Keysight D90103CKC IEEE 802.3 ck Compliance Application

KEYSIGHT

PROGRAMMER'S REFERENCE

Notices

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CAUTION

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In This Book

This book is your guide to programming the Keysight Technologies D90103CKC IEEE 802.3 ck 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 35 provide information specific to programming the D90103CKC IEEE 802.3 ck 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

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This chapter introduces the basics for remote programming a compliance/test application. The programming commands provide the means of remote control. Basic operations that you can do remotely with a computer and a compliance/test 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/test 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 D90103CKC IEEE 802.3 ck Compliance Application uses Remote Interface Revision 7.12. 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 D90103CKC IEEE 802.3 ck 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	Auto-Tune Prerequisite - J3u	J3uPre	(Accepts user-defined text), 0.115	Set the value of J3u for Auto-tune
Configure	Auto-Tune Prerequisite - JRMS	JRMSPre	(Accepts user-defined text), 0.023	Set the value of JRMS for Auto-tune
Configure	Auto-Tune Prerequisite - RLM	RLMPre	(Accepts user-defined text), 0.98	Set the value of RLM for Auto-tune
Configure	Auto-Tune Prerequisite - SNDR	SNDRPre	(Accepts user-defined text), 32.5	Set the value of SNDR for Auto-tune

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Auto-Tune Prerequisites	AutoPre	Measured, User, Default	For auto-tune, there are 4 prerequisite measurements (J3u, JRMS, SNDR, and RLM). These measurements are best done at TP0v. Many transmitters will supply these results. When the "Measured" option is selected, the application will make these measurements at the end of the channel and use the best fit results. When "User Entry" is selected, the application will use the values entered for the config variables below. When "Default Jitter" is selected, then jitter will default to the best values and SNDR and RLM will be measured. This option decreases test time with minimal impact on outcome.
Configure	Auto-tune Tx FEE source	ATFFESource	Scope, DUT	Select where FFE is applied for auto-tune. Optimal transmitter FFE is calcuated during Auto-tune. User can select to have the scope use the values found, or set DUT FFE.
Configure	Bandwidth	BW	(Accepts user-defined text), 50e9	Enter the scope bandwidth.
Configure	Clock Recovery Method	CRMethod	FOPLL, SOPLL	Select the Cock Recovery Method to be used.
Configure	Damping Factor	DFactor	(Accepts user-defined text), 1	Enter the Damping Factor to use for clock recovery. This values is only used for Second Order PLL. You may enter any value.
Configure	Disable Pattern Check	DisablePattern	Enable, Disable	Select "Disable" to disable the pattern verification for square 8 pattern tests and suppress pattern error pop-ups. Select "Enable" to ensure that the correct pattern is being tested as per specification.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Disable SNDR Pre-requisites	DisSNDRPre	Enabled, Disabled	Sigma n and ES1/ES2 are pre-requisite measurements to SNDR. If you want to skip these pre-requisites and enter a user sigma-n value, Select "Disable". ES1/ES2 will be set to 0.33.
Configure	Dp	DpVal	(Accepts user-defined text), 2, 3, 4	Set the Dp value used for steady state, linear fit pulse peak, and error calculations.
Configure	Eye Gaussian Standard Deviation	EyeStd	(Accepts user-defined text), 2	Select or set the standard deviation used in eye measurements (EH, EW, VEC) when gaussian window shape is used.
Configure	Eye Height/Width Probability	NumUI	(Accepts user-defined text), 1e-5, 1e-6, 1e-15	Select the eye probability to test to for Eye Height and Width tests.
Configure	Eye Level Width	EyeLevWidth	(Accepts user-defined text), 5, 10	Select the eye level width used in eye measurements (EH, EW, VEC).
Configure	Eye Window Shape	EyeWinShape	GAUSsian, BOXCar	Select the eye window shape used in eye measurements (EH, EW, VEC).
Configure	Find Scope Optimal FFE	ScopeOptFFE	OFF, ON	Select to automatically find the optimal FFE with the scope at the start of the run. Use Test Tx FFE source to set whether FFE will be applied in the scope or the Tx. Note: this is not used for auto-tune. This is for debugging only using FFE for testing.
Configure	Jitter Edge Count	JitCount	(Accepts user-defined text), 200, 10000	Set the number of edges for jitter to start measuring results. Note: lower value than the default of 10000 will not be as accurate and consistent. However, will enable quick results.
Configure	Jitter Pattern	JitPat	(Accepts user-defined text), P9Q, P13Q, Other	Select PRBS13Q or PRBS9Q to test jitter. Select Other for PRBS13Q pattern that not only swapped the 3/2 (as defined by grey code), but also the 0/1.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Loop Bandwidth	LoopBandwidth	(Accepts user-defined text), 4e6, 10e6, 10.3035e6	Enter the loop bandwidth to use for clock recovery. Value with automatically scale with signaling rate change. Manually set to desired value if different from autoset.
Configure	Measure Tfx Delay Method (ERL)	MeasureTfxDelayMethod	COM, User	This is for test point TP0v only. Select "COM" to have the COM measure the fixture delay time (Tfx) and apply in ERL calculation. If you select "User Provided", enter the value that you would like to use.
Configure	Measure Tfx Delay Method (Reference ERL)	MeasureRefERLTfxDelayMethod	COM, User	This is for test point TP0v only. Select "COM" to have the COM measure the fixture delay time (Tfx) and apply in Ref ERL calculation. If you select "User Provided", enter the value that you would like to use.
Configure	Nb	NbVal	(Accepts user-defined text), 6, 10, 12, 13, 14, 16	Set the Nb value used for steady state, linear fit pulse peak, and error calculations.
Configure	NbSNRISI	NbSNRISIVal	(Accepts user-defined text), 6, 10, 12, 13, 14, 16	Set the Nb value used for SNRISI calculations.
Configure	Np	NpVal	(Accepts user-defined text), 8, 12, 13, 14, 29, 200	Set the Np value used for used for SNDR and SNR_ISI calculations.
Configure	Number of FFE precursors	NumFFEPre	(Accepts user-defined text), 3	Set the number of FFE Precursors to use in scope optimization. Note: this is not used for auto-tune. This is for debugging only using FFE for testing.
Configure	Number of FFE taps	NumFFETaps	(Accepts user-defined text), 5	Set the number of FFE Taps to use in scope optimization. Note: this is not used for auto-tune. This is for debugging only using FFE for testing.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Nv	NvVal	(Accepts user-defined text), 8, 12, 13, 14, 29, 200	Set the Nv value used for steady state, linear fit pulse peak, and error calculations.
Configure	Optimize CTLE options	MeasureAll	COMOnly, FineTune	For auto-tune, you can select how much CTLE tuning to do. This greating impacts the auto-tune test time. "COM Only" will use a pulse response and COM to calculate the optimal FFE,CTLE,DFE settings. Then directly use the COM results. "Fine Tune" will use a pulse response and COM to calculation the optimal FFE,CTLE,DFE settings. Then check a few steps up and down of CTLE to fine tune CTLE setting.
Configure	Sample Rate	SR	(Accepts user-defined text), 80e9	Enter the scope sample rate.
Configure	Save Tested Waveforms	SaveWFM	No, Yes	Select Yes to save the waveform files of the tested signals. Files will be saved to directory set in Select waveform directory.
Configure	Scope Response	ScopeResp	BESSEL4, BUTT, WALL	Select the Scope Response. A selection of 4th order Bessel will better represent a reference reciever. A flat response will give a direct look at the exact signal at the test point.
Configure	Scope Response 3dB frequency	ScopeFreq	33e9, 40e9, 43e9, 75, 50e9, 63e9, 80e9	Select the Scope Response 3dB frequency. Note: a selection of 75% of Baud Rate will automatically calculate the valued based on the Baud Rate.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Select Eye for Auto-Tune	WhichEye	(Accepts user-defined text), 0, 1, 2, 3, 4, 5	Select which eye or eye combination is used for auto-tune selection. Eye 0 will use the results of Eye 0 only. Eye 1 will use the results of Eye 1 only. Eye 2 will use the results of Eye 2 only. Average All will use the average value of all three eyes. Min Height\Width - Max VEC will use the min eye height of the three eyes and the max VEC. (Note: the min/max opposite for height and VEC is because a min height is worse and max VEC is worse) Max Height\Width - Min VEC will use the max eye height of the three eyes and the min VEC. (Note: the min/max opposite for height and VEC is because a max height is better and min VEC is better)
Configure	Select Waveform Directory	DirWFM	(Accepts user-defined text), C:\Temp\IEEEwfm	Type in a directory path to save your measured waveforms.
Configure	Sigma N	SigmaN	(Accepts user-defined text), 2e-3	Enter the value to use for Sigma N. This value will be used when SNDR pre-req are disabled. Format 0.002 or 2e-3.
Configure	Signal Channels	CHANPAIR	1, 2, Channel 1 and 2, Channel 3 and 4, CHANnel1, CHANnel2, CHANnel3, CHANnel4, 3, 4, WMEMory1, WMEMory2, WMEMory3, WMEMory4, FUNCtion1, FUNCtion2, FUNCtion3, FUNCtion4	Select the oscllloscope input channel pair if connected dual single-ended. Or select the channel used for differential connection. All single channel, waveform memories, or functions that contain the word "differential", must be a single probe or signal that is differential. The channel or waveform memories with two channels are for dual single-ended connections. Note: All functions must be differential.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Signaling Rate	SignalingRate	(Accepts user-defined text), 10.3125e9, 25.78125e9, 26.5625e9, 53.125e9	Set the Signaling Rate to be tested. Enter value in the format 10.3125e9.
Configure	Start value for Far-end CTLE utility for Eye Opening TP4 Long	StartFarCTLELong	-2, -3, -4, -5, -6, -7, -8, -9	Select the starting Far-end CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from this start value, to the stop value set in the next config.
Configure	Start value for Far-end CTLE utility for Eye Opening TP4 Short	StartFarCTLE	-2, -3, -4, -5, -6, -7, -8, -9	Select the starting Far-end CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from this start value, to the stop value set in the next config.
Configure	Start value for Far-end gDC2 CTLE auto-tune TP4 Long	StartFarCTLEgDC2Long	-1, -1.5, -2, -2.5, -3	Select the starting CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from this start value, to the stop value set in the next config.
Configure	Start value for Far-end gDC2 CTLE auto-tune TP4 Short	StartFarCTLEgDC2	-1, -1.5, -2, -2.5, -3	Select the starting CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from this start value, to the stop value set in the next config.
Configure	Start value for Near-end gDC CTLE auto-tune TP4 Long	StartNearCTLELong	-1, -2, -3, -4, -5	Select the starting CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from this start value, to the stop value set in the next config.
Configure	Start value for Near-end gDC CTLE auto-tune TP4 Short	StartNearCTLEShort	-1, -2, -3, -4, -5	Select the starting CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from this start value, to the stop value set in the next config.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Start value for Near-end gDC2 CTLE auto-tune TP4 Long	StartNearCTLEgDC2Long	0, -0.5, -1, -1.5, -2	Select the starting CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from this start value, to the stop value set in the next config.
Configure	Start value for Near-end gDC2 CTLE auto-tune TP4 Short	StartNearCTLEgDC2Short	0, -0.5, -1, -1.5, -2	Select the starting CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from this start value, to the stop value set in the next config.
Configure	Start value for gDC CTLE auto-tune TP1a	StartCTLE	-2, -3, -4, -5, -6, -7, -8, -9, -10, -11	Select the starting CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from this start value, to the stop value set in the next config.
Configure	Start value for gDC2 CTLE auto-tune TP1a	StartCTLEgDC2	0, -0.5, -1, -1.5, -2, -2.5, -3	Select the starting CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from this start value, to the stop value set in the next config.
Configure	Stop value for Far-end CTLE utility for Eye Opening TP4 Long	StopFarCTLELong	-3, -4, -5, -6, -7, -8, -9	Select the last Far-end CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from this start value, to the stop value set in the next config.
Configure	Stop value for Far-end CTLE utility for Eye Opening TP4 Short	StopFarCTLE	-3, -4, -5, -6, -7, -8, -9	Select the last Far-end CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from this start value, to the stop value set in the next config.
Configure	Stop value for Far-end gDC2 CTLE auto-tune TP4 Long	StopFarCTLEgDC2Long	-1.5, -2, -2.5, -3	Select the last CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from start value selected in the previous config, to the stop value set here.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Stop value for Far-end gDC2 CTLE auto-tune TP4 Short	StopFarCTLEgDC2	-1.5, -2, -2.5, -3	Select the last CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from start value selected in the previous config, to the stop value set here.
Configure	Stop value for Near-end gDC CTLE auto-tune TP4 Long	StopNearCTLELong	-2, -3, -4, -5	Select the last CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from start value selected in the previous config, to the stop value set here.
Configure	Stop value for Near-end gDC CTLE auto-tune TP4 Short	StopNearCTLEShort	-2, -3, -4, -5	Select the last CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from start value selected in the previous config, to the stop value set here.
Configure	Stop value for Near-end gDC2 CTLE auto-tune TP4 Long	StopNearCTLEgDC2Long	-0.5, -1, -1.5, -2	Select the last CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from start value selected in the previous config, to the stop value set here.
Configure	Stop value for Near-end gDC2 CTLE auto-tune TP4 Short	StopNearCTLEgDC2Short	-0.5, -1, -1.5, -2	Select the last CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from start value selected in the previous config, to the stop value set here.
Configure	Stop value for gDC CTLE auto-tune TP1a	StopCTLE	-3, -4, -5, -6, -7, -8, -9, -10, -11	Select the last CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from start value selected in the previous config, to the stop value set here.
Configure	Stop value for gDC2 CTLE auto-tune TP1a	StopCTLEgDC2	-0.5, -1, -1.5, -2, -2.5, -3	Select the last CTLE setting to use for the "Auto-Tune" test. The test will test the range of settings from start value selected in the previous config, to the stop value set here.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Switch Matrix Scope Channels	CHANPAIR2	3, 4	This configuration variable is automatically set. This is for information purposes, to show the user which channels were selected in the setup tab.
Configure	Test Tx FEE source	FFESource	Scope, DUT	Select where FFE is applied for eye tests. Optimal transmitter FFE is calcuated during Auto-tune. User can select to have the scope use the values found, or set DUT FFE.
Configure	Tfx Delay for TP0v (ERL)	TfxTP0v	(Accepts user-defined text), 0	Select the value of fixture delay time for TP0v. This is for ERL measurement. The fixture delay time (Tfx) is twice the propagation delay in ns associated with the test fixture. Please enter value in the format 2e-9.
Configure	Tfx Delay for TP0v (Reference ERL)	RefERLTfxTP0v	(Accepts user-defined text), 0	Select the value of fixture delay time for TP0v. This is for Ref ERL measurement. The fixture delay time (Tfx) is twice the propagation delay in ns associated with the test fixture. Please enter value in the format 2e-9.
Configure	Tfx Delay for TP1a	TfxTP1a	(Accepts user-defined text), 0	Select the value of fixture delay time for TP1a. This is for ERL measurement. The fixture delay time (Tfx) is twice the propagation delay in ns associated with the test fixture. Please enter value in the format 2e-9.
Configure	Tfx Delay for TP2	TfxTP2	(Accepts user-defined text), 0	Select the value of fixture delay time for TP2. This is for ERL measurement. The fixture delay time (Tfx) is twice the propagation delay in ns associated with the test fixture. Please enter value in the format 2e-9.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Tfx Delay for TP4	TfxTP4	(Accepts user-defined text), 0	Select the value of fixture delay time for TP4. This is for ERL measurement. The fixture delay time (Tfx) is twice the propagation delay in ns associated with the test fixture. Please enter value in the format 2e-9.
Configure	Tx pattern	SNDRPat	PRBS13Q, PRBS13Qu, Other, OtherInv	Select the pattern to be used for SNDR, Coefficient, and DFE calculations. NOTE: This pattern is NOT for Jitter measurements. Due to specific edge definitions for the 12 edges, PRBS13Q grey code or PRBS9Q gray code are required. Use jitter pattern configuration for jitter selection. "PRBS13Q" is the specified PRBS13Q grey code signal. "PRBS13Q Uncoded" is PRBS13Q uncoded. "Other" is a PRBS13Q pattern that not only swapped the 3/2 (as defined by grey code), but also the 0/1. "Other Inv" is the inverse of "Other"
Configure	Use Optimized CTLE gDC for Eye Opening TP1a.	UseCTLE	-2, -3, -4, -5, -6, -7, -8, -9, -10, -11	Select the optimized setting to use. Default is off. Run "Auto-tune" Test under "Utilities" to find the optimal setting. When the utility is run, it will automatically set the optimal setting. This value will only be automatically set if utility is run any time after app load or if project is loaded with setting. All other instances, the setting will be the default of off and will need to be manually selected.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Use Optimized CTLE gDC for Far-end Eye Opening TP4 Long.	UseFarCTLELong	-2, -3, -4, -5, -6, -7, -8, -9	Select the optimized setting to use. Default is off. Run "Auto-tune" Test under "Utilities" to find the optimal setting. When the utility is run, it will automatically set the optimal setting. This value will only be automatically set if utility is run any time after app load or if project is loaded with setting. All other instances, the setting will be the default of off and will need to be manually selected.
Configure	Use Optimized CTLE gDC for Far-end Eye Opening TP4 Short.	UseFarCTLE	-2, -3, -4, -5, -6, -7, -8, -9	Select the optimized setting to use. Default is off. Run "Auto-tune" Test under "Utilities" to find the optimal setting. When the utility is run, it will automatically set the optimal setting. This value will only be automatically set if utility is run any time after app load or if project is loaded with setting. All other instances, the setting will be the default of off and will need to be manually selected.
Configure	Use Optimized CTLE gDC for Near-end Eye Opening TP4 Long.	UseNearCTLELong	-1, -2, -3, -4, -5	Select the optimized setting to use. Default is off. Run "Auto-tune" Test under "Utilities" to find the optimal setting. When the utility is run, it will automatically set the optimal setting. This value will only be automatically set if utility is run any time after app load or if project is loaded with setting. All other instances, the setting will be the default of off and will need to be manually selected.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Use Optimized CTLE gDC for Near-end Eye Opening TP4 Short.	UseNearCTLEShort	-1, -2, -3, -4, -5	Select the optimized setting to use. Default is off. Run "Auto-tune" Test under "Utilities" to find the optimal setting. When the utility is run, it will automatically set the optimal setting. This value will only be automatically set if utility is run any time after app load or if project is loaded with setting. All other instances, the setting will be the default of off and will need to be manually selected.
Configure	Use Optimized CTLE gDC2 for Eye Opening TP1a.	UseCTLEgDC2	0, -0.5, -1, -1.5, -2, -2.5, -3	Select the optimized setting to use. Default is off. Run "Auto-tune" Test under "Utilities" to find the optimal setting. When the utility is run, it will automatically set the optimal setting. This value will only be automatically set if utility is run any time after app load or if project is loaded with setting. All other instances, the setting will be the default of off and will need to be manually selected.
Configure	Use Optimized CTLE gDC2 for Far-end Eye Opening TP4 Long.	UseFarCTLEgDC2Long	-1, -1.5, -2, -2.5, -3	Select the optimized setting to use. Default is off. Run "Auto-tune" Test under "Utilities" to find the optimal setting. When the utility is run, it will automatically set the optimal setting. This value will only be automatically set if utility is run any time after app load or if project is loaded with setting. All other instances, the setting will be the default of off and will need to be manually selected.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Use Optimized CTLE gDC2 for Far-end Eye Opening TP4 Short.	UseFarCTLEgDC2	-1, -1.5, -2, -2.5, -3	Select the optimized setting to use. Default is off. Run "Auto-tune" Test under "Utilities" to find the optimal setting. When the utility is run, it will automatically set the optimal setting. This value will only be automatically set if utility is run any time after app load or if project is loaded with setting. All other instances, the setting will be the default of off and will need to be manually selected.
Configure	Use Optimized CTLE gDC2 for Near-end Eye Opening TP4 Long.	UseNearCTLEgDC2Long	0, -0.5, -1, -1.5, -2	Select the optimized setting to use. Default is off. Run "Auto-tune" Test under "Utilities" to find the optimal setting. When the utility is run, it will automatically set the optimal setting. This value will only be automatically set if utility is run any time after app load or if project is loaded with setting. All other instances, the setting will be the default of off and will need to be manually selected.
Configure	Use Optimized CTLE gDC2 for Near-end Eye Opening TP4 Short.	UseNearCTLEgDC2Short	0, -0.5, -1, -1.5, -2	Select the optimized setting to use. Default is off. Run "Auto-tune" Test under "Utilities" to find the optimal setting. When the utility is run, it will automatically set the optimal setting. This value will only be automatically set if utility is run any time after app load or if project is loaded with setting. All other instances, the setting will be the default of off and will need to be manually selected.

Table 2 Configuration Variables and Values (continued)

GUI Location	Label	Variable	Values	Description
Configure	Use Predifined Function	UseFunc	Chan, FUNCtion1, FUNCtion3, FUNCtion4, FUNCtion5, FUNCtion6	This gives the option to use a function that the user sets up. Select the function the user has set. The app will skip default setup and scaling. Please ensure that the function you are using is properly scaled before starting run. Note: Function2 is used by the app, do not include Function 2 in your setup.
Configure	Use Scope Cal	ScopeCal	Y, N	Select Yes to use scope calibrtion. No, to not. This is automatically set to Yes when a scope cal is run on the setup tab.
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 <= 99	Specify N using the 'Minimum required margin %' control.

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. Listed at the end, you may also find:

- Deprecated IDs and their replacements.
- Macro IDs which may be used to select multiple related tests at the same time.

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
AC Common Mode Voltage, Full-band VCMFB	5107	Test the AC common mode voltage, full band. This test can only be tested in dual single ended connection
AC Common Mode Voltage, Full-band VCMFB	206107	Test the AC common mode voltage, full band. This test can only be tested in dual single ended connection
AC Common Mode Voltage, Full-band VCMFB (Long)	306108	Test the AC common mode voltage, full band. This test can only be tested in dual single ended connection
AC Common Mode Voltage, Full-band VCMFB (Short)	306107	Test the AC common mode voltage, full band. This test can only be tested in dual single ended connection
AC Common Mode Voltage, Low-frequency VCMLF	5103	Test the AC common mode voltage, low-frequency, 100MHz low-pass filter. This test can only be tested in dual single ended connection
AC Common Mode Voltage, Low-frequency VCMLF	206103	Test the AC common mode voltage, low-frequency, 100MHz low-pass filter. This test can only be tested in dual single ended connection
AC Common Mode Voltage, Low-frequency VCMLF (Long)	306106	Test the AC common mode voltage, low-frequency, 100MHz low-pass filter. This test can only be tested in dual single ended connection
AC Common Mode Voltage, Low-frequency VCMLF (Short)	306103	Test the AC common mode voltage, low-frequency, 100MHz low-pass filter. This test can only be tested in dual single ended connection
Auto-tune CTLE,DFE Eye Opening TP1a	6600	Measures the eye height VEC with CTLE and DFE settings for TP1a and reports the optimal settings to use in Eye measurements. The optimal values are automatically set in the configure tab after this test has run.
Auto-tune Far-end CTLE Eye Opening TP4 (Long)	6604	Measures the eye width and height with each CTLE setting TP4 (Long) and reports the optimal setting to use in Eye Width and Eye Height measurements. The optimal value is automatically set in the configure tab after this test has run.

Table 4 Test IDs and Names (continued)

Name	TestID	Description
Auto-tune Far-end CTLE Eye Opening TP4 (Short)	6603	Measures the eye width and height with each CTLE setting TP4 (Short) and reports the optimal setting to use in Eye Width and Eye Height measurements. The optimal value is automatically set in the configure tab after this test has run.
Auto-tune Near-end CTLE,DFE Eye Opening TP4 (Long)	6602	Measures the eye height VEC with CTLE and DFE settings for TP4 Near-end (Long) and reports the optimal settings to use in Eye measurements. The optimal values are automatically set in the configure tab after this test has run.
Auto-tune Near-end CTLE,DFE Eye Opening TP4 (Short)	6601	Measures the eye height VEC with CTLE and DFE settings for TP4 Near-end (Short) and reports the optimal settings to use in Eye measurements. The optimal values are automatically set in the configure tab after this test has run.
BUJ	55202	Bounded Uncorrelated Jitter BUJ measurement
Baud Rate	55200	Baud rate of the signal
Coefficient Initialization Preset 2 c(-1)	66412	Measures the the coefficients for Preset 2 c(-1)
Coefficient Initialization Preset 2 c(-2)	66411	Measures the the coefficients for Preset 2 c(-2)
Coefficient Initialization Preset 2 c(-3)	66410	Measures the the coefficients for Preset 2 c(-3)
Coefficient Initialization Preset 2 c(0)	66413	Measures the the coefficients for Preset 2 c(0)
Coefficient Initialization Preset 2 c(1)	66414	Measures the the coefficients for Preset 2 c(1)
Coefficient Initialization Preset 3 c(-1)	66417	Measures the the coefficients for Preset 3 c(-1)
Coefficient Initialization Preset 3 c(-2)	66416	Measures the the coefficients for Preset 3 c(-2)
Coefficient Initialization Preset 3 c(-3)	66415	Measures the the coefficients for Preset 3 c(-3)
Coefficient Initialization Preset 3 c(0)	66418	Measures the the coefficients for Preset 3 c(0)
Coefficient Initialization Preset 3 c(1)	66419	Measures the the coefficients for Preset 3 c(1)
Coefficient Initialization Preset 4 c(-1)	66422	Measures the the coefficients for Preset 4 c(-1)
Coefficient Initialization Preset 4 c(-2)	66421	Measures the the coefficients for Preset 4 c(-2)
Coefficient Initialization Preset 4 c(-3)	66420	Measures the the coefficients for Preset 4 c(-3)
Coefficient Initialization Preset 4 c(0)	66423	Measures the the coefficients for Preset 4 c(0)
Coefficient Initialization Preset 4 c(1)	66424	Measures the the coefficients for Preset 4 c(1)
Coefficient Initialization Preset 5 c(-1)	66427	Measures the the coefficients for Preset 5 c(-1)
Coefficient Initialization Preset 5 c(-2)	66426	Measures the the coefficients for Preset 5 c(-2)
Coefficient Initialization Preset 5 c(-3)	66425	Measures the the coefficients for Preset 5 c(-3)
Coefficient Initialization Preset 5 c(0)	66428	Measures the the coefficients for Preset 5 c(0)
Coefficient Initialization Preset 5 c(1)	66429	Measures the the coefficients for Preset 5 c(1)

Table 4 Test IDs and Names (continued)

Name	TestID	Description
Common Mode Noise, RMS	55103	Test the common mode RMS Noise. This test can only be tested in dual single ended connection
Common Mode Noise, RMS	256103	Test the common mode rms noise. This test can only be tested in dual single ended connection
Common Mode Noise, RMS	356103	Test the common mode rms noise. This test can only be tested in dual single ended connection. Must be DC coupled.
Common Mode Voltage - Vcm	256101	Test the DC common mode voltage. This test can only be tested in dual single ended connection
Common Mode Voltage - Vcm	356101	Test the common mode voltage. This test can only be tested in dual single ended connection. Must be DC coupled.
Common-mode Output Return Loss	15001	Common-mode Output Return Loss measurement
Common-mode to Common-mode Output Return Loss	10001	Common-mode to Common-mode Output Return Loss measurement
Common-mode to Differential Output Return Loss	11111	Common-mode to Differential Output Return Loss measurement
Common-mode to Differential Output Return Loss	210003	Common-mode to Differential Output Return Loss measurement
Common-mode to Differential Output Return Loss	310003	Common-mode to Differential Output Return Loss measurement
Common-mode to Differential Output Return Loss	310004	Common-mode to Differential Output Return Loss measurement
Common-mode to Differential Output Return Loss	310005	Common-mode to Differential Output Return Loss measurement
Common-mode to Differential Output Return Loss	215003	Common-mode to Differential Output Return Loss measurement
Common-mode to Differential Output Return Loss	315003	Common-mode to Differential Output Return Loss measurement
DC Common Mode Output Voltage Test	5101	Test the DC common mode voltage. This test can only be tested in dual single ended connection
DC Common Mode Output Voltage Test	206101	Test the DC common mode voltage. This test can only be tested in dual single ended connection. Must be DC coupled.
DC Common Mode Voltage	55101	Test the DC common mode voltage. This test can only be tested in dual single ended connection
DC Common Mode Voltage Test (Long)	306104	Test the DC common mode voltage. This test can only be tested in dual single ended connection. Must be DC coupled.
DC Common Mode Voltage Test (Short)	306101	Test the DC common mode voltage. This test can only be tested in dual single ended connection. Must be DC coupled.

Table 4 Test IDs and Names (continued)

Name	TestID	Description
Differential Output Return Loss	10000	Differential Output Return Loss measurement
Differential Output Return Loss	210000	Differential Output Return Loss measurement
Differential Output Return Loss	310000	Differential Output Return Loss measurement
Differential Output Return Loss	15000	Differential Output Return Loss measurement
Differential Output Return Loss	215000	Differential Output Return Loss measurement
Differential Output Return Loss	315000	Differential Output Return Loss measurement
Differential Output Voltage Test (Long)	306105	Test the maximum voltage with the TX enabled
Differential Output Voltage Test (Short)	306102	Test the maximum voltage with the TX enabled
Differential Peak to Peak Output Voltage Test	5102	Test the maximum voltage with the TX enabled
Differential Peak to Peak Output Voltage Test	206102	Test the maximum voltage with the TX enabled
Differential Peak to Peak Output Voltage Test with TX disabled	5100	Test the maximum voltage with the TX disabled
Differential Peak to Peak Output Voltage Test with TX disabled	206100	Test the maximum voltage with the TX disabled
Differential Voltage pk-pk	256102	Test the maximum voltage with the TX enabled
Differential Voltage, pk-pk	55102	Test the maximum voltage with the TX enabled
Differential Voltage, pk-pk	356102	Test the maximum voltage with the TX enabled
ERL	5409	Calculates ERL.
ERL	5399	Calculates ERL.
ERL	5499	Calculates ERL.
ERL TP1a	205409	Calculates ERL TP1a.
ERL TP4	305409	Calculates ERL.
ESMW	206603	Measures the Eye symmetry mask width at Host recommended CTLE, 1dB higher, and 1dB lower of optimal CTLE
Effective bounded uncorrelated jitter	65205	Effective bounded uncorrelated Jitter measurement
Effective total uncorrelated jitter	65206	Effective total uncorrelated Jitter measurement
Even-Odd Jitter	5201	Even-Odd Jitter measurement
Even-Odd Jitter	55201	Even-Odd Jitter measurement
Even-Odd Jitter	65204	Even-Odd Jitter measurement
Eye Height	206600	Measures the height of each the eye at user selected CTLE

Table 4 Test IDs and Names (continued)

Name	TestID	Description
Eye Height - EH6	256600	Measures the height of each the eye at user selected CTLE at 10-6 probability.
Eye Width	206601	Measures the width of the eye at user CTLE
Eye Width - EW6	256601	Measures the width of the eye at user CTLE at 10-6 probability.
Eye linearity	256603	Measures the Eye linearity
Eye linearity	356603	Measures the eye linearity of each the eye at user selected CTLE
Far-end Eye Height (Long)	306630	Measures the Far-end height (Long) of each the eye at user selected CTLE
Far-end Eye Height (Short)	306610	Measures the Far-end height (Short) of each the eye at user selected CTLE
Far-end Eye Height - EH6	356610	Measures the Far-end eye height of each the eye at user selected CTLE at 10-6 probability.
Far-end Eye Width - EW6	356611	Measures the Far-end eye width of the eye at user CTLE at 10-6 probability
Far-end Vertical Eye Closure (Long)	306632	Measures the Vertical Eye Closure at Far-End (Long)
Far-end Vertical Eye Closure (Short)	306612	Measures the Vertical Eye Closure at Far-End (Short)
J3u	5204	J3u Jitter measurement
J3u03	5206	J3u03 Jitter measurement
J4u	5202	J4u Jitter measurement
J4u03	5205	J4u03 Jitter measurement
JRMS	5203	JRMS Jitter measurement
Level - Linearity pattern	51000	Measures the level for each level in the linearity pattern on UI 7 and 8 of 16
Level - PRBS pattern	2000	Tests the level for each level in the PRBS pattern
Level - PRBS pattern	52000	Tests the level for each level in the PRBS pattern
Level Noise - Linearity pattern	51002	Tests the noise of each level in the linearity pattern
Level Noise - PRBS pattern	2002	Tests the noise of each level in the PRBS pattern
Level Noise - PRBS pattern	52002	Tests the noise of each level in the PRBS pattern
Level RMS - Linearity pattern	51001	Tests the level rms for each level in the linearity pattern on UI 7 and 8 of 16
Level RMS - PRBS pattern	2001	Tests the level rms for each level in the PRBS pattern
Level RMS - PRBS pattern	52001	Tests the level rms for each level in the PRBS pattern
Level Separation Mismatch Ratio - RLM	2003	Tests the level mismatch ratio

Table 4 Test IDs and Names (continued)

Name	TestID	Description
Level Separation Mismatch Ratio - RLM	52003	Tests the level mismatch ratio
Level Separation Mismatch Ratio - RLM	51003	Tests the level mismatch ratio on UI 7 and 8 of 16
Linear Fit Pulse Peak	5301	Linear Fit Pulse Peak
Linear Fit Pulse Peak Ratio	55301	Linear Fit Pulse Peak Ratio
Minimum Output Fall Time (20%-80%) (Long)	206403	Fall Time measurement
Minimum Output Fall Time (20%-80%) (Long)	306403	Fall Time measurement
Minimum Output Fall Time (20%-80%) (Short)	206401	Fall Time measurement
Minimum Output Fall Time (20%-80%) (Short)	306401	Fall Time measurement
Minimum Output Rise Time (20%-80%) (Long)	206402	Rise Time measurement
Minimum Output Rise Time (20%-80%) (Long)	306402	Rise Time measurement
Minimum Output Rise Time (20%-80%) (Short)	206400	Rise Time measurement
Minimum Output Rise Time (20%-80%) (Short)	306400	Rise Time measurement
Near-end Eye Height (Long)	306620	Measures the Near-end height (Long) of each the eye at user selected CTLE
Near-end Eye Height (Short)	306600	Measures the Near-end height (Short) of each the eye at user selected CTLE
Near-end Eye Height - EH6	356600	Measures the Near-end eye height of each the eye at user selected CTLE at 10-6 probability.
Near-end Eye Width - EW6	356601	Measures the Near-end eye width of the eye at user CTLE at 10-6 probability
Near-end Vertical Eye Closure (Long)	306622	Measures the Vertical Eye Closure at Near-End (Long)
Near-end Vertical Eye Closure (Short)	306602	Measures the Vertical Eye Closure at Near-End (Short)
Post-cursor equalization Local_eq_c1(0)	5504	Measures Post-cursor equalization for c(1) weight 0
Post-cursor equalization Local_eq_c1(1)	5505	Measures Post-cursor equalization for c(1) weight 1
Post-cursor equalization Local_eq_c1(2)	5506	Measures Post-cursor equalization for c(1) weight 2

Table 4 Test IDs and Names (continued)

Name	TestID	Description
Post-cursor equalization Local_eq_c1(3)	5507	Measures Post-cursor equalization for c(1) weight 3
Post-cursor equalization Local_eq_c1(4)	5508	Measures Post-cursor equalization for c(1) weight 4
Post-cursor equalization Local_eq_c1(5)	5509	Measures Post-cursor equalization for c(1) weight 5
Pre-cursor equalization Local_eq_cm1(0)	5500	Measures Pre-cursor equalization for c(-1) weight 0
Pre-cursor equalization Local_eq_cm1(1)	5501	Measures Pre-cursor equalization for c(-1) weight 1
Pre-cursor equalization Local_eq_cm1(2)	5502	Measures Pre-cursor equalization for c(-1) weight 2
Pre-cursor equalization Local_eq_cm1(3)	5503	Measures Pre-cursor equalization for c(-1) weight 3
Signal to AC common-mode noise ratio, SCMR	5304	Measures the SCMR
Signal-to-noise-and-distortion ratio	5302	Measures the SNDR
Signal-to-noise-and-distortion ratio	55302	Measures the SNDR
Signal-to-residual-intersymbol-interference ratio, SNRISI	5303	Measures the SNRISI
Signaling Rate	5200	Signaling rate of the signal
Signaling Rate	206200	Signaling rate of the signal
Signaling Rate (Long)	306201	Signaling rate of the signal
Signaling Rate (Short)	306200	Signaling rate of the signal
Single-Ended Output Voltage Test	206104	Test the minimum and maximum voltages of the single-ended signals
Steady-State Voltage Vf	5300	Steady-State Voltage Vf measurement
Steady-State Voltage Vf	55300	Steady-State Voltage Vf measurement
Transition Time - Rise Time (20%-80%)	55400	Rise Time measurement
Transition Time - Rise Time (20%-80%)	256400	Rise Time measurement
Transition Time - Fall Time (20%-80%)	55401	Fall Time measurement
Transition Time - Fall Time (20%-80%)	256401	Fall Time measurement
Transition Time - Fall Time (20%-80%)	356401	Fall Time measurement
Transition Time - Rise Time (20%-80%)	356400	Rise Time measurement

Table 4 Test IDs and Names (continued)

Name	TestID	Description
UUGJ	55203	Uncorrelated Unbounded Gaussian Jitter UUGJ measurement
Vertical Eye Closure	206602	Measures the Vertical Eye Closure TP1a
Vertical Eye Closure	356602	Measures the Vertical Eye Closure at Near-End
abs Step Size for c(-1)	5400	abs Coefficient Step Size measurement for Coefficient c(-1)
abs Step Size for c(-1)	66400	abs Coefficient Step Size measurement for Coefficient c(-1)
abs Step Size for c(-2)	5403	abs Coefficient Step Size measurement for Coefficient c(-2)
abs Step Size for c(-2)	66403	abs Coefficient Step Size measurement for Coefficient c(-2)
abs Step Size for c(-3)	5404	abs Coefficient Step Size measurement for Coefficient c(-3)
abs Step Size for c(-3)	66404	abs Coefficient Step Size measurement for Coefficient c(-3)
abs Step Size for c(0)	5401	abs Coefficient Step Size measurement for Coefficient c(0)
abs Step Size for c(0)	66401	abs Coefficient Step Size measurement for Coefficient c(0)
abs Step Size for c(1)	5402	abs Coefficient Step Size measurement for Coefficient c(1)
abs Step Size for c(1)	66402	abs Coefficient Step Size measurement for Coefficient c(1)
dERL	5412	Calculates ERL and fixture reference ERL.
dRpeak	5411	Linear Fit Pulse Peak dRpeak measurement and referencee calculation
dVf	5410	Steady-State Voltage dVf measurement and reference calculation
value at max. state for c(-1)	5418	Measures the value of c(-1) at max
value at max. state for c(-2)	5406	Measures the value of c(-2) at max
value at max. state for c(-2)	66406	Measures the value of c(-2) at max
value at max. state for c(-3)	5416	Measures the value of c(-3) at max
value at max. state for c(1)	5419	Measures the value of c(1) at max
value at min. state for c(-1)	5407	Measures the value of c(-1) at min
value at min. state for c(-1)	66407	Measures the value of c(-1) at min
value at min. state for c(-2)	5417	Measures the value of c(-2) at min
value at min. state for c(-3)	5405	Measures the value of c(-3) at min
value at min. state for c(-3)	66405	Measures the value of c(-3) at min
value at min. state for c(0)	5415	Measures the value of c(0) at min
value at min. state for c(0)	66409	Measures the value of c(0) at min
value at min. state for c(1)	5408	Measures the value of c(1) at min
value at min. state for c(1)	66408	Measures the value of c(1) at min

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
Infiniium	The primary oscilloscope
Keysight PNA	Performance Network Analyzer
Keysight ENA	Economy Network Analyzer

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