multiLane

DATASHEET

Innovation for the next generation

ML4079

8-Lane 8.5-15 & 21-30 Gbps | 200G Bit Error Ratio Tester

Vertical & Horizontal Eye Closure | Bathtub Curve Measurement | Eye Contour Measurement | Receiver Sensitivity | Jitter Tolerance | Custom Pattern 40 bits

Summary

With the accelerated growth of hyperscale datacenters, the performance demands on Ethernet network infrastructure is increasing exponentially, and customer expectations for high-speed data throughput is at an all-time high. As a result, Bit Error Rate Testers (BERT) have become a cornerstone for physical layer testing, from qualifying fiber optic and copper-wire digital data transmission lines to testing signal integrity.

A BERT generates a sequence of bits through a communication channel and the received bits are then compared against the transmitted bits. A Bit Error Ratio (BER) evaluates the full end-to-end performance of a connectivity system and assures communication reliability.

The ML4079 is a 8x30 Gbps BERT that supports NRZ signal generation required for 100 GbE measurements. It is ideally suited for the production testing of systems, components, and Electro-Optical Modules. It supports the required test patterns defined by IEEE and OIF. Other features include signal-to-noise ratio (SNR) and histogram measurements, as well as transmitter and receiver equalizers.

ML4079

8 Channels BERT

Introduction

The ML4079 is an eight Lane Pulse Pattern Generator and Error Detector up to 30.2 Gbps that is fully equipped for laboratory and production testing of systems, components, and Electro-Optical Modules. This instrument covers all the critical bitrates for 10, 40, 100 and 200G Ethernet, 16 and 32GFC as well as CPRI. The product has instrument-grade 2.92 mm K connectors.

Key Features

Transmit

- Data Rates: 8.5-15 & 21-30 Gbps
- Low intrinsic jitter
- Ability to tune the bit rate in steps of 100 kbps and find the RX PLL locking margin
- Automated J2/J9 measurement

Available patterns are:

- PRBS 7/8/15/23/31 and their inverses
- Error injection
- 3-tap LUT-based Pre- and Post-emphasis

Receive

- Programmable front-end attenuator
- Error-detection on following patterns:
  - PRBS 7/9/15/16/23/31

- Automatic pattern detects
- LOS indicators.

Target Applications

- Interconnect testing QSFP-DD, OSFP
- Backplane testing
- Interference and crosstalk testing
- Receiver sensitivity testing
- Electro-Optical module testing
- Electrical eye testing for 200 Gbps Ethernet,
- MLD/CAUI application, OIF CEI-28G-VSR, CPPI4, CAUI-4, GAUI-8, 32G Fiber Channel chip to module.

ML BERT GUI

- Tests 8-channel BER test at the same time
- Supports BER curve
- Provides multiple and single layouts of bathtub and eye contour

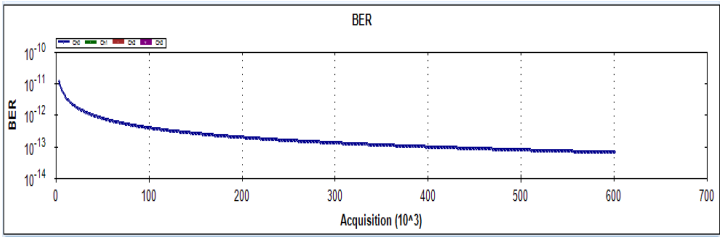

Figure 1: BER curves for one channel with 1 error inserted at the MSB and LSB respectively

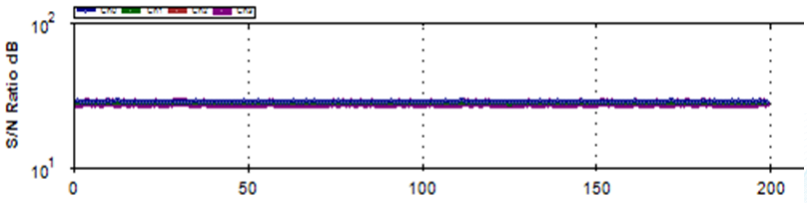

Figure 2: S/N Ratio over 200 captures

Specifications

Parameter	Specifications
Bit Rates	8.5-15 and 21-30 Gbps
Data Format	NRZ
Pattern	PRBS 7, 9, 15, 23, 31, and User Defined Pattern 16 bits at 10G & 40 bits at 25G
TX Amplitude Differential	200-800 mV
TX Amplitude Adjustment	200 mV/step
Pre-Emphasis	6 dB
Pre-Emphasis Resolution	20 steps
Equalizing Filter Spacing	-
Total Jitter pk-pk @10G	10 ps (typical)
Total Jitter pk-pk @25G	12 ps (typical)
Rise/Fall Time (20–80%) @25G	17 ps
Sinusoidal Phase Modulation	-
Sinusoidal Jitter Frequency	-
Random Jitter in Phase Modulation	-
Output Return Loss up to 10GHz	< -15 dB
Output Return Loss (16-25GHz)	< -8 dB
TX Skew Control Range	-
Lane to Lane Skew Resolution	-
Error Detector Input Amplitude	110-1050 mVpp at 11G, 1200 mVpp at 25G
Error Detector Maximum Input	1200 mV Diff
Error Detector Input Sensitivity	30 mVpp at 10.3125G / 50 mVpp at 28G
Phase Scan Resolution	7 bits
Vertical Scan Resolution	8 bits
Input CTLE Dynamic Range	10 dB
Reference Clock Output	Rate/32 for 8.5-15G and Rate/80 for 21-30G
Reference Clock Output Amplitude	550-850 mVpp
Reference Clock Input	Rate/32 for 8.5-15G and Rate/80 for 21-30G
Reference Clock Input Amplitude	300-1900 mVpp
Clock Data Recovery	Rate/N (user selectable from 8 and 16)
Power Requirement	12 V dc, 40 W max

*Output amplitude setting error: ±30 mV

[1] With appropriate de-emphasis and short cables; measured on a scope with >40 GHz analog BW
[2] Rev A3

Mechanical Dimensions

The ML4079 is a benchtop instrument that fits in a 19-inch 2U rack. MultiLane also supplies the needed brackets.

Ordering Information

Option	Description
ML4079	200G BERT (8 CH 21-30 GBd NRZ)
3YW	Total 3-year warranty
CAL	Single calibration
3YWC	Total 3-year warranty with 3 annual calibrations

Recommended Accessories

Instruments	Recommended *Phase matched cable pairs*	Alternative *Phase matched cable sets*	Comments
ML4079	16x MLCBPM-2.92-30	2x MLCBPM-2.92-30-16	2.92 mm connector 2x16 channel 30 cm
ML4079	16x MLCBPM-2.92-60	2x MLCBPM-2.92-60-16	2.92 mm connector 2x16 channel 60 cm

Please contact us at sales@multilaneinc.com.