Keysight U7250A MIPI C-PHY Compliance Application

KEYSIGHT TECHNOLOGIES

Programmer's Reference

Notices

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CAUTION

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WARNING

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In This Book

This book is your guide to programming the Keysight Technologies U7250A MIPI C-PHY Compliance Application.

- Chapter 1, “Introduction to Programming,” starting on page 7, describes compliance application programming basics.
- Chapter 2, “Configuration Variables and Values,” starting on page 9, Chapter 3, “Test Names and IDs,” starting on page 25, and Chapter 4, “Instruments,” starting on page 31, provide information specific to programming the U7250A MIPI C-PHY Compliance Application.

How to Use This Book

Programmers who are new to compliance application programming should read all of the chapters in order. Programmers who are already familiar with this may review chapters 2, 3, and 4 for changes.

Contents

1 Introduction to Programming

This chapter introduces the basics for remote programming a compliance application. The programming commands provide the means of remote control. Basic operations that you can do remotely with a computer and a compliance app running on an oscilloscope include:

- Launching and closing the application.
- Configuring the options.
- Running tests.
- Getting results.
- Controlling when and were dialogs get displayed
- Saving and loading projects.

You can accomplish other tasks by combining these functions.

Remote Programming Toolkit

The majority of remote interface features are common across all the Keysight Technologies, Inc. family of compliance applications. Information on those features is provided in the N5452A Compliance Application Remote Programming Toolkit available for download from Keysight here: www.keysight.com/find/rpi. The U7250A MIPI C-PHY Compliance Application uses Remote Interface Revision 3.50. The help files provided with the toolkit indicate which features are supported in this version.

In the toolkit, various documents refer to "application-specific configuration variables, test information, and instrument information". These are provided in Chapters 2, 3, and 4 of this document, and are also available directly from the application's user interface when the remote interface is enabled (View>Preferences::Remote tab::Show remote interface hints). See the toolkit for more information.

2 Configuration Variables and Values

The following table contains a description of each of the U7250A MIPI C-PHY Compliance Application options that you may query or set remotely using the appropriate remote interface method. The columns contain this information:

- GUI Location – Describes which graphical user interface tab contains the control used to change the value.
- Label – Describes which graphical user interface control is used to change the value.
- Variable – The name to use with the SetConfig method.
- Values – The values to use with the SetConfig method.
- Description – The purpose or function of the variable.

For example, if the graphical user interface contains this control on the **Set Up** tab:

- Enable Advanced Features

then you would expect to see something like this in the table below:

Table 1 Example Configuration Variables and Values

GUI Location	Label	Variable	Values	Description
Set Up	Enable Advanced Features	EnableAdvanced	True, False	Enables a set of optional features.

and you would set the variable remotely using:

```
ARSL syntax
-----------
arsl -a ipaddress -c "SetConfig 'EnableAdvanced' 'True'"

C# syntax
```

```
---------
remoteAte.SetConfig("EnableAdvanced", "True");
```

Here are the actual configuration variables and values used by this application:

NOTE Some of the values presented in the table below may not be available in certain configurations. Always perform a "test run" of your remote script using the application's graphical user interface to ensure the combinations of values in your program are valid.

NOTE The file, "ConfigInfo.txt", which may be found in the same directory as this help file, contains all of the information found in the table below in a format suitable for parsing.

Table 2 Configuration Variables and Values

GUI Location	Label	Variable	Values	Description
Configure	Acquisition Points[HS Tests]	HSTestAcqPoints	(Accepts user-defined text), 100E+3, 200E+3, 300E+3, 500E+3, 1E+6, 2E+6	Enter the acquisition points for all HS tests. Set it such that at least one complete cycle of LP to HS transition, HS burst sequence and HS to LP transition are captured within the sampling window. The actual sampling window length when running all the HS tests is determined based on this acquisition points value together with the corresponding sampling rate used. Sampling Window = [Acquisition point] / [Sampling Rate] For example; If the acqusition points is set to 1 Mpts and the sampling rate used is 20GSa/s, then the Sampling Window = 50us.
Configure	Acquisition Points[LP Escape Tests]	LPEscapeTestAcqPoints	1E+6, 2E+6	Enter the acquisition points for all LP Escape tests. Set it such that at least one complete cycle of LP Escape sequence is captured within the sampling window. The actual sampling window length when running all the LP Escape tests is determined based on this acquisition points value together with the corresponding sampling rate used. Sampling Window = [Acquisition point] / [Sampling Rate] For example; If the acqusition points is set to 2Mpts and the sampling rate used is 20GSa/s, then the Sampling Window = 100us.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Acquisition Points[LP Tests]	LPTestAcqPoints	3.2E+3, 6.4E+3	Enter the acquisition points for all LP tests except LP Escape tests. Set it such that only one transition is captured within the sampling window. The actual sampling window length when running all the LP tests(except LP Escape tests) is determined based on this acquisition points value together with the corresponding sampling rate used. Sampling Window = [Acquisition point] / [Sampling Rate] For example; If the acqusition points is set to 3.2kpts and the sampling rate used is 20GSa/s, then the Sampling Window = 160ns.
Configure	CdrCPHY Timeout [ms]	CdrCPHY_UDF_Timeout	(Accepts user-defined text), 300000, 150000, 100000, 10000	Specify the timeout setting used for CdrCPHY UDF to generate CDR waveform data. This option is specify as a whole number in mili-seconds (does not accept decimal point values) with a minimum of 1000 ms.
Configure	Export Tested Waveform Data	RawDataExport	non, all, bin, wfm	Specifies whether to export waveform data that used in the test. Selecting to export will cause the tests take slightly longer time to complete.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Eye Diagram Display - Horizontal Center Position(UI)	EyeDiagramCenterPos_VOD_VOHHS	0, 0.5	This config is used to determine how the eye diagram is displayed on the screen. The C-PHY eye pattern is a triggered eye where the right side of the eye is aligned at a trigger point. The trigger point is the first zero crossing of any of the three differential waveforms (A minus B, B minus C, and C minus A) that occur at each UI boundary. By default, this value is set to 0UI, hence the trigger point will be centered on the display. If 0.5UI option is selected, the eye will be centered on the display by shifting the trigger point 0.5UI to the right. This config is only applicable for 1.2.7 HS-TX Differential Voltages(VOD) and 1.2.9 HS-TX Single-Ended Output High Voltages(VOHHS) tests.
Configure	HS Differential Threshold[T3-PREPARE, TREOT]	HSDifferentialThreshold_T3PREPARE_TREOT	(Accepts user-defined text), 0.048, 0.070	This config is used determine the end point of T3_PREPARE Duration and start point of TREOT. This config is only applicable to Test 1.2.2 T3-PREPARE Duration and Test 1.2.17 TREOT.
Configure	HS Differential Threshold[THS-EXIT]	HSDifferentialThreshold_THSEXIT	(Accepts user-defined text), 0.070	This config is used determine the start point of THS-EXIT. This config is only applicable to Test 1.2.18 THS-EXIT Value.
Configure	HS Single Ended Threshold	HSSingleEndedThreshold	(Accepts user-defined text), 0.225, 0.23, 0.25	This is the voltage level that will be used to identify the edges of single-ended HS signal. The default value of HS threshold is the expected Vcptx value. The C-PHY specification recommends 0.225-0.250V. This option only affects HS tests.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	HS Symbol Rate Check	HSDataRateCheck	1, 0	Enable this setting to perform HS symbol rate verification when running the HS tests. Select "Disable" to skip the HS symbol rate verification process. This option is applicable for all HS tests except Test 1.2.17 TREOT and Test 1.2.18 THS-EXIT Value.
Configure	High Threshold [Window Trigger]	WindowTriggerHighThreshold	(Accepts user-defined text), 0.6	High trigger level used.
Configure	Histogram Result	HistogramMeasResult	MODE, MEAN	Select the histogram statistical result to be used in VOL and VOH tests.
Configure	Interpolation Factor[VOD,VOHHS]	InterpolationFactor_VOD_VOHHS	OFF, INT2, INT4, INT8, INT16	Specify the interpolation factor to be used when loading waveform file for eye diagram generation. This config is only applicable for 1.2.7 HS-TX Differential Voltages(VOD) and 1.2.9 HS-TX Single-Ended Output High Voltages(VOHHS) tests.
Configure	LP Observations	NumLPElectricalTestObservation	(Accepts user-defined text), 10	Number of LP measurement instances to be observed.
Configure	LP Trigger Threshold	LPTriggerThreshold	(Accepts user-defined text), 0.55	Trigger level for LP edges, set it such that it will not trigger wrongly on HS. The C-PHY specification recommends 0.550-0.740.
Configure	Low Threshold [Window Trigger]	WindowTriggerLowThreshold	(Accepts user-defined text), -0.1	Low trigger level used.
Configure	Lower Threshold[tR, tF](V)	HSTransTimeLowerThreshold	(Accepts user-defined text), -0.058	Identifies the lower threshold for rise/fall time measurement. This config is only applicable to Test 1.2.14 HS-TX Rise Time (tR) and Test 1.2.15 HS-TX Fall Time (tF).

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Manual Vertical Max voltage level	MaxVoltageLevel	(Accepts user-defined text), 1.50	Determine the max voltage level for each channel. This value will be observed only when Signal Scaling Mode is MANUAL. The C-PHY specification for VOH recommends 0.95 - 1.30V. This value should be greater than VOH to allow some headroom. Default value is 1.50V.
Configure	Manual Vertical Min voltage level	MinVoltageLevel	(Accepts user-defined text), -0.40	Determine the min voltage level for each channel. This value will be observed only when Signal Scaling Mode is MANUAL. The C-PHY specification for VOL recommends -0.05 - 0.05V. This value should be greater than VOL to allow some headroom. Default value is -0.40V.
Configure	Maximum Trip-level Threshold	MaxTripLevelThreshold	(Accepts user-defined text), 0.790	Specify the maximum trip-level threshold used for pulse width and period measurement for Exclusive-OR Clock. The default value is 790mV. This config is only applicable to Test 1.1.6 LP-TX Pulse Width of Exclusive-OR Clock(TLP-PULSE-TX) and Test 1.1.7 LP-TX Period of Exclusive-OR Clock (TLP-PER-TX).
Configure	Minimum Trip-level Threshold	MinTripLevelThreshold	(Accepts user-defined text), 0.500	Specify the minimum trip-level threshold used for pulse width and period measurement for Exclusive-OR Clock. The default value is 500mV. This config is only applicable to Test 1.1.6 LP-TX Pulse Width of Exclusive-OR Clock(TLP-PULSE-TX) and Test 1.1.7 LP-TX Period of Exclusive-OR Clock (TLP-PER-TX).

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Minimum VA LP-High State Length	MinVALPHighStateLength	(Accepts user-defined text), 500e-9, 1.50e-6	Specify the minimum VA LP-High State Length which will be used for Window triggering in Test 1.2.17 30%-85% Post-EoT Rise Tme(TREOT) and Test 1.2.18 THS-EXIT Value tests. The default value is 1.5 µs. This config is only applicable to Test 1.2.17 30%-85% Post-EoT Rise Tme(TREOT) and Test 1.2.18 THS-EXIT Value tests.
Configure	Minimum Valid HS Length	MinValidHSLength	(Accepts user-defined text), 500e-9, 1.50e-6	Specify the minimum valid HS Length which will be used for Window triggering for all HS tests. Set this value to avoid extremely short HS stream. The default value is 1.5 µs. This config is applicable to all HS Tests except Test 1.2.17 30%-85% Post-EoT Rise Tme(TREOT) and Test 1.2.18 THS-EXIT Value tests.
Configure	Scope Sampling Rate	ScopeSampleRate	10e9, 20e9, 40e9	The scope sampling rate. Default value is 20GSa/s.
Configure	Signal Scaling Mode	SignalScalingMode	AUTO, MANUAL	Set signal scaling to AUTO or MANUAL mode. AUTO: Use the scope autoscale to determine the vertical range of each channel. Only for signals with LP and HS intervals less than 60ms. MANUAL: Set the vertical range for each channel based on the manual vertical max and min voltage level settings. "MANUAL" mode is used as default setting for Signal Scaling Mode because "AUTO" mode does not work for all test signals. For example, "AUTO" mode does not work for test signal with long HS-burst that is more than 60ms.
Configure	Slew rate test CLoad(pF)	SlewrateCLoad	(Accepts user-defined text), 0, 5, 20, 70	Load capacitance to determine the LP Slew Rate min and max values.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Strong0 Threshold(V)	Strong0ThresLevel	(Accepts user-defined text), -0.1985	Identifies the threshold level of Strong 0 state. The default value of Strong Zero Threshold(V) = (-0.3 + (-0.097))/2 = -0.1985V. This config is only applicable to Test 1.2.14 HS-TX Rise Time (tR) and Test 1.2.15 HS-TX Fall Time (tF).
Configure	Strong1 Threshold(V)	Strong1ThresLevel	(Accepts user-defined text), 0.1985	Identifies the threshold level of Strong 1 state. The default value of Strong One Threshold(V) = (0.3 + 0.097)/2 = 0.1985V. This config is only applicable to Test 1.2.14 HS-TX Rise Time (tR) and Test 1.2.15 HS-TX Fall Time (tF).
Configure	Upper Threshold[tR, tF](V)	HSTransTimeUpperThreshold	(Accepts user-defined text), 0.058	Identifies the upper threshold for rise/fall time measurement. This config is only applicable to Test 1.2.14 HS-TX Rise Time (tR) and Test 1.2.15 HS-TX Fall Time (tF).
Configure	UseWfmFile(Must be hidden)	UseWfmFile	(Accepts user-defined text), 0.0, 1.0	For supporting offline
Configure	VA	VAChan	CHAN1, CHAN2, CHAN3, CHAN4	Identifies the oscilloscope channels probing VA signal.
Configure	VB	VBChan	CHAN1, CHAN2, CHAN3, CHAN4	Identifies the oscilloscope channels probing VB signal.
Configure	VC	VCChan	CHAN1, CHAN2, CHAN3, CHAN4	Identifies the oscilloscope channels probing VC signal.
Configure	VIH(min)	VIHMin	(Accepts user-defined text), 0.740	VIH(min) is used to determine the ending point for TREOT. The default value for VIH(min) is 740m. Please see C-Phy specification for the allowable value. This config is only applicable to Test 1.2.17 30%-85% Post-EoT Rise Time(TREOT).

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	VIL(max)	VILMax	(Accepts user-defined text), 0.550	VIL(max) is used to determine: -start and end point of TLPX Duration measurement -start point of T3-PREAPARE Duration measurement -end point of THS-EXIT Value measurement The default value for VIH(min) is 550m. Please see C-Phy specification for the allowable value. This config is only applicable to Test 1.2.1 TLPX Duration, Test 1.2.2 T3-PREPARE and Test 1.2.18 THS-EXIT Value.
Configure	VOD Histogram Window Width(UI)	VODHistogramWindowWidth	(Accepts user-defined text), 0.01, 0.02, 0.05	This config is used to specify the histogram window width for VOD measurement. Increase the histogram window width to avoid performing VOD measurements on the vertical gap of the eye diagram generated from signal that doesn't contain dither. For example, if 0.05UI is selected, - the histogram is placed at a location that is 0.20UI to (0.20+0.05)UI before the trigger point for 1.2.7 HS-TX Differential Voltages (VOD-Weak1) and 1.2.7 HS-TX Differential Voltages (VOD-Weak0) tests. - the histogram is placed at a location that is (0.20-0.05)UI to 0.20UI before trigger point for 1.2.7 HS-TX Differential Voltages (VOD-Strong1) and 1.2.7 HS-TX Differential Voltages (VOD-Strong0) tests. This config is only applicable for Test 1.2.7 HS-TX Differential Voltages(VOD).
Configure	VOD(Strong0, Weak0) Histogram Window[Bottom](V)	VODTestStrong0Weak0HistogramWindowBottom	(Accepts user-defined text), -5	This config is used to specify the bottom limit of the histogram window for VOD-Strong0 and VOD-Weak0 measurement. This config is only applicable to Test 1.2.7 HS-TX VOD-Strong0 and Test 1.2.7 HS-TX VOD-Weak0.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	VOD(Strong0, Weak0) Histogram Window[Top](V)	VODTestStrong0Weak0HistogramWindowTop	(Accepts user-defined text), 0	This config is used to specify the top limit of the histogram window for VOD-Strong0 and VOD-Weak0 measurement. This config is only applicable to Test 1.2.7 HS-TX VOD-Strong0 and Test 1.2.7 HS-TX VOD-Weak0.
Configure	VOD(Strong1, Weak1) Histogram Window[Bottom](V)	VODTestStrong1Weak1HistogramWindowBottom	(Accepts user-defined text), 0	This config is used to specify the bottom limit of the histogram window for VOD-Strong1 and VOD-Weak1 measurement. This config is only applicable to Test 1.2.7 HS-TX VOD-Strong1 and Test 1.2.7 HS-TX VOD-Weak1.
Configure	VOD(Strong1, Weak1) Histogram Window[Top](V)	VODTestStrong1Weak1HistogramWindowTop	(Accepts user-defined text), 5	This config is used to specify the top limit of the histogram window for VOD-Strong1 and VOD-Weak1 measurement. This config is only applicable to Test 1.2.7 HS-TX VOD-Strong1 and Test 1.2.7 HS-TX VOD-Weak1.
Configure	VOHHS Histogram Window Width(UI)	VOHHSHistogramWindowWidth	(Accepts user-defined text), 0.01, 0.02, 0.05	This config is used to specify the histogram window width for VOHHS measurement. Increase the histogram window width to avoid performing VOHHS measurements on the vertical gap of the eye diagram generated from signal that doesn't contain dither. For example, if 0.05UI is selected, the histogram is placed at a location that is at (0.20 ± 0.025)UI before the trigger point. This config is only applicable to Test 1.2.9 HS-TX Single-Ended Output High Voltages(VOHHS).
Configure	VOHHS Histogram Window[Bottom](V)	VOHHSTestHistogramWindowBottom	(Accepts user-defined text), 0.3	This config is used to specify the bottom limit of the histogram window for VOHHS measurement. This config is only applicable to Test 1.2.9 HS-TX Single-Ended Output High Voltages(VOHHS) tests.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	VOHHS Histogram Window[Top](V)	VOHHSTestHistogramWindowTop	(Accepts user-defined text), 1.0	This config is used to specify the top limit of the histogram window for VOHHS measurement. This config is only applicable to Test 1.2.9 HS-TX Single-Ended Output High Voltages(VOHHS) tests.
Configure	Weak0 Threshold(V)	Weak0ThresLevel	(Accepts user-defined text), -0.0485	Identifies the threshold level of Weak 0 state. The default value of Weak Zero Threshold(V) = (-0.097 + 0)/2 = -0.0485V. This config is only applicable to Test 1.2.14 HS-TX Rise Time (tR) and Test 1.2.15 HS-TX Fall Time (tF).
Configure	Weak1 Threshold(V)	Weak1ThresLevel	(Accepts user-defined text), 0.0485	Identifies the threshold level of Weak 1 state. The default value of Weak One Threshold(V) = (0.097 + 0)/2 = 0.0485V. This config is only applicable to Test 1.2.14 HS-TX Rise Time (tR) and Test 1.2.15 HS-TX Fall Time (tF).
Run Tests	Event	RunEvent	(None), Fail, Margin < N, Pass	Names of events that can be used with the StoreMode=Event or RunUntil RunEventAction options
Run Tests	RunEvent=Margin < N: Minimum required margin %	RunEvent_Margin < N_MinPercent	Any integer in range: 0 <= value <= 100	Specify N using the 'Minimum required margin %' control.
Set Up	Data Type	posDataType	HS Burst Data, LP Escape ONLY	This option allow user to select the C-PHY data type.
Set Up	DeviceID	DeviceID	(Accepts user-defined text)	Device ID
Set Up	HS Symbol Rate	HSDataRate	(Accepts user-defined text)	Enter the HS Symbol Rate. The CPHY Data Rate is ~ 2.28x the HS Symbol Rate. Enter the HS Symbol Rate. The CPHY Data Rate is ~ 2.28x the HS Symbol Rate.
Set Up	HSBurstModeHSExitTest_VAWfmFile	HSBurstModeHSExitTest_VAWfmFile	(Accepts user-defined text)	Saved VA waveform file for Tests 1.3.14 TREOT. This option is applicable only for Offline Mode. Saved VA waveform file for Tests 1.3.14 TREOT. This option is applicable only for Offline Mode.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Set Up	HSBurstModeHSExitTest_VBWfmFile	HSBurstModeHSExitTest_VBWfmFile	(Accepts user-defined text)	Saved VB waveform file for Tests 1.3.14 TREOT. This option is applicable only for Offline Mode. Saved VB waveform file for Tests 1.3.14 TREOT. This option is applicable only for Offline Mode.
Set Up	HSBurstModeHSExitTest_VCWfmFile	HSBurstModeHSExitTest_VCWfmFile	(Accepts user-defined text)	Saved VC waveform file for Tests 1.3.14 TREOT. This option is applicable only for Offline Mode. Saved VC waveform file for Tests 1.3.14 TREOT. This option is applicable only for Offline Mode.
Set Up	HSBurstModeTest_VAWfmFile	HSBurstModeTest_VAWfmFile	(Accepts user-defined text)	Saved VA waveform file for all HS Burst Mode test except Tests 1.3.14 TREOT. This option is applicable only for Offline Mode. Saved VA waveform file for all HS Burst Mode tests except Test 1.3.14 TREOT. This option is applicable only for Offline Mode.
Set Up	HSBurstModeTest_VBWfmFile	HSBurstModeTest_VBWfmFile	(Accepts user-defined text)	Saved VB waveform file for all HS Burst Mode test except Tests 1.3.14 TREOT. This option is applicable only for Offline Mode. Saved VB waveform file for all HS Burst Mode test except Tests 1.3.14 TREOT. This option is applicable only for Offline Mode.
Set Up	HSBurstModeTest_VCWfmFile	HSBurstModeTest_VCWfmFile	(Accepts user-defined text)	Saved VC waveform file for all HS Burst Mode test except Tests 1.3.14 TREOT. This option is applicable only for Offline Mode. Saved VC waveform file for all HS Burst Mode test except Tests 1.3.14 TREOT. This option is applicable only for Offline Mode.
Set Up	LPEscapeMode	pcbLPEscapeData	0.0, 1.0	This option allow user to select LP Data Escape mode.
Set Up	LPEscapeModeTest_VAWfmFile	LPEscapeModeTest_VAWfmFile	(Accepts user-defined text)	Saved VA waveform file for all LP Escape Mode tests. This option is applicable only for Offline Mode. Saved VA waveform file for all LP Escape Mode tests. This option is applicable only for Offline Mode.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Set Up	LPEscapeModeTest_VBWfmFile	LPEscapeModeTest_VBWfmFile	(Accepts user-defined text)	Saved VB waveform file for all LP Escape Mode tests. This option is applicable only for Offline Mode. Saved VB waveform file for all LP Escape Mode tests. This option is applicable only for Offline Mode.
Set Up	LPEscapeModeTest_VCWfmFile	LPEscapeModeTest_VCWfmFile	(Accepts user-defined text)	Saved VC waveform file for all LP Escape Mode tests. This option is applicable only for Offline Mode. Saved VC waveform file for all LP Escape Mode tests. This option is applicable only for Offline Mode.
Set Up	LPVohTest_AllWfmFolder	LPVohTest_AllWfmFolder	(Accepts user-defined text)	Saved folder path that contain Waveform Files for Test 1.1.2 LP-TX Thevenin Output High Voltage(VOH). This option is applicable only for Offline Mode. Saved folder path that contain Waveform Files for Test 1.1.2 LP-TX Thevenin Output High Voltage(VOH). This option is applicable only for Offline Mode.
Set Up	LPVolTfTest_AllWfmFolder	LPVolTfTest_AllWfmFolder	(Accepts user-defined text)	Saved folder path that contain Waveform Files for Test 1.1.2 LP-TX Thevenin Output Low Voltage(VOL) and Test 1.1.4 LP-TX 15%-85% Fall Time(TRLP). This option is applicable only for Offline Mode. Saved folder path that contain Waveform Files for Test 1.1.2 LP-TX Thevenin Output Low Voltage(VOL) and Test 1.1.4 LP-TX 15%-85% Fall Time(TRLP). This option is applicable only for Offline Mode.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Set Up	UserComment	UserComment	(Accepts user-defined text)	User Comment
Set Up	pcbInformativeTests	pcbInformativeTests	0.0, 1.0	This option allow user to enable or disable the informative tests. The informative tests include Test 1.1.1 LP-TX Thevenin Output High Level Voltage(VOH), Test 1.1.2 LP-TX Thevenin Output Low Level Voltage(VOL) and Test 1.1.4 LP-TX 15%-85% Fall Time(TFLP) tests. This option allow user to enable or disable the informative tests. The informative tests include Test 1.1.1 LP-TX Thevenin Output High Level Voltage(VOH), Test 1.1.2 LP-TX Thevenin Output Low Level Voltage(VOL) and Test 1.1.4 LP-TX 15%-85% Fall Time(TFLP) tests.

3 Test Names and IDs

The following table shows the mapping between each test's numeric ID and name. The numeric ID is required by various remote interface methods.

- Name – The name of the test as it appears on the user interface **Select Tests** tab.
- Test ID – The number to use with the RunTests method.
- Description – The description of the test as it appears on the user interface **Select Tests** tab.

For example, if the graphical user interface displays this tree in the **Select Tests** tab:

- All Tests
  - Rise Time
  - Fall Time

then you would expect to see something like this in the table below:

Table 3 Example Test Names and IDs

Name	Test ID	Description
Fall Time	110	Measures clock fall time.
Rise Time	100	Measures clock rise time.

and you would run these tests remotely using:

```
ARSL syntax
-----------
arsl -a ipaddress -c "SelectedTests '100,110'"
arsl -a ipaddress -c "Run"

C# syntax
---------
remoteAte.SelectedTests = new int[]{100,110};
remoteAte.Run();
```

Here are the actual Test names and IDs used by this application:

NOTE The file, "TestInfo.txt", which may be found in the same directory as this help file, contains all of the information found in the table below in a format suitable for parsing.

Table 4 Test IDs and Names

Name	TestID	Description
1.1.1 LP-TX Thevenin Output High Level Voltage (VOH)	101	Thevenin Output High Level Voltage (VOH) is measured as the mode of all waveform samples that are greater than 50% of the absolute peak-to-peak signal amplitude.
1.1.1 LP-TX Thevenin Output High Level Voltage (VOH) ESCAPEMODE	100	Thevenin Output High Level Voltage (VOH) ESCAPEMODE is measured as the mode of all waveform samples that are greater than 50% of the absolute peak-to-peak signal amplitude.
1.1.2 LP-TX Thevenin Output Low Level Voltage (VOL)	201	Thevenin Output Low Level Voltage (VOL) is measured as the mode of all waveform samples that are less than 50% of the absolute peak-to-peak signal amplitude.
1.1.2 LP-TX Thevenin Output Low Level Voltage (VOL) ESCAPEMODE	200	Thevenin Output Low Level Voltage (VOL) ESCAPEMODE is measured as the mode of all waveform samples that are less than 50% of the absolute peak-to-peak signal amplitude.
1.1.3 LP-TX 15%-85% Rise Time (TRLP) ESCAPEMODE	300	15%-85% Rise Time (TRLP) ESCAPEMODE
1.1.4 LP-TX 15%-85% Fall Time (TFLP)	401	15%-85% Fall Time (TFLP)
1.1.4 LP-TX 15%-85% Fall Time (TFLP) ESCAPEMODE	400	15%-85% Fall Time (TFLP) ESCAPEMODE
1.1.5 LP-TX Slew Rate vs. CLOAD (FallEdgeMax)	503	Slew Rate vs. CLOAD (FallEdgeMax) measurement across the entire falling edge. Note: Please set the value of 'Slew rate test Cload' in the configuration tab before running the test.
1.1.5 LP-TX Slew Rate vs. CLOAD (FallEdgeMin)	504	Slew Rate vs. CLOAD (FallEdgeMin) measurement across 400mV-790mV regions of falling edges.
1.1.5 LP-TX Slew Rate vs. CLOAD (RiseEdgeMargin)	502	Slew Rate vs. CLOAD (RiseEdgeMargin) measurement across the 550mV-790mV region of rising edges.
1.1.5 LP-TX Slew Rate vs. CLOAD (RiseEdgeMax)	500	Slew Rate vs. CLOAD (RiseEdgeMax) measurement across the entire rising edge. Note: Please set the value of 'Slew rate test Cload' in the configuration tab before running the test.
1.1.5 LP-TX Slew Rate vs. CLOAD (RiseEdgeMin)	501	Slew Rate vs. CLOAD (RiseEdgeMin) measurement across the 400mV-550mV regions of rising edges.
1.1.6 LP-TX Pulse Width of Exclusive-OR Clock (TLP-PULSE-TX)	600	Pulse Width of Exclusive-OR Clock (TLP-PULSE-TX)
1.1.6 LP-TX Pulse Width of Exclusive-OR Clock (TLP-PULSE-TX) [Initial]	601	Pulse Width of Exclusive-OR Clock (TLP-PULSE-TX) [Initial]

Table 4 Test IDs and Names (continued)

Name	TestID	Description
1.1.7 LP-TX Period of Exclusive-OR Clock (TLP-PER-TX)[Falling-to-Falling]	701	Period of Exclusive-OR Clock (TLP-PER-TX)[Falling-to-Falling]
1.1.7 LP-TX Period of Exclusive-OR Clock (TLP-PER-TX)[Rising-to-Rising]	700	Period of Exclusive-OR Clock (TLP-PER-TX)[Rising-to-Rising]
1.2.1 TLPX Duration	1100	The duration of the final LP-001 state immediately before HS transmission. TLPX duration is measured from the time where the VA falling edge crosses below the maximum low level LP threshold,VIL,MAX(550mV) and ending at the time where the VC falling edge crosses below VIL,MAX(550mV).
1.2.10 HS-TX Static Common-Point Voltages (VCPTX_HS_+X)	2000	Static Common-Point Voltages (VCPTX_HS_+X)
1.2.10 HS-TX Static Common-Point Voltages (VCPTX_HS_+Y)	2002	Static Common-Point Voltages (VCPTX_HS_+Y)
1.2.10 HS-TX Static Common-Point Voltages (VCPTX_HS_+Z)	2004	Static Common-Point Voltages (VCPTX_HS_+Z)
1.2.10 HS-TX Static Common-Point Voltages (VCPTX_HS_-X)	2001	Static Common-Point Voltages (VCPTX_HS_-X)
1.2.10 HS-TX Static Common-Point Voltages (VCPTX_HS_-Y)	2003	Static Common-Point Voltages (VCPTX_HS_-Y)
1.2.10 HS-TX Static Common-Point Voltages (VCPTX_HS_-Z)	2005	Static Common-Point Voltages (VCPTX_HS_-Z)
1.2.11 HS-TX Static Common-Point Voltage Mismatch (ΔVCPTX(HS))	2100	Static Common-Point Voltage Mismatch (ΔVCPTX(HS))
1.2.12 HS-TX Dynamic Common-Point Variations Between 50-450MHz (ΔVCPTX(LF))	2200	Dynamic Common-Point Variations Between 50-450MHz (ΔVCPTX(LF))
1.2.13 HS-TX Dynamic Common-Point Variations Above 450MHz (ΔVCPTX(HF))	2300	Dynamic Common-Point Variations Above 450MHz (ΔVCPTX(HF))
1.2.14 HS-TX Rise Time (tR) [1.5Gsps and below]	2400	Rise Time (tR) [1.5Gsps and below]
1.2.14 HS-TX Rise Time (tR) [above 1.5Gsps]	2401	Rise Time (tR) [above 1.5Gsps]
1.2.15 HS-TX Fall Time (tF) [1.5Gsps and below]	2500	Fall Time (tF) [1.5Gsps and below]
1.2.15 HS-TX Fall Time (tF) [above 1.5Gsps]	2501	Fall Time (tF) [above 1.5Gsps]

Table 4 Test IDs and Names (continued)

Name	TestID	Description
1.2.17 30%-85% Post-EoT Rise Time (TREOT)	2700	30%-85% Post-EoT Rise Time (TREOT) is measured from the time where the differential signal last crosses +/-48mV, and ends where VA signal crosses VIH,MIN(740mV).
1.2.18 THS-EXIT Value	2800	The duration that the Data Lane transmitter remains in the LP-111(stop) state after exiting HS mode(THS-EXIT). THS-EXIT is measured from the time where the differential signal crosses below the minimum valid HS-RX differential thershold level(+/-70mV) and ends at the time where the VA LP-001 falling edge crosses VIL,MAX(550mV) during the next successive HS burst.
1.2.19 HS Clock Instantaneous UI (UIINST_Max)	2900	HS Clock Instantaneous UI (UIINST_Max)
1.2.2 T3-PREPARE Duration	1200	The duration of the final LP000 state immediately before HS transmission. T3-PREPARE Duration is measured from the time where the VC signal crossed below VIL,MAX(550mV) and ends at the beginning of the first HS state where the differential signal crosses above minimum valid HS-0 differential threshold level(+/-48mV).
1.2.20 HS Clock Delta UI (ΔUI) [1Gsps and below]	3000	HS Clock Delta UI (ΔUI) [1Gsps and below]
1.2.20 HS Clock Delta UI (ΔUI) [above 1Gsps]	3001	HS Clock Delta UI (ΔUI) [above 1Gsps]
1.2.7 HS-TX Differential Voltages (VOD-AB-Strong0) [Min]	1703	Minimum of Differential Voltages (VOD-AB-Strong0)
1.2.7 HS-TX Differential Voltages (VOD-AB-Strong1) [Max]	1700	Maximum of Differential Voltages (VOD-AB-Strong1)
1.2.7 HS-TX Differential Voltages (VOD-AB-Weak0) [Max]	1702	Maximum of Differential Voltages (VOD-AB-Weak0)
1.2.7 HS-TX Differential Voltages (VOD-AB-Weak1) [Min]	1701	Minimum of Differential Voltages (VOD-AB-Weak1)
1.2.7 HS-TX Differential Voltages (VOD-BC-Strong0) [Min]	1713	Minimum of Differential Voltages (VOD-BC-Strong0)
1.2.7 HS-TX Differential Voltages (VOD-BC-Strong1) [Max]	1710	Maximum of Differential Voltages (VOD-BC-Strong1)
1.2.7 HS-TX Differential Voltages (VOD-BC-Weak0) [Max]	1712	Maximum of Differential Voltages (VOD-BC-Weak0)
1.2.7 HS-TX Differential Voltages (VOD-BC-Weak1) [Min]	1711	Minimum of Differential Voltages (VOD-BC-Weak1)
1.2.7 HS-TX Differential Voltages (VOD-CA-Strong0) [Min]	1723	Minimum of Differential Voltages (VOD-CA-Strong0)

Table 4 Test IDs and Names (continued)

Name	TestID	Description
1.2.7 HS-TX Differential Voltages (VOD-CA-Strong1) [Max]	1720	Maximum of Differential Voltages (VOD-CA-Strong1)
1.2.7 HS-TX Differential Voltages (VOD-CA-Weak0) [Max]	1722	Maximum of Differential Voltages (VOD-CA-Weak0)
1.2.7 HS-TX Differential Voltages (VOD-CA-Weak1) [Min]	1721	Minimum of Differential Voltages (VOD-CA-Weak1)
1.2.8 HS-TX Differential Voltage Mismatch (ΔVOD)	1800	Differential Voltage Mismatch (ΔVOD)
1.2.9 HS-TX Single-Ended Output High Voltages (VOHHS(VA))	1900	Mean of Single-Ended Output High Voltages (VOHHS(VA))
1.2.9 HS-TX Single-Ended Output High Voltages (VOHHS(VB))	1901	Mean of Single-Ended Output High Voltages (VOHHS(VB))
1.2.9 HS-TX Single-Ended Output High Voltages (VOHHS(VC))	1902	Mean of Single-Ended Output High Voltages (VOHHS(VC))

4 Instruments

The following table shows the instruments used by this application. The name is required by various remote interface methods.

- Instrument Name — The name to use as a parameter in remote interface commands.
- Description — The description of the instrument.

For example, if an application uses an oscilloscope and a pulse generator, then you would expect to see something like this in the table below:

Table 5 Example Instrument Information

Name	Description
scope	The primary oscilloscope.
Pulse	The pulse generator used for Gen 2 tests.

and you would be able to remotely control an instrument using:

```
ARSL syntax (replace [description] with actual parameter)
------------------------------------------------------------------------
arsl -a ipaddress -c "SendScpiCommandCustom 'Command=[scpi
command];Timeout=100;Instrument=pulsegen'"

arsl -a ipaddress -c "SendScpiQueryCustom 'Command=[scpi
query];Timeout=100;Instrument=pulsegen'"


C# syntax (replace [description] with actual parameter)
------------------------------------------------------------------------
SendScpiCommandOptions commandOptions = new SendScpiCommandOptions();
commandOptions.Command = "[scpi command]";
commandOptions.Instrument = "[instrument name]";
commandOptions.Timeout = [timeout];
remoteAte.SendScpiCommand(commandOptions);

SendScpiQueryOptions queryOptions = new SendScpiQueryOptions();
queryOptions.Query = "[scpi query]";
queryOptions.Instrument = "[instrument name]";
```

```
queryOptions.Timeout = [timeout];
remoteAte.SendScpiQuery(queryOptions);
```

Here are the actual instrument names used by this application:

NOTE The file, "InstrumentInfo.txt", which may be found in the same directory as this help file, contains all of the information found in the table below in a format suitable for parsing.

Table 6 Instrument Names

Instrument Name	Description
scope	The primary oscilloscope.

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