

M809228XA

OIF-CEI CEI-28G VSR/SR Compliance Receiver Test Plugin

The screenshot displays the software interface for the M809228XA test plugin. The interface is divided into several sections:

- Top Bar:** Includes 'Configure', 'Test', and 'Stressed Input' tabs, along with control buttons for play, stop, and refresh. The status is 'Finished'.
- Measurement History:** A vertical sidebar on the left.
- Connection Diagram:** A central diagram showing the physical connections between the Host Device, HCB, and the test device. Below it, a 'Connect:' section lists instructions:
 - Host Device and HCB.
 - Set Device to Loopback
 - Victim Generator Data Out 1 / Data Out 1 N to TP4a P/N via blocking capacitors
 - Victim Analyzer Data In 1 / Data In 1 N to TP1a P/N via blocking capacitors and pickoffs
 - Unused ports should be terminated with 50 ohms
 - Data for clock recovery from pickoffs
 - Clock from N1076A
- Parameters:** A right-hand panel with two sections:
 - Setup (M1.System):**
 - Mode: Compliance
 - Baud Rate: 25.780 GS/s
 - Lane Mode: Single
 - Prompt for Manual...: Off
 - Test Setup (M1.System):**
 - Mode: Compliance
 - Low Frequency SJ...: 100.00 kHz
 - Low Frequency SJ...: 5.000 UI
 - Steps to High SJ Fr...: 0
 - High Frequency SJ...: 10.000 MHz
 - High Frequency SJ...: 50 mUI
- Calculated Results:** A table at the bottom left showing test outcomes:

Parameter	Status	Frequency	Amplitude
SJ1	Pass	100 kHz	5 UI
SJ2	Pass	10 MHz	50 mUI

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Key Features

- Covers OIF-CEI 28G-VSR Host and 28G-SR from 18 to 29 GBaud
- Covers IEEE 802.3 CAUI-4 host and module tests in advanced mode
- Support a wide range of Keysight equipment (DCA sampling scopes, clock recovery devices, M8020A and M8040A BER Testers)
- Guided setup, automated stress signal calibration and compliance measurement for host compliance tests

Description

The M809228XA receiver test plug-in for M8070B is designed to assist and simplify the stress signal calibration used for testing the inputs of OIF-CEI CEI-28G-SR and 28G-VSR host compliance interfaces. The OIF-CEI 3.1 standard option is available within the M8070B user interface menu with the flexibility of choosing either compliance or debug mode. It reduces user interaction to a minimum and performs all required calibration routines and compliance testing automatically by remote controlling all required instruments. When a user is required to perform setup changes, the user is guided by diagram as well as text to minimize errors.

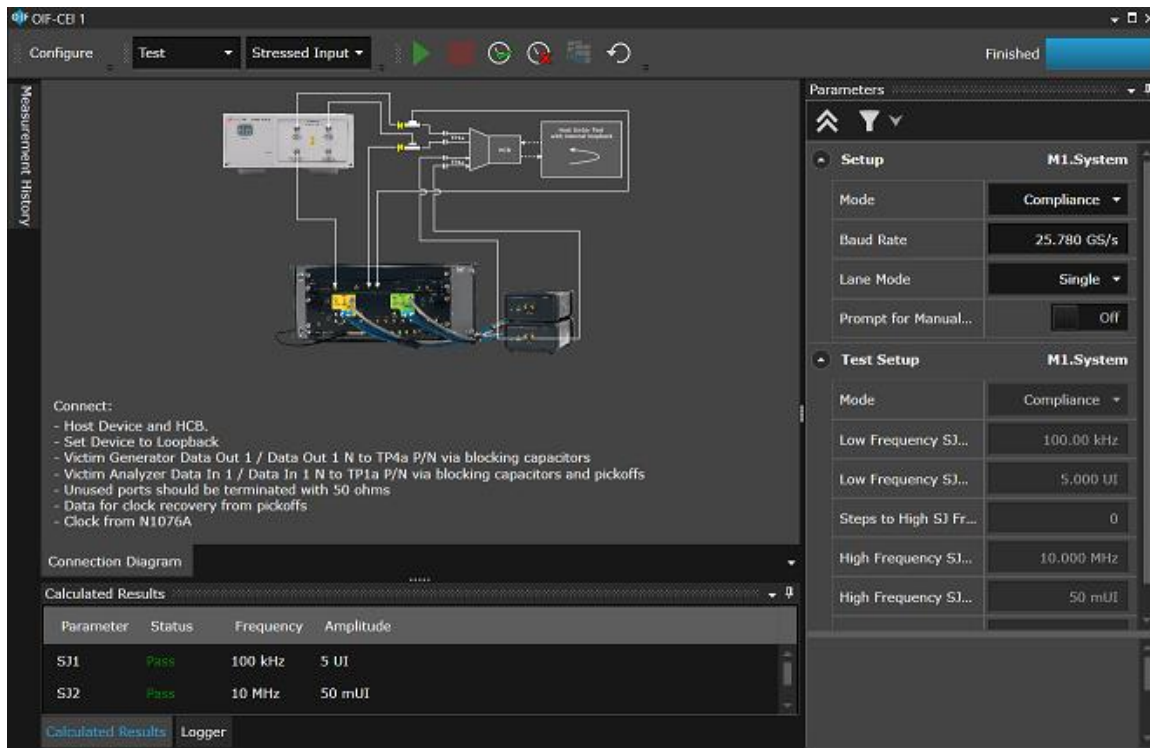


Figure 1: Connection diagram, parameters and calculated results of VSR Crosstalk Transition Time Calibration

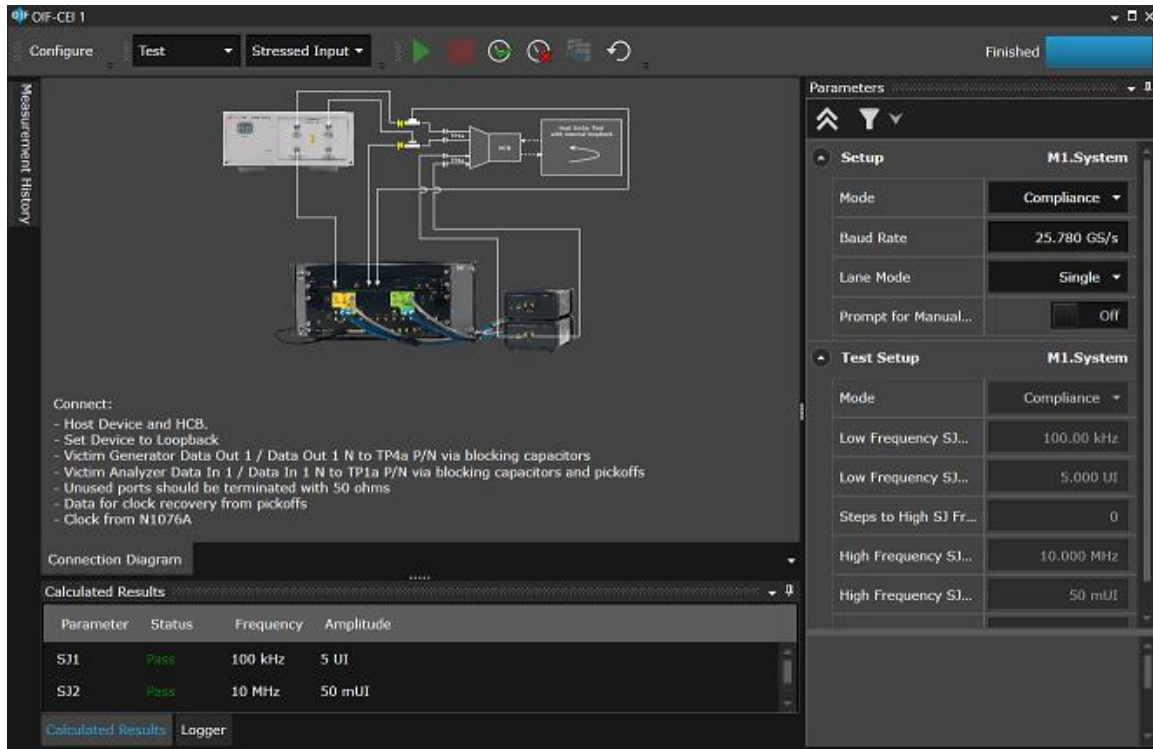


Figure 2: Connection diagram, parameters and calculated results of Stressed Input Test

Covered Calibrations and Tests

CEI-28G-Very Short Reach (VSR) Interface

The CEI 28G-VSR is a high-speed chip-to-module electrical interface with low voltage logic. It is applicable for data lane(s) that supports the bit rates from 19.60 to 28.10 Gsym/s using NRZ coding over printed circuit boards. The transmission range has a minimum value of 100 mm for host PCB trace plus one connector and has a minimum value of 50 mm PCB trace module. In 28G-VSR interface, the electrical interface connections are point-to-point in balanced differential pairs. It defines the characteristics required to communicate between CEI-28G-VSR transmitter and a CEI-28G-VSR receiver using copper signal traces on a printed circuit board.

For more details, refer to “Implementation Agreement *OIF-CEI-03.1*”-*Clause 13 CEI 28G -Very Short Reach (VSR) Interface*”.

Keysight M809228XA OIF-CEI 28G VSR/ SR Compliance Receiver Test Plugin provides the following calibrations and tests for 28G-VSR Host compliance.

All calibration steps are automated. The test plugin prompts the user whenever user interaction is required for connecting or modifying the test setup. Detailed connection diagrams and instructions are provided by the test application.

OIF CEI-28G-VSR Host

- Calibrations are implemented according to OIF-CEI-3.1 Common Electrical I/O (CEI) – Electrical and Jitter Interoperability Agreements, February 18, 2014 (Chapter 13)
 - Crosstalk Amplitude
 - Crosstalk Transition Time
 - Amplitude
 - Uncorrelated Unbounded Gaussian Jitter (UUGJ)
 - Uncorrelated Bounded High Probability Jitter (UBHPJ)
 - Sinusoidal Jitter (SJ)
 - Stressed Eye
- Test is implemented according to OIF-CEI-3.1 Common Electrical I/O (CEI) – Electrical and Jitter Interoperability Agreements, February 18, 2014 (Chapter 13)
 - Stressed Input
 - Voltage Tolerance

Example setup for VSR Host input Stress Eye Calibration

- Connect MCB and HCB
- Connect the crosstalk generator's Data Out/ Data Out N to TP1 P/N.
- Connect termination via blocking capacitor to TP1a P/N of HCB
- Connect the victim generator's Data Out/ Data Out N to TP4a P/N via blocking capacitors
- Connect the oscilloscope's Channel 1/ Channel 2 to TP4 P/N

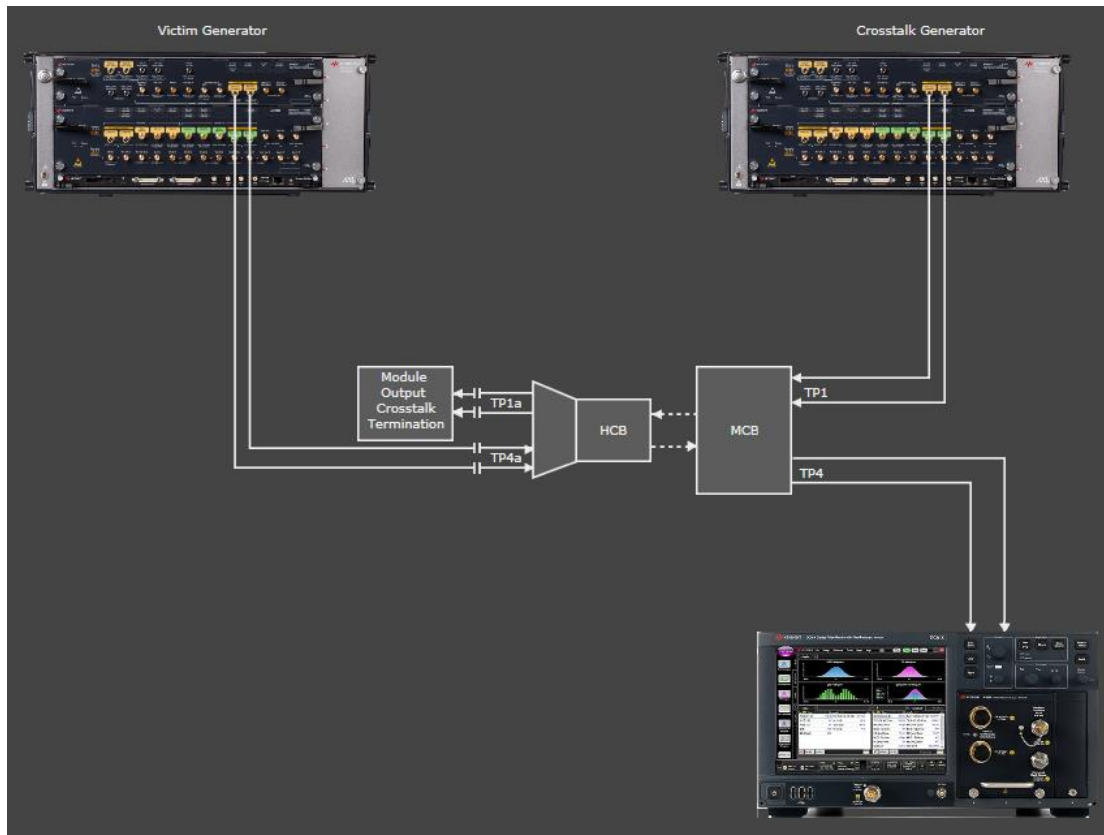


Figure 3. Setup configuration for VSR Host input Stress Eye Calibration

CEI-28G-Short Reach (SR) Interface

The CEI 28G-SR is a high-speed electrical interface with low voltage logic. It is applicable for data lane(s) that support the bit rates from 19.90 to 28.05 Gsym/s using NRZ coding over printed circuit boards. The transmission range is from 0 to 300 mm up to one connector and its signaling is unidirectional.

In 28G-SR interface, the electrical interface connections are point to point in balanced differential pairs. Its electrical implementation agreements are based on loss and jitter budget. It defines the characteristics required to communicate between CEI-28G-SR transmitter and a CEI-28G-SR receiver using copper signal traces on a printed circuit board.

For more details, refer to "Implementation Agreement OIF-CEI-03.1"-Clause 10 CEI 28G -Short Reach (SR) Interface".

Keysight M809228XA OIF-CEI 28G VSR/ SR Compliance Receiver Test Plugin provides the following calibrations and tests for 28G-SR.

All calibration steps are automated. The test plugin prompts the user whenever user interaction is required for connecting or modifying the test setup. Detailed connection diagrams and instructions are provided by the test application.

OIF CEI-28G-SR

- Calibrations are implemented according to OIF-CEI-3.1 Common Electrical I/O (CEI) – Electrical and Jitter Interoperability Agreements, February 18, 2014 (Chapter 10)
 - Amplitude Direct Connection
 - Amplitude
 - Uncorrelated Unbounded Gaussian Jitter (UUGJ)
 - Uncorrelated Bounded High Probability Jitter (UBHPJ)
 - Sinusoidal Jitter (SJ)
 - Transmitter Common Mode Noise
 - Integrated Crosstalk Noise
- Test is implemented according to OIF-CEI-3.1 Common Electrical I/O (CEI) – Electrical and Jitter Interoperability Agreements, February 18, 2014 (Chapter 10)
 - Stressed Input
 - Voltage Tolerance

Example setup for SR Stressed Input Test

- Set the device to loopback
- Connect the victim generator to power combiner via blocking capacitors
- Connect the noise generator's Data Out 1 to power combiner of victim generator Data Out
- Connect the noise generator's Data Out 4 to power combiner of victim generator Data Out N
- Connect the power combiner of Data Out/ Data Out N to Test point T P/N
- Connect the victim analyzer's Data In/ Data In N to Test point of looped back signal P/N

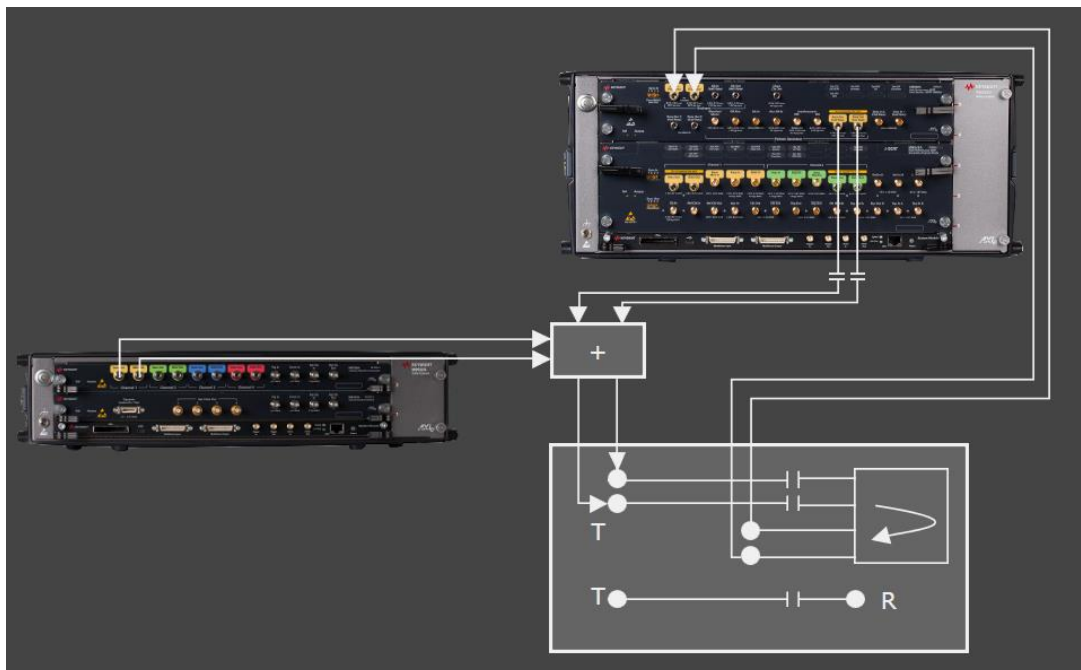


Figure 4. Setup configuration for SR Stressed Input Test

Configuration Guide

Following table below shows the required equipment for each standard option under OIF CEI-28G VSR & SR. Required instrument configuration and required software options are listed in the following section.

Equipment Type	VSR-Host	SR
Victim Pattern Generator	M8041A + M8062A or M8045A Channel 1	M8041A + M8062A or M8045A Channel 1
Crosstalk Generator	M8041A/ M8062A or M8045A Channel 2	N/A
Interference Source	N/A	M8195A AWG
Victim Error Detector	M8041A + M8062A or M8046A-0A4/ 0A5 or N1076A/ N1076B/ N1077A/ N1078A or DCI (DUT Control Interface available in M8070ADVB)	
Oscilloscope	N1000A + N1060A or N1000A + 86108B or 86100D + 86108B or N1092C/E or N1094A/B + N1076A/ N1076B/ N1077A/ N1078A	

Minimum required instrument configuration

Select ONE DCA-X or DCA-M Oscilloscope

DCA-X Configuration – N1000A + N1060A or N1000A + 86108B or 86100D + 86108B (Hardware Options)

N1000A + N1060A

N1000A	DCA-X Wide-Bandwidth Oscilloscope Mainframe
N1000A-PLK	Pattern Lock Trigger Hardware Model
N1060A	Precision Waveform Analyzer
N1060A-050 Or N1060A-085	50GHz Bandwidth, 2 Channel Electrical Or 85GHz Bandwidth, 2 Channel Electrical
N1060A-232 Or N1060A-264	Clock Recovery 125 MBd to 32 GBd Or Clock Recovery 125 MBd to 64 GBd
N1060A-PTB	Integrated Precision Timebase
N1060A-JSA	Jitter Spectrum Analysis and SW Clock Recovery Emulation

FlexDCA N1000-Series System Software – choose legacy DCA options or R&D package (Software Options)

N1010100A OR	Research and Development Package OR
86100D-200	Enhanced Jitter Analysis Software
86100D-201	Advanced Waveform Analysis Software
86100D-SIM	InfiniiSim-DCA Waveform Transformation Software, Transportable License

DCA-X Configuration – N1000A + N1060A or N1000A + 86108B or 86100D + 86108B (Hardware Options)**N1000A + 86108B**

N1000A	DCA-X Wide-Bandwidth Oscilloscope Mainframe
N1000A-PLK	Pattern Lock Trigger Hardware Model
86108B	Precision Waveform Analyzer
86108B-HBW	50GHz Bandwidth, 2 Channel Electrical
86108B-232	Supported input rates: 50 MB/s to 32 Gb/s
86108B-PTB	Integrated Precision Timebase
86108B-JSA	Jitter Spectrum Analysis and SW Clock Recovery Emulation
86108B-PT2	Two Phase Trimmers for external skew adjustments, 2.4 mm (Optional)
86108B-CA2	Matched Cable Pair, 2.4mm – 2.4mm 24 inch (Optional)
86108B-DC2	Two DC Block 2.4mm 16V 50kHz – 50GHz (Optional)

FlexDCA N1000-Series System Software – choose legacy DCA options or R&D package (Software Options)

N1010100A OR	Research and Development Package OR
86100D-200	Enhanced Jitter Analysis Software
86100D-201	Advanced Waveform Analysis Software
86100D-SIM	InfiniiSim-DCA Waveform Transformation Software, Transportable License

DCA-X Configuration – N1000A + N1060A or N1000A + 86108B or 86100D + 86108B (Hardware Options)**86100D + 8610B**

86100D	DCA-X Wide-Bandwidth Oscilloscope Mainframe
86100D-ETR	Enhanced Trigger, 13 GHz BW, pattern and module trigger
86108B	Precision Waveform Analyzer
86108B-HBW	50GHz Bandwidth, 2 Channel Electrical
86108B-232	Supported input rates: 50 MB/s to 32 Gb/s
86108B-PTB	Integrated Precision Timebase
86108B-JSA	Jitter Spectrum Analysis and SW Clock Recovery Emulation
86108B-PT2	Two Phase Trimmers for external skew adjustments, 2.4 mm (Optional)
86108B-CA2	Matched Cable Pair, 2.4mm – 2.4mm 24 inch (Optional)
86108B-DC2	Two DC Block 2.4mm 16V 50kHz – 50GHz (Optional)

FlexDCA N1000-Series System Software – choose legacy DCA options or R&D package (Software Options)

N1010100A OR	Research and Development Package OR
86100D-200	Enhanced Jitter Analysis Software
86100D-201	Advanced Waveform Analysis Software
86100D-SIM	InfiniiSim-DCA Waveform Transformation Software, Transportable License

DCA-M Configuration – N1092C/E or N1094A/B (Hardware Options)

N1092C or N1092E	DCA-M Sampling Oscilloscope
LOJ	Low Jitter Timebase
PLK	Pattern Lock Trigger Hardware
FS1 (Optional)	Fast Sampling Rate

FlexDCA N1000-Series System Software – choose legacy DCA options or R&D package (Software Options)

N1010100A OR	Research and Development Package OR
86100D-200	Enhanced Jitter Analysis Software
86100D-201	Advanced Waveform Analysis Software
86100D-SIM	InfiniiSim-DCA Waveform Transformation Software, Transportable License

Select ONE of the following CDR options

Choose on N107xx Clock Recovery

N1076A/N1077A/N1078A	Electrical/optical Clock Recovery
N107xA-232	Supported input rates: 50 MBd to 32 GBd
N1076B/ N1078A	Electrical/optical Clock Recovery
N107xx-232	Supported input rates: 125 MBd to 32 GBd or
N107xx-264	Supported input rates: 125 MBd to 64 GBd

DCA-M Configuration – N1092C/E or N1094A/B (Hardware Options)

N1094A or N1094B	DCA-M Sampling Oscilloscope
LOJ	Low Jitter Timebase
PLK	Pattern Lock Trigger Hardware
050	50 Hz Electrical Bandwidth
FS1 (Optional)	Fast Sampling Rate

FlexDCA N1000-Series System Software – choose legacy DCA options or R&D package (Software Options)

N1010100A OR	Research and Development Package OR
86100D-200	Enhanced Jitter Analysis Software
86100D-201	Advanced Waveform Analysis Software
86100D-SIM	InfiniiSim-DCA Waveform Transformation Software, Transportable License

Select ONE of the following CDR options

Choose on N107xx Clock Recovery

N1076A/N1077A/N1078A	Electrical/optical Clock Recovery
N107xA-232	Supported input rates: 50 MBd to 32 GBd
N1076B/ N1078A	Electrical/optical Clock Recovery
N107xx-232	Supported input rates: 125 MBd to 32 GBd or
N107xx-264	Supported input rates: 125 MBd to 64 GBd

Victim Generator & Analyzer/ Crosstalk Generator (for VSR testing only)

M8040A 64 GBaud High-performance BERT

M8070B	System software for M8000 Series of BER test solutions
M8070ADV	Advanced Measurement Package for M8000 Series of BERT Test Solutions

Victim Generator and Analyzer

M8045A + M8046A

M8045A	Pattern Generator and Clock Module 32/64 GBaud, 3 slot AXIe
M8045A-G32 OR M8045A-G64	Pattern Generator one Channel NRZ, Data Rate up to 32 GBaud OR Pattern Generator one Channel NRZ, Data Rate up to 64 GBaud
M8045A-0G2	Second channel, hardware and license (requires remote head, M8057A)

(For VSR Crosstalk)

M8045A-0G3	Advanced Jitter Sources for Receiver Characterization, Module-wide License
M8045A-0G4	De-emphasis, Module-wide License

M8046A	Analyzer module, 32/64 GBaud, 1-slot AXIe
M8046A-A32	Analyzer, one Channel, Data Rate up to 32 GBaud, NRZ OR
M8046A-A64	Analyzer, one Channel, Data Rate up to 64 GBaud, NRZ

Select ONE of the following CDR options

M8046A-0A4	Clock recovery for 32 GBaud, License
M8046A-0A5	Clock recovery extension up to 64GBaud, License

Choose on N107xx Clock Recovery if M8046A-0A4/ 0A5 CDR option not selected

N1076A/N1077A/N1078A	Electrical/optical Clock Recovery
N107xA-232	Supported input rates: 50 MBd to 32 GBd

N1076B/ N1078A	Electrical/optical Clock Recovery
N107xx-232	Supported input rates: 125 MBd to 32 GBd OR
N107xx-264	Supported input rates: 125 MBd to 64 GBd

M8020A J-BERT High-Performance BERT

M8070B	System software for M8000 Series of BER test solutions
M8070ADVB	Advanced Measurement Package for M8000 Series of BERT Test Solutions

Victim Generator and Analyzer

M8041A + M8062A

M8041A	High-Performance BERT Generator-Analyzer-Clock Module
M8041A-G16	Pattern Generator one Channel, Data Rate up to 16 Gb/s
M8041A-C16	BERT one Channel, Data Rate up to 16 Gb/s
M8041A-0G2	Second Channel for Pattern Generator, License
M8041A-0A2	Second Channel for Analyzer, License
M8041A-0G3	Advanced Jitter Sources for Receiver Characterization, Module-wide License

M8062A		
	M8062A-C32	32 b/s BERT front-end
	M8062A-G32	32 Gb/s Pattern generator front-end
	M8062A-0A4	Clock Recovery up to 32 Gb/s

Crosstalk Generator for VSR Host Test

M8041A + M8062A

M8041A		High-Performance BERT Generator-Analyzer-Clock Module
	M8041A-G16	Pattern Generator one Channel, Data Rate up to 16 Gb/s
	M8041A-0G2	Second Channel for Pattern Generator, License

M8062A		32Gb/s BERT Front End
	M8062A-G32	32 Gb/s Pattern generator front-end
	M8062A-0G4	Multi-tap De-emphasis License

Interference source for SR Tests (Not needed for VSR Host Test)

M8195A		65 GSa/s Arbitrary Waveform Generator
	M8195A-002 or M8195A-004	Arbitrary Waveform Generator, 2 Channels, 65 GSa/s or Arbitrary Waveform Generator, 4 Channels, 65 GSa/s
	M8195A-16G	Upgrade to 16GSa Memory

Remote Programming

The M809228XA OIF-CEI 28G VSR/ SR Compliance Receiver Test Plugin is a plugin of M8070B Software and can be programmed via SCPI.

Related Products

The [N109256CB TX Test Automation SW Application for OIF-CEI 4.0](#) for the sampling oscilloscopes and the [N6473A OIF-CEI 4.0 Compliance Application for Infinium real-time oscilloscopes](#) offer automated transmitter testing for CEI-56G-VSR host or module, CEI-56G-MR and CEI-56G-LR outputs.

The [N4917BACA](#) and [N4917B Optical Receiver Stress Test Applications](#) addresses test needs for optical input test of transceiver modules for IEEE 100GBASE-based optical interfaces.

Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

