TDSHT3
HDMI Compliance Test Software

Programmer Online Help

077-0353-00

Tektronix

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Introduction to Remote GPIB

The Remote General Purpose Interface Bus (RGPIB) is another way of interfacing with the oscilloscope and the TDSHT3 application. It allows you to control much of the functionality of the oscilloscope as defined by the software, from a Remote GPIB controller. You can use the following GPIB command to start the TDSHT3 HDMI Compliance Test Software:

```
application:activate "HDMI Compliance Test Software(1.4)"
```

With the knowledge of Remote GPIB command syntax, you can design a Remote GPIB program to do the following tasks:

- Start the TDSHT3 application
- Recognize an active application with Remote GPIB protocol
- Program and read the application setup parameters
- Sequence measurements
- Generate reports

About the Remote GPIB program

The Remote GPIB feature provides a framework to remotely automate the TDSHT3 application to perform HT3 compliance testing. The Remote GPIB support can be used to select, configure and run all TDSHT3 tests and supports the test report generation. An example of a Remote GPIB program that can execute the TDSHT3 measurement is included with the application. The oscilloscope hard disk and optional applications disc both contain the file, `TDSHT3.c`. On the hard drive, the file resides in the `C:\Program Files\TekApplications\TDSHT3v1-3` directory.

This example shows how a Remote GPIB program executes the application to do the following tasks:

1. Start the application
2. Select a measurement and configure the parameters
3. Run the measurement
4. Generate a report
5. Exit the application

Remote GPIB Reference Materials

To use the Remote GPIB commands with your oscilloscope, refer to the following materials:

- The `TDSHT3.c` file on the oscilloscope hard drive (located in the `C:\Program Files\TekApplications\TDSHT3v1-3` directory) and optional application disc for an example of a Remote GPIB command that can execute the application.
- The Remote GPIB Program Example section for guidelines to use while designing the Remote GPIB program.
- The programmer information is in the online help of your oscilloscope.
- The Guidelines to Remote GPIB Programming section in the Online Help.

Guidelines to Remote GPIB Programming

The TDSHT3 application includes an example of a Remote GPIB program for your reference as a program example. Your Remote GPIB program should comply with the following guidelines:

- Launch the application before sending any remote GPIB commands to the application (see the program example).
- Before running the GPIB commands, you can use the *IDN? variable to identify the oscilloscope and ensure that the oscilloscope is responding.
- GPIB commands do not work through LAN.
- When the application processes remote GPIB commands, no messages are displayed.
- For save, recall, and report generation, the successive file names should be different.
- The application does not respond to commands that were sent before the application was activated.
- To generate reports, first check whether the sequencer state is "Ready".
- Check the status variable to ensure that an error has not occurred because of a measurement command.
- Monitor the Remote GPIB even queue. You can use the Call Monitor application to monitor the RGPIB event queue. Make sure the event queue is clear before sending the next Remote GPIB command to prevent event queue overflow.
- Commands are case and space sensitive. Your program will not operate correctly if you do not follow the capitalization and spacing precisely.
- For information on error queries in Remote GPIB, refer to the Error Codes section in the Online Help.
- Ensure that the return value of the `commandStatus` is true before sending the next command and that there is a delay of 1.0 sec between the commands.

NOTE. *Use TDSHT3 in either the manual or Remote GPIB mode, but not both the modes.*

Launching the Application using Remote GPIB

You must manually set up the oscilloscope to launch the application.

The application uses the Remote `GPIB VARIABLE: VALUE` command with arguments to execute some features. The set of Remote GPIB commands includes the variable names and variable values necessary to select, configure, and run the measurements and to generate reports in the Remote GPIB program.

You can select and configure the measurements that you want to use with your Remote GPIB program.

NOTE. *When the application is launched, the default directory for the report files is set to* `C:\TekApplications\TDSHT3v1-3\Reports`.

NOTE. *In Remote GPIB mode, the setup files are saved and recalled only from the directory* `C:\TekApplications\TDSHT3v1-3\Setup`. *The save and recall name should be appended with* `.ini` *extension.*

Remote GPIB Commands

The Remote General Purpose Interface Bus (RGPIB) is another way of interfacing with the oscilloscope. It allows you to control much of the functionality of the oscilloscope as defined by the software, from a Remote GPIB controller.

You can use the following GPIB command to start the TDSHT3 HDMI Compliance Test Software:

```
application:activate “HDMI Compliance Test Software(1.4)”
```

How to Set and Query

1. The following command syntax sets the value to the variable:

   ```
   VARIABLE:VALUE “<variable name>”,“<variable value>”
   ```

   The arguments `<variable name>` and `<variable value>` are required in the order indicated.

2. The following command syntax queries the value of the variable:

   ```
   VARIABLE:VALUE? “<variable name>”
   ```

3. The following command syntax runs the selected test:

   ```
   VARIABLE:VALUE “sequencerState”,“Sequencing”
   ```

Command Syntax

You can use the IEEE 488.1 command VARIABLE:VALUE with string arguments to control and query the TDSHT3 application. The string arguments are case sensitive.

Command Form

The command form is:

`VARIABLE:VALUE` “<variable name>”,“<variable value>”

where the <variable name> and <variable value> strings are listed in the tables in the *Command Arguments* section.

An example of a command form is:

```
VARIABLE:VALUE “setup”,“Default”
```

Query Form

The query form is:

`VARIABLE:VALUE?` “<variable name>”

where the <variable name> string is listed in the tables in the *Command Arguments* section.

An example of a query form is:

```
VARIABLE:VALUE? “clockSourceChange”
```

Starting the TDSHT3 Application

To start the TDSHT3 application, send the oscilloscope the following GPIB command:

```
APPLICATION:ACTIVATE “HDMI Compliance Test Software(1.4)”
```

Application Commands

Variable name	Valid values	Command form	Query form
application	exit	Setting the value will terminate a running application.	Returns the name of the currently running application.

Sequencer Commands

Variable name	Valid values	Command form	Query form
sequencerState	Sequencing Ready, Sequencing	This command is equivalent to running the measurement. Queries the state of the measurement: running or stopped.	Returns the sequencer state.

Save/Recall Commands

Variable name	Valid values	Command form	Query form
setup	Default, Recall, Save	Sets the Save/Recall/Default action.	The default value for this variable is an empty string. This variable is set to the selected value momentarily and returns to its default value after the task is complete.
recallName	Any string of length 1 to 50 containing the characters from A to Z, 0 to 9.	Sets the setup recall file name.	Returns the setup recall file name.
saveName	Any string of length 1 to 50 containing the characters from A to Z, 0 to 9.	Sets the setup save file name.	Returns the setup save file name.

Reports Commands

Variable name	Valid values	Command form	Query form
reportSummary	Save	Saves the report summary to a .csv file.	Not applicable
reportDetails	Save	Saves the report summary to a .csv file.	Not applicable

Flow Control Selection Commands

Variable name	Valid values	Command form	Query form
select	true false	Selects the **Select** button on the flow control panel.	Returns true if the **Select** button is selected, else returns false.
configure	true false	Selects the **Configure** button on the flow control panel. ***NOTE.*** *To use this command, at least one measurement has to be selected.*	Returns true if the **Configure** button is selected, else returns false.
connect	true false	Selects the **Connect** button on the flow control panel describing the procedure to connect the DUT.	Returns true if the **Connect** button is selected, else returns false.
viewWaveform	true false	Selects the **View Waveform** button on the flow control panel to view the input waveforms connected.	Returns true if the **View Waveform** button is selected, else returns false.

Device Type Selection Commands

Variable name	Valid values	Command form	Query form
measDeviceTypeChange	source, sink, cable	Selects the measurement device type.	Returns the selected measurement device type.

Source Measurement Selection Commands

Variable name	Valid values	Command form	Query form
measAdd	sourceEyeDiagram, sourceClockDutyCycle, sourceRiseTime, sourceFallTime, sourceClockJitter, sourceInterPairSkew, sourceIntraPairSkew, sourceLowAmpPositive, sourceLowAmpNegative	Selects the specified measurement.	Not applicable
measRemove	sourceEyeDiagram, sourceClockDutyCycle, sourceRiseTime, sourceFallTime, sourceClockJitter, sourceInterPairSkew sourceIntraPairSkew sourceLowAmpPositive sourceLowAmpNegative	Clears the specified measurement.	Not applicable
measDifferentialSelectAll	true false	Selects all the differential source measurements. Clears all the differential source measurements.	Returns true if all the measurements are selected, else returns false.
measSingleEndedSelectAll	true false	Selects all the single-ended source measurements. Clears all the single-ended source measurement.	Returns true if all the measurements are selected, else returns false.
isMeasAdded	true false	Not applicable	Returns true if a measurement is selected, else returns false.
isMeasRemoved	true false	Not applicable	Returns true if a measurement is removed, else returns false.

Examples

To add and remove the measurements, use the following commands:

`VARIABLE:VALUE "measAdd","sourceEyeDiagram"` selects the source eye diagram measurement.

`VARIABLE:VALUE? "isMeasAdded"` returns true if the measurement is selected.

`VARIABLE:VALUE "measRemove","sourceEyeDiagram"` clears the source eye diagram measurement.

`VARIABLE:VALUE? "isMeasRemoved"` returns true if the measurement is cleared.

Sink Measurement Selection Commands

Variable name	Valid values	Command form	Query form
`measAdd`	sinkMinMaxDiff, sinkJitterTolerance, sinkIntraPairSkew	Selects the specified measurement required.	Not applicable
`isMeasAdded`	true false	Not applicable	Returns true if a measurement is selected, else returns false.

Examples

To add the measurements, use the following commands:

`VARIABLE:VALUE "measAdd","sinkJitterTolerance"` selects the sink jitter tolerance measurement.

`VARIABLE:VALUE? "isMeasAdded"` returns true if the measurement is selected.

Source Eye Diagram Configuration Commands

Variable name	Valid values	Command form	Query form
`clockSourceChange`	Ch1, Ch2, Ch3, Ch4, Ref1, Ref2, Ref3, Ref4	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
`data0SourceChange`	Ch1, Ch2, Ch3, Ch4, Ref1, Ref2, Ref3, Ref4, notConn	Selects the differential data0 source channel.	Returns the channel value set for the differential data0 source.
`data1SourceChange`	Ch1, Ch2, Ch3, Ch4, Ref1, Ref2, Ref3, Ref4, notConn	Selects the differential data1 source channel.	Returns the channel value set for the differential data1 source.

Variable name	Valid values	Command form	Query form
data2SourceChange	Ch1, Ch2, Ch3, Ch4, Ref1, Ref2, Ref3, Ref4, notConn	Selects the differential data2 source channel.	Returns the channel value set for the differential data2 source.
recordLengthChange	For TDS series oscilloscope, the record length are as follows: 8.0k, 20.0k, 40.0k, 100k, 200k, 400k, 1.0M, 2.0M, 4.0M, 10.0M, 20.0M, 32.0M For DPO/DSA70000/B series oscilloscope, the record length are as follows: 10.0k, 25.0k, 50.0k, 100k, 250k, 500k, 1.00M, 2.50M, 5.00M, 10.0M, 25.0M Use the following example while entering the values. Example: 8.0e3, 20.0e3, 32.0e6, 20.0e6.	Sets the record length to the specified value for the source eye diagram measurement.	Returns the set record length.
clockTypeChange	PLL, Raw, Ideal	Sets the clock type required for the source eye diagram measurement.	Returns the clock type set for the source eye diagram measurement.
refLevelTypeChange	percentage, absolute	Sets the type of value to be entered for the reference level inputs.	Returns the selected value type for the reference level inputs.
absoluteHysteresisChange	Any double value in the range of 0.0 V to 1.0 V. ***NOTE.*** *Set the* `refLevelTypeChange` *to absolute to enter the absolute value.* Use the following example while entering the values. Example: 100e–3, 250e–3, 600e–3.	Sets the hysteresis value to the value specified within the range.	Returns the set hysteresis value.
percentageHysteresisChange	Any double value, in the range of 0.0 to 25.0. ***NOTE.*** *Set the* `refLevelTypeChange` *to percentage to enter the percentage value.*	Sets the hysteresis value to the value specified within the range.	Returns the set hysteresis value.

Variable name	Valid values	Command form	Query form
absoluteMidLevelChange	Any double value in the range of –2.0 V to 2.0 V. ***NOTE.*** *Set the* refLevelTypeChange *to absolute to enter the absolute value.* Use the following example while entering the values. Example: –120e–3, –2.0, 150e–3, 1.25.	Sets the mid reference level to the value specified within the range.	Returns the set mid reference level value.
percentageMidLevelChange	Any double value in the range of 25.0 to 75.0. ***NOTE.*** *Set the* refLevelTypeChange *to percentage to enter the percentage value.*	Sets the mid reference level to the value specified within the range.	Returns the set mid reference level value.

Source Clock Jitter Configuration Commands

Variable name	Valid values	Command form	Query form
clockSourceChange	Ch1, Ch2, Ch3, Ch4, Ref1, Ref2, Ref3, Ref4	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
recordLengthChange	For TDS series oscilloscope, the record length are as follows: 8.0k, 20.0k, 40.0k, 100k, 200k, 400k, 1.0M, 2.0M, 4.0M, 10.0M, 20.0M, 32.0M For DPO/DSA70000/B series oscilloscope, the record length are as follows: 10.0k, 25.0k, 50.0k, 100k, 250k, 500k, 1.00M, 2.50M, 5.00M, 10.0M, 25.0M Use the following example while entering the values. Example: 8.0e3, 20.0e3, 32.0e6, 20.0e6.	Sets the record length tothe specified value for the source eye diagram measurement.	Returns the set record length.

Variable name	Valid values	Command form	Query form
clockTypeChange	PLL, Raw, Ideal	Sets the clock type required for the source eye diagram measurement.	Returns the clock type set for the source eye diagram measurement.
refLevelTypeChange	percentage, absolute	Sets the type of value to be entered for the reference level inputs.	Returns the selected value type for the reference level inputs.
absoluteHysteresisChange	Any double value in the range of 0.0 V to 1.0 V. ***NOTE.*** *Set the* `refLevelTypeChange` *to absolute to enter the absolute value.* Use the following example while entering the values. Example: 100e–3, 250e–3, 600e–3.	Sets the hysteresis value to the value specified within the range.	Returns the set hysteresis value.
percentageHysteresisChange	Any double value in the range of 0.0 to 25.0. ***NOTE.*** *Set the* `refLevelTypeChange` *to percentage to enter the percentage value.*	Sets the hysteresis value to the value specified within the range.	Returns the set hysteresis value.
absoluteMidLevelChange	Any double value in the range of –2.0 V to 2.0 V. ***NOTE.*** *Set the* `refLevelTypeChange` *to absolute to enter the absolute value.* Use the following example while entering the values. Example: –120e–3, –2.0, 150e–3, 1.25.	Sets the mid reference level to the value specified within the range.	Returns the set mid reference level value.
percentageMidLevelChange	Any double value in the range of 25.0 to 75.0. ***NOTE.*** *Set the* `refLevelTypeChange` *to percentage to enter the percentage value.*	Sets the mid reference level to the value specified within the range.	Returns the set mid reference level value.

Source Clock Duty Cycle Configuration Commands

Variable name	Valid values	Command form	Query form
clockSourceChange	Ch1, Ch2, Ch3, Ch4	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
tbitCalculationTypeChange	tbitExisting, tbitRecalculate	Selects the tbit calculation type.	Returns the selected tbit calculation type.
numberOfAvgChange	Any double value in the range of 2.0 to 1e3. Use the following example while entering the values. Example: 2.0, 2.25, 99.5, 1e3.	Sets the number of averages to calculate the tbit.	Returns the value set for the number of averages.
numberOfAcqChange	Any double value in the range of 10.0e3 to 1.0e6. Use the following example while entering the values. Example: 10.5e3, 20.25e3, 1.0e6.	Sets the number of acquisitions required.	Returns the value set for the number of acquisitions.

Source Rise Time and Fall Time Configuration Commands

Variable name	Valid values	Command form	Query form
clockSourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
data0SourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential data0 source channel.	Returns the channel value set for the differential data0 source.
data1SourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential data1 source channel.	Returns the channel value set for the differential data1 source.
data2SourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential data2 source channel.	Returns the channel value set for the differential data2 source.

Variable name	Valid values	Command form	Query form
tbitCalculationTypeChange	tbitExisting, tbitRecalculate	Selects the tbit calculation type.	Returns the selected tbit calculation type.
numberOfAvgChange	Any double value in the range of 2.0 to 1e3. Use the following example while entering the values. Example: 2.0, 2.25, 99.5, 1e3.	Sets the number of averages to calculate the tbit.	Returns the value set for the number of averages.
numberOfAcqChange	Any double value in the range of 10.0e3 to 1.0e6. Example: 10.5e3, 20.25e3, 1.0e6.	Sets the number of acquisitions required.	Returns the value set for the number of acquisitions.
refLevelTypeChange	percentage, absolute	Sets the type of value to be entered for the reference level inputs.	Returns the selected value type for the reference level inputs.
absoluteHighLevelChange	Any double value in the range of –2.0 V to 2.0 V. ***NOTE.*** *Set the* `refLevelTypeChange` *to absolute to enter the absolute value.*	Sets the high reference level to the value specified within the range.	Returns the set high reference level value.
percentageHighLevelChange	Any double value in the range of 25.0 to 75.0. ***NOTE.*** *Set the* `refLevelTypeChange` *to percentage to enter the percentage value.*	Sets the high reference level to the value specified within the range.	Returns the set high reference level value.
absoluteLowLevelChange	Any double value in the range of –2.0 V to 2.0 V. ***NOTE.*** *Set the* `refLevelTypeChange` *to absolute to enter the absolute value.*	Sets the low reference level to the value specified within the range.	Returns the set low reference level value.
percentageLowLevelChange	Any double value in the range of 25.0 to 75.0. ***NOTE.*** *Set the* `refLevelTypeChange` *to percentage to enter the percentage value.*	Sets the low reference level to the value specified within the range.	Returns the set low reference level value.

Source Inter-Pair Skew Configuration Commands

Variable name	Valid values	Command form	Query form
clockSourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
data0SourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential data0 source channel.	Returns the channel value set for the differential data0 source.
data1SourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential data1 source channel.	Returns the channel value set for the differential data1 source.
data2SourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential data2 source channel.	Returns the channel value set for the differential data2 source.
tbitCalculationTypeChange	tbitExisting, tbitRecalculate	Selects the tbit calculation type.	Returns the selected tbit calculation type.
numberOfAvgChange	Any double value in the range of 2.0 to 1e3. Use the following example while entering the values. Example: 2.0, 2.25, 99.5, 1e3.	Sets the number of averages to calculate the tbit.	Returns the value set for the number of averages.
refLevelTypeChange	percentage, absolute	Sets the type of value to be entered for the reference level inputs.	Returns the selected value type for the reference level inputs.
absoluteHysteresisChange	Any double value in the range of 0.0 V to 1.0 V. ***NOTE.*** *Set the* `refLevelTypeChange` *to absolute to enter the absolute value.* Use the following example while entering the values. Example: 100e–3, 250e–3, 600e–3.	Sets the hysteresis value to the value specified within the range.	Returns the set hysteresis value.

Variable name	Valid values	Command form	Query form
percentageHysteresisChange	Any double value, in the range of 0.0 to 25.0. ***NOTE.*** *Set the* `refLevelTypeChange` *to percentage to enter the percentage value.*	Sets the hysteresis value to the value specified within the range.	Returns the set hysteresis value.
absoluteMidLevelChange	Any double value in the range of –2.0 V to 2.0 V. ***NOTE.*** *Set the* `refLevelTypeChange` *to absolute to enter the absolute value.* Use the following example while entering the values. Example: –120e–3, –2.0, 150e–3, 1.25.	Sets the mid reference level to the value specified within the range.	Returns the set mid reference level value.
percentageMidLevelChange	Any double value in the range of 25.0 to 75.0. ***NOTE.*** *Set the* `refLevelTypeChange` *to percentage to enter the percentage value.*	Sets the mid reference level to the value specified within the range.	Returns the set mid reference level value.

Status Messages for Source Inter-Pair Skew Configuration

T-Bit dialog box status message:

T-bit is recalculated. Set the **status** to **stop** to exit else set it to **continue**.

Example:

Do the following steps to check for the T-bit dialog box:

1. Use the command `VARIABLE:VALUE "sequencerState","Sequencing"` to run the measurement.
2. While executing the measurement, to check for the T-bit dialog box use the following command:

   `VARIABLE:VALUE? "statusMessage"` returns the following string:

   "T-bit is recalculated. Set the **status** to **stop** to exit else set it to **continue**."

3. Use the following commands:

   `VARIABLE:VALUE "status","stop"` to stop the test.

   `VARIABLE:VALUE "status","continue"` to continue the test.

Source Intra-Pair Skew Configuration Commands

Variable name	Valid values	Command form	Query form
source1TypeChange	clock, data0, data1, data2	Selects the input signal type for the source1.	Returns the selected input type for the source1.
source2TypeChange	clock, data0, data1, data2, notConn	Sets the source2 input to the specified signal type and also to the not connected state.	Returns the selected input type for the source2.
source1PositiveChange	Ch1, Ch2, Ch3, Ch4	Sets the channel for the source1 positive type.	Returns the selected channel value.
source1NegativeChange	Ch1, Ch2, Ch3, Ch4	Sets the channel for the source1 negative type.	Returns the selected channel value.
source2PositiveChange	Ch1, Ch2, Ch3, Ch4	Sets the channel for the source2 positive type.	Returns the selected channel value.
source2NegativeChange	Ch1, Ch2, Ch3, Ch4	Sets the channel for the source2 negative type.	Returns the selected channel value.
clockSourceChange	Ch1, Ch2, Ch3, Ch4	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
tbitCalculationTypeChange	tbitExisting, tbitRecalculate	Selects the tbit calculation type.	Returns the selected tbit calculation type.
numberOfAvgChange	Any double value in the range of 2.0 to 1e3. Use the following example while entering the values. Example: 2.0, 2.25, 99.5, 1e3.	Sets the number of averages to calculate the tbit.	Returns the value set for the number of averages.

Variable name	Valid values	Command form	Query form
numberOfAcqChange	Any double value in the range of 10.0e3 to 1.0e6. Example: 10.5e3, 20.25e3, 1.0e6.	Sets the number of acquisitions required.	Returns the value set for the number of acquisitions.
avccChange	Any double value in the range of 1.0 V to 5.0 V.	Sets the AVcc voltage value to the specified value in the range.	Returns the set AVcc voltage value.

Status Messages for Source Intra-Pair Skew Configuration

T-Bit dialog box status message:

T-bit is recalculated. Set the **status** to **stop** to exit else set it to **continue**.

For example, refer to the Example (see page 16) section.

Source Low Amplitude +ve and -ve Configuration Commands

Variable name	Valid values	Command form	Query form
source1TypeChange	clock, data0, data1, data2	Selects the input signal type for the source1.	Returns the selected input type for source1.
source2TypeChange	clock, data0, data1, data2, notConn	Sets the source2 input to the specified signal type and also to a not connected state.	Returns the selected input type for source2.
source1PositiveChange	Ch1, Ch2, Ch3, Ch4	Sets the channel for the source1 positive type.	Returns the selected channel value.
source1NegativeChange	Ch1, Ch2, Ch3, Ch4	Sets the channel for the source1 negative type.	Returns the selected channel value.
source2PositiveChange	Ch1, Ch2, Ch3, Ch4	Sets the channel for the source2 positive type.	Returns the selected channel value.
source2NegativeChange	Ch1, Ch2, Ch3, Ch4	Sets the channel for the source2 negative type.	Returns the selected channel value.
clockSourceChange	Ch1, Ch2, Ch3, Ch4	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
tbitCalculationTypeChange	tbitExisting, tbitRecalculate	Selects the tbit calculation type.	Returns the selected tbit calculation type.
numberOfAvgChange	Any double value in the range of 2.0 to 1.0e3. Use the following example while entering the values. Example: 2.0, 2.25, 99.5, 1e3.	Sets the number of averages to calculate the tbit.	Returns the value set for the number of averages.
numberOfAcqChange	Any double value in the range of 10.0e3 to 1.0e6. Example: 10.5e3, 20.25e3, 1.0e6.	Sets the number of acquisitions required.	Returns the value set for the number of acquisitions.
avccChange	Any double value in the range of 1.0 V to 5.0 V.	Sets the AVcc voltage to the specified value in the range.	Returns the set AVcc voltage value.

Status Messages for Source Low Amplitude +ve and Low Amplitude -ve Configuration

T-Bit dialog box status message:

T-bit is recalculated. Set the **status** to **stop** to exit else set it to **continue**.

For example, refer to the Example (see page 16) section.

Source Eye Diagram Results Query Commands

Variable name	Valid values	Command form	Query form
sourceEyeDiagramCKD0Status	Pass, Fail, Error	Not applicable	Returns the result status of the measurement for the data lane Data0 if connected.
sourceEyeDiagramCKD1Status	Pass, Fail, Error	Not applicable	Returns the result status of the measurement for the data lane Data1 if connected.
sourceEyeDiagramCKD2Status	Pass, Fail, Error	Not applicable	Returns the result status of the measurement for the data lane Data2 if connected.
sourceEyeDiagramCKD0MeasValue	Any double value	Not applicable	Returns the result of the measured value for the measurement on the data lane Data0.
sourceEyeDiagramCKD1MeasValue	Any double value	Not applicable	Returns the result of the measured value for the measurement on the data lane Data1.
sourceEyeDiagramCKD2MeasValue	Any double value	Not applicable	Returns the result of the measured value for the measurement on the data lane Data2.

Source Clock Duty Cycle Results Query Commands

Variable name	Valid values	Command form	Query form
maxDutyCycleCKStatus	Pass, Fail, Error	Not applicable	Returns the result status for the maximum clock duty cycle measurement.
maxDutyCycleCKMeasValue	Any double value	Not applicable	Returns the result for the measured value of the maximum clock duty cycle measurement.
minDutyCyleCKStatus	Pass, Fail, Error	Not applicable	Returns the result status for the minimum clock duty cycle measurement.
minDutyCyleCKMeasValue	Any double value	Not applicable	Returns the result for the measured value of the minimum clock duty cycle measurement.

Source Rise Time Results Query Commands

Variable name	Valid values	Command form	Query form
sourceRiseTimeCKStatus	Pass, Fail, Error	Not applicable	Returns the result status for the source rise time measurement connected to the data lane Clock.
sourceRiseTimeD0Status	Pass, Fail, Error	Not applicable	Returns the result status for the source rise time connected to the data lane Data0.
sourceRiseTimeD1Status	Pass, Fail, Error	Not applicable	Returns the result status for the source rise time measurement connected to the data lane Data1.
sourceRiseTimeD2Status	Pass, Fail, Error	Not applicable	Returns the result status for the source rise time measurement connected to the data lane Data2.
sourceRiseTimeCKMeasValue	Any double value	Not applicable	Returns the result for the measured value of the source rise time measurement connected to the data lane Clock.
sourceRiseTimeD0MeasValue	Any double value	Not applicable	Returns the result for the measured value of the source rise time measurement connected to the data lane Data0.
sourceRiseTimeD1MeasValue	Any double value	Not applicable	Returns the result for the measured value of the source rise time measurement connected to the data lane Data1.
sourceRiseTimeD2MeasValue	Any double value	Not applicable	Returns the result for the measured value of the source rise time measurement connected to the data lane Data2.

Source Fall Time Results Query Commands

Variable name	Valid values	Command form	Query form
sourceFallTimeCKStatus	Pass, Fail, Error	Not applicable	Returns the result status for the source fall time measurement connected to the data lane Clock.
sourceFallTimeD0Status	Pass, Fail, Error	Not applicable	Returns the result status for the source fall time measurement connected to the data lane Data0.
sourceFallTimeD1Status	Pass, Fail, Error	Not applicable	Returns the result status for the source fall time measurement connected to the data lane Data1.
sourceFallTimeD2Status	Pass, Fail, Error	Not applicable	Returns the result status for the source fall time measurement connected to the data lane Data2.
sourceFallTimeCKMeasValue	Any double value	Not applicable	Returns the result for the measured value of source fall time measurement connected to the data lane Clock.
sourceFallTimeD0MeasValue	Any double value	Not applicable	Returns the result for the measured value of source fall time measurement connected to the data lane Data0.
sourceFallTimeD1MeasValue	Any double value	Not applicable	Returns the result for the measured value of source fall time measurement connected to the data lane Data1.
sourceFallTimeD2MeasValue	Any double value	Not applicable	Returns the result for the measured value of source fall time measurement connected to the data lane Data2.

Source Clock Jitter Results Query Commands

Variable name	Valid values	Command form	Query form
sourceClockJitterCKStatus	Pass, Fail, Error	Not applicable	Returns the result status for the source clock jitter measurement.
sourceClockJitterCKMeasvalue	Any double value	Not applicable	Returns the result for the measured value of the source clock jitter measurement.

Source Inter-Pair Skew Results Query Commands

Variable name	Valid values	Command form	Query form
sourceInterPairSkewD0D1Status	Pass, Fail, Error	Not applicable	Returns the result status for the source inter-pair skew measurement connected to the data lanes Data0 and Data1.
sourceInterPairSkewD1D2Status	Pass, Fail, Error	Not applicable	Returns the result status for source inter-pair skew measurement connected to the data lanes Data1 and Data2.
sourceInterPairSkewD2D0Status	Pass, Fail, Error	Not applicable	Returns the result status for the source inter-pair skew measurement connected to the data lanes Data2 and Data0.
sourceInterPairSkewD0D1MeasValue	Any double value	Not applicable	Returns the result for the measured value of the source inter-pair skew measurement connected to the data lanes Data0 and Data1.
sourceInterPairSkewD1D2MeasValue	Any double value	Not applicable	Returns the result for the measured value of the source inter-pair skew measurement connected to the data lanes Data1 and Data2.
sourceInterPairSkewD2D0MeasValue	Any double value	Not applicable	Returns the result for the measured value of the source inter-pair skew measurement connected to the data lanes Data2 and Data0.

Source Intra-Pair Skew Results Query Commands

Variable name	Valid values	Command form	Query form
sourceIntraPairSkewCKStatus	Pass, Fail, Error	Not applicable	Returns the result status for the source intra-pair skew measurement connected to the data lane Clock.
sourceIntraPairSkewD0Status	Pass, Fail, Error	Not applicable	Returns the result status for the source intra-pair skew measurement connected to the data lane Data1.
sourceIntraPairSkewD2Status	Pass, Fail, Error	Not applicable	Returns the result status for source intra-pair skew measurement connected to the data lane Data2.
sourceIntraPairSkewCKMeasValue	Any double value	Not applicable	Returns the result for the measured value for the source intra-pair skew measurement for the data lane Clock.
sourceIntraPairSkewD0MeasValue	Any double value	Not applicable	Returns the result for the measured value for the source intra-pair skew measurement for the data lane Data0.
sourceIntraPairSkewD1MeasValue	Any double value	Not applicable	Returns the result for the measured value for the source intra-pair skew measurement for the data lane Data1.
sourceIntraPairSkewD2MeasValue	Any double value	Not applicable	Returns the result for the measured value for the source intra-pair skew measurement for the data lane Data2.

Source Low Amplitude +ve Results Query Commands

Variable name	Valid values	Command form	Query form
sourceLowAmpPositiveCKStatus	Pass, Fail, Error	Not applicable	Returns the result status for the source low amplitude+ measurement connected to the data lane Clock.
sourceLowAmpPositiveD0Status	Pass, Fail, Error	Not applicable	Returns the result status for the source low amplitude+ measurement connected to the data lane Data0.
sourceLowAmpPositiveD1Status	Pass, Fail, Error	Not applicable	Returns the result status for the source low amplitude+ measurement connected to the data lane Data1.
sourceLowAmpPositiveD2Status	Pass, Fail, Error	Not applicable	Returns the result status for source low amplitude+ measurement connected to the data lane Data2.
sourceLowAmpPositiveCKMeasValue	Any double value	Not applicable	Returns the result for the measured value for the source low amplitude+ measurement for the data lane Clock.
sourceLowAmpPositiveD0MeasValue	Any double value	Not applicable	Returns the result for the measured value for the source low amplitude+ measurement for the data lane Data0.
sourceLowAmpPositiveD1MeasValue	Any double value	Not applicable	Returns the result for the measured value for the source low amplitude+ measurement for the data lane Data1.
sourceLowAmpPositiveD2MeasValue	Any double value	Not applicable	Returns the result for the measured value for the source low amplitude+ measurement for the data lane Data2.

Source Low Amplitude -ve Results Query Commands

Variable name	Valid values	Command form	Query form
sourceLowAmpNegativeCKStatus	Pass, Fail, Error	Not applicable	Returns the result status for the source low amplitude– measurement connected to the data lane Clock.
sourceLowAmpNegativeD0Status	Pass, Fail, Error	Not applicable	Returns the result status for the source low amplitude– measurement connected to the data lane Data0.
sourceLowAmpNegativeD1Status	Pass, Fail, Error	Not applicable	Returns the result status for the source low amplitude– measurement connected to the data lane Data1.
sourceLowAmpNegativeD2Status	Pass, Fail, Error	Not applicable	Returns the result status for the source low amplitude– measurement connected to the data lane Data2.
sourceLowAmpNegativeCKMeasValue	Any double value	Not applicable	Returns the result for the measured value for the source low amplitude– measurement for the data lane Clock.
sourceLowAmpNegativeD0MeasValue	Any double value	Not applicable	Returns the result for the measured value for the source low amplitude– measurement for the data lane Data0.
sourceLowAmpNegativeD1MeasValue	Any double value	Not applicable	Returns the result for the measured value for the source low amplitude– measurement for the data lane Data1.
sourceLowAmpNegativeD2MeasValue	Any double value	Not applicable	Returns the result for the measured value for the source low amplitude– measurement for the data lane Data2.

Preference Selection Commands

Variable name	Valid values	Command form	Query form
maskInCenter	true false	Selects the Position Eye Mask in Center option in the preference panel. Clears the Position Eye Mask in Center option in the preference panel.	Returns true if the Position Eye Mask in Center option is selected, else returns false.
acquisitionAlertMsgEnable	true false	Selects the Acquisition Alert Message option in the preference panel. Clears the Acquisition Alert Message option in the preference panel.	Returns true if the Acquisition Alert Message option is selected, else returns false.
noJitterToleranceCalibration	true false	Clears the sink Jitter Tolerance (No calibration) option in the preference panel. Selects the Sink Jitter Tolerance (No calibration) option in the preference panel.	Returns false if the sink Jitter Tolerance (No calibration) option is selected, else returns true.
singleEndedTermination	true false	Selects the source Single Ended (With 50 Ω term) option in the preference panel. Clears the Source Single Ended (With 50 Ω term) option in the preference panel.	Returns true if the Single Ended (With 50 Ω term) option is selected, else returns false.
probeCompensationInternal	true false	Selects the Set the probe control to internal 3.3 V option in the preference panel. Clears the Set the probe control to internal 3.3 V option in the preference panel.	Returns true if the Set the probe control to internal 3.3 V option is selected, else returns false.

Report Configuration Commands

Variable name	Valid values	Command form	Query form
deviceDetailsChange	Any string containing the characters from A to Z, 0 to 9, and all the special characters.	Changes the device details in the report file to be generated.	Returns the set device details.
resolutionChange	Any string containing the characters from A to Z, 0 to 9, and all the special characters.	Changes the resolution value in the report file to be generated.	Returns the set resolution value.
refreshRateChange	Any string containing the characters from A to Z, 0 to 9, and all the special characters.	Changes the refresh rate value in the report file to be generated.	Returns the set refresh rate value.
reportFileChange	Any valid file name consisting of string containing the characters from A to Z, 0 to 9 along with the absolute path name of the existing directory.	Changes the report file name and the directory to save the report file.	Returns the full path of the file name of the report file.
configAutoIncrement	true false	Selects the Auto increment check box when true. Clears the Auto Increment check box when false.	Returns true if the Auto increment check box is selected, else returns false.

Results Configuration Commands

Variable name	Valid values	Command form	Query form
dataLaneChange	CKD0, CKD1, CKD2	Selects the data lane pair to display the eye diagram plot.	Returns the selected data lane for the eye diagram plot.
viewJitterPlot	true	Displays the jitter plot if the clock jitter test is completed successfully.	Not applicable
viewSourceEyeDiagramPlot	true	Displays the eye diagram plot if the source eye diagram test is completed successfully.	Not applicable
clearResults	true	Clears the results and resets all the values of result query.	Not applicable
testPointSelect	TP1, TP2, TP5	Selects the test point to display the results for the specified test point.	Returns the test point selected to display the results.
viewCableEyePlot	true	Displays the eye diagram plot if the cable eye diagram test is completed successfully.	Not applicable

Sink Min/Max Configuration Commands

DTG Method

Variable name	Valid values	Command form	Query form
clockSourceChange	Ch1, Ch2, Ch3, Ch4	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
dtgPatternListChange	Name of the DTG pattern with .dtg extension.	Selects the DTG pattern file for running the test.	Not applicable

Variable name	Valid values	Command form	Query form
isDtgPatternSelected	true false	Not applicable	Returns true if the DTG pattern list is selected.
testMethodChange	DTGMethod, DDSMethod ***NOTE.*** *The DDS method is supported only on DPO/DSA70000/B series oscilloscopes with bandwidths greater than or equal to 8 GHz.*	Selects the test method for the measurements.	Returns the selected test method.

Example

To select the DTG patterns, use the following commands:

VARIABLE:VALUE "dtgPatternListChange","720x480p 60Hz Gray RGB PC V3-3.dtg" selects the DTG pattern from the list.

VARIABLE:VALUE? "isDtgPatternSelected" returns true if the DTG pattern is selected.

DDS Method

Variable name	Valid values	Command form	Query form
clockSourceChange	Ch1, Ch2, Ch3, Ch4	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
awg1MarkerChange	Ch1, Ch2, Ch3, Ch4	Selects the AWG output channels.	Returns the selected AWG output channel values.
awg2MarkerChange	Ch1, Ch2, Ch3, Ch4	Selects the AWG output channels.	Returns the selected AWG output channel values.
testMethodChange	DTGMethod, DDSMethod ***NOTE.*** *The DDS method is supported only on DPO/DSA70000/B series oscilloscopes with bandwidths greater than or equal to 8 GHz.*	Selects the test method for the measurements.	Returns the selected test method.

Variable name	Valid values	Command form	Query form
awgPatternListChange	The name of the AWG pattern file.	Selects the AWG pattern file for running the test.	Returns the file name of the selected AWG pattern.
isAwgPatternSelected	true false	Not applicable	Returns true if the AWG pattern list is selected, else returns false.

Example

To select the DDS patterns, use the following commands:

VARIABLE:VALUE "awgPatternListChange","720x480p 60Hz 8Bit Gray RGB PC" selects the AWG pattern file from the list.

VARIABLE:VALUE? "isAwgPatternSelected" returns true if the AWG pattern is selected.

Status Messages for Sink Min/Max Configuration

DTG Method

- **Verifying minimum differential voltage status message:**

  To verify the minimum differential voltage, connect the sink device and set the **status** to **ok** to continue.

- **Verifying maximum differential voltage status message:**

  To verify the maximum differential voltage, connect the sink device and set the **status** to **ok** to continue.

- **Manual procedure for finding the minimum differential voltage for DTG method status message:**

  To find the minimum differential voltage, follow the manual procedure to configure the DTG. Set the **status** to **ok** to continue.

- **Setting up oscilloscope connection status message status message:**

  To find the minimum differential voltage, set up the oscilloscope connections and set the **status** to **ok** to continue.

- **Verify maximum supported differential voltage status message:**

  To verify the maximum differential voltage, set up the oscilloscope connections manually. Set the **status** to **yes** if the signal is supported else set it to **no**.

- **Confirm the sink device support for the maximum swing voltage status message:**

  The V_{diff} is set to xx mV. If the sink device supports this signal, set the **status** to yes else set it to no.

NOTE. *xx indicates the value calculated while running the measurement.*

- **Confirm the sink device support for the minimum swing voltage status message:**

  V_{icm} is set to xx V and V_{diff} is set to xx mV. If the sink device supports this signal, set the **status** to **yes** else set it to **no**.

NOTE. *xx indicates the value calculated while running the measurement.*

DDS Method

- **Setting up the DUT connections for sink status message:**

  Set up the sink DUT connections and set the **status** to **ok** to continue.

- **Confirm sink device support (maximum differential swing voltage) status message:**

  Differential voltage is set to 1200 mV and V_{icm2} is xx. If the sink device supports the signal, set the **status** to **yes** else set it to **no**.

- **Confirm sink device support (diff swing voltage) status message:**

  Differential voltage is set to xx mV and V_{icm} is xx. If the sink device supports the signal, set the **status** to **yes** else set it to **no**.

NOTE. *xx indicates the value calculated while running the measurement.*

Example:

Do the following to check the status messages:

1. Use the command `VARIABLE:VALUE "sequencerState","Sequencing"` to run the measurement.
2. While executing the measurement, to check for the status message use the following command:

   `VARIABLE:VALUE? "statusMessage"` returns the string prompting you to execute the next command.

   For example, to confirm sink device support (maximum differential swing voltage) in the Sink Min/Max measurement, the following status message is displayed:

"Differential voltage is set to 120 mV. If the sink device supports the signal, set the **status** to **yes** else set it to **no**."

3. Use the following commands:

   `VARIABLE:VALUE "status","yes"` to continue the test.

   `VARIABLE:VALUE "status","no"` to stop the test.

Sink Jitter Tolerance Configuration Commands

DTG Method

Variable name	Valid values	Command form	Query form
`clockSourceChange`	Ch1, Ch2, Ch3, Ch4	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
`data0SourceChange`	Ch1, Ch2, Ch3, Ch4	Selects the differential data0 source channel.	Returns the channel value set for the differential data0 source.
`jitterFrequencyPairChange`	500KHz_10MHz, 1MHz_7MHz, both	Selects the jitter frequency pair if the test runs on both the frequency pairs.	Returns the selected frequency pair.
`clockFrequencyChange`	25.175, 27, 74.25, 148.5, 222.75, 297	Selects the DUT frequency based on the selected test method. The frequency value selected is in MHz.	Returns the selected frequency value.
`testMethodChange`	DTGMethod, DDSMethod ***NOTE.*** *The DDS method is supported only on DPO/DSA70000/B series oscilloscopes with bandwidths greater than or equal to 8 GHz.*	Selects the test method for the measurements.	Returns the selected test method.
`dtgPatternListChange`	Name of the DTG pattern with `.dtg` extension.	Selects the DTG pattern file for running the test.	Not applicable

Variable name	Valid values	Command form	Query form
isDtgPatternSelected	true false	Not applicable	Returns true if the DTG pattern list is selected, else returns false.
dtgJitterInsertionChange	compositeAFG, compositeAWG, separateAWG	Selects the jitter insertion method for the test measurement.	Returns the selected jitter insertion method.
jitterAmpClockChange	Any double value in the range of 150.0e–3 to 500.0e–3. Use the following example while entering the values. Example: 160.0e-3, 225.0e-3, 450.0e-3.	Sets the jitter amplitude value for the clock.	Returns the jitter amplitude value for the clock.
jitterAmpDataChange	Any double value in the range of 150.0e–3 to 500.0e–3. Use the following example while entering the values. Example: 160.0e-3, 225.0e-3, 450.0e-3.	Sets the jitter amplitude value for the data.	Returns the jitter amplitude value for the data.

Example

To select the DTG patterns, use the following commands:

`VARIABLE:VALUE "dtgPatternListChange","720x480p 60Hz Gray RGB PC V3-3.dtg"` selects the DTG pattern from the list.

`VARIABLE:VALUE? "isDtgPatternSelected"` returns true if the DTG pattern is selected.

DDS Method

Variable name	Valid values	Command form	Query form
clockSourceChange	Ch1, Ch2, Ch3, Ch4	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
data0SourceChange	Ch1, Ch2, Ch3, Ch4	Selects the differential data0 source channel.	Returns the channel value set for the differential data0 source.
jitterFrequencyPairChange	500KHz_10MHz, 1MHz_7MHz, both	Selects the jitter frequency pair if the test runs on both the frequency pairs.	Returns the selected frequency pair.

Variable name	Valid values	Command form	Query form
clockFrequencyChange	27, 74.25, 148.5, 222.75, 27TypeE, 74.25TypeE	Selects the DUT frequency based on the selected test method. The frequency value selected is in MHz.	Returns the selected frequency value.
testMethodChange	DTGMethod, DDSMethod ***NOTE.*** *The DDS method is supported only on DPO/DSA70000/B series oscilloscopes with bandwidths greater than or equal to 8 GHz.*	Selects the test method for the measurements.	Returns the selected test method.
ddsJitterInsertionChange	composite, separate	Selects the jitter insertion method for the test measurement.	Returns the selected jitter insertion method.
awgPatternListChange	The name of the AWG pattern file.	Selects the AWG pattern file for running the test.	Returns the file name of the selected AWG pattern.
isAwgPatternSelected	true false	Not applicable	Returns true if the AWG pattern list is selected, else returns false.
awg1MarkerChange	Ch1, Ch2, Ch3, Ch4	Selects the channel value for the AWG1 marker outputs.	Returns the selected channel value.
awg2MarkerChange	Ch1, Ch2, Ch3, Ch4	Selects the channel value for the AWG2 marker outputs.	Returns the selected channel value.
cableEmulatorChange	1stCableEmulator, 2ndCableEmulator, both	Selects the cable emulator type to be used. If **both** is selected then both the category types are used.	Returns the selected cable emulator type.

Example

To select the DDS patterns, use the following commands:

`VARIABLE:VALUE "awgPatternListChange","720x480p 60Hz 8Bit Gray RGB PC"` selects the AWG pattern file from the list.

`VARIABLE:VALUE? "isAwgPatternSelected"` returns true if the AWG pattern is selected.

Status Messages for Sink Jitter Tolerance Configuration

DTG Method

- **Creating no-jitter waveforms status message:**

  If the sink DUT reproduces the signal, set the **status** to **yes** else set it to **no** and check the connections.

- **Setting up the oscilloscope connections (to calibrate jitter) status message:**

  To calibrate the data jitter, set up the oscilloscope connections and set the **status** to **ok** to continue.

- **Setting up the oscilloscope connections (to calibrate clock jitter) status message:**

  To calibrate the clock jitter, set up the oscilloscope connections and set the **status** to **ok** to continue.

- **Setting up the DUT connections for sink status message:**

  Set up the sink DUT connections and set the **status** to **ok** to continue.

- **Setting the signal sources (manual method) status message:**

  Set up and configure the signal sources connections manually, and set the **status** to **ok** to continue.

- **Setting up signal sources (manual test procedure CTS method) status message:**

  Set up and configure the signal sources connections manually and set the **status** to **ok** to continue.

- **Setting up DUT connection (manual test procedure CTS method) status message:**

  Set up the DUT connections manually. If an error occurs before 1.0*Tbit, set the **status** to **yes** else set it to **no**.

- **Confirm the sink device support status message:**

  Skew is set to xx. If the sink device supports this skew, set the **status** to **yes** else set it to **no**.

NOTE. *xx indicates the value calculated while running the measurement.*

DDS Method

- **Sink device connection status message:**

  Set up the sink device connection and set the status to **ok** to continue.

- **Skew calculation status message:**

  Skew is set to xx * Tbit, cable emulator is set to xx, and frequency pair is set to xx. If the sink device supports this signal, set the **status** to **yes** else set it to **no**.

- **No-jitter waveform status message:**

  For creating no-jitter waveform, the cable emulator is set to xx, and frequency pair is set to xx. If the sink device supports this signal, set the **status** to **yes** else set it to **no**.

- **TP1 waveform status message:**

  For creating TP1 waveform, the cable emulator is set to xx, and frequency pair is set to xx. If the sink device supports this signal, set the **status** to **yes** else set it to **no**.

- **TP2 waveform status message:**

  For creating TP2 waveform, the cable emulator is set to xx, and frequency pair is set to xx. If the sink device supports this signal, set the **status** to **yes** else set it to **no**.

NOTE. *xx indicates the value calculated while running the measurement.*

Example:

Do the following to check the status messages:

1. Use the command `VARIABLE:VALUE "sequencerState","Sequencing"` to run the measurement.
2. While executing the measurement, to check for the status message use the following command:

   `VARIABLE:VALUE? "statusMessage"` returns the string prompting you to execute the next command.

   For example, while creating no-jitter waveforms in the Sink Jitter Tolerance measurement, the following status message is displayed:

   "If the sink DUT reproduces the signal, set the **status** to **yes** else set it to **no** and check the connections."
3. Use the following commands:

   `VARIABLE:VALUE "status","yes"` to continue the test.

   `VARIABLE:VALUE "status","no"` to stop the test.

Sink Intra-Pair Skew Configuration Commands

DTG Method

Variable name	Valid values	Command form	Query form
`clockSourceChange`	Ch1, Ch2, Ch3, Ch4	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
`tbitCalculationTypeChange`	tbitExisting, tbitRecalculate	Selects the tbit calculation type.	Returns the selected tbit calculation type.

Variable name	Valid values	Command form	Query form
testMethodChange	DTGMethod, DDSMethod ***NOTE.*** *The DDS method is supported only on DPO/DSA70000/B series oscilloscopes with bandwidths greater than or equal to 8 GHz.*	Selects the test method for the measurements.	Returns the selected test method.
numberOfAvgChange	Any double value in the range of 2.0 to 1.0e3. Use the following example while entering the values. Example: 2.0, 2.25, 99.5, 1e3.	Sets the number of averages to calculate the tbit.	Returns the value set for the number of averages.
skewOnAllChannelsChange	true false	Selects the skew on all the channels. Selects the skew on one channel.	Returns true if the state is selected, else returns false.
skewChannelChange ***NOTE.*** *This option is enabled only if Skew on one channel is selected.*	CK, D0, D1, D2	Select the channel to introduce the skew.	Returns the selected skew channel.
dtgPatternListChange	The name of the DTG pattern with .dtg extension.	Selects the dtg pattern file for running the test.	Not applicable
isDtgPatternSelected	true false	Not applicable	Returns true if the DTG pattern list is selected, else returns false.

Example

To select the DTG patterns, use the following commands:

`VARIABLE:VALUE "dtgPatternListChange","720x480p 60Hz Gray RGB PC V3-3.dtg"` selects the DTG pattern from the list.

`VARIABLE:VALUE? "isDtgPatternSelected"` returns true if the DTG pattern is selected.

DDS Method

Variable name	Valid values	Command form	Query form
clockSourceChange	Ch1, Ch2, Ch3, Ch4	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
tbitCalculationTypeChange	tbitExisting, tbitRecalculate	Selects the tbit calculation type.	Returns the selected tbit calculation type.
testMethodChange	DTGMethod, DDSMethod ***NOTE.*** *The DDS method is supported only on DPO/DSA70000/B series oscilloscopes with bandwidths greater than or equal to 8 GHz.*	Selects the test method for the measurements.	Returns the selected test method.
numberOfAvgChange	Any double value in the range of 2.0 to 1.0e+3. Use the following example while entering the values. Example: 2.0, 2.25, 99.5, 1e3.	Sets the number of averages to calculate the tbit.	Returns the value set for the number of averages.
skewOnAllChannelsChange	true false	Selects the skew on all the channels. Selects the skew on one channel.	Returns true if the state is selected, else returns false.
skewChannelChange ***NOTE.*** *This option is enabled only if Skew on one channel is selected.*	CK, D0, D1, D2	Select the channel to introduce the skew.	Returns the selected skew channel.
awgPatternListChange	The name of AWG pattern file.	Selects the AWG pattern file for running the test.	Returns the file name of the selected AWG pattern.
isAwgPatternSelected	true false	Not applicable	Returns true if the AWG pattern list is selected, else returns false.

Variable name	Valid values	Command form	Query form
awg1MarkerChange	Ch1, Ch2, Ch3, Ch4	Selects the channel value on the oscilloscope for the AWG1 outputs.	Returns the selected channel value.
awg2MarkerChange	Ch1, Ch2, Ch3, Ch4	Selects the channel value on the oscilloscope for the AWG2 outputs.	Returns the selected channel value.

Example

To select the DDS patterns, use the following commands:

`VARIABLE:VALUE "awgPatternListChange","720x480p 60Hz 8Bit Gray RGB PC"` selects the AWG pattern file from the list.

`VARIABLE:VALUE? "isAwgPatternSelected"` returns true if the AWG pattern is selected.

Status Messages for Sink Intra-Pair Skew Configuration

DTG Method

- **Tbit calculation status message:**

  For Tbit calculation, set up the connections and set the **status** to **ok** to continue.

- **T-Bit dialog box status message:**

  T-bit is recalculated. Set the **status** to **stop** to exit else set it to **continue**.

  For example, refer to the Example (see page 16) section.

- **Finding intra-pair skew single channel status message:**

  To find the intra-pair skew on a single channel, set up the connections and set the **status** to **ok** to continue.

- **Finding intra-pair skew on all channels status message:**

  To find intra-pair skew on all channels, set up the connections and set the **status** to **ok** to continue.

- **Finding intra-pair skew single channel (manual procedure for DTG) status message:**

  To find intra-pair skew, follow the manual procedure to configure DTG. If error occurs before 0.4*Tbit, set the **status** to **yes** else set it to **no**.

- **Sink device support status message:**

  The skew is set to xx * Tbit. If the sink device supports the signal, set the **status** to **yes** else set it to **no**.

NOTE. *xx indicates the value calculated while running the measurement.*

DDS Method

- **Tbit calculation status message:**

  To calculate the Tbit, set up the connections and set the **status** to **ok** to continue.

- **T-Bit dialog box status message:**

  T-bit is recalculated. Set the **status** to **stop** to exit else set it to **continue**.

  For example, refer to the Example (see page 16) section.

- **Setup sink device connection status message:**

  Set up the sink device connections and set the **status** to **ok** to continue.

- **Finding worst clock data skew status message:**

  Skew is set to 0. If the sink device supports this signal, set the **status** to **yes** else set it to **no**.

- **Confirm sink device support status message:**

  Skew is set to xx * Tbit. If the sink device supports this signal, set the **status** to **yes** else set it to **no**.

NOTE. *xx indicates the value calculated while running the measurement.*

Example:

Do the following to check the status messages:

1. Use the command `VARIABLE:VALUE "sequencerState","Sequencing"` to run the measurement.
2. While executing the measurement, to check for the status message use the following command:

   `VARIABLE:VALUE? "statusMessage"` returns the string prompting you to execute the next command.

   For example, for finding worst clock data skew in the Sink Intra-Pair Skew measurement, the following status message is displayed:

   "Skew is set to 0. If the sink device supports this signal, set the **status** to **yes** else set it to **no**."

3. Use the following commands:

   `VARIABLE:VALUE "status","yes"` to continue the test.

   `VARIABLE:VALUE "status","no"` to stop the test.

Sink Min-Max Diff Swing Tolerance Results Query Commands

Variable name	Valid values	Command form	Query form
minDiffVoltageVicm1Status	Pass, Fail, Error	Not applicable	Returns the result status of the min-max measurement for the data lane V_{icm1}.
minDiffVoltageVicm2Status	Pass, Fail, Error	Not applicable	Returns the result status of the min-max measurement for the data lane V_{icm2}.
minDiffVoltageVicm1MeasValue	Any double value	Not applicable	Returns the measured value of the min-max measurement for the data lane V_{icm1}.
minDiffVoltageVicm2MeasValue	Any double value	Not applicable	Returns the measured value of the min-max measurement for the data lane V_{icm2}.
maxDiffVoltageStatus	Pass, Fail, Error	Not applicable	Returns the result status for the max swing voltage.

Sink Jitter Tolerance Results Query Commands

DTG Method

Variable name	Valid values	Command form	Query form
jitterTolerancePair1Status	Pass, Fail, Error	Not applicable	Returns the result status of the jitter tolerance for the pair data and clock (D, CK): 500 kHz, 10 MHz.
jitterTolerancePair2Status	Pass, Fail, Error	Not applicable	Returns the result status of the jitter tolerance for the pair D, CK: 1 MHz, 7 MHz.

Variable name	Valid values	Command form	Query form
jitterTolerancePair1MeasValue	Any double value	Not applicable	Returns the measured value of the jitter tolerance for the pair D, CK: 500 kHz, 10 MHz.
jitterTolerancePair2MeasValue	Any double value	Not applicable	Returns the measured value of the jitter tolerance for the pair D, CK: 1 MHz, 7 MHz.

DDS Method

Variable name	Valid values	Command form	Query form
jitterTolerancePair1CE1Status	Pass, Fail, Error	Not applicable	Returns the result status of the jitter tolerance for the selected pair D, CK: 500 kHz, 10 MHz, and 1st cable emulator.
jitterTolerancePair1CE2Status	Pass, Fail, Error	Not applicable	Returns the result status of the jitter tolerance for the selected pair D, CK: 500 kHz, 10 MHz, and 2nd cable emulator.
jitterTolerancePair1CE1MeasValue	Any double value	Not applicable	Returns the result status of the jitter tolerance for the selected pair D, CK: 500 kHz, 10 MHz, and 1st cable emulator.
jitterTolerancePair1CE2MeasValue	Any double value	Not applicable	Returns the measured value of the jitter tolerance for the selected pair D, CK: 500 kHz, 10 MHz, and 2nd cable emulator.
jitterTolerancePair2CE1Status	Pass, Fail, Error	Not applicable	Returns the measured value of the jitter tolerance for the selected pair D, CK: 1 MHz, 7 MHz, and 1st cable emulator.

Variable name	Valid values	Command form	Query form
jitterTolerancePair2CE2Status	Pass, Fail, Error	Not applicable	Returns the measured value of the jitter tolerance for the selected pair D, CK: 1 MHz, 7 MHz, and 1st cable emulator.
jitterTolerancePair2CE1MeasValue	Any double value	Not applicable	Returns the measured value of the jitter tolerance for the selected pair D, CK: 1 MHz, 7 MHz, and 1st cable emulator.
jitterTolerancePair2CE2MeasValue	Any double value	Not applicable	Returns the measured value of the jitter tolerance for the selected pair D, CK: 1 MHz, 7 MHz, and 2nd cable emulator.

Sink Intra-Pair Skew Results Query Commands

Variable name	Valid values	Command form	Query form
sinkIntraPairSkewStatus	Pass, Fail, Error	Not applicable	Returns the result status of the sink intra-pair skew measurements for the data lane Clock.
sinkIntraPairSkewMeasValue	Any double value	Not applicable	Returns the measured value of the sink intra-pair skew measurements for the data lane Clock.

Cable Eye Diagram Configuration Commands

DTG Method

Variable name	Valid values	Command form	Query form
clockSourceChange	Ch1, Ch2, Ch3, Ch4	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
data0SourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential data0 source channel.	Returns the channel value set for the differential data0 source.
data1SourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential data1 source channel.	Returns the channel value set for the differential data1 source.
data2SourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential data2 source channel.	Returns the channel value set for the differential data2 source.
recordLengthChange	For TDS series oscilloscope, the record length are as follows: 8.0k, 20.0k, 40.0k, 100k, 200k, 400k, 1.0M, 2.0M, 4.0M, 10.0M, 20.0M, 32.0M For DPO/DSA70000/B series oscilloscope, the record length are as follows: 10.0k, 25.0k, 50.0k, 100k, 250k, 500k, 1.00M, 2.50M, 5.00M, 10.0M, 25.0M Use the following example while entering the values. Example: 8.0e3, 20.0e3, 32.0e6, 20.0e6.	Sets the record length to the specified value for the source eye diagram measurement.	Returns the set record length.
clockTypeChange	PLL, Raw, Ideal	Sets the clock type required for the source eye diagram measurement.	Returns the clock type set for the source eye diagram measurement.

Variable name	Valid values	Command form	Query form
refLevelTypeChange	percentage, absolute	Sets the type of value to be entered for the reference level inputs.	Returns the selected value type for the reference level inputs.
absoluteHysteresisChange	Any double value in the range of 0.0 V to 1.0 V. ***NOTE.*** *Set the refLevelTypeChange to absolute to enter the absolute value.* Use the following example while entering the values. Example: 100e–3, 250e–3, 600e–3.	Sets the hysteresis value to the value specified within the range.	Returns the set hysteresis value.
percentageHysteresisChange	Any double value in the range of 0.0 to 25.0. ***NOTE.*** *Set the refLevelTypeChange to percentage to enter the percentage value.*	Sets the hysteresis value to the value specified within the range.	Returns the set hysteresis value.
absoluteMidLevelChange	Any double value in the range of –2.0 V to 2.0 V. ***NOTE.*** *Set the refLevelTypeChange to absolute to enter the absolute value.* Use the following example while entering the values. Example: –120e–3, –2.0, 150e–3, 1.25.	Sets the mid reference level to the value specified within the range.	Returns the set mid reference level value.
percentageMidLevelChange	Any double value in the range of 25.0 to 75.0. ***NOTE.*** *Set the refLevelTypeChange to percentage to enter the percentage value.*	Sets the mid reference level to the value specified within the range.	Returns the set mid reference level value.
tp1Enable	true false	Selects the test point TP1. Clears the test point TP1.	Returns true if TP1 is selected, else returns false.

Variable name	Valid values	Command form	Query form
tp2Enable	true false	Selects the test point TP2. Clears the test point TP2.	Returns true if TP2 is selected, else returns false.
dtgPatternListChange	Name of the DTG pattern with .dtg extension along with the absolute path name of the existing directory.	Selects the DTG pattern file for running the test.	Returns the file name of the selected DTG pattern file.
isDtgPatternSelected	true false	Not applicable	Returns true if the DTG pattern list is selected, else returns false.
cableJitterInsertionChange	AFG, DTGInternal	Selects the jitter insertion method for the test measurement.	Returns the selected jitter insertion method.
cableEqualizerOptionChange	internalCableEqualizer, externalCableEqualizer, noCableEqualizer	Selects the cable equalizer options.	Returns the selected cable equalizer options.
cableEqualizerFilenameChange	Any valid file name with .flt extension along with the absolute path name of the existing directory.	Sets the file name for the external filter coefficients.	Returns the file name along with the full path to the file.
riseTimeFilterOptionChange ***NOTE.*** *This command is applicable only for the DTG method.*	internalRiseTimeFilter, externalRiseTimeFilter, noRiseTimeFilter	Selects the rise time filter options.	Returns the selected rise time filter option.
riseTimeFilterFilenameChange ***NOTE.*** *This command is applicable only for the DTG method.*	Any valid file name with .flt extension along with the absolute path name of the existing directory.	Sets the file name for the external filter coefficients.	Returns the file name along with the full path to the file.
testMethodChange	DTGMethod, DDSMethod ***NOTE.*** *The DDS method is supported only on DPO/DSA70000/B series oscilloscopes with bandwidths greater than or equal to 8 GHz.*	Selects the test method required for the specified measurements.	Returns the selected test method.

Example

To select the DTG patterns, use the following commands:

`VARIABLE:VALUE "dtgPatternListChange","720x480p 60Hz Gray RGB PC V3-3.dtg"` selects the DTG pattern from the list.

`VARIABLE:VALUE? "isDtgPatternSelected"` returns true if the DTG pattern is selected.

DDS Method

Variable name	Valid values	Command form	Query form
clockSourceChange	Ch1, Ch2, Ch3, Ch4	Selects the differential clock source channel.	Returns the channel value set for the differential clock source.
data0SourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential data0 source channel.	Returns the channel value set for the differential data0 source.
data1SourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential data1 source channel.	Returns the channel value set for the differential data1 source.
data2SourceChange	Ch1, Ch2, Ch3, Ch4, notConn	Selects the differential data2 source channel.	Returns the channel value set for the differential data2 source.
recordLengthChange	For TDS series oscilloscope, the record length are as follows: 8.0k, 20.0k, 40.0k, 100k, 200k, 400k, 1.0M, 2.0M, 4.0M, 10.0M, 20.0M, 32.0M For DPO/DSA70000/B series oscilloscope, the record length are as follows: 10.0k, 25.0k, 50.0k, 100k, 250k, 500k, 1.00M, 2.50M, 5.00M, 10.0M, 25.0M Use the following example while entering the values. Example: 8.0e3, 20.0e3, 32.0e6, 20.0e6.	Sets the record length to the specified value for the source eye diagram measurement.	Returns the set record length.

Variable name	Valid values	Command form	Query form
clockTypeChange	PLL, Raw, Ideal	Sets the clock type required for the source eye diagram measurement.	Returns the clock type set for the source eye diagram measurement.
refLevelTypeChange	percentage, absolute	Sets the type of value to be entered for the reference level inputs.	Returns the selected value type for the reference level inputs.
absoluteHysteresisChange	Any double value in the range of 0.0 V to 1.0 V. ***NOTE.*** *Set the* refLevelTypeChange *to absolute to enter the absolute value.* Use the following example while entering the values. Example: 100e–3, 250e–3, 600e–3.	Sets the hysteresis value to the value specified within the range.	Returns the set hysteresis value.
percentageHysteresisChange	Any double value in the range of 0.0 to 25.0. ***NOTE.*** *Set the* refLevelTypeChange *to percentage to enter the percentage value.*	Sets the hysteresis value to the value specified within the range.	Returns the set hysteresis value.
absoluteMidLevelChange	Any double value in the range of –2.0 V to 2.0 V. ***NOTE.*** *Set the* refLevelTypeChange *to absolute to enter the absolute value.* Use the following example while entering the values. Example: –120e–3, –2.0, 150e–3, 1.25.	Sets the mid reference level to the value specified within the range.	Returns the set mid reference level value.
percentageMidLevelChange	Any double value in the range of 25.0 to 75.0. ***NOTE.*** *Set the* refLevelTypeChange *to percentage to enter the percentage value.*	Sets the mid reference level to the value specified within the range.	Returns the set mid reference level value.

Variable name	Valid values	Command form	Query form
`tp1Enable`[1]	true false	Selects the test point TP1. Clears the test point TP1.	Returns true if TP1 is selected, else returns false.
`tp2Enable`[1]	true false	Selects the test point TP2. Clears the test point TP2.	Returns true if TP2 is selected, else returns false.
`tp5Enable`[1] ***NOTE.*** *This command is applicable only when you select 74 MHz Type-E cable frequency.*	true false	Selects the test point TP5. Clears the test point TP5.	Returns true if TP5 is selected, else returns false.
`cableFrequencyChange` ***NOTE.*** *This command is applicable only for the DDS method.*	74MHz, 165MHz, 340MHz, 74MHzTypeE	Selects the cable frequency.	Returns the selected cable frequency.
`cableEqualizerOptionChange`	internalCableEqualizer, externalCableEqualizer, noCableEqualizer	Selects the cable equalizer options.	Returns the selected cable equalizer options.
`cableEqualizerFilenameChange`	Any valid file name with `.flt` extension along with the absolute path name of the existing directory.	Sets the file name for the external filter coefficients.	Returns the file name along with the full path to the file.
`testMethodChange`	DTGMethod, DDSMethod ***NOTE.*** *The DDS method is supported only on DPO/DSA70000/B series oscilloscopes with bandwidths greater than or equal to 8 GHz.*	Selects the test method required for the specified measurements.	Returns the selected test method.

[1] For the DDS Method using the Type-E cable emulator, you can select only two test points at a time (TP1 and TP2, TP1 and TP5, or TP5 and TP2).

Example

To select the DDS patterns, use the following commands:

`VARIABLE:VALUE “awgPatternListChange”,“720x480p 60Hz 8Bit Gray RGB PC”` selects the AWG pattern file from the list.

`VARIABLE:VALUE? “isAwgPatternSelected”` returns true if the AWG pattern is selected.

Status Messages for Cable Eye Diagram Configuration (DTG and DDS Methods)

- **Test point TP1 change status message:**

  If TP1 eye diagram test is complete, set the **status** to **ok** to continue.

- **Test point TP2 change status message:**

  If TP2 eye diagram test is complete, set the **status** to **ok** to continue.

- **Test point TP5 change status message:**

  If TP5 eye diagram test is complete, set the **status** to **ok** to continue.

- **Test point change status message:**

  To test the cable at TP2, set up the connections and set the **status** to **ok** to continue.

- **Physical connection change status message:**

  Swap the clock and data0 lanes to run the TP2 measurement again. Set the **status** to **ok** to continue.

- **To create worst-eye at TP1 status message:**

  To create the worst-eye diagram at TP1, set up the connections and set the **status** to **ok** to continue.

- **Confirm worst-eye status message:**

  Data jitter is set to xx. If this is the worst-eye diagram, set the **status** to **yes** else set it to **no** and adjust the signal sources.

NOTE. *xx indicates the value calculated while running the measurement.*

- **DTG jitter adjustment status message:**

  Adjust the required data jitter on the DTG and set the **status** to **ok** to continue.

- **Confirm data jitter value status message:**

  Data jitter is set to xx * Tbit. If this is the correct data jitter value, set the **status** to **no** else set it to **yes** and recalculate.

NOTE. *xx indicates the value calculated while running the measurement.*

- **Adjust signal source swing voltage status message:**

  Adjust the signal source swing voltage and set the **status** to **ok** to continue.

Example:

Do the following to check the status messages:

1. Use the command `VARIABLE:VALUE "sequencerState","Sequencing"` to run the measurement.
2. While executing the measurement, to check for the status message use the following command:

   `VARIABLE:VALUE? "statusMessage"` returns the string prompting you to execute the next command.

   For example, while creating worst-eye at TP1 in the Cable Eye Diagram measurement, the following status message is displayed:

   "To create the worst-eye diagram at TP1, set up the connections and set the **status** to **ok** to continue."
3. Use the following commands:

   `VARIABLE:VALUE "status","yes"` to continue the test.

   `VARIABLE:VALUE "status","no"` to stop the test.

Cable Eye Diagram Results Query Commands

Variable name	Valid values	Command form	Query form
`cableEyeDiagramTP1CKD0Status`	Pass, Fail, Error	Not applicable	Returns the result status of the cable eye diagram measurement for the data lane TP1:CKD0.
`cableEyeDiagramTP1CKD1Status`	Pass, Fail, Error	Not applicable	Returns the result status of the cable eye diagram measurement for the data lane TP1:CKD1.
`cableEyeDiagramTP1CKD2Status`	Pass, Fail, Error	Not applicable	Returns the result status of the cable eye diagram measurement for the data lane TP1:CKD2.
`cableEyeDiagramTP1CKD0MeasValue`	Any double value	Not applicable	Returns the measured value of cable eye diagram measurement for the data lane TP1:CKD0.

Variable name	Valid values	Command form	Query form
cableEyeDiagramTP1CKD1MeasValue	Any double value	Not applicable	Returns the measured value of the cable eye diagram measurement for the data lane TP1:CKD1.
cableEyeDiagramTP1CKD2MeasValue	Any double value	Not applicable	Returns the measured value of the cable eye diagram measurement for data lane TP1:CKD2.
cableEyeDiagramTP2CKD0Status	Pass, Fail, Error	Not applicable	Returns the result status of cable eye diagram measurement for the data lane TP2:CKD0.
cableEyeDiagramTP2CKD1Status	Pass, Fail, Error	Not applicable	Returns the result status of cable eye diagram measurement for the data lane TP2:CKD1.
cableEyeDiagramTP2CKD2Status	Pass, Fail, Error	Not applicable	Returns the result status of cable eye diagram measurement for data lane TP2:CKD2.
cableEyeDiagramTP2CKD0MeasValue	Any double value	Not applicable	Returns the measured value of cable eye diagram measurement for the data lane TP2:CKD0.
cableEyeDiagramTP2CKD1MeasValue	Any double value	Not applicable	Returns the measured value of cable eye diagram measurement for the data lane TP2:CKD1.

Variable name	Valid values	Command form	Query form
cableEyeDiagramTP2CKD2MeasValue	Any double value	Not applicable	Returns the measured value of cable eye diagram measurement for the data lane TP2:CKD2.
cableEyeDiagramTP2CKD0Status	Pass, Fail, Error	Not applicable	Returns the result status of cable eye diagram measurement for the data lane TP5:CKD0.
cableEyeDiagramTP2CKD1Status	Pass, Fail, Error	Not applicable	Returns the result status of cable eye diagram measurement for the data lane TP5:CKD1.
cableEyeDiagramTP2CKD2Status	Pass, Fail, Error	Not applicable	Returns the result status of cable eye diagram measurement for data lane TP5:CKD2.
cableEyeDiagramTP2CKD0MeasValue	Any double value	Not applicable	Returns the measured value of cable eye diagram measurement for the data lane TP5:CKD0.

Variable name	Valid values	Command form	Query form
cableEyeDiagramTP2CKD1MeasValue	Any double value	Not applicable	Returns the measured value of cable eye diagram measurement for the data lane TP5:CKD1.
cableEyeDiagramTP2CKD2MeasValue	Any double value	Not applicable	Returns the measured value of cable eye diagram measurement for the data lane TP5:CKD2.

DTG Output Configuration Commands (for both Sink and Cable measurements)

Variable name	Valid values	Command form	Query form
dtgClockSourceChange	A1, A2, B1, B2, C1, C2, D1, D2	Selects the DTG output channel value for the clock source.	Returns the selected DTG output channel value.
dtgData0SourceChange	A1, A2, B1, B2, C1, C2, D1, D2	Selects the DTG output channel value for the data0 source.	Returns the selected DTG output channel value.
dtgData1SourceChange	A1, A2, B1, B2, C1, C2, D1, D2	Selects the DTG output channel value for the data1 source.	Returns the selected DTG output channel value.
dtgData2SourceChange	A1, A2, B1, B2, C1, C2, D1, D2	Selects the DTG output channel value for the data2 source.	Returns the selected DTG output channel value.

Utilities Deskew Configuration Commands

Variable name	Valid values	Command form	Query form
deskewSourceTypeChange	externalSource, internalSource	Selects the deskew source type required.	Returns the selected deskew source type.
deskewFromInputChange	Ch1, Ch2, Ch3, Ch4	Selects the deskew input channel value from a source.	Returns the selected deskew input channel value.
deskewToInputChange	Ch1, Ch2, Ch3, Ch4	Selects the deskew input channel value to a source.	Returns the selected deskew input channel value.
deskewFromHysteresisChange	Any double value in the range of 0.0 to 25.0.	Sets the deskew hysteresis value form a source.	Returns the selected deskew hysteresis value.
deskewToHysteresisChange	Any double value in the range of 0.0 to 25.0.	Sets the deskew hysteresis value to a source.	Returns the selected deskew hysteresis value.
deskewFromRefChange	Any double value in the range of 25.0 to 75.0.	Sets the deskew reference level value form a source.	Returns the selected deskew hysteresis value.
deskewToRefChange	Any double value in the range of 25.0 to 75.0.	Sets the deskew reference level value to a source.	Returns the selected deskew hysteresis value.
deskewSlopeTypeChange	riseSlope, fallSlope	Selects the required deskew slope type.	Returns the selected slope type.
deskewSlopeValueChange	Any integer value in the range of 1 to 100.	Sets the required deskew slope value.	Returns the selected slope value.

Signal Sources Control Commands

Variable name	Valid values	Command form	Query form
deviceTypeChange	AWG, DTG, AFG	Selects the signal source device type.	Returns the selected device type.
controlTypeChange	GPIB, manual	Selects the control type for the selected signal source device.	Returns the selected control type.
boardNumberChange	GPIB0, GPIB1, GPIB2, GPIB3, GPIB4, GPIB5, GPIB6, GPIB7	Selects the required GPIB board number for the selected signal source device.	Returns the selected board number for the signal source device.
primaryAddressChange ***NOTE.*** *This command is applicable only for the DTG and AFG device types.*	Any integer in the range of 1 to 7.	Sets the primary address for the selected signal source.	Returns the selected primary address for the signal source.
secondaryAddressChange ***NOTE.*** *This command is applicable only for the DTG and AFG device types.*	Any integer in the range of 0 to 7.	Sets the secondary address for the selected signal source.	Returns the selected secondary address for the signal source.
awg1PrimaryAddressChange	Any integer in the range of 1 to 7.	Sets the primary address for the first AWG selected.	Returns the selected primary address for the first AWG.
awg1SecondaryAddressChange	Any integer in the range of 0 to 7.	Sets the secondary address for the first AWG selected.	Returns the selected primary address for the first AWG.
awg2PrimaryAddressChange ***NOTE.*** *This command is applicable only for the DDS method.*	Any integer in the range of 1 to 7.	Sets the primary address for the second AWG selected.	Returns the selected primary address for the second AWG.
awg2SecondaryAddressChange ***NOTE.*** *This command is applicable only for the DDS method.*	Any integer in the range of 0 to 7.	Sets the secondary address for the second AWG selected.	Returns the selected secondary address for the second AWG.
testDeviceConnection	true	Tests the signal sources connection.	Not applicable

Error/Status Commands

Variable name	Valid values	Command form	Query form
statusMessage	These values include valid error codes and status messages. ***NOTE.*** *Status messages are same as dialog boxes messages displayed in the software.*	Not applicable	Returns the error code and the status messages.
status	ok, yes, no, stop, and continue.	Sets the value for the status.	Not applicable
commandStatus	true, false	Not applicable	Returns true if the command has completed the execution, else returns false if the command is still executing.

Example:

Do the following to check for the completion of the execution of the commands using `command status`:

1. To start the TDSHT3 application, send the oscilloscope the following GPIB command:

   `APPLICATION:ACTIVATE "HDMI Compliance Test Software(1.4)"`

2. To run the selected measurements, use the following command:

   `VARIABLE:VALUE "sequencerState","Sequencing"` selects the source device type.

3. Use the command `VARIABLE:VALUE? "commandStatus"` returns true if the command has completed the execution else returns false if the command is still executing.

Do the following to select and configure the measurements:

1. To start the TDSHT3 application, send the oscilloscope the following GPIB command:

   `APPLICATION:ACTIVATE "HDMI Compliance Test Software(1.4)"`

2. To select the required device type, use the following command:

   `VARIABLE:VALUE "measDeviceTypeChange","sink"` selects the source device type.

3. Use the command `VARIABLE:VALUE "select","true"` to select the **Select** button on the flow control panel.

4. Use the command `VARIABLE:VALUE "measAdd","sinkJitterTolerance"` to select the specified measurement.

5. Use the command `VARIABLE:VALUE "configure","true"` to select the **Configure** button on the flow control panel.

6. Use the command `VARIABLE:VALUE "clockSourceChange","Ch2"` to select the differential clock source channel.
7. Use the command `VARIABLE:VALUE "testMethodChange","DTGMethod"` to select the test method for the measurements.

Program Example

* TDSHT3

* This is a reference program to illustrate how to communicate to TDSHT3

* using Remote GPIB facilities.

A typical application does following steps:

- Start the application
- Select a measurement and configure parameters
- Run the measurement
- Execute the results query
- Exit the application

For the current program, we will recall a setup file named as sqcsetup.

You can save setup files according to your own needs using the GUI-based interface of the application.

```
*/
#include "stdafx.h"
#include <windows.h>
#include <stdio.h>
#include <stdlib.h>
#include "decl-32.h"

/* Forward Declarations */
int start_application(int scope);
int exit_application(int scope);
bool isCommandStatus(int scope);

/* parameters needed to access the device driver handler */
#define BDINDEX 0      // Board Index
#define PRIMARY_ADDR_OF_DMM 1 // Primary address of device
```

```
#define NO_SECONDARY_ADDR 0 // Secondary address of device
#define TIMEOUT T10s   // Timeout value = 10 seconds
#define EOTMODE 1       // Enable the END message
#define EOSMODE 0       // Disable the EOS mode
char ErrorMnemonic[21][5] = {"EDVR", "ECIC", "ENOL", "EADR", "EARG",
"ESAC", "EABO", "ENEB", "EDMA", "",
"EOIP", "ECAP", "EFSO", "", "EBUS",
"ESTB", "ESRQ", "", "", "", "ETAB"};

/*
* After each GPIB call, the application checks whether the call
* succeeded.  If an NI-488.2 call fails, the GPIB driver sets the
* corresponding bit in the global status variable.  If the call
* failed, this procedure prints an error message, takes
* the device offline and exits.
*/

void GPIBCleanup(int ud, char* ErrorMsg)
{
   printf("Error :  %s\nibsta = 0x%x iberr = %d (%s)\n", ErrorMsg, ibsta,
   iberr, ErrorMnemonic[iberr]);
   if (ud != -1)
   {
   printf("Cleanup:  Taking device offline\n");
   ibonl(ud, 0);
   }
   exit(0);
}

int start_application( int scope )
{
```

```
char write_buffer[100];
char read_buffer[100];
char app_name[] = "\"TDSHT3v1.4\"\n";
int status, timer;

/* Start the TDSHT3 application */
sprintf(write_buffer, "%s", "Application:activate \"HDMI Compliance Test
Software(1.4)"\"");
status = ibwrt(scope, write_buffer, strlen(write_buffer));
if (ibsta & ERR)
{
GPIBCleanup(scope, "Unable to start the application");
return 0;
}
timer = 1;
while (1)
{
/* Check whether application has started */
sprintf(write_buffer, "%s", "Variable:value?  \"application\"");
status = ibwrt(scope, write_buffer, strlen(write_buffer));
status = ibrd(scope, read_buffer, sizeof(read_buffer));
read_buffer[ibcnt] = '\0';
if (strcmp(app_name, read_buffer) == 0)
{
return 1;
}
timer++;
if (timer > 60)
{
return 0;
}
```

```
   Sleep(1000)
   }
   return 1;
}

int exit_application(int scope)
{
   char write_buffer[100];
   printf("Exit Application ...\n");
   sprintf(write_buffer, "%s", "Variable:value \"application\",\"exit\"");
   ibwrt(scope, write_buffer, strlen(write_buffer));
   return 1;
}

/* Run the Measurement*/
int run_test (int scope)
{
   char write_buffer[100];
   char read_buffer[100];
   int timer;
   sprintf(write_buffer, "%s", "Variable:value \"sequencerState\",
   \"Sequencing\"");
   ibwrt(scope, write_buffer, strlen(write_buffer));
   printf("Executing Test...\n");
   Sleep(100);
   /* Wait for application to come to Ready State */
   timer = 1;
   while (1)
   {
   timer++;
   if (timer > 90)
```

```
    {
    printf("******Test Time Out ******\n");
    return 0;
    }
    sprintf(write_buffer, "%s", "Variable:value?  \"sequencerState\"");
    ibwrt(scope, write_buffer, strlen(write_buffer));
    ibrd(scope, read_buffer, 99);
    if (ibsta & ERR)
    {
    GPIBCleanup(scope, "Unable to write to device");
    }
    read_buffer[ibcnt] = '\0';
    if (strcmp(read_buffer,"\"Ready\"\n") == 0)
    {
    printf("Test Complete ...\n");
    return 1;
    }
    Sleep(1000);
    }
}

/* Select and Configuring the Measurement*/
void execute_command(int scope, char *variable_name,char *value)
{
    char write_buffer[100];
    char read_buffer[100];
    int status;
    char *command;
    command = "Variable:value \"";
    strcat(command,variable_name);
    strcat(command,"\",\"");
```

```
    strcat(command,value);
    strcat(command,"\"");
    /*Select Device Type*/
    strcpy(write_buffer,command);
    printf("%s\n",write_buffer);
    status = ibwrt(scope, write_buffer, strlen(write_buffer));
    if (ibsta & ERR)
    {
    GPIBCleanup(scope, "Unable to communicate with Scope");
    return;
    }
    //checking if the command has completed execution
    while(1)
    {
    bool commandStatus = isCommandStatus(scope);
    if(commandStatus == true)
    {
    break;
    }
    Sleep(1000);
    }
}

/* this function queries for the value set */
char* execute_query(int scope, char *variable_name)
{
    char write_buffer[100];
    char read_buffer[100];
    char command[100] = "Variable:value?  \"";
    strcat(command,variable_name);
    strcat(command,"\"");
```

```
    //Querying for the value set
    strcpy(write_buffer,command);
    ibwrt(scope, write_buffer, strlen(write_buffer));
    ibrd(scope, read_buffer, 99);
    if (ibsta & ERR)
    {
    GPIBCleanup(scope, "Unable to write to device");
    }
    read_buffer[ibcnt] = '\0';
    return read_buffer;
}



//This function checks if the previous Remote GPIB command has completed
Execution
bool isCommandStatus(int scope)
{
    char write_buffer[100];
    char read_buffer[100];
    sprintf(write_buffer, "%s", "Variable:value?  \"commandStatus\"");
    ibwrt(scope, write_buffer, strlen(write_buffer));
    ibrd(scope, read_buffer, 99);
    if (ibsta & ERR)
    {
    GPIBCleanup(scope, "Unable to write to device");
    }
    read_buffer[ibcnt] = '\0';
    if (strcmp(read_buffer,"\"ture\"\n") == 0)
    {
    return true;
    }
    else if(strcmp(read_buffer,"\"false\"\n") == 0)
```

```
    {
   return false;
    }
}

//This function queries for the results of the source Eye diagram measurements
void results_query(int scope, char *variable_Name)
{
   char write_buffer[100];
   char read_buffer[100];
   char command[100] = "Variable:value?  \"";
   strcat(command,variable_Name);
   strcat(command,"\"");
   printf("\nexecuting the results query for Source Eye Diagram\n");
   //Querying for the Result Status
   strcpy(write_buffer,command);
   ibwrt(scope, write_buffer, strlen(write_buffer));
   ibrd(scope, read_buffer, 99);
   if (ibsta & ERR)
   {
   GPIBCleanup(scope, "Unable to write to device");
   }
   read_buffer[ibcnt] = '\0';
   printf("\nThe Result for %s is %s",variable_Name,read_buffer);
}

void main()
{
   int Dev;
   char write_buffer[100];
   char* query_value;
```

```
int status;
Dev = ibdev (BDINDEX, PRIMARY_ADDR_OF_DMM, NO_SECONDARY_ADDR,
TIMEOUT, EOTMODE, EOSMODE);
if (ibsta & ERR)
{
GPIBCleanup(Dev, "Unable to open device");
}
else
{
printf("My device id - %i", Dev);
}
Sleep(1000);
sprintf(write_buffer, "%s", "header off");
status = ibwrt(Dev, write_buffer, strlen(write_buffer));
if (start_application(Dev))
{
printf("\nApplication started....\n");
}
Sleep(10000);
execute_command(Dev,"measDeviceTypeChange","source");
execute_command(Dev,"select","true");
execute_command(Dev,"measAdd","sourceEyeDiagram");
while(1)
{
execute_command(Dev,"measAdd","sourceClockJitter");
querry_value = execute_query(Dev,"isMeasAdded");
if(strcmp(query_value,"true") == 0)
{
break;
}
}
```

```
    execute_command(Dev,"configure","true");
    execute_command(Dev,"clockSourceChange","Ch2");
    execute_command(Dev,"data0SourceChange","Ch3");
    execute_command(Dev,"recordLengthChange","20e6");
    run_test(Dev);
    Sleep(4000);
    while(1)
    {
    bool commandStatus = isCommandStatus(Dev);
    if(commandStatus == true)
    {
    break;
    }
    }
    results_query(Dev,"sourceEyeDiagramCKD0Status");
    Sleep(2000);
    results_query(Dev,"sourceEyeDiagramCKD0MeasValue");
    Sleep(2000);
    exit_application(Dev);
    /* leave the device back elegantly */
    printf("Cleanup:  Taking device offline\n");
    ibonl(Dev, 0);
}
```

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