyze panel of the Configuration Panel dialog box for a given suite or measurement.	The return value is "" (an empty String) on success.	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string
SetAcquireParame- ter()	string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64) string parameterString (see page 64)	This method sets the configuration parameters in the Acquire panel of the Configuration Panel dialog box for a given suite or measurement.	returnVal = remo- teObject.SetAc- quireParameter(id, device, suite, test, parameterString) if ((OP_STATUS) returnVal != OP_STA- TUS.SUCCESS) return Command- Failed(returnVal)	

NOTE. The Fail condition for PI commands occurs in any of the following cases:

The server is LOCKED and the message displayed is "Server is locked by another client".

The session is UNLOCKED and the message displayed is "Lock Session to execute the command".

The server is NOTFOUND and the message displayed is "Server not found...Disconnect!".

Select channel example

returnval=mClient.SetGeneralParameter(clientID, "Device", "Source", "Test 72.7.1.3_Signaling speed", "Lane0 Connected to:Lane0:Differential\$CH1")

Select measurement method example

returnval=mClient.SetGeneralParameter(clientID, "Device", "Source", "Test 72.7.1.3_Signaling speed", "Measurement Method\$Automatic")

Configure analyze parameters example	
Parameter	Example
Record Length	returnval = mClient.SetAcquireParameter(clientID, "Device", "Source", "Test 72.7.1.3_Signaling speed", "Record Length\$5M")

Query the Configuration Parameters for a suite or measurement

Command name	Parameters	Description	Return Value	Example
GetGeneralParame- ter()	string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64) string parameterString (see page 64)	This method gets the general configuration parameters for a given suite or measurement.	The return value is the general configuration parameter for a given suite or measurement that is set.	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string Query Channel (see page 75) Query Measurement Method (see page 75)
GetAnalyzeParame- ter()	string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64) string parameterString (see page 64)	This method gets the configuration parameters set in the Analyze tab of the Configuration Panel dialog box for a given suite or measurement.	The return value is the configuration parameter set in the Analyze tab of the Configuration Panel dialog box for a given suite or measurement.	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string
GetAcquireParame- ter()	string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64) string parameterString (see page 64)	This method gets the configuration parameters set in the Acquire tab for a given suite or measurement.	The return value is the configuration parameter set in the Acquire tab for a given suite or measurement.	Query Acquire Parameters example (see page 75)

NOTE. The Fail condition for PI commands occurs in any of the following cases:

The server is LOCKED and the message displayed is "Server is locked by another client".

The session is UNLOCKED and the message displayed is "Lock Session to execute the command".

The server is NOTFOUND and the message displayed is "Server not found...Disconnect!".

Query channel example

returnval=mClient.GetGeneralParameter(clientID, "Device", "Source", "<Test/Measurement Name>", "Lane0 Connected to")

Query measurement method example

returnval=mClient.GetGeneralParameter(clientID, "Device", "Source", "<Test/Measurement Name>", "Measurement Method")

Query acquire parameter examples	
Parameter	Example
Record Length	returnval = mClient.GetAcquireParameter(clientID, "Device", "Source", "Test72.7.1.3_Signaling speed", "Record Length\$5M")

Select a measurement

SelectTest() string clientID (see page 68) This method selects or deselects a given String that displays the status of the client() //m_Client m_Client = new Client() //m_Client string device (see page 64) test. operation after it is performed is a reference to the client class in the client	Command name	Parameters	Description	Return Value	Example
page 64)when this parameterperformedClient DLLpage 64)is set to true,The return value is ""client DLLyou can select a(an empty String) onselectpage 64)When this parameterset to false,you can deselectbool isSelected (seeyou can deselectset to false,72.7.1.3_Signalinyou can deselecta measurement.return-value is ""return-value is ""bool isSelected (seeyou can deselectspeed):return-value is ""you can deselecta measurement.return-value is ""return-value is ""you can deselecta measurement.return-value is is set to false,return-value is is set to false,you can deselectis set to false,return-value is is set to false,return-value is is set is set to false,you can deselectis set to false,return-value is is set	SelectTest()	string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64) bool isSelected (see page 65)	This method selects or deselects a given test. When this parameter is set to true, you can select a measurement. When this parameter is set to false, you can deselect a measurement.	String that displays the status of the operation after it is performed The return value is "" (an empty String) on success.	<pre>m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL returnval as string Select Measurement (Test 72.7.1.3_Signaling speed): return- val=m_Client.Se- lectTest(clientID, "Device", "Source", "Test 72.7.1.3_Sig- naling speed", true)</pre>

NOTE. The Fail condition for PI commands occurs in any of the following cases:

The server is LOCKED and the message displayed is "Server is locked by another client".

The session is UNLOCKED and the message displayed is "Lock Session to execute the command".

The server is NOTFOUND and the message displayed is "Server not found...Disconnect!".

Select a suite

Command name	Parameters	Description	Return Value	Example
SelectSuitet()	string clientID (see page 68) string device (see page 64) string suite (see page 64) bool isSelected (see page 65)	This method selects or deselects a given suite. When this parameter is set to true, you can select a suite. When this parameter is set to false, you can deselect a suite.	String that gives the status of the operation after it is performed The return value is "" (an empty String) on success.	<pre>m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string Select Suite (Default): return- val=m_Client.Se- lectTest(clientID, "Device", "Source", true)</pre>

NOTE. The Fail condition for PI commands occurs in any of the following cases:

The server is LOCKED and the message displayed is "Server is locked by another client".

The session is UNLOCKED and the message displayed is "Lock Session to execute the command".

The server is NOTFOUND and the message displayed is "Server not found...Disconnect!".

Select a channel

Command name	Parameters	Description	Return Value	Example
SetGeneralParame- ter()	string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64) string parameterString (see page 64)	This method sets the parameters that are not specific to any given test. NOTE. Use this command to select a lane, channel, or source type.	String that gives the status of the operation after it is performed The return value is "" (an empty String) on success.	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string <u>Select Channel (see page 78)</u> <u>Select Measurement</u> <u>Method (see page 78)</u>
SetAnalyzeParame- ter()	string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64) string test (see page 64) string get 64) string test (see page 64) string (see page 64)	This method sets the configuration parameters in the Analyze tab of the Configuration Panel dialog box for a given suite or measurement.	The return value is "" (an empty String) on success.	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string
SetAcquireParame- ter()	string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64) string parameterString (see page 64)	This method sets the configuration parameters in the Acquire tab of the Configuration Panel dialog box for a given suite or measurement.	returnVal = remo- teObject.SetAc- quireParameter(id, device, suite, test, parameterString) if ((OP_STATUS) returnVal != OP_STA- TUS.SUCCESS) return Com- mandFailed(re- turnVal)	

NOTE. The Fail condition for PI commands occurs in any of the following cases: The server is LOCKED and the message displayed is "Server is locked by another client". The session is UNLOCKED and the message displayed is "Lock Session to execute the command". The server is NOTFOUND and the message displayed is "Server not found...Disconnect!". When none of these fail conditions occur, then the message displayed is "Failed...".

Select channel example

returnval=mClient.SetGeneralParameter(clientID, "Device", "Source", "Test 72.7.1.3_Signaling speed", "Lane0 Connected to:Lane0:Differential\$CH1")

Select measurement method example

returnval=mClientSetGeneralParameter(clientID, "Device", "Source", "Test 72.7.1.3_Signaling speed", "Measurement Method\$Automatic")

Configure the selected measurement

Command name	Parameters	Description	Return Value	Example
SetAnalyzeParame- ter()	string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64) string parameterString (see page 64)	This method sets the Analyze parameters (Configuration parameters) for a given test.	The return value is "" (an empty String) on success.	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string
SetAcquireParame- ter()	string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64) string parameterString (see page 64)	This method sets the Acquire parameters in the Acquire tab of the Configure Dialog box for a given test.	returnVal = remo- teObject.SetAc- quireParameter(id, device, suite, test, parameterString) if ((OP_STATUS) returnVal != OP_STA- TUS.SUCCESS) return Com- mandFailed(re- turnVal)	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string <u>Configure Acquire</u> <u>Parameters for</u> <u>Record Length (see page 79)</u>

NOTE. The Fail condition for PI commands occurs in any of the following cases:

The server is LOCKED and the message displayed is "Server is locked by another client".

The session is UNLOCKED and the message displayed is "Lock Session to execute the command".

The server is NOTFOUND and the message displayed is "Server not found...Disconnect!".

Configure parameter example	
Parameter	Example
Record Length	returnval = mClient.SetAcquireParameter(clientID, "Device", "Source", "Test 72.7.1.3_Signaling speed", "Record Length\$5M")

Run with set configurations or stop the run operation

Command name	Parameters	Description	Return Value	Example
Run()	string clientID (see page 68)Runs the selected tests. Note (see page 65)After the server is set up and configured, run it remotely using this function.	String that gives the status of the operation after it is performed The return value is	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL.	
		this function.	success.	returnval=m_Client. Run(clientID)
Stop()	string clientID (see page 68)	Stops the currently running tests <u>Note</u> (see page 66)	String that gives the status of the operation after it is performed. The return value	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL.
			is "Stopped" on	returnval as string
			SUCCESS.	returnval=m_Client. Stop(clientID)

NOTE. The Fail condition for PI commands occurs in any of the following cases: The server is LOCKED and the message displayed is "Server is locked by another client". The session is UNLOCKED and the message displayed is "Lock Session to execute the command". The server is NOTFOUND and the message displayed is "Server not found...Disconnect!". When none of these fail conditions occur, then the message displayed is "Failed...".

Handle error codes

The return value of the remote automations at the server-end is OP_STATUS, which changes to a string value depending on its code and returned to the client. The values of OP_STATUS are as follows:

Value	Code	Description	
FAIL	-1	The operation failed.	
SUCCESS	1	The operation succeeded.	
NOTFOUND	2	Server not found	
LOCKED	3	The server is locked by another client, so the operation cannot be performed.	
UNLOCK	4	The server is not locked. Lock the server before performing the operation.	
NULL	0	Nothing	

Command name	Parameters	Description	Return Value	Example
GetTimeOut()	string clientID (see page 68)	Returns the current timeout period set by the client	String that gives the status of the operation after it is performed The default return value is 1800000.	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string
				return- val=m_Client.Get- TimeOut()
SetTimeOut()	string clientID (see page 68) string time (see page 66)	Sets a timeout period specified by the client. After this timeout period expires, the server is unlocked automatically.	String that gives the status of the operation after it is performed On success the return value is "TimeOut Period Changed".	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string return- val=m_Client.Set- TimeOut(clientID, desiredTimeOut)

Get or set the timeout value

NOTE. The Fail condition for PI commands occurs in any of the following cases: The server is LOCKED and the message displayed is "Server is locked by another client". The session is UNLOCKED and the message displayed is "Lock Session to execute the command". The server is NOTFOUND and the message displayed is "Server not found...Disconnect!". When none of these fail conditions occur, then the message displayed is "Failed...".

Wait for the test to complete

The commands in this group execute while tests are running. The GetCurrentStateInfo() and SendResponse() commands are executed when the application is running and in the wait state.

Command name	Parameters	Description	Return Value	Example
ApplicationStatus()	string clientID (see page 68)	This method gets the status of the server application. The states at a given time, are Ready	String value that gives the status of the server application	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL.
		Running, Paused,		returnval as string
		<u>page 62)</u>		return- val=m_Client.Ap- plicationStatus(clien- tID)
QueryStatus()	string clientID (see page 68) out string[] status (see page 65)	An interface for the user to transfer Analyze panel status messages from the server to the client.	String that gives the status of the operation after it is performed On success the return value is "Transferred".	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string returnVal=m_Client- .QueryStatus(clien- tID, out statusMes- sages) if ((OP_STATUS)re- turnVal == OP_STA- TUS.SUCCESS) return "Status updated" else return Com- mandFailed(re-

Command name	Parameters	Description	Return Value	Example
GetCurrentState- Info() NOTE. This command is used when the application is running and is in the wait or error state.	string clientID (see page 68) out string caption (see page 66) out string message (see page 67) out string[] buttonTexts (see page 67)	This method gets the additional information of the states when the application is in Wait or Error state. Except client ID, all the others are Out parameters.	This command does not return any value. This function populates the Out parameters that are passed when invoking this function.	<pre>m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. m_Client.GetCur- rentStateInfo(clien- tID, caption,mes- sage, buttonTexts)</pre>
SendResponse() NOTE. This command is used when the application is running and is in the wait or error state.	string clientID (see page 68) out string caption (see page 66) out string message (see page 67) string response (see page 67)	After receiving the additional infor- mation using the method GetCur- rentStateInfo(), the client decides which response to send, and then sends the response to the application using this function. The response should be one of the strings that was received earlier as a string array in the GetCurrentState- Info function. The _caption and _mes- sage should match the information re- ceived earlier in the GetCurrentStateInfo function.	This command does not return any value.	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. m_Client.SendR- esponse(clientID, caption,message, response)

NOTE. The Fail condition for PI commands occurs in any of the following cases:

The server is LOCKED and the message displayed is "Server is locked by another client".

The session is UNLOCKED and the message displayed is "Lock Session to execute the command".

The server is NOTFOUND and the message displayed is "Server not found...Disconnect!".

After the test is complete

Command name	Parameters	Description	Return Value	Example
GetPassFailStatus()	string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64)	This method gets the pass or fail status of the measurement after test completion. NOTE. Execute this command after completing the measurement.	String that gives the status of the operation after it is performed Returns the pass or fail status in the form of a string	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string return- val=m_Client.Get- PassFailStatus(cli- entID, Device, Source, "Test 72.7.1.3_Signal- ing speed") //Pass or Fail
GetResultsValue()	string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64) string parameterString (see page 64)	This method gets the result values of the measurement after the run.	String that gives the status of the operation after it is performed Returns the result value in the form of a string	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as srting return- val=m_Client.Ge- tResultsValue(cli- entID, "Device", "Source", "Test 72.7.1.3_Signaling speed", "Measured Value")

GetResultsValue- ForSubMeasure- ments()string clientID (see page 68)This method gets the result values for individual sub-measurements after the run.String that gives the status of the operation after it is performedm_Client = new Client() //m_Client is a reference to the Client DLL.This method gets to individual sub-measurements after the run.String that gives the result values for individual sub-measurements after the run.String that gives the status of the operation after it is performedm_Client = new Client() //m_Client is a reference to the Client class in the Client DLL.Test 72.7.1.3_Signaling speedreturn- val=m_Client.Ge- tResultsValue- ForSubMeasure- ments(clientID, "De- vice", "Source", "Test 72.7.1.8_Max output jitter (peak-peak)",	Command name	Parameters	Description	Return Value	Example
//For DCD measure- ment on Max output	Command name GetResultsValue- ForSubMeasure- ments()	Parameters string clientID (see page 68) string device (see page 64) string suite (see page 64) string test (see page 64) string parameterString (see page 64) int rowNr (see page 64)	Description This method gets the result values for individual sub-measurements after the run.	Return Value String that gives the status of the operation after it is performed Returns the result value in the form of a string	Example m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string Test 72.7.1.3_Signaling speed return- val=m_Client.Ge- tResultsValue- ForSubMeasure- ments(ClientID, "De- vice", "Source", "Test 72.7.1.8_Max output jitter (peak-peak)", "Measured Value",0) //For DCD measure- ment on Max output
					tResultsValue- ForSubMeasure- ments(clientID, "De- vice", "Source", "Test 72.7.1.3_Signaling speed", "Measured Value",1) //For DN

Command name	Parameters	Description	Return Value	Example
GetReportParame- ter()	string clientID (see page 68) string device (see page 64) string suite (see	This method gets the general report details such as oscilloscope model, TekExpress version, and 10G-KR	The return value is the oscilloscope model, TekExpress version, and 10G-KR version.	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL.
	page 64)	version.		returnval as string
	string test (see page 64)			Oscilloscope Model
	string parameterString (see page 87)			return- val=m_Client.Ge- tReportParame- ter(clientID,"Scope Model")
				TekExpress Version
				return- val=m_Client.Ge- tReportParame- ter(clientID,"TekEx- press Version")
				10G-KR Version
				return- val=m_Client.Ge- tReportParame- ter(clientID,"Applica- tion Version")
TransferReport()	string clientID (see	This method	String that gives	m_Client = new
	<u>page 68)</u>	transfers the report	the status of the	Client() //m_Client
	string filePath (see gen page 66) run.	run.	performed	Client Class in the
		the summary of the	result values in the	returnval as string
		run. The client must provide the location where the report is to be saved at the client-end.	form of a string	return- val=m_Client.Trans- ferReport(clien- tID,"C:\Report")

Command name	Parameters	Description	Return Value	Example
TransferWave- forms()	string clientID (see page 68) string filePath (see page 66)	This method transfers all the waveforms from the folder for the current run. NOTE . <i>Each time</i>	String that gives the status of the operation after it is performed Transfers all the waveforms in the	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string
		you click Start, a folder is created on the X: drive. Transfer the waveforms before clicking Start	form of a string On success the return value is "Transferred"	return- val=m_Client.Trans- ferWaveforms(clien- tID,"C:\Waveforms")
TransferImages()	string clientID (see page 68) od string filePath (see page 66)	This method transfers all the images (screen shots) from the folder for the current run (for a given suite or measurement).	String that gives the status of the operation after it is performed Transfers all the images in the form of a string	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string
		NOTE. Each time you click Start, a folder is created in the X: drive. Transfer the waveforms before clicking Start.		return- val=m_Client.Trans- ferImages(clientID, "C:\Waveforms")

NOTE. The Fail condition for PI commands occurs in any of the following cases: The server is LOCKED and the message displayed is "Server is locked by another client". The session is UNLOCKED and the message displayed is "Lock Session to execute the command". The server is NOTFOUND and the message displayed is "Server not found...Disconnect!". When none of these fail conditions occur, then the message displayed is "Failed...".

string parameterSt	ring		
Name	Туре	Direction	Description
parameterString	string	IN	Specifies the oscilloscope model, TekExpress version, and 10G-KR version.

Save, recall, or check if a session is saved

Command name	Parameters	Description	Return Value	Example
CheckSession- Saved()	string clientID (see page 68) out bool saved (see page 63)	This method checks whether the current session is saved.	Return value is either True or False	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string
				return- val=m_Client.Check- Session- Saved(m_clientID, out savedStatus)
RecallSession()	string clientID (see page 68) string name (see page 65)	Recalls a saved session. The client provides the session name.	String that gives the status of the operation after it is performed The return value is "Session	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string
			Recalled".	return- val=m_Client.Re- callSession(clientID, savedSessionName)
SaveSession()	string clientID (see page 68) string name (see page 65)	Saves the current session. The client provides the session name.	String that gives the status of the operation after it is performed	m_Client = new Client() //m_Client is a reference to the Client class in the Client DL
			The return value is "Session Saved"/"Failed".	returnval as string returnval=m_Client- .SaveSession(clien- tID, desiredSession- Name)
SaveSessionAs()	string clientID (see page 68) string name (see page 65)	Saves the current session under a different name every time this method is called. The client provides the session name.	String that gives the status of the operation after it is performed The return value is "Session Saved".	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string returnval=m_Client-
				.SaveSessionAs(cli- entID, desiredSes- sionName)

NOTE. The Fail condition for PI commands occurs in any of the following cases: The server is LOCKED and the message displayed is "Server is locked by another client". The session is UNLOCKED and the message displayed is "Lock Session to execute the command". The server is NOTFOUND and the message displayed is "Server not found...Disconnect!". When none of these fail conditions occur, then the message displayed is "Failed...".

Unlock the server

Command name	Parameters	Description	Return Value	Example
UnlockSession()	<u>string clientID (see</u> page 68 <u>)</u>	This method unlocks the server from the client. The ID of the client to be unlocked must be provided. <u>Note (see page 66)</u>	String that gives the status of the operation after it is performed The return value is "Session Un-Locked".	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string return- val=m_Client.Un- lockServer(clientID)

NOTE. The Fail condition for PI commands occurs in any of the following cases: The server is LOCKED and the message displayed is "Server is locked by another client". The session is UNLOCKED and the message displayed is "Lock Session to execute the command". The server is NOTFOUND and the message displayed is "Server not found...Disconnect!". When none of these fail conditions occur, then the message displayed is "Failed...".

Command name	Parameters	Description	Return Value	Example
Disconnect()	<u>string clientID (see</u> page 68)	This method disconnects the client from the server. <u>Note (see page 63)</u>	Integer value that gives the status of the operation after it is performed 1 for Success –1 for Failure	m_Client = new Client() //m_Client is a reference to the Client class in the Client DLL. returnval as string return- val=m_Client.Dis- connect(m_clientID)

Disconnect from the server

NOTE. The Fail condition for PI commands occurs in any of the following cases: The server is LOCKED and the message displayed is "Server is locked by another client". The session is UNLOCKED and the message displayed is "Lock Session to execute the command". The server is NOTFOUND and the message displayed is "Server not found...Disconnect!". When none of these fail conditions occur, then the message displayed is "Failed...".

72.7.1.3 Signaling speed

Measures the signaling speed using the recommended PRBS11 signal. The 10GBASE-KR signaling speed shall be 10.3125 GBd \pm 100 ppm.

Measurement algorithm

TekExpress 10G-KR automatically executes the following measurements and calculations. This measurement is performed using DPOJET.

The input signal for this test is a PRBS11 waveform.

- 1. Compute the differential signal on Math1 = Dp Dn.
- 2. Compute Period using DPOJET with Math1 as source.
- **3.** The required result is 1/Period (mean).

See also

Connection diagram for single ended tests (see page 44) Connection diagram for differential tests (see page 44)

72.7.1.4 Differential peak-to-peak output voltage (max)

Measures the differential peak-peak output voltage (max) using the recommended PRBS11 signal. The differential output voltage is constrained via the transmitter output waveform requirements specified in 72.7.1.10 of IEEE 802.3ap. The peak-to-peak differential output voltage shall be less than 1200 mV, regardless of equalization setting. The differential output voltage test pattern shall consist of at least eight symbols of alternating polarity.

Measurement algorithm

TekExpress 10G-KR automatically executes the following measurements and calculations. This measurement is performed as described below.

The input signal for this test is a differential PRBS11 waveform.

- 1. Identify the regions with the pattern 1010 or 0101 on the input signal.
- 2. Measure the high voltage and low voltage in that region.
- 3. The voltages corresponding to the signal high regions are taken as vHigh. The voltages corresponding to the signal low are taken as vLow. Compute the peak-to-peak (V_{pk-pk}) voltage by vHigh vLow.
- 4. The V_{pk-pk} values are averaged across all regions (the required result for the differential peak to peak measurement).

See also

Connection diagram for single ended tests (see page 44) Connection diagram for differential tests (see page 44)

72.6.5 Differential peak-to-peak output voltage (max) with Tx disabled

Measures the differential peak-peak output voltage (max) with Tx disabled. The differential output voltage is constrained via the transmitter output waveform requirements specified in 72.7.1.10 of IEEE 802.3ap. The peak-to-peak differential output voltage shall be less than 1200 mV, regardless of equalization setting. The transmitter output voltage shall be less than 30 mV peak-to-peak when disabled. The differential output voltage test pattern shall consist of no fewer than eight symbols of alternating polarity.

Measurement algorithm

TekExpress 10G-KR automatically executes the following measurements and calculations. This measurement is performed as described below.

The input signal for this test is a differential PRBS11, transmitter disabled, waveform.

- 1. Measure the high voltage and low voltage in the waveform.
- 2. The voltages corresponding to the signal high regions are taken as vHigh. The voltages corresponding to the signal low are taken as vLow. Compute the peak-to-peak (V_{pk-pk}) voltage by vHigh vLow.

See also

Connection diagram for single ended tests (see page 44) Connection diagram for differential tests (see page 44)

72.7.1.4 Common mode voltage limits

Measures the common mode voltage limits using the recommended PRBS11 signal. The common-mode voltage of SL(p) and SL(n) shall be between 0 V and 1.9 V with respect to signal ground.

Measurement algorithm

TekExpress 10G-KR automatically executes the following measurements and calculations. This measurement is made using the base oscilloscope measurement.

The input signal for this test is a differential PRBS11 waveform.

- 1. Math1 = $(Dp + Dn) \div 2$. Switch off channels connected to Dp and Dn.
- 2. From the Measure menu, select Amplitude > Peak to Peak.
- 3. Select Math1 as the measurement source.
- 4. Do a single step run and measure the mean value of the histogram standard deviation. This is the measurement result.

See also

Connection diagram for single ended tests (see page 44) Connection diagram for differential tests (see page 44)

72.7.1.7 Transition time

Measures the transition time (Rise time and Fall time) using the recommended N1N0 signal where N is between 8 and 11 (inclusive). The rising and falling edge transition times shall be between 24 ps and 47 ps as measured at the 20% and 80% levels referenced to v2 and v5 as defined in 72.7.1.11 of IEEE 802.3ap. The measurement is done using the square wave test pattern with no equalization and a run of at least eight consecutive ones and zeroes.

Measurement algorithm

TekExpress 10G-KR automatically executes the following measurements and calculations. This measurement is performed as described below.

The input signal for this test is a differential N1N0 (where N lies between 8 and 11, both inclusive) waveform.

- 1. Obtain the values of the upper limit (V2) and the lower limit (V5) from the Output Waveform Characteristics measurement.
- 2. Find the position of the rising and falling edges in the input waveform.
- **3.** On each rising edge, traverse forward until the first point crossing the upper limit (80%) is found (=End) and traverse backward until the first point crossing the lower limit (20%) is found (= Start).
- **4.** On each falling edge, traverse backward until the first point crossing the upper limit (80%) is found (=Start) and traverse forward until the first point crossing the lower limit (20%) is found (=End).
- 5. Compute the Transition Time, TT (= End Start). This value is averaged across all edges.

See also

Connection diagram for single ended tests (see page 44) Connection diagram for differential tests (see page 44)

72.7.1.8 Max output jitter (peak-peak)

Measures the Max output jitter (peak-peak) using the recommended PRBS11 signal.

Jitter components are measured along with their limits:

Random jitter less than 0.15 UI (inclusive)

Random Jitter is the statistics for all timing errors not exhibiting deterministic behavior, based on the assumption that they follow a Gaussian distribution. Random Jitter is typically characterized by its standard deviation.

Deterministic jitter less than 0.15 UI (inclusive)

Deterministic Jitter is the statistics for all timing errors that follow deterministic behavior. Deterministic Jitter is typically characterized by its peak-to-peak value.

Duty cycle distortion less than 0.035 UI (inclusive)

Duty cycle distortion is the result of bit states that have different durations.

Total jitter less than 0.28 UI (inclusive)

Total Jitter at a specified Bit Error Rate (BER). This combines the Random and Deterministic effects, and predicts a peak-to-peak jitter that will only be exceeded with a probability equal to the BER.

For the jitter measurement, the effect of a single-pole high-pass filter with a 3 dB point at 4 MHz is applied to the jitter. Crossing times are defined with respect to the mid-point (0 V) of the AC-coupled differential signal. Equalization is off during jitter testing.

Transmit jitter test requirements are specified in 72.7.1.9 of IEEE 802.3ap. The transmitter shall have a maximum total jitter of 0.28 UI peak-to-peak, composed of a maximum deterministic component of 0.15 UI peak-to-peak and a maximum random component of 0.15 UI peak-to-peak. Duty cycle distortion (DCD) is considered a component of deterministic jitter and shall not exceed 0.035 UI peak-to-peak. The peak-to-peak duty cycle distortion is defined as the absolute value of the difference in the mean pulse width of a 1 pulse or the mean pulse width of a 0 pulse (as measured at the mean of the high- and low-voltage levels in a clock-like repeating 0101 bit sequence) and the nominal pulse width.

Jitter specifications are specified for BER 10-12.

Measurement algorithm (random jitter)

TekExpress 10G-KR automatically executes the following measurements and calculations. Measurements are made using the base oscilloscope measurements and DPOJET.

The input signal for this test is a differential PRBS11 waveform.

- 1. Deskew the Data+ and Data- inputs. Compute the differential signal on Math1 = Dp Dn.
- 2. Use DPOJET measurement RJ (Jitter tab) on the Math signal.

Measurement algorithm (deterministic jitter)

TekExpress 10G-KR automatically executes the following measurements and calculations. Measurements are made using the base oscilloscope measurements and DPOJET.

The input signal for this test is a differential PRBS11 waveform.

- 1. Deskew the Data+ and Data- inputs. Compute the differential signal on Math1 = Dp Dn.
- 2. Use DPOJET measurement RJ (Jitter tab) on the Math signal.

Measurement algorithm (duty cycle distortion)

TekExpress 10G-KR automatically executes the following measurements and calculations. This measurement is performed as described below.

The input signal for this test is a differential PRBS11 waveform.

- 1. Check if the input waveform pattern is a square wave test pattern.
- 2. If the input is a square wave test pattern, check for a number of continuous ones (between 8 and 11) in the test pattern.
- **3.** Estimate the UI of the waveform (UI = bit duration). Identify the edges on the input waveform and the regions with the patterns 1010 or 0101.
- **4.** Find the absolute value of the difference in the mean pulse width of a 1 pulse or the mean pulse width of a 0 pulse (from 1010 or 0101 patterns) and the nominal pulse width (estimated UI).

Measurement algorithm (total jitter)

TekExpress 10G-KR automatically executes the following measurements and calculations. Measurements are made using the base oscilloscope measurements and DPOJET.

The input signal for this test is a differential PRBS11 waveform.

- 1. Deskew the Data+ and Data- inputs. Compute the differential signal on Math1 = Dp Dn.
- 2. Use DPOJET measurement TJ@BER (Jitter tab) on the Math signal.

See also

Connection diagram for single ended tests (see page 44) Connection diagram for differential tests (see page 44)

72.7.1.10 Transmitter output waveform characteristics

Measures the output waveform characteristics using the recommended N1N0 signal where N is between 8 and 11 (inclusive).

The test pattern for the transmitter output waveform is the square wave test pattern defined in 52.9.1.2 of IEEE 802.3, with a run of at least eight consecutive ones. The transmitter output waveform test is based on the voltages v1 through v6, Δ v2, and Δ v5, which shall be measured as shown in Figure 72–12 of IEEE 802.3ap.

Measurement algorithm

TekExpress 10G-KR automatically executes the following measurements and calculations. This measurement is performed as described below.

The input signal for this test is a differential PRBS11 waveform.

- 1. Check if the input waveform pattern is a square wave test pattern.
- 2. If the input is a square wave test pattern, check for a number of continuous ones (between 8 and 11) in the test pattern.
- **3.** Determine if the starting edge is rising or falling. Depending on the result, measure the voltages v1, v2, v3, v4, v5, v6, and Rpre, Rpst according to the specification. Average the computed values across all the regions.
- 4. Compute Rpre and Rpst values from above computed voltages. Rpre = v3/v2, Rpst = v1/v2.
- 5. The values of v2 and v5 are considered as the upper and lower limits for transition time measurement.

See also

Connection diagram for single ended tests (see page 44) Connection diagram for differential tests (see page 44)

72.7.1.11a Output waveform coefficient update

Measures the output waveform coefficient update and status using the recommended N1N0 signal where N is between 8 and 11 (inclusive).

The state of the transmitter equalizer and hence the transmitter output waveform is manipulated via the protocol defined in 72.6.10 of IEEE 802.3ap or via management. The changes in the transmitter output waveform resulting from coefficient update requests shall meet the requirements stated in Table 72–7 of IEEE 802.3ap. The coefficient update requests in Table 72–7 of IEEE 802.3ap are to be followed by a coefficient update equal to hold for all taps. The results shall be verified after the coefficient status for all taps is reported as not_updated. For any coefficient update, the magnitudes of the changes in v1, v2, and v3 shall be within 5 mV of each other. When sufficient increment or decrement updates have been

applied to a given tap, it will reach a maximum or minimum limit governed by the coefficient range or by restrictions placed on minimum steady-state or maximum peak voltage, and the coefficient status is reported accordingly.

The transmitter output waveform shall meet the requirements of Table 72–8 of IEEE 802.3ap for all of the limiting cases represented in the table. Implementation of c(-1) or c(1) coefficient values greater than zero or less than the minimum defined by Rpre (min) and Rpst (min) is optional. A coefficient may be disabled by first asserting the preset control defined in IEEE 802.3 Table 45–55 and 45.2.1.78, then manipulating the other coefficients as required by the test.

Measurement algorithm

TekExpress 10G-KR automatically executes the following measurements and calculations. This measurement is performed as described below.

The input signal for this test is an N1N0 (where N lies between 8 and 11, both inclusive) waveform of the same pattern with different acquisitions captured at different states (1 through 6).

- 1. Check if each input waveform pattern is a square wave test pattern.
- 2. If the inputs are square wave test patterns, check for a number of continuous ones (between 8 and 11) in the test patterns.
- **3.** Determine if the starting edge is rising or falling. Depending on the result, measure the voltages v1, v2, v3, v4, v5, v6, and Rpre, Rpst according to the specification. Average the computed values across all the regions.
- 4. Compute Rpre and Rpst values from above computed voltages. Rpre = v3/v2, Rpst = v1/v2 for all input waveforms.
- 5. Calculate V1(k)-V1(k-1),V2(k)-V2(k-1),V3(k)-V3(k-1) for all input waveforms where K varies from 1 to 6.

See also

Connection diagram for single ended tests (see page 44) Connection diagram for differential tests (see page 44)

72.7.1.11b Output waveform coefficient status

Measures the output waveform coefficient update and status using the recommended N1N0 signal where N is between 8 and 11 (inclusive).

The state of the transmitter equalizer and hence the transmitter output waveform is manipulated via the protocol defined in 72.6.10 of IEEE 802.3ap or via management. The changes in the transmitter output waveform resulting from coefficient update requests shall meet the requirements stated in Table 72–7 of IEEE 802.3ap. The coefficient update requests in Table 72–7 of IEEE 802.3ap are to be followed by a coefficient update equal to hold for all taps. The results shall be verified after the coefficient status for all taps is reported as not_updated. For any coefficient update, the magnitudes of the changes in v1, v2, and v3 shall be within 5 mV of each other. When sufficient increment or decrement updates have been applied to a given tap, it will reach a maximum or minimum limit governed by the coefficient status is reported accordingly.

The transmitter output waveform shall meet the requirements of Table 72–8 of IEEE 802.3ap for all of the limiting cases represented in the table. Implementation of c(-1) or c(1) coefficient values greater than zero or less than the minimum defined by Rpre (min) and Rpst (min) is optional. A coefficient may be disabled by first asserting the preset control defined in IEEE 802.3 Table 45–55 and 45.2.1.78, then manipulating the other coefficients as required by the test.

Measurement algorithm

TekExpress 10G-KR automatically executes the following measurements and calculations. This measurement is performed as described below.

The input signal for this test is an N1N0 (where N lies between 8 and 11, both inclusive) waveform of same pattern with different acquisitions captured at different states (1 though 4).

- 1. Check if each input waveform pattern is a square wave test pattern.
- 2. If the inputs are square wave test patterns, check for a number of continuous ones (between 8 and 11) in the test patterns.
- **3.** Determine if the starting edge is rising or falling. Depending on the result, measure the voltages v1, v2, v3, v4, v5, v6, and Rpre, Rpst according to the specification. Average the computed values across all the regions.
- 4. Compute Rpre and Rpst values from above computed voltages. Rpre = v3/v2, Rpst = v1/v2 for all input waveforms.

See also

Connection diagram for single ended tests (see page 44) Connection diagram for differential tests (see page 44)
10G-KR protocol decoding

This solution supports KR Protocol Decode for the 64b-66b standard as defined in IEEE802.3.

NOTE. *KR* protocol decoding is only supported on oscilloscopes with the Windows 7 (64-bit) operating system.

To decode KR protocol signals:

1. Connect the test setup and acquire a valid signal with the instrument.



2. Select Vertical >Bus Setup (or Digital > Bus Setup on MSO70K series oscilloscopes) to open the Bus Setup controls.

File	Edit	Vertical	Dig	ital	Но	riz/Ac	9	Trig	Displ
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E				By	is Se	tup			
				·		• •			

3. Click the Config tab to open the Bus Setup pane.

	Bus Setup					
Config	Bus	Bus 1	Bus Type • Serial	Custom	Decoder	
Display	B1 B2	Clear Pue	Custom	KR KR_Descram	bler V	
	B3		Parallel	Components	Input	Threshold
	B4 B5	Label		Data	Ch1 🕑	V0.0
	B6	B1				
	87	0.0div				

- 4. Click Serial and select Custom from the list.
- 5. Select a Custom Decoder option:
 - **KR**: Without descrambler
 - **KR_Descrambler**: With descambler support
- 6. Enter a decoder Threshold value based on the incoming signal.
- 7. Click Bus 1 On. The oscilloscope screen displays the decoded packets.

File	Edit	Vertical	Horiz/Acq	Trig	Display	Cursors	Measure	Mask	Math	MyScope	a Analyze	Utilities	Help	-	0	SA7125	Tek	-	X
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9	B1														 				
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															0 acc	s		RL:10.0	M
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8. Click the **Display** tab to optionally select Busform and Waveform. The Protocol Decode Event Table shows the list of decoded packets. You can also access the Protocol Decode Event Table from the TekScope Analyze menu.

								Do
dex	Start Time	Sync	Inv_Sync	Block_Type	Inv_Block_Type	Data	Control	
372	-29.23u	2h		T0/c1/c2/c3/c4/c5/c6/c7			22h 11h 08h 44h 22h 11h -	Opt
073	-29.17u		0h			99999999999999999h		-
1074	-29.10u	2h		D0/D1/T2/C3/C4/C5/C6/C7		AAh AAh	2Ah /K/ 2Ah /K/ 2Ah	
1075	-29.03u	2h		D0/D1/D2/T3/C4/C5/C6/C7		BBh BBh BBh	5Dh 6Eh 77h 3Bh	C
1076	-28.97u	2h		D0/D1/D2/D3/T4/C5/C6/C7		cch cch cch cch	R1 19h 4Ch	
1077	-28.90u	2h		D0/D1/D2/D3/D4/T5/C6/C7		DDh DDh DDh DDh DDh	3Bh 5Dh	
1078	-28.84u	2h		D0/D1/D2/D3/D4/D5/T6/C7		EEH EEH EEH EEH EEH	6Eh	
1079	-28.77u	2h		D0/D1/D2/D3/D4/D5/D6/T7		FFh FFh FFh FFh FFh FFh FFh		Se
1080	-28.70u	2h		c0/c1/c2/c3/c4/c5/c6/c7			08h 44h 22h 11h 08h 44h	
1081	-28.64u	2h		c0/c1/c2/c3/04/D5/D6/D7		02h 22h 22h	11h 08h 44h 22h	
1082	-28.57u		0h			33333333333333333		C
1083	-28.51u	2h		00/D1/D2/D3/S4/D5/D6/D7		44h 44h 44h 44h 44h 44h		
1084	-28.44u	2h		00/D1/D2/D3/04/D5/D6/D7		55h 55h 55h 55h 55h 55h		
1085	-28.37u		3h			7866666666666666		3
1086	-28.31u	2h		00/D1/D2/D3/C4/C5/C6/C7		77h 77h 77h	3Bh 5Dh 6Eh 77h	
1087	-28.24u	2h		T0/c1/c2/c3/c4/c5/c6/c7			22h 11h 08h 44h 22h 11h	
1088	-28.18u		0h			99999999999999999h		
1089	-28.11u	2h		D0/D1/T2/C3/C4/C5/C6/C7		AAh AAh	2Ah /K/ 2Ah /K/ 2Ah	
1090	-28.04u	2h		D0/D1/D2/T3/C4/C5/C6/C7		66h 66h 66h	5Dh 6Eh 77h 3Bh	
1091	-27.98u	2h		D0/D1/D2/D3/T4/C5/C6/C7		cch cch cch cch	R1 19h 4Ch	
1092	-27.91u	2h		D0/D1/D2/D3/D4/T5/C6/C7		DDh DDh DDh DDh DDh	3Bh 5Dh	
1093	-27.85u	2h		D0/D1/D2/D3/D4/D5/T6/C7		EEh EEh EEh EEh EEh	6Eh	
1094	-27.78u	2h		D0/D1/D2/D3/D4/D5/D6/T7		FFh FFh FFh FFh FFh FFh FFh		
1095	-27.71u	2h		c0/c1/c2/c3/c4/c5/c6/c7			08h 44h 22h 11h 08h 44h	
1096	-27.65u	2h		C0/C1/C2/C3/O4/D5/D6/D7		02h 22h 22h	11h 08h 44h 22h	
1097	-27.58u		0h			33333333333333333		
1098	-27.52u	2h		00/D1/D2/D3/S4/D5/D6/D7		44h 44h 44h 44h 44h 44h		
1099	-27.45u	2h		00/D1/D2/D3/04/D5/D6/D7		55h 55h 55h 55h 55h 55h		
100	-27.38u		3h			78666666666666666		
1101	-27.32u	2h		00/D1/D2/D3/C4/C5/C6/C7		77h 77h 77h	3Bh 5Dh 6Eh 77h	
102	-27.25u	2h		T0/C1/C2/C3/C4/C5/C6/C7			22h 11h 08h 44h 22h 11h	
103	-27.19u		0h			99999999999999999h		
104	-27.12u	2h		D0/D1/T2/C3/C4/C5/C6/C7		AAh AAh	2Ah /K/ 2Ah /K/ 2Ah	
105	-27.05u	2h		D0/D1/D2/T3/C4/C5/C6/C7		BBh BBh BBh	5Dh 6Eh 77h 3Bh	
106	-26.99u	2h		D0/D1/D2/D3/T4/C5/C6/C7		cch cch cch cch	R1 19h 4Ch	
1107	-26.92u	2h		D0/D1/D2/D3/D4/T5/C6/C7		DDh DDh DDh DDh DDh	3Bh 5Dh	

- 9. Click Export to save the packet information to a .csv format file.
- 10. Select Analyze > Search in the TekScope application to enable searching on the various packet fields.



11. Click on **Bus** in the Type field.

	Search - Se	elect							All Searches X
Select	Edge	Glitch	Width	Setun/Hold	DDR Read	🔽 Ali	Туре	Source	
					(⊡ 1 ▼	Bus	B1:Custom 🕞	Mark
Configure								l 🕑	
Results	Bus	Runt	Window	Pattern	DDR Write				
3.6			(Ing						Set/Clr
view									Bring Cursor to Mark
Mode		Transition	Timeout	State	DDR Read & Write				
			(H)						Cursor 1 Cursor 2
							Clear		Bring Zoom to Mark
							Selected	Clear All	Zoom 2 Zoom 3

12. Click the Configure tab and select the packet type to search for from the Search For list.

	Search	- Config	gure				
Solort	All	Туре	Source	e	Custom Bus	Search For	
JUILON	₩1 ▼	Bus	B1:Custom		KR	Sync	•
Configure				-		Inv_Sync	
						Block_Type	
Results						Inv_Block_Type	
View						O_Code	
						Inv_O_Code	
Mode						Start	
						Terminate	
		Copy				Data	
		Setting	IS			Control	

13. Select Data in the Search For list to search on the specific data fields.



14. Use the **Radix** and **Data** fields to specify the data for which to search. The application highlights the search results on the instrument graticule.

File Edit Vertical Horiz/Acq Trig Display Curs	ors Measure Mask Math MyScope	Analyze Utilities Help 🔽	osariosacTek 📃 🔀

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		, a fa fa fa fa fa fa fa	ja ya ya ya ya ya t
C1 200mV/div 50Ω B _W :12.5G Z1G1 200mV 10.0ns -40.8µs -40.7µs		A' C1 / 4.0mV	20.0µs/div 50.0GS/s 20.0ps/pt Preview Single Seq
			0 acqs RL:10.0M Man November 22, 2012 04:00:32

15. Click the **Results** tab to show the list of search results.

	Re	sul	ts: Mai	rk Table									
Select			Index	Тире	Source	Location		Ti	me Del	ta		Description	1
		-	179	Bus	B1: Custom	-41 749us	Sec	 	us 000	ns 007	ps 999	Data	•
Configure			180	Bus	B1: Custom	-41.741us	000	000	000	008	000	Data	
		Z1	181	Bus	B1: Custom	-40.767us	000	000	000	974	000	Data	-
Results			182	Bus	B1: Custom	-40.759us	000	000	000	007	999	Data	
			183	Bus	B1: Custom	-40.751us	000	000	000	008	000	Data	
Miew			184	Bus	B1: Custom	-39.777us	000	000	000	974	002	Data	-
Mode		Use	er Marks	s in Table		∆Z1,Z2 ∆Z2,Z3 ∆Z1,Z3						Total Marks: 612	
		S	et (Clear									
		Set All Clear All			Digits >>>			<< Digits				Export	

16. Click on items in the list to display the associated waveform on the instrument graticule.

Fik	Edi	t <u>V</u> ertical	H <u>o</u> riz/Acq	Trig	<u>D</u> isplay	<u>C</u> ursors	Mea <u>s</u> ure	Mas <u>k</u>	Math	M <u>v</u> Scope	<u>A</u> nalyze	Ltilities	Help		DS	A71254C	Tek		X
ľ	M	fi fi fi fi	1111	M	nî	înî	(M)	nr	1/1			^س ر				1) ^م	
0	28%th:	Control rese	erved3 2AI	h: Cont	rol resen	/ed3 2/	Ah:C			BBh:Da	ata (BB	ih:Data	BBh:Data	Bh: /T/	5Dh: C	6Eh: Contr	rol 77h: Ca	ntrol 3E	Bh: C
		UUU	UUU			ŲŲ	JUU	5							UIU		UU		Ę
	C1	200mV/div	v l	50Ω ^B	w:12.5G							A' (1	_ / 4.0mV		20.0µs	/div 50.0G	SS/s	20.0ps/p	pt
	Z1C1) 200mV 1	0.0ns -40	.8µs -/	10.7µs										Previe 0 acqs	w s	Single Sec R	L:10.0M	
															Man	Novembe	er 22, 2012	2 04:00	0:59

17. Click **Export** to save the search results to a .csv format file.

De-embed using filter files

TekExpress 10G-KR provides an option to de-embed the signal path using filter files. You create the filter files. The filter files are .flt files composed of de-embed filter coefficients for a particular sampling rate. A filter file created for one sampling rate might not work for other sampling rates, so it is important to understand at what sampling rate the measurements are being performed.

Also, the de-embedding filters might differ based on the type of input. For example, if a single ended input is made via a matched SMA cable pair, a filter file for de-embedding a single SMA cable needs to be provided, since matched SMA cables mostly have similar s-parameters. So in this case, the same filter file would be used for de-embedding the SMA cable pair.

The maximum sampling rate provided on any channel combination on MSO/DPO/DSA70000 A and B series oscilloscopes is 50 GS/s in realtime mode. The maximum sampling rate provided on Ch1-Ch3 and Ch2-Ch4 channel combinations on MSO/DPO/DSA70000 C and D series oscilloscopes is 100 GS/s, provided only 2 channels are switched on at a given time.

See also

Common test parameters and values (see page 30) Configure tests (see page 30)

Deskew channels

If skew is present between positive and negative channels, then the channels need to be deskewed before being used for waveform measurements. TekExpress 10G-KR provides support for channel deskew 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 10G-KR, 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.
- 8. Click Read Deskew/Attn.
- 9. When the status in the dialog box indicates the deskew is finished, click Close.

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.

See also

Select acquisitions (see page 28) Prerun checklist (see page 51)

DPOJET option 10G-KR plug-in

The TekExpress 10G-KR installation process allows you to also install the 10G-KR option plug-in to the TekScope DPOJET application.

By installing this plug-in, you'll be able to use the DPOJET analysis tools that will allow you much greater flexibility to make changes to the 10G-KR tests and explore other configurations to help you in your particular test environment.

If the 10G-KR DPOJET plug-in is installed, the 10G-KR is added to the plug-in section of the <u>TekScope</u> <u>Analyze menu (see page 109)</u> and the standard is added to the DPOJET Jitter and Eye Diagram Analysis Tools. Selecting the 10G-KR plug-in option launches DPOJET and displays the Standard menu. The <u>TekScope Help menu (see page 110)</u> is also updated to include the help topic 10G-KR MOI (Methods of Implementation).



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Using the DPOJET 10G-KR plug-in

1. In the TekScope Analyze menu, select 10G-KR. This launches DPOJET and displays the Select > Standard menu.

Jitter and I	Eye Diagrai	m Analysis To	ools					Preferences 💽	Clear	8
Select	Period/ Freg	Standard	10G-KR		•		Measurement	Source(s)	Recalc	${\bf A} {\bf A}$
Configure	Jitter	Test Point	None	selected	Setup	Clear Selected			Single	
Results	Time	Wfm-V5	Wfm-dV2	KR-DCD	Wfm-RPre	<u> </u>			Run	
	Eye	Mfm M6	Wife divis	DataBata		Clear All				
Plots	Ampi				More					
Reports	Standard									

2. Click the Setup button. This opens a browsing window. Navigate to the 10G-KR folder in the DPOJET/Setups folder. 10G-KR setup files are pre-loaded during installation.

📻 Recall				×
🖉 🖉 – 🚺 « TekApplicati	ions > DPOJET > Setups > 10G-KR	👻 🍫 Search	10G-KR	٩
Organize 🔻 New folder			= -	1 0
🔶 Favorites	Name	Date modified	Туре	Size
📃 Desktop	10G-KR_N1N0.set	6/9/2012 10:11 PM	SET File	
🐌 Downloads 📃	KR_Tx_PRBS11.set	6/9/2012 10:11 PM	SET File	
📃 Recent Places 🛑	KR_Tx_PRBS31.set	6/9/2012 10:11 PM	SET File	
📤 Google Drive				
🎐 Ghost Install (eiw				
🥽 Libraries				
Documents				
J Music				
Pictures				
🛃 Videos				
🌉 Computer 🛛 👻 🗸		III		F.
File nam	e:	✓ setup file	es (*.set)	-
		Oper	Can	cel

- **3.** Select a setup file. selecting a setup file populates the Measurement and Source(s) window with the 10G-KR measurements based on the setup file selected.
- **4.** Now you can use the DPOJET settings and configurations to make adjustments to the test parameters to meet your testing or debugging needs.

Refer to the TekScope online help for detailed information about using DPOJET.

Jitter and Eye Diagram Analysis Tools Preferences 💽										Clear 🗴
Select	Period/ Freq	Standard	10G-KR		•		Measurement KR Fall-Time1	Source(s)		Recalc
Configure	Jitter	Test Point	None	selected	Setup	Clear Selected	Wfm-V1 1 Wfm-V2 1	Ref1		Single
Results	Time	Wfm-V5	Wfm-dV2	KR-DCD	Wfm-RPre	Clear All	Wfm-V3 1 Wfm-V4 1	Ref1	-	Run
Plots	Ampl	Wfm-V6	Wfm-dV5	DataRate	More	Clear All	Wfm-V5 1 Wfm-V6 1	Ref1		
Reports	Standard						Wfm-dV2 1 Wfm-dV5 1	Ref1		

5. Select RUN to start the test.

Table 10: 10G-KR measurements map to DPOJET and 10G-KR DPOJET Plug-in measurements

10G-KR measurements	DPOJET and 10G-KR measurements (DPOJET Standard tab: Standard set to 10G-KR)				
72.7.1.3 Signaling speed	Standard tab:	Data rate			
72.7.1.4 Differential peak-to-peak output voltage (max)	Standard tab:	Vpk-pk			
72.6.5 Differential peak-to-peak output voltage (max) with Tx disabled					
72.7.1.7 Transition time	Standard tab:	KR Rise-Time KR Fall-Time			

10G-KR measurements	DPOJET and 10G-KR measurements (DPOJET Standard tab: Standard set to 10G-KR)			
72.7.1.8 Max output jitter (peak-peak)	Jitter tab:	RJ DJ TJ@BER		
	Standard tab:	KR-DCD		
72.7.1.10 Transmitter output waveform characteristics72.7.1.11a Output waveform coefficient update72.7.1.11b Output waveform coefficient status	Standard tab:	Square wave voltages: Wfm-V1 Wfm-V2 Wfm-V3 Wfm-V4 Wfm-V5 Wfm-V6 Wfm-V6 Wfm-dV2 Wfm-dV5		
	(v1 + v4)/v1 ratio is measured by Wfm-V1V4R. (v2 + v5)/v2 ratio is measured by Wfm-V2V5R. (v3 + v5)/v3 ratio is measured by Wfm-V3V5R. Rpre and Rpst are measured by Wfm-RPre and Wfm-RPost respectively.			

Table 10: 10G-KR measurements map to DPOJET and 10G-KR DPOJET Plug-in measurements (cont.)

Map the My TekExpress folder

Follow these steps to map the My TekExpress folder on the instrument:

- 1. Open Windows Explorer.
- 2. From the Windows Explorer menu, click Computer.
- 3. In the menu bar, select Map network drive.
- 4. Select the Drive letter as X: (if there is any previous connection on X:, disconnect it first through Tools > Disconnect Network drive menu of Windows Explorer. Windows 7 users: if you do not see the Tools menu, press the Alt key).
- 5. In the Folder field, enter the remote My TekExpress folder path (for example, \\192.158.97.65\ My TekExpress).

To determine the IP address of the instrument where the My TekExpress folder exists, do the following:

- 1. On the instrument where the My TekExpress folder exists, click Start and select Run.
- 2. Type "cmd" and then press Enter.
- 3. At the command prompt, type "ipconfig" and then press Enter.

See also

Before you click start (see page 49) Install the software (see page 3)

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