

multiLane 



**DEPLOY 800G
WITH CONFIDENCE**
2022 PRODUCT BROCHURE

DESIGNCON[®] 2022
WHERE THE CHIP MEETS THE BOARD

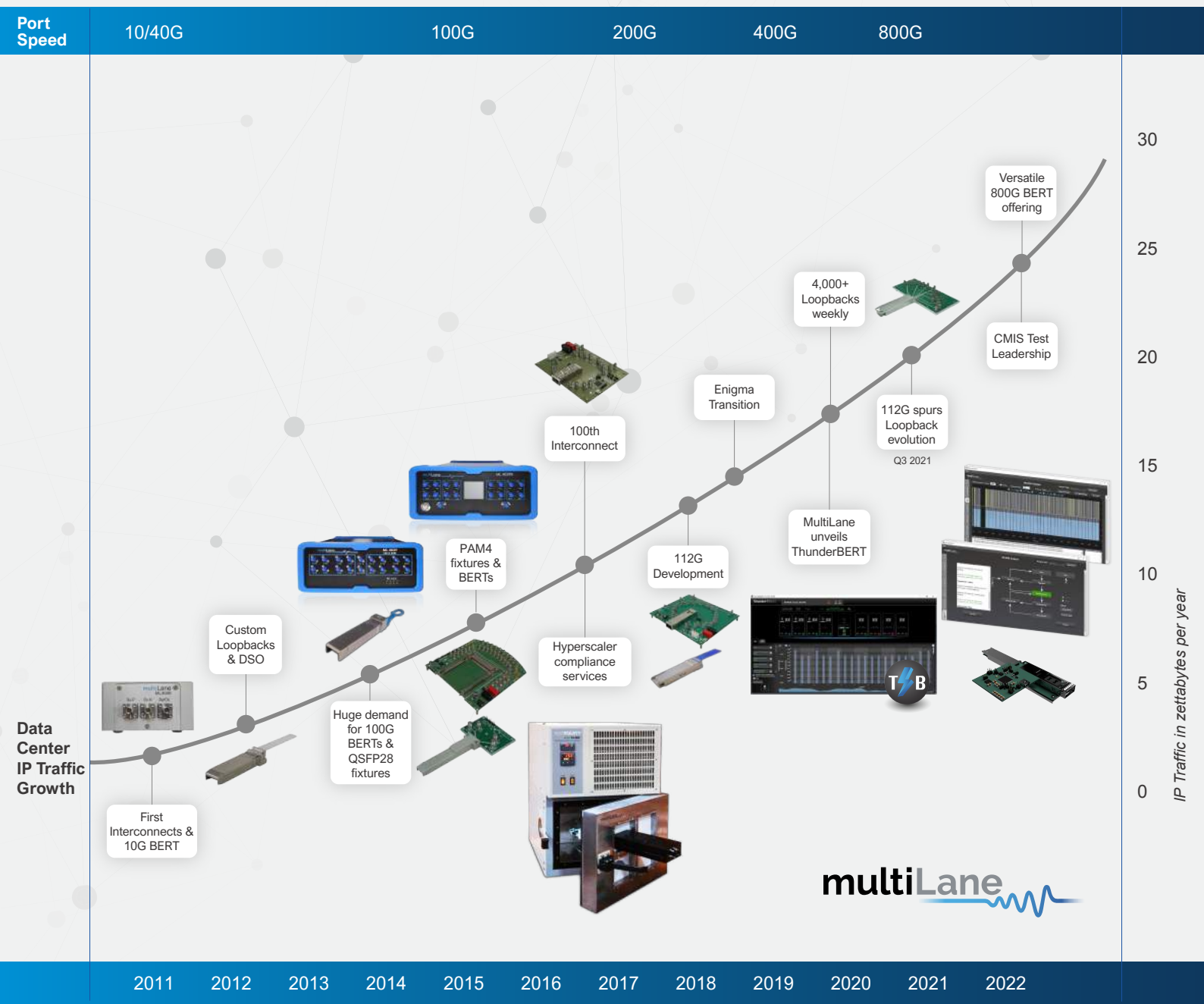
Innovation for the next generation

IT'S GOOD TO BE BACK

After taking time away from live participation, MultiLane is delighted to return for DesignCon 2022 to meet our customers face to face. As 800G ecosystems continue to grow, MultiLane is committed to ensuring as painless a transition as possible for all our partners. As such, our 2022 offerings are focused on enabling and facilitating the adoption of 800G technologies, with state-of-the-art instruments and interconnects tailored to meet our clients' needs.

Innovation Timeline

Check in on our journey of growth over the past ten year to meet the rising demands of high speed networks!



BERT CORNER

MultiLane specializes in compact, streamlined BERTs perfect for benchtop testing and field deployment at 400G and 800G. We are excited to share our latest lineup including the ML4079E/EN line, which received a 4.5/5 in the 2022 Lightwave Innovation Awards.



BERT CORNER

ML4079EN

- Fully-featured 800G BERT
- Integrated crosstalk noise and jitter injection
- Output amplitude of 1.5 V
- Signal to noise ratio (SNR) and histogram measurements
- Tx and Rx equalizers
- Up to 56 GBd PAM4/NRZ
- Real Hardware FEC (KR4/KP4 Analysis)
- Rated 4.5 in 2022 Lightwave Innovation Awards
- Dense M-SMPM connectors



Read the full specifications [here](#).

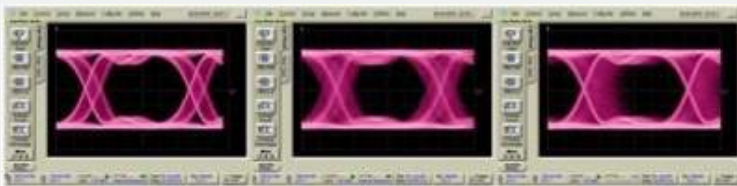
Automated IEEE Stress Testing

Stress Tolerance testing a receiver is a key step towards ensuring that a DUT is not only up to expectations but can also exceed them. Our advanced stress characterization is done through jitter and noise injection and is complemented by a power integrity tolerance test, a comprehensive assortment of test solutions for a smooth transition to 800G.

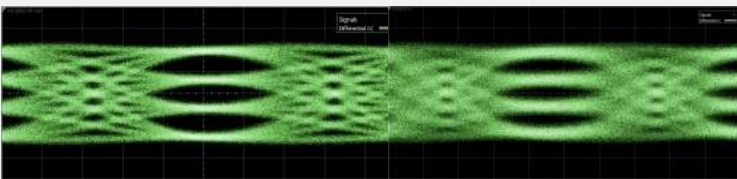
MultiLane JTOL Performance



Jitter



Noise



MultiLane ITOL Performance

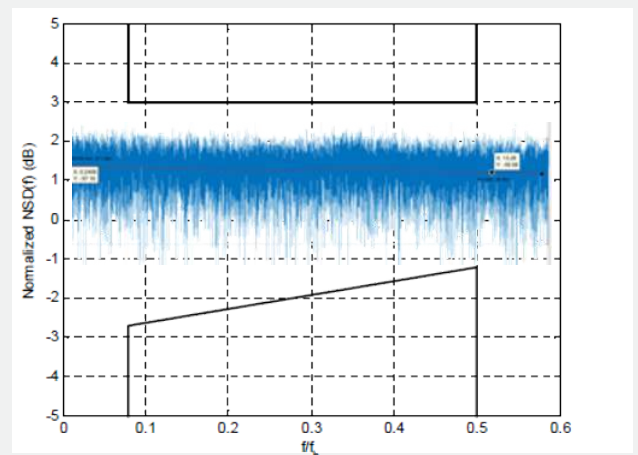
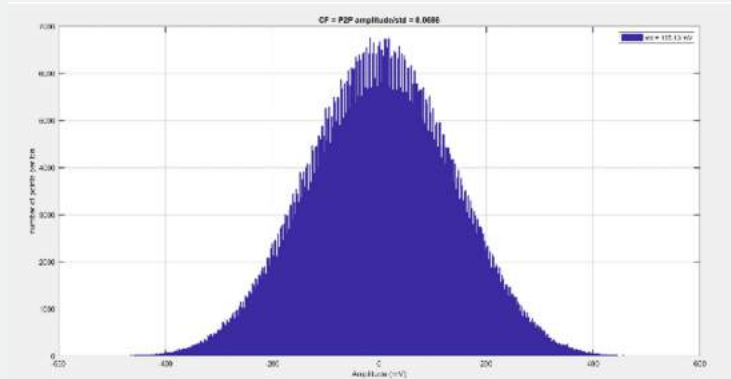


Figure 93C-1—Example NSD(f) constraint template

MultiLane takes IEEE standard requirements to another level. With our Automated Jitter & Noise Solution we are able to accurately establish not only whether a DUT is resilient enough to operate reliably under real-world conditions but also determine its operating margins above the spec limit.

BERT CORNER

ML4079E

- Fully-featured 800G BERT
- Signal to noise ratio (SNR) and histogram measurements
- Tx and Rx equalizers
- Real Hardware FEC (KR4/KP4 Analysis)
- Up to 56 GBd PAM4/NRZ
- Dense M-SMPM connectors
- Rated 4.5 in 2022 Lightwave Innovation Awards



Read the full specifications [here](#).

ML4054B

- Fully-featured 400G BERT
- Up to 28.125 GBd PAM4/NRZ
- Integrated, field-replaceable, MSA-compliant interface for simple plug-and-play characterization
- Real Hardware FEC (KR4/KP4)
- QSFP-DD, OSFP, and QSFP
- CMIS 4.0 implementation testing
- Ideal for product development and validation, production testing, and volume testing.



Read the full specifications [here](#).

ML4054E

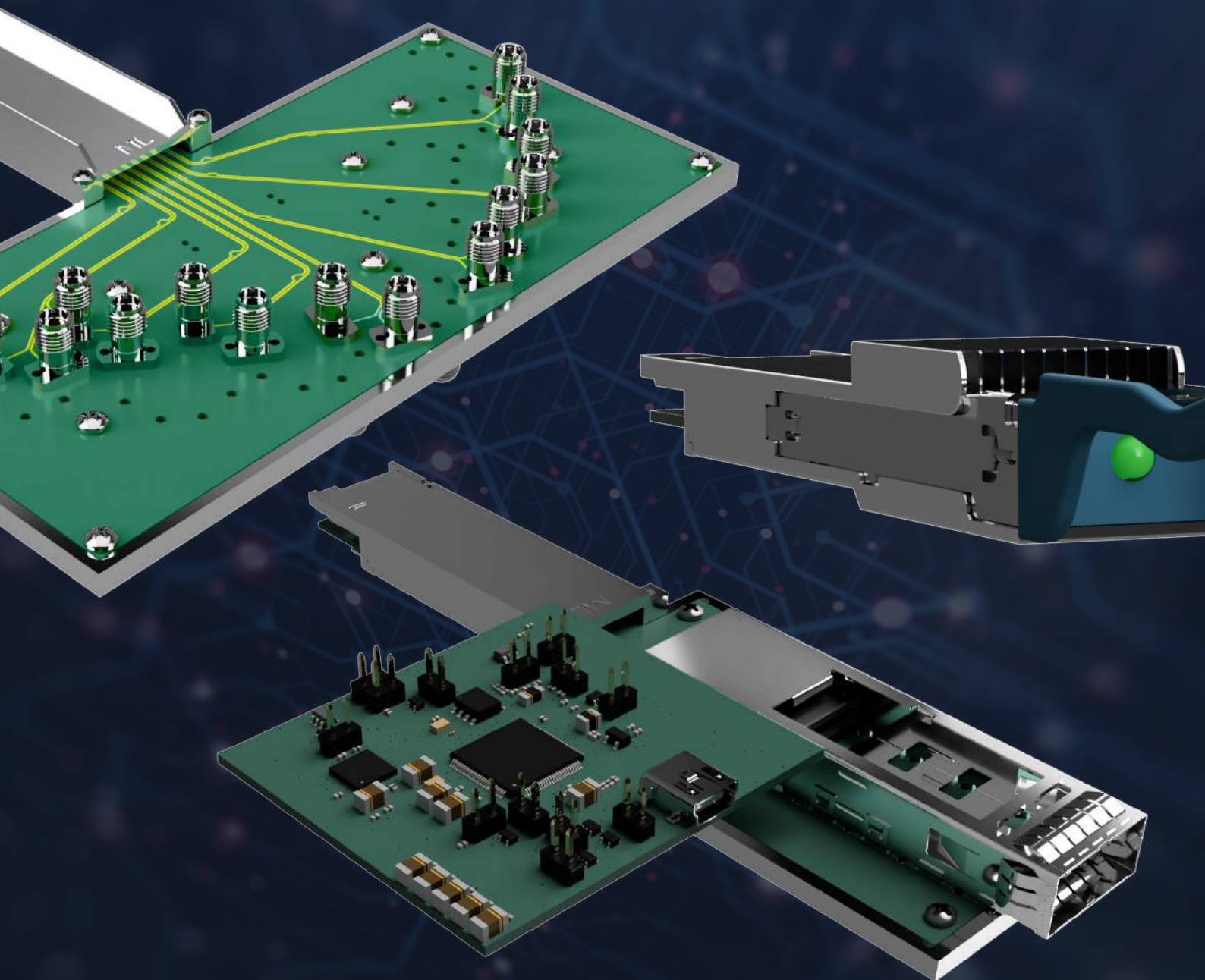
- Fully-featured 800G BERT
- Up to 58 GBd PAM4/NRZ
- Integrated, field-replaceable, MSA-compliant interface for simple plug-and-play characterization
- Integrated crosstalk noise and jitter injection
- Real Hardware FEC (KR4/KP4)
- QSFP-DD, OSFP, and QSFP
- CMIS 4.0, 5.0, 5.X implementation testing
- Ideal for product development and validation, production testing, and volume testing



Contact sales for more information.

INTERCONNECTS & CMIS

One of MultiLane's key competencies is the design and deployment of interconnects either as single solutions, or full testing kits for all primary form factor MSAs for 400/800G. In the move to 800G, we are particularly excited to reveal our first lineup of Active Loopbacks and our unique revamped CMIS analyzers for CMIS 5.0 to validate the proper implementation and test for interoperability.



INTERCONNECTS & CMIS

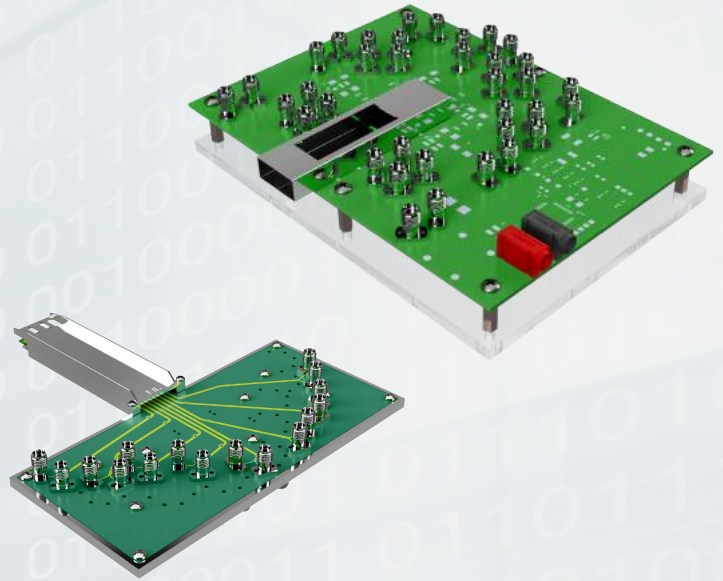
800G MCB, HCB, LBs, LTL

MultiLane is proud to announce our new lineup of interconnects for 112 Gbps per lane: OSFP 800, QSFP-DD800, and QSFP112.

Test development kits: Host Compliance Boards, Module Compliance Boards, and Loopbacks.

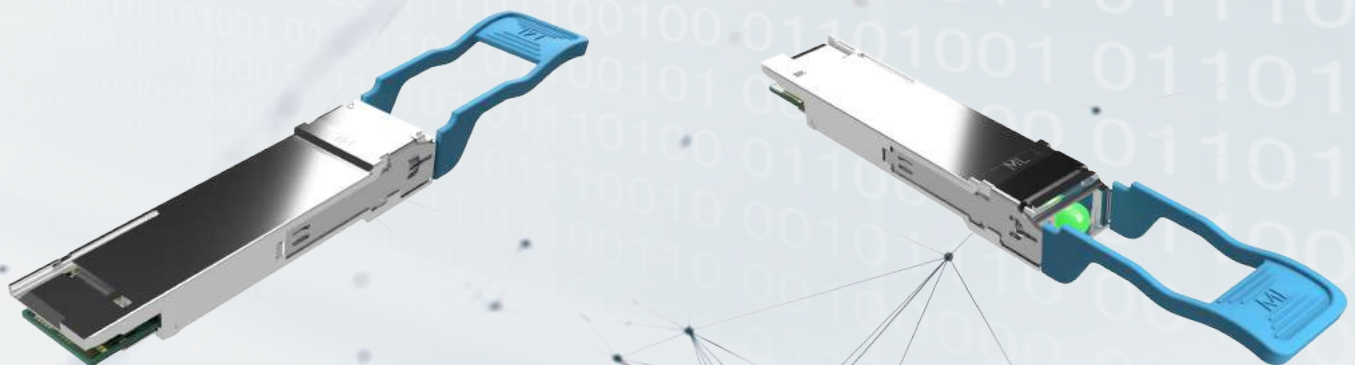
Test fixtures are equipped with standard 2.4 mm precision connectors (1.85 mm connectors available upon request).

Loss Target Loopbacks emulate specific DAC loss profiles at 26 GHz with 3, 6, and 9 dB attenuation.



Passive Loopbacks

- Key competency at MultiLane
- A suite of offerings from SFP to QSFP-DD800
- All 400G/800G Loopbacks CMIS 4.0 compliant
- **ML4062-LB2a/ML4062-LB2a-9dB** offer attenuation of 6 and 9 dB respectively, emulating specific DAC loss host ports
- Find our full complement of QSFP-DD800 loopback offerings [here](#)
- Find our full complement of OSFP800 loopback offerings [here](#)

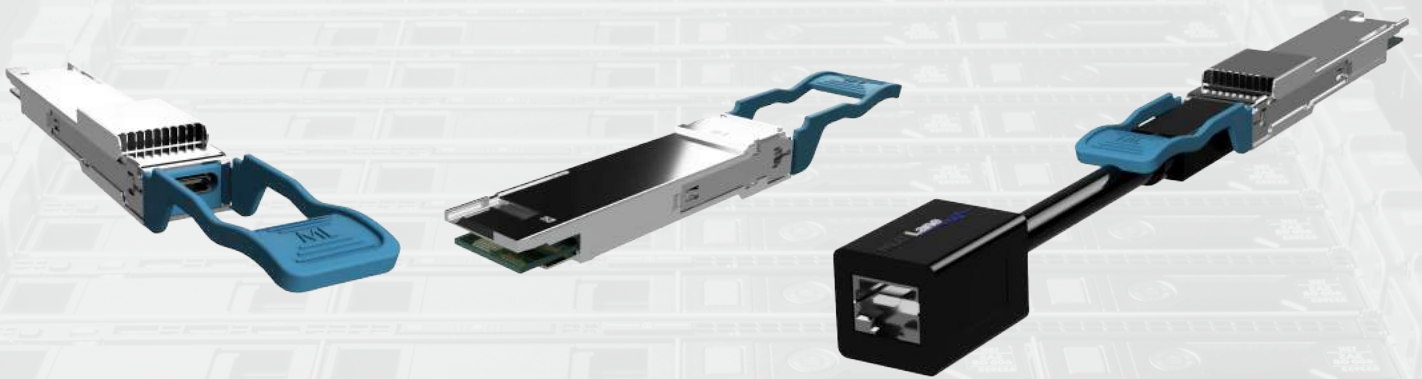


INTERCONNECTS & CMIS

Active Loopbacks

MultiLane enables the comprehensive equalization techniques required at 800G with the implementation of our new range Active Loopback modules.

ML4062-ALB1-112 QSFP-DD800 Active Loopback provides instrument-grade measurements directly in port and can retime and equalize port signals to test lossy channels.



The ALB offers 800G port analysis, where a DSP enables retiming and equalization of host signals. Features include:

- Multi-Vendor DSP support
- VSR support
- BERT with PRBS PPG + ED and SNR monitoring
- CMIS 5.0 support
- 20W+ programmable power dissipation
- Communication via USB-C, I2C or ethernet
- OSFP800 and QSFP-DD800 support
- Access to ALB GUI
- Access to ThunderBert (BERT GUI) for BER Analysis directly within port, TX EQ tuning, CMIS validation

Watch video



INTERCONNECTS & CMIS

CMIS

The new Common Management Interface Specification (CMIS) in 3.0, 4.0, and 5.0 versions is a unified protocol to ensure device interoperability at speeds ranging from 100G to 800G.

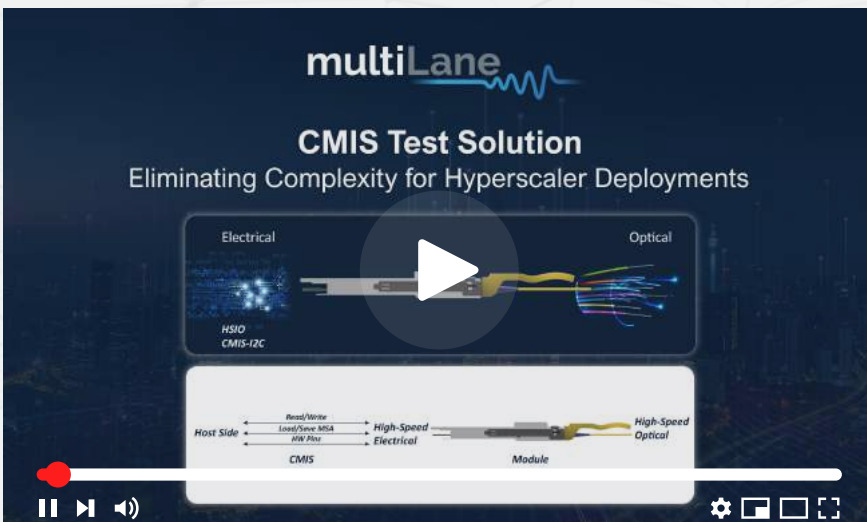
MultiLane's ML4066 CMIS analyzers ensure both module and host properly conform to this vital standard, no matter the manufacturer.

OSFP, QSFP-DD, QSFP112 modules (more form factors upon request).

Read the full specifications [here](#).



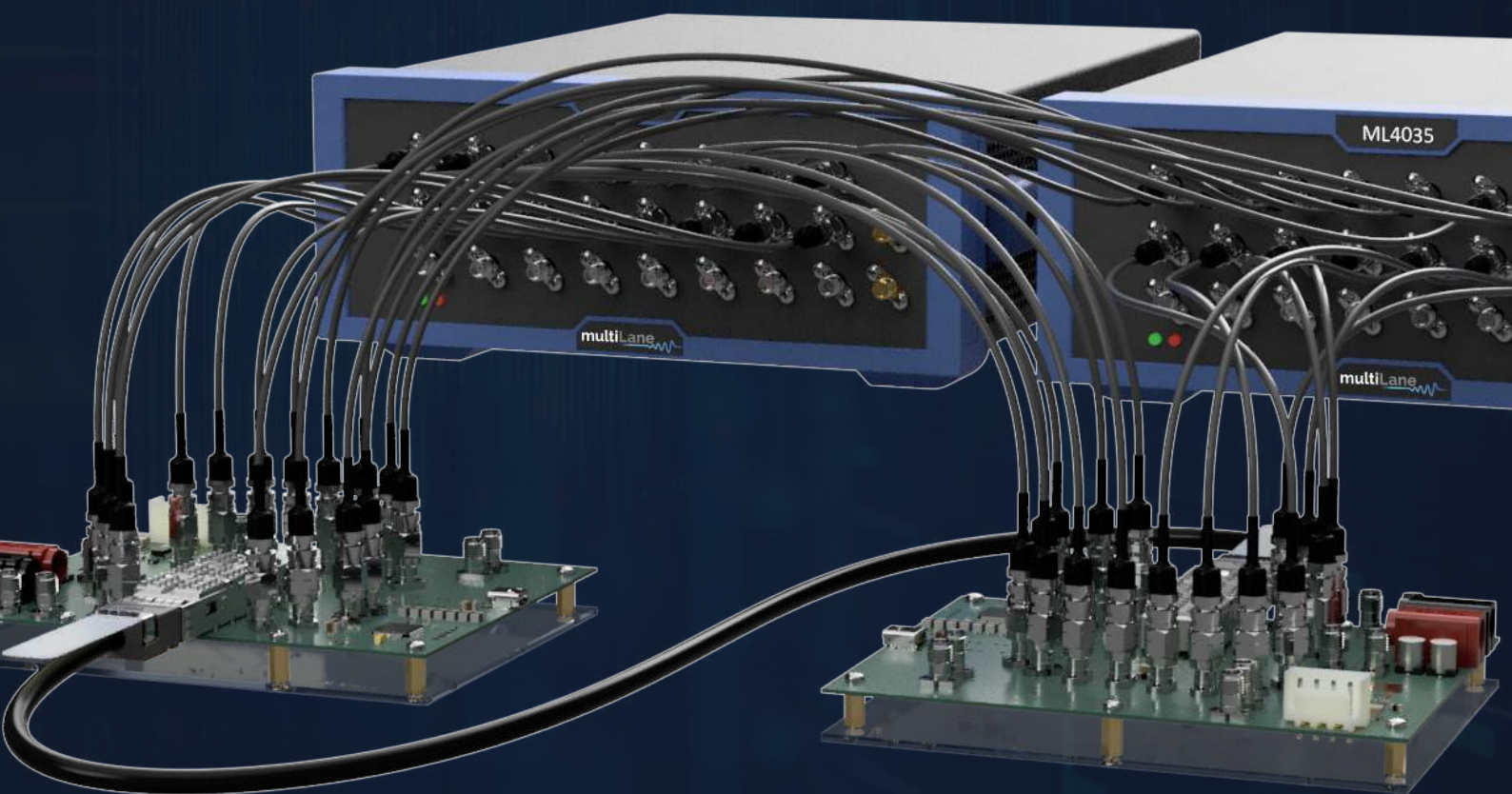
Watch video



TRANSCEIVER AND CABLE TEST SOLUTIONS



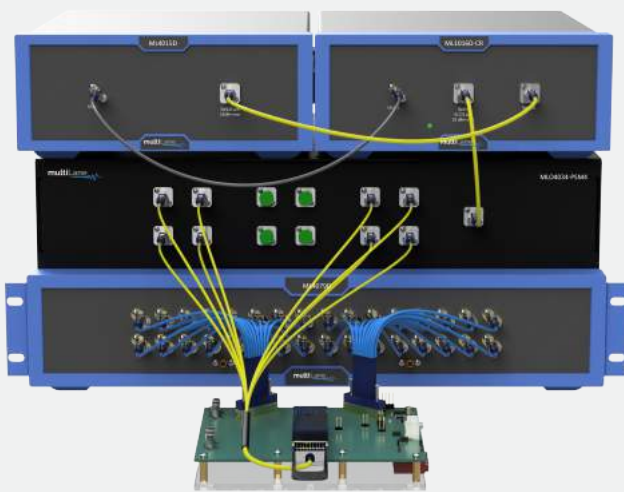
MultiLane enables the rapid deployment and troubleshooting of these essential components with a suite of streamlined testing solutions that can characterize pluggables at the press of a button. Whether it is the crucial DAC characterization at 800G, or the implementation of the new 800G Active Copper solutions, MultiLane's signature eye for innovation ensures a seamless transition to an 800G environment.



TRANSCEIVER AND CABLE TEST SOLUTIONS

ML7007

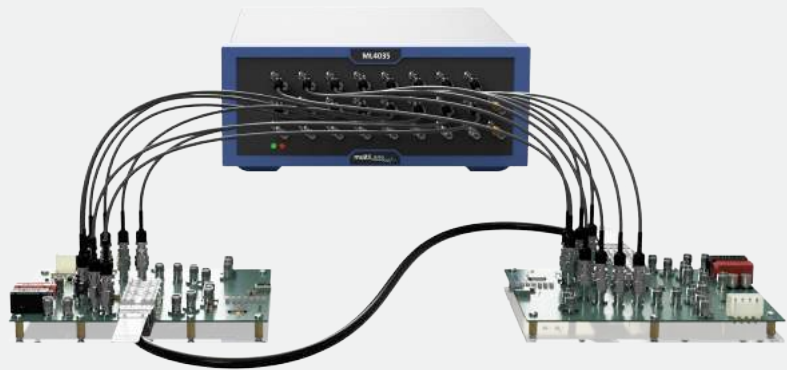
- Fully automated, transceiver testing solution for speeds of up to 400G
- Tests both the optical transmitter parameters and bit error rate receiver sensitivity
- Single push of a button
- Software controls the equipment, executes the tests, and generates a summary report with pass/fail information
- Supports many MSA compliant form factors such as: SFP28/PSM4, QDD/CWDM4



Read the full specifications [here](#).

ML1105 DAC Testing Solution

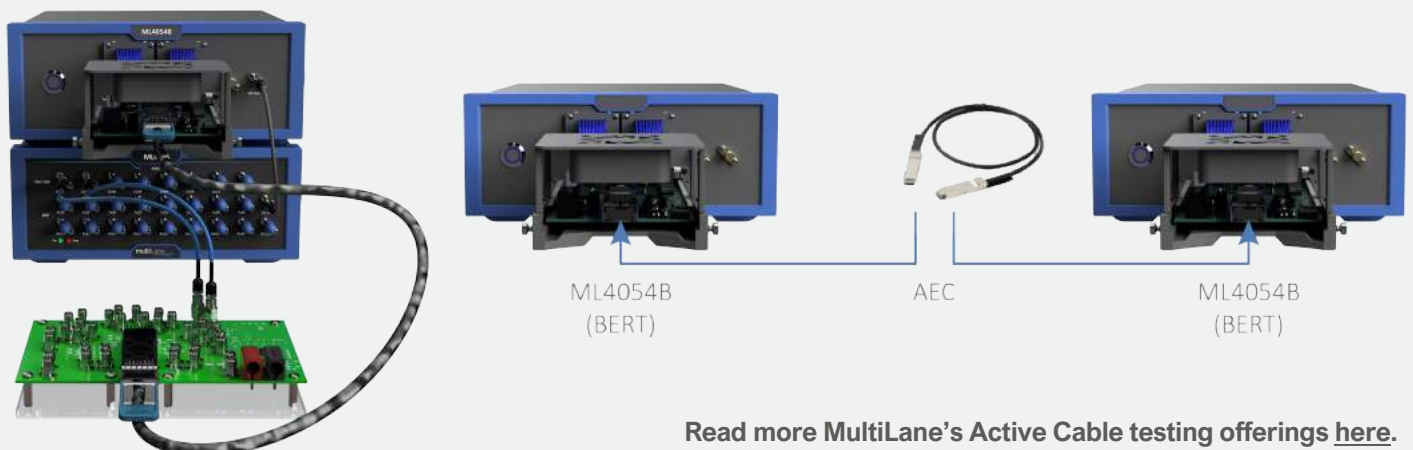
- An all-in-one spec conforming S-parametric solution to reliably characterize 800G DAC cables.
- Performs a variety of tests including insertion loss, return loss, Far & Near-End Crosstalk, Integrated Crosstalk Noise, COM and Effective Return Loss.
- Generates a Pass/Fail report.



Read the full specifications [here](#).

Active Cable Testing

- Testing available for both Active Electrical Cables (AECs) and Active Copper Cables (ACCs).
- AECs testers use HiWire consortium parameters.
- Tests for CMIS validation, linkup capabilities, and real-hardware pre- and post-FEC measurements.
- ACCs testing based on the most common parameters in the field today:
 - Frequency and time domain measurements
 - Eye diagram optimization
 - Insertion loss
 - Bit Error Rate



Read more MultiLane's Active Cable testing offerings [here](#).

PROFESSIONAL SERVICES



COMPLIANCE AND INTEROP TEST SERVICES

MultiLane's specialized services hold our customers to the comprehensive standards upon which our industry relies with compliance testing, and enable them to develop their technologies further with our unique system and interoperability testing.

SIGNAL INTEGRITY DESIGN SERVICES

After tripling the size of its SI team in a calendar year, MultiLane is excited to announce our new SI design and optimization consultation services. The new SI design services enables industry partners to achieve optimal performance from their complex layouts.



COMPLIANCE AND INTEROP TEST SERVICES

Compliance Testing

A vital component for operating in the industry, compliance testing ensures devices are up to the standards put forth by organizations like the IEEE.

- Wide range of Electrical, Optical, VNA, and Multi-corner environment compliance tests for all major transceiver form factors.
- Cable testing for DACs, AOCs, AECs, and ACCs.

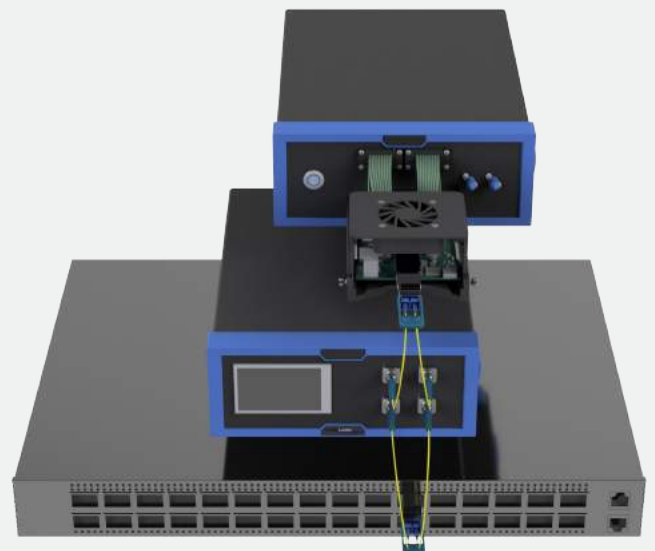
[Read more](#)



Interoperability Testing

System and interoperability testing is MultiLane's more customized approach, giving you a clearer picture of how your devices will function in a real-life networking environment. With the introduction of 100GE and 400GE data centers switches, MultiLane Interoperability test services enable system-level insight. Customers can assess the performance of their pluggable DUTs through the lens of their end customers in real life networking environments thanks to diagnostic capabilities (FEC statistics, BER, optical diagnostics, etc.) offered by these platforms, in addition to CMIS validation.

[Read more](#)

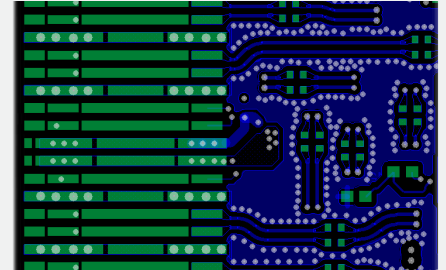


SIGNAL INTEGRITY DESIGN SERVICES

As data transmissions speeds increase to 100G per electrical lane and beyond, signal integrity (SI) is an increasingly important aspect of successful system design. Connector vendors, semiconductor companies, original design manufacturers (ODMs), and hyperscalers all depend on Signal Integrity disciplines to deliver their products to a rapidly evolving market in a timely manner.

Based on its experience with developing test solutions for the latest HSIO technologies, MultiLane has developed unique Signal Integrity expertise.

[Read more](#)



NEW | MultiLane's SI Design and Consultancy Services

High-speed PCB Layout and Design

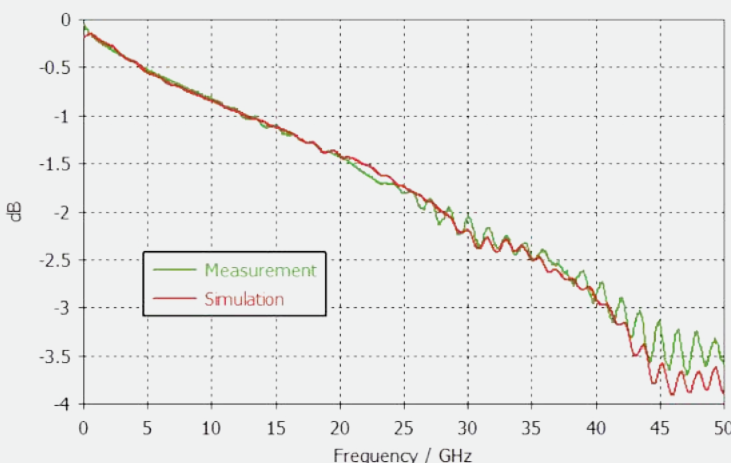
MultiLane provides design and simulation services based on its extensive experience in ultra-high-speed (exceeding 100G per electrical lane) PCB design and manufacturing.

Tools

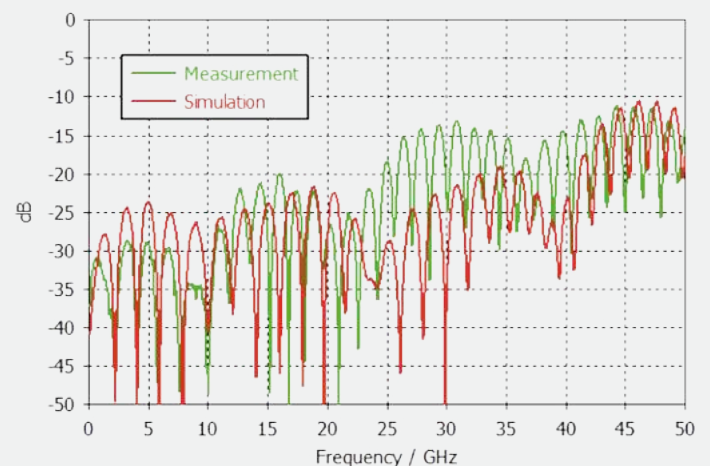
Cutting edge software tools, such as CST Microwave Studio, and HFSS, are used to simulate and overcome a variety of signal integrity challenges before any physical device is built.

Faster Time-to-Market

MultiLane has the expertise for quick turnaround designs with **strong correlation between simulations and real-world performance.**



ML4064-MCB-112 Insertion Loss



ML4064-MCB-112 Return Loss

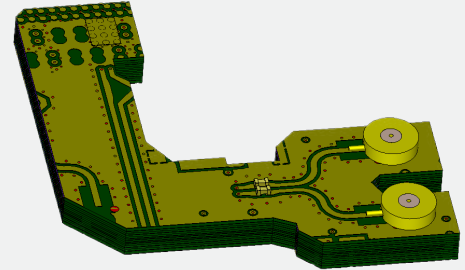
SIGNAL INTEGRITY DESIGN SERVICES

Simulation, Design and Validation Capabilities

Any combination of the following capabilities can be conducted for high-speed system developments:

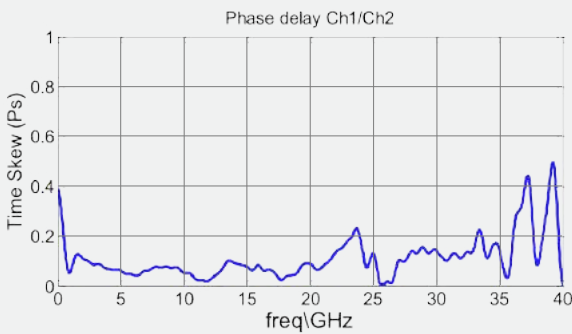
3D Simulation and Optimization

- Single-ended & differential bus design for noise minimization
- Preliminary simulations during layout phase
- Connector footprint optimization
- Etc.

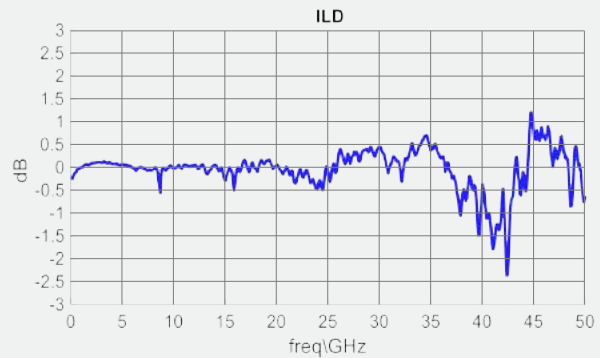


Theoretical Simulation and Analysis

- Skew, IL deviation and COM calculation
- Skin depth, plating, and surface roughness effect



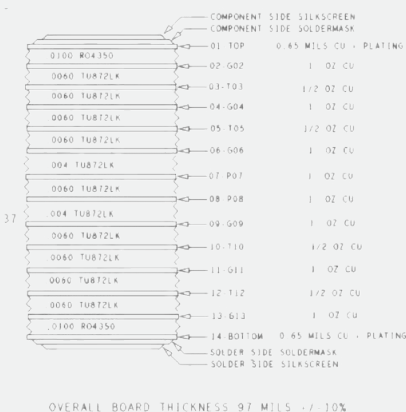
Time skew up to 40 GHz



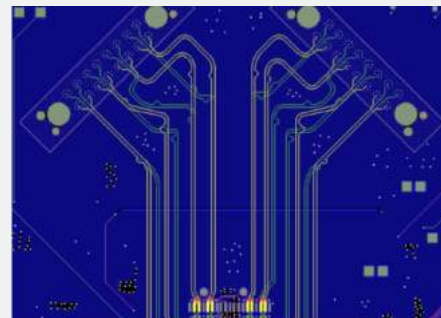
Insertion loss deviation up to 50 GHz

PCB Design and Review

- Defining PCB stack-ups and material selection
- Routing evaluation



Multilayer Stackup-14 layers



Trace routing with length precision


In-House Bring-Up and Validation at MultiLane R&D Labs

- Time and frequency domain measurements
- Crosstalk and ICN measurements

To inquire or receive a quote for your desired SI design consultancy or services, please contact our sales department at sales@multilaneinc.com

ADVANCED OPTICAL AND ELECTRICAL SOLUTIONS

MultiLane is proud to announce our third generation of electrical and optical oscilloscopes, perfectly suited for 112G per channel. With expanded bandwidth up to 60 GHz, and improved jitter tolerance and noise performance, these oscilloscopes are ideal for examining optical and electrical signals at 53 GBd PAM4.



ADVANCED OPTICAL AND ELECTRICAL SOLUTIONS

ML4006B

The ML4006B is a new ultra-compact high bandwidth (60 GHz) electrical DSO. Undoubtedly the most economic electrical characterization tool for 802.3ck and OIF 112G validation.



Contact sales@multilaneinc.com for more information.

ML4015E

Testing 100G Lambda optical signals at affordable, scalable rates remains one of the most significant challenges for our industry today. With our new ML4015E Optical DSO, MultiLane sets the standard for a new price/performance point that is sure to expedite the expansion of the 800G ecosystem.

Contact sales@multilaneinc.com for more information.



ML4100L

With 400ZR adoption around the corner, an affordable tool set that can support the development of this technology and prepare for mass adoption is essential. MultiLane will be demonstrating our unique new instruments and roadmap for Coherent testing at DesignCon.



ML4100L-AWG can be used as a generic high speed waveform generator or pattern generator up to 96 GS/s or 64 GBd PAM4/NRZ. It has the same signal format as 400ZR and is therefore an ideal tool to support Coherent module development.

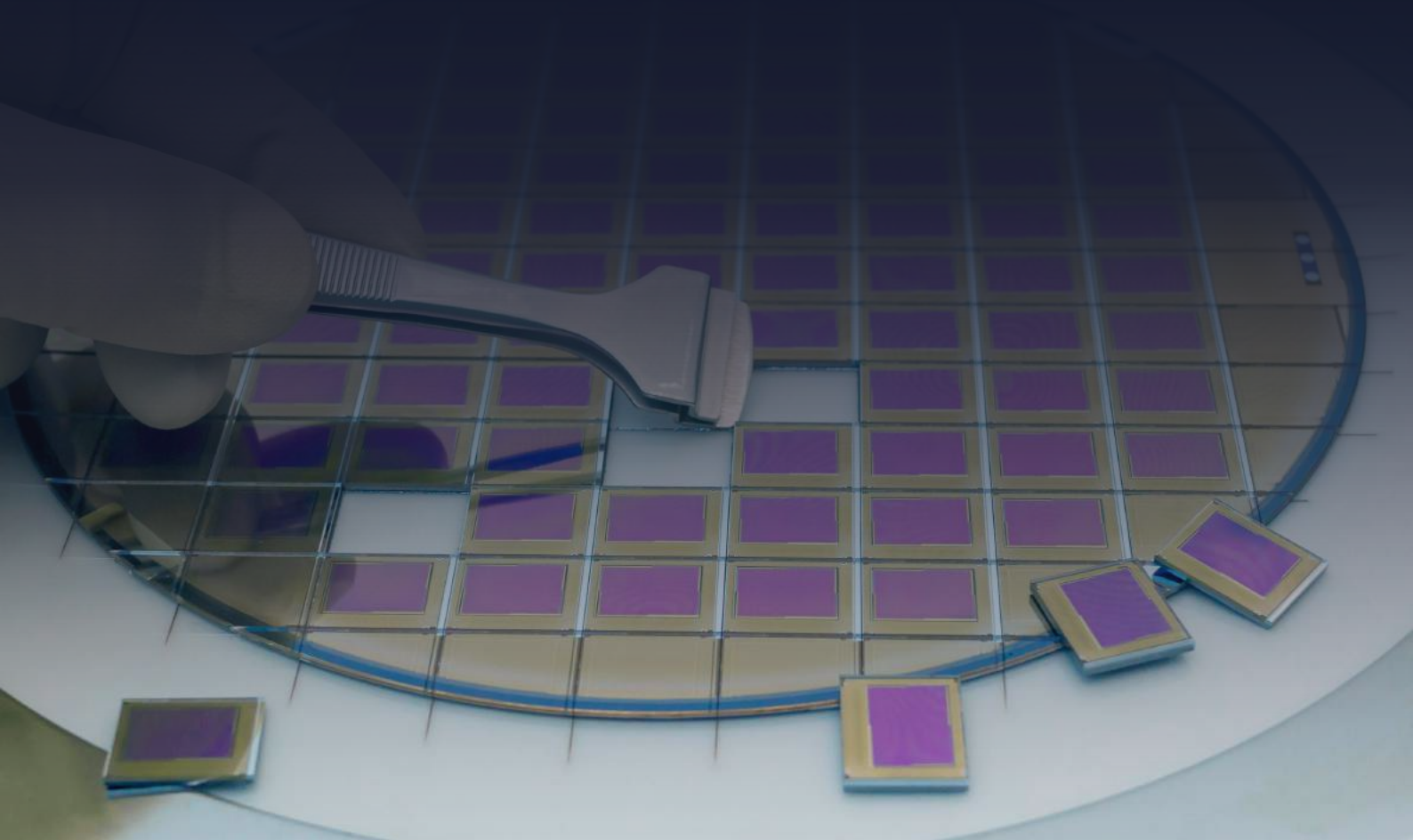


Contact sales@multilaneinc.com for more information.

AUTOMATED TEST EQUIPMENT



MultiLane has partnered with ATE test equipment provider, Advantest, to codesign a turnkey solution for an industry that stands to benefit from a new class of high-speed external instruments at wafer probe. MultiLane has demonstrated the viability of production level wafer testing, with successful measurements taken at 28 GBd and 56 GBd PAM4. Our ATE solutions bring our same benchtop signature eye for accurate, scalable solutions, reconfigured to fit into the twinning frame of Advantest's V93000 semiconductor tester.



AUTOMATED TEST EQUIPMENT

AT4039E

- Variant of the ML4039E BERT modeled to fit into the V93000 tester
- Fully-featured, instrument-grade, 400G BERT
- Configured for 4-channel PAM4 56 GBd/28 GBd, or 4-channel NRZ 56 Gbps/28 Gbps
- Fine-tuning bit rate to facilitate finding the locking margin
- Up to 0.8 Vppd output swing
- Gray coding and polarity inversion support
- PRBS13Q/15Q/31Q support
- User-defined pattern support
- Advantest SmarTest API library, sample code

Read the full specifications [here](#).



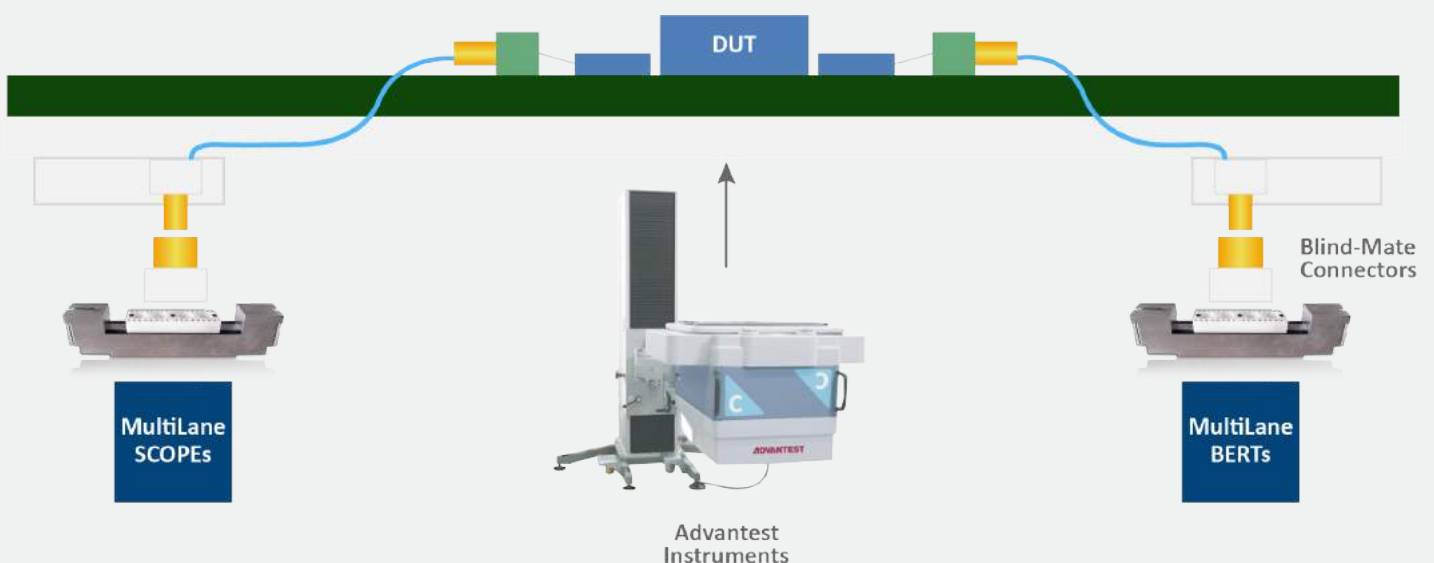
AT4025-50

- Variant of the ML4025 DSO modeled to fit into the V93000 tester
- Fully-featured, cost effective four channel equivalent time sampling oscilloscope
- 4 CH 50 GHz DSO for 53 GBd PAM4 validation
- Memory depth of 256 16-bit MSamples
- Up to 100 MHz sampling rate
- Less than 5 seconds TDECQ on a SSPRQ pattern
- Fast pattern capture and DSP for shorter test times
- Extensive library of built-in DSP filters such as Bessel-Thomson, CTLE, DFE, FFE, de-embedding and component emulation.

Read the full specifications [here](#).



Signal Routing

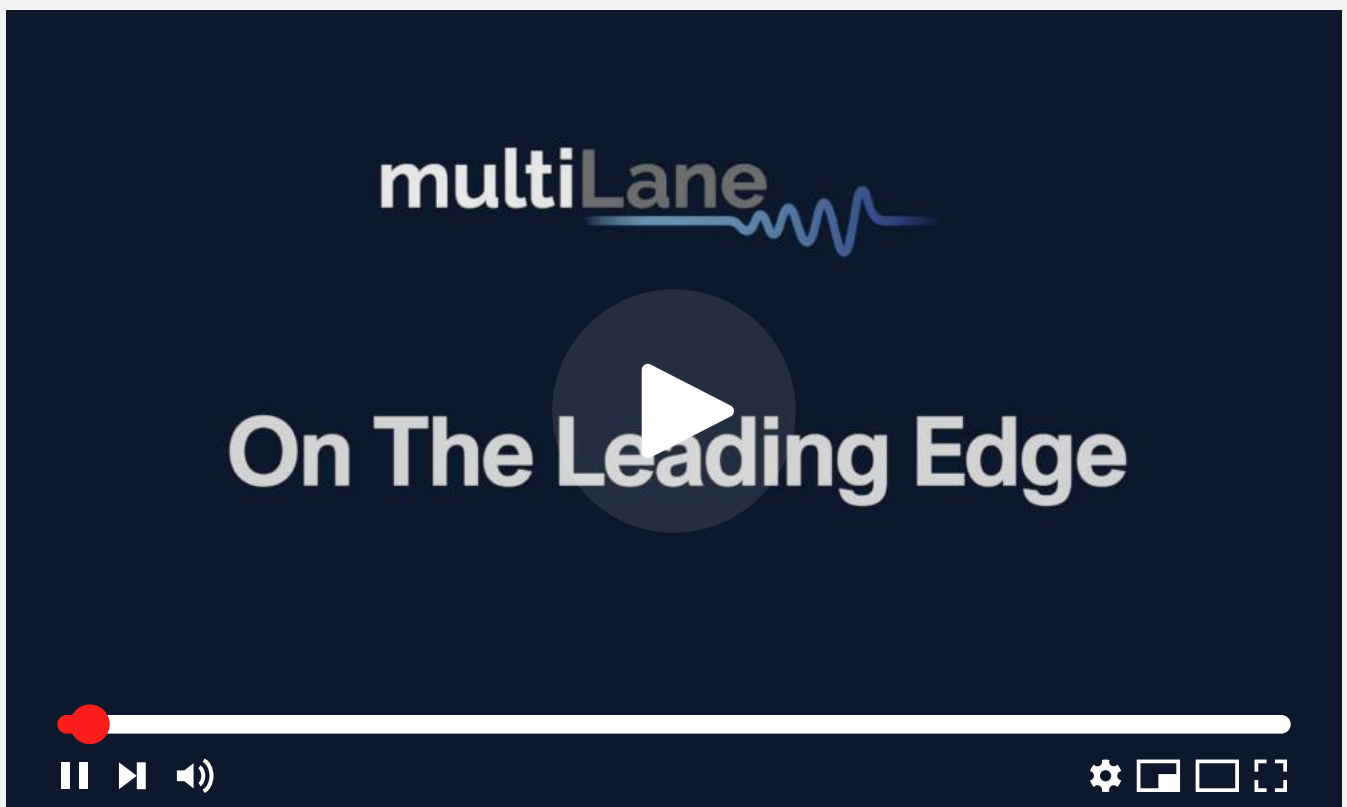


multiLane



Innovation for the next generation

Learn more about MultiLane



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