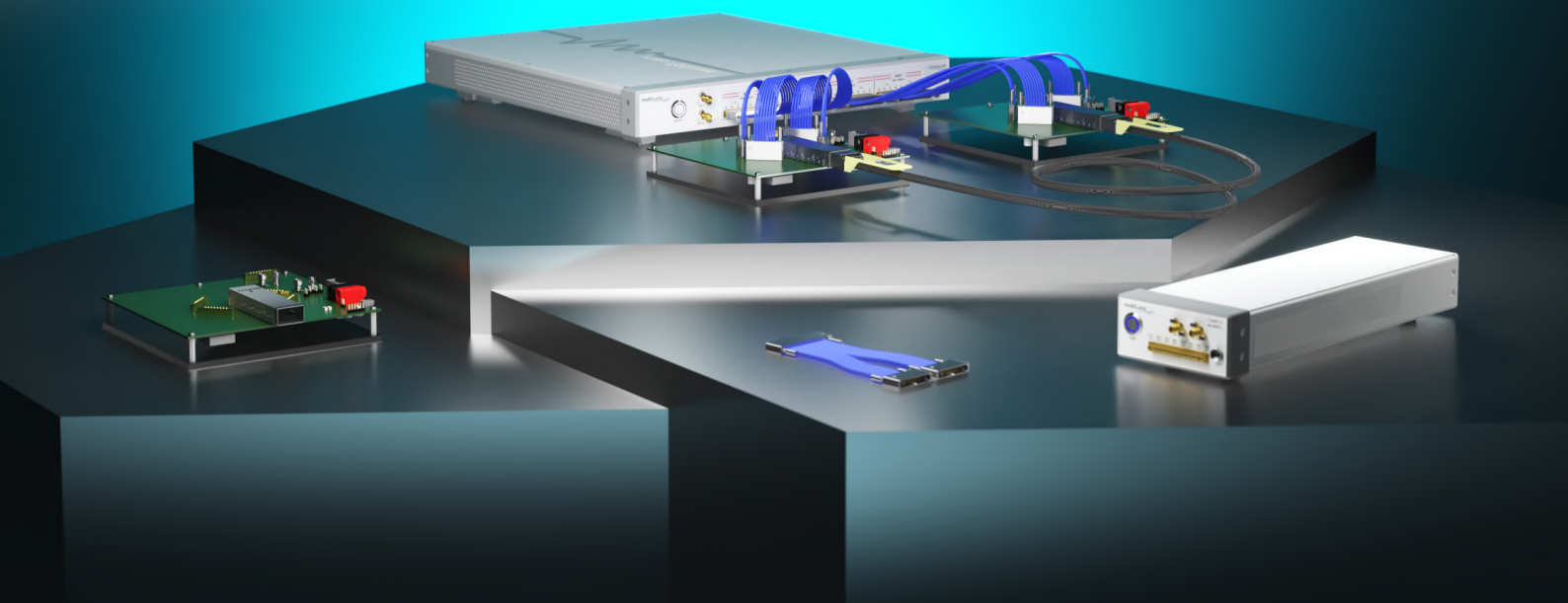
multiLane

# Hyper-Scale Testing for the Terabit Era



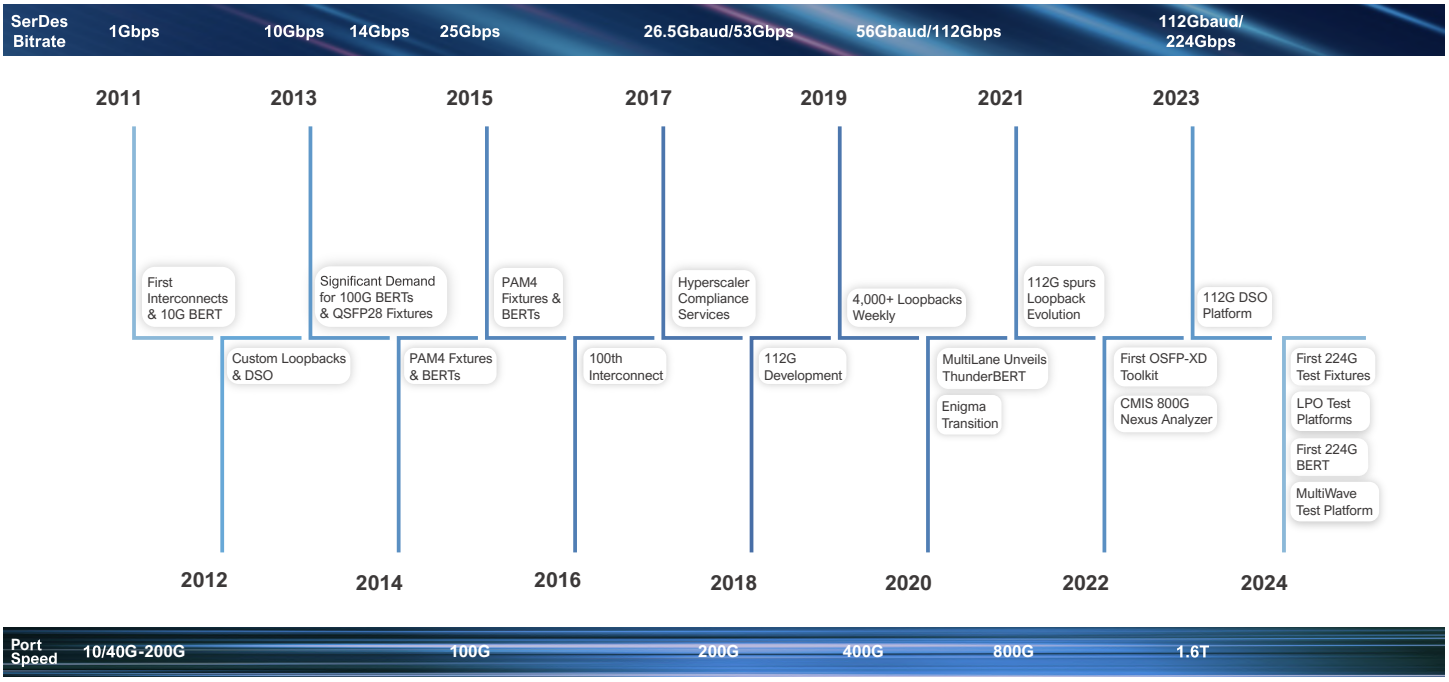
2025 Product Brochure

# A Comprehensive Approach to a Diverse Industry

This brochure reflects the full diversity of MultiLane solutions, from Loopbacks and CMIS management, testing instruments, personalized engineering services, to creating the building blocks for our products with our new interconnects, we have cast a wide net while maintaining our exceptional quality to ensure we can continue to meet and exceed market expectations. Happy browsing!

## Innovation Timeline

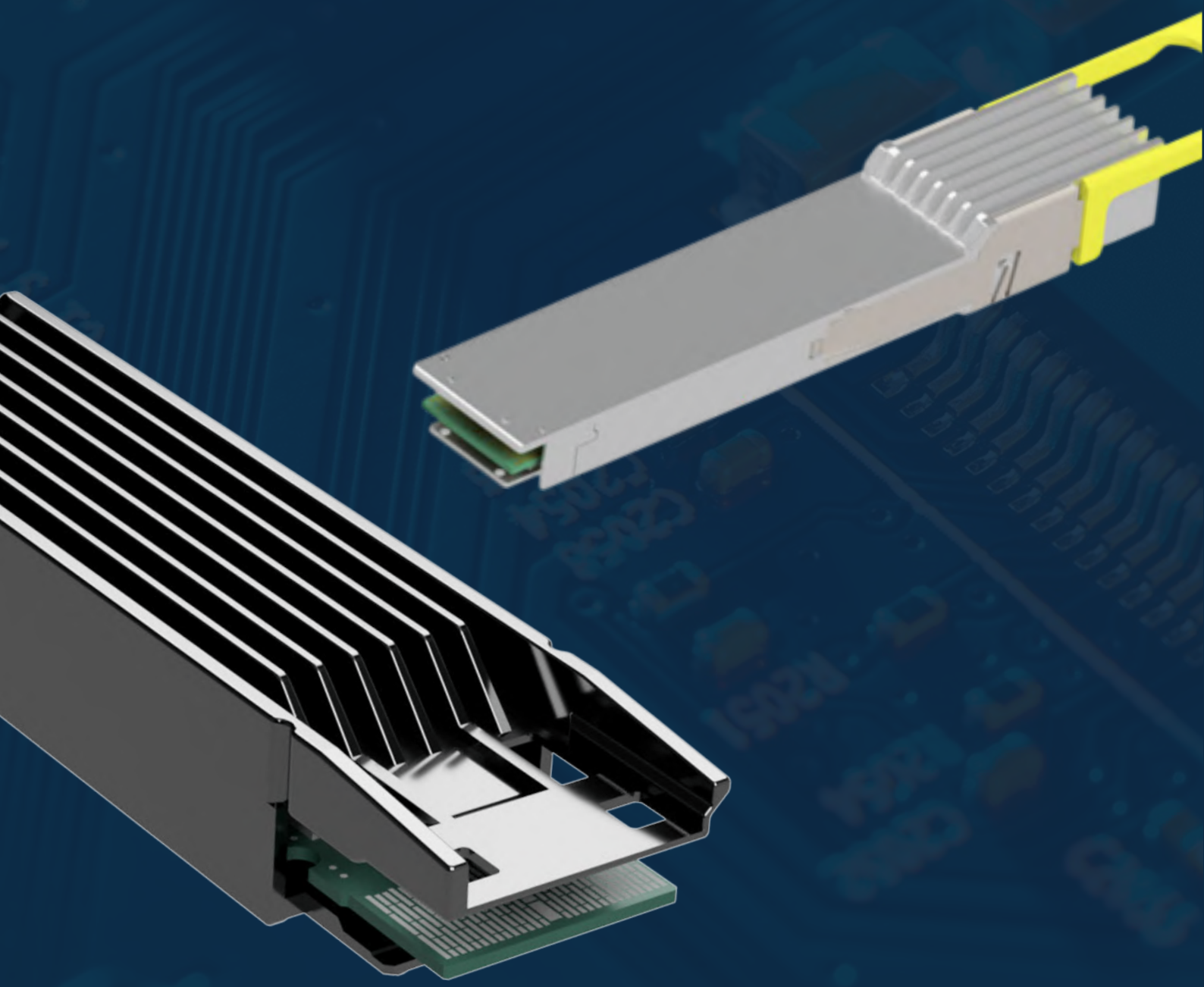
Our journey of growth over the past ten years to meet the rising demands of high speed networks.



# DATA CENTER TEST SOLUTIONS

## ACCELERATING HIGH-SPEED ADOPTION ACROSS THE INDUSTRY

MultiLane Data Center Test Solutions offer an extensive selection of testing capabilities to enable the modern day data center. We have ready solutions for the most dominant form factors across many generations. Our focus is on the specialized tools that allow for the development of 1.6T hosts ports and next-gen pluggables; accelerating both the current and next generation of Giga/Terabit ethernet.

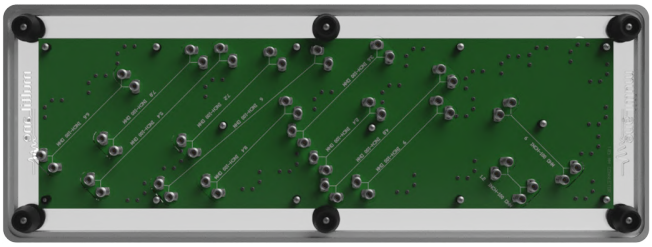


# THE 1.6T ECOSYSTEM

As the race to 224Gbps/lane heats up, MultiLane stands ready to accelerate the development and adoption of this latest technology with three new products in 224Gbps Signal Integrity characterization. Taken together, these products offer a compliance and development suite to accelerate vital R&D for next-gen networks.

# ML4067-224 CHANNEL EMULATION BOARD

The latest MultiLane Channel Emulation Board, the ML4067-224 provides a comprehensive set of trace paths for 224Gbps signals to test and validate responses to lossy channels. With 11 traces at 92 and another 11 traces at 100 Ohms the ML4067-224 can emulate losses which range from 4 to 30 dB at the target Nyquist frequency of 53.125 GHz. The board supports 1 mm and 1.85 mm connectors.

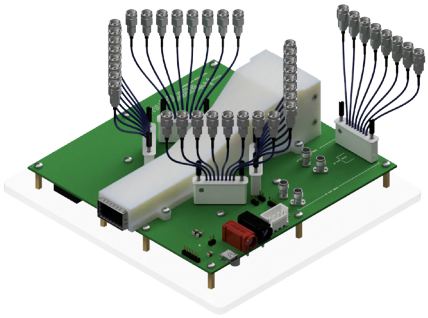


*ML4067-224 Channel Emulation Board*

# 224GBPS/LANE OSFP COMPLIANCE BOARDS

### OSFP1.6T Module Compliance Board

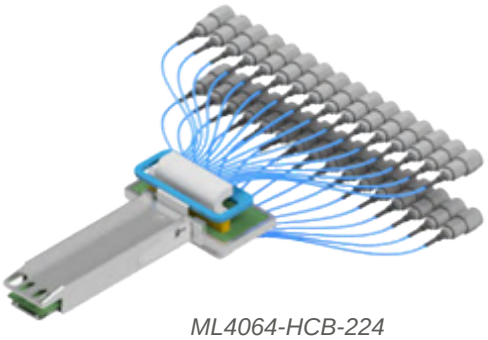
The MultiLane OSFP 224G MCB is designed to validate next-gen pluggables with loss profiles compliant with the IEEE 802.3df, high performance SMPX connectors offering a bandwidth of up to 110GHz, and a USB interface that gives access to a CMIS GUI. The MCB provides a comprehensive approach to compliance and interoperability validation with access to full CMIS implementation in modules



*ML4064-MCB-224*

### OSFP1.6T Host Compliance Board

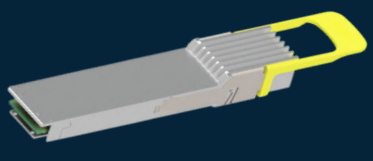
The MultiLane OSFP 224G Host Compliance Board (HCB), the ML4064-HCB-224, provides good SI performance as defined by the IEEE specification for accurate host characterization at 224Gbps/lane. With a narrow, cabled design to enable easy setup and crosstalk validation, the ML4064-HCB-224 is purpose built to address the challenges of streamlining the testing process without compromising that has come to define 224Gbps/lane validation.

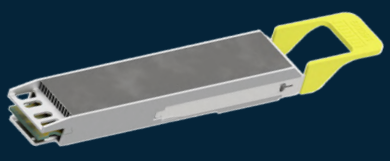


*ML4064-HCB-224*

# OSFP1.6T LOOPBACKS

MultiLane offers both Electric and Active Loopbacks for OSFP 224G. These pluggables are designed to demonstrate host interoperability, establish a baseline performance before introducing outside variables, and run simplified debug routines to save on support cycles and FAE resources.





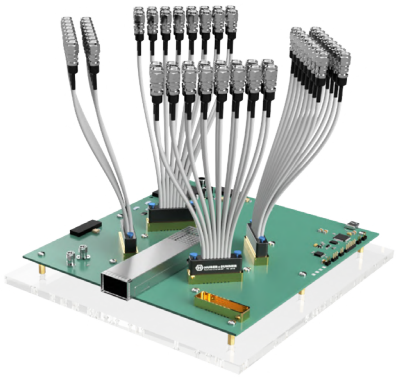
# OSFP-XD

## Test Fixtures

MultiLane's line of OSFP-XD Host and Module Compliance Boards (HCBs and MCBs) are ready to accelerate the industry into the Terabit generation. The ready-to-ship ML4064-XD-MCB-112-MXPM70 provides a means of testing very early OSFP-XD pluggables, while the ML4064-XD-HCB1/2-112 and its series of high-performance SI traces allow for early port characterization/testing. Both test fixtures are compliant with the CEI-56G-VSR-NRZ and IEEE 802.3ck specs.

### ML4064-XD-MCB-112-MXPM70 Key Features

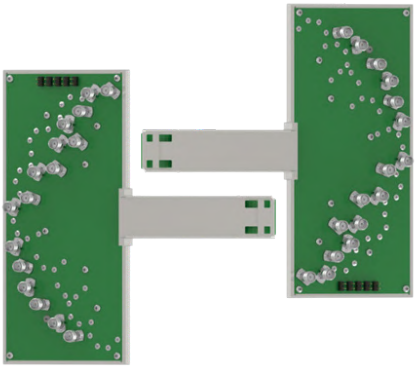
- MCB loss including the 3" MXPM70 cable is compliant with CEI-56G-VSR-NRZ and IEEE 802.3ck.
- CMIS GUI providing comprehensive approach to DUT interoperability, allowing users to access full CMIS implementation in modules. APIs available.
- I2C master driven from both on board microcontroller and/or external pin headers
- On-board LEDs display MSA output alarm states
- On-board buttons/jumpers for MSA input control signals



ML4064-XD-MCB-112-MXPM70

### ML4064-XD-HCB1/2-112 Key Features

- Compliant with IEEE802.3ck and CEI-56G-VSR-NRZ
- Built with high performance PCB Material
- High performance signal integrity traces
- Same low Insertion Loss for all channels
- HCB1 supports 8x112G TX and RX lanes
- HCB2 supports 8x112G TX and RX lanes
- High speed signals accessible through 2.4-mm or 1.85-mm connectors

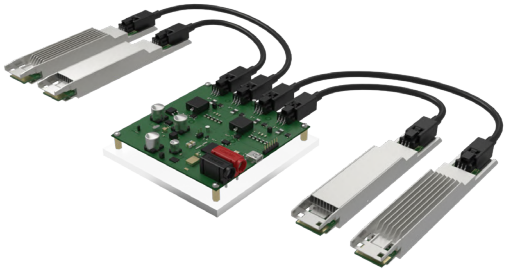


ML4064-XD-HCB1-112 ML4064-XD-HCB2-112

### Thermal Solutions

MultiLane's Thermal Load and Controller Board – the ML4064-XD-TL and ML4064-XD-CNT – provide an early, efficient solution for testing the anticipated 45 W heat dissipation required by the 1.6T generation. Configurable power spots on the thermal load allows for a variety of internal combinations to be tested for both transceiver emulation and cooling solutions.

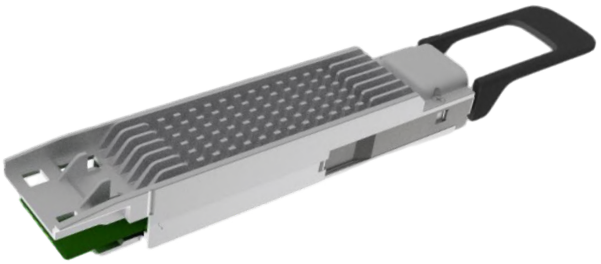
Up to 4 Thermal Loads can be controlled using the ML4064-XD-CNT Controller Board, allowing for multiple configurations to be tested at once for a total of 176 W.



Four ML4064-XD-TL thermal loads plugged into the ML4064-XD-CNT thermal controller board

### OSFP-XD Loopback

Building on the strong MultiLane OSFP-XD portfolio, the MultiLane OSFP-XD loopback, the ML4064-XD-LB is designed to provide rapid, confident host port characterization and validation for OSFP-XD ports up to 1.6T.



ML4064-XD-LB Loopback

# Nexus Analyzer

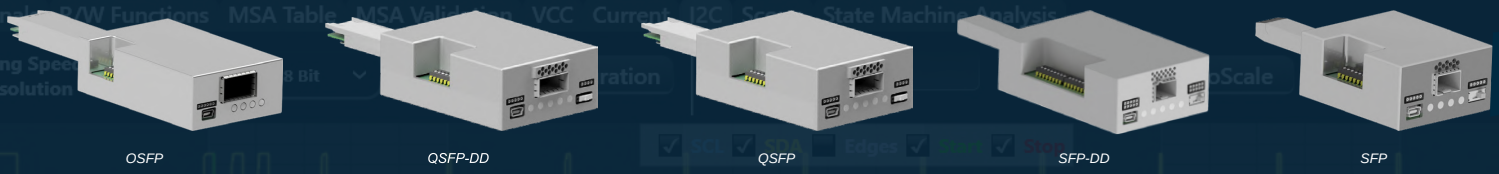
As new CMIS standards are developed and adopted, with a wide variety of SFF and CMIS specs available, CMIS testing becomes increasingly complex and time consuming. The MultiLane Nexus Analyzer is a direct response to this complexity, designed with speed and simplicity at its core. A CMIS/SFF debug tool for interoperability testing and CMIS/SFF failures, the Nexus Analyzer is equipped with a full feature sweep implemented in its GUI.

The Nexus Analyzer is used as a verification tool to validate the CMIS/SFF implementation, with a CMIS/SFF register sweep, state machine and data path state machine testing, I2C R/W commands and packet analysis, included in the product's features.

Capable of running a full system debug in minutes, with pinpoint accuracy on interoperability issues from either the module or host side, the Nexus Analyzer acts as a dramatic accelerant to CMIS adoption across the industry.

The product includes a port extender which connects low speed signals from the host to the plugged module while providing a probing interface at the same time. It also implements SI traces capable of 112G/lane, to connect the TX and RX paths from the host port to the plugged transceiver in the adapter.

Mating onto the adapter through a set of pin headers, the Analyzer gives access to the Nexus GUI with the capabilities to troubleshoot the interoperability between the system and the pluggable. Features include data path state machine testing, a full CMIS/SFF register sweep, I2C communication packets capturing and measurement of voltage and inrush current.The Nexus Analyzer is available in SFP, SFP-DD, QSFP-DD, and OSFP form factors.



*OSFP* *QSFP-DD* *QSFP* *SFP-DD* *SFP*

## Adapter

800G Adapter Key Features:
- SI traces and connector support 112G rates
- Support up to 30W modules
- Current and temperature sensor
- Module power ripples and inrush current measurement
- Detection of power spikes during module state transitions
- Probing interface for Vcc and GND pins
- External I2C
- Dip switch to choose low-speed signal source: internal/external
- Available in all SFF/CMIS form factors

## Analyzer

800G Analyzer Key Features:
- Voltage sensor
- ePPS signal validation
- 1 MHz I2C
- Probing interface for low-speed signals
- External control for any low-speed signal:
  -INT/RST
  -LPW/PRS
  -SDA
  -SCL
- LEDs for control/alarm signal status
- USB port for PC connection to use GUI or API features
- Available in all SFF/CMIS form factors

# Nexus Analyzer

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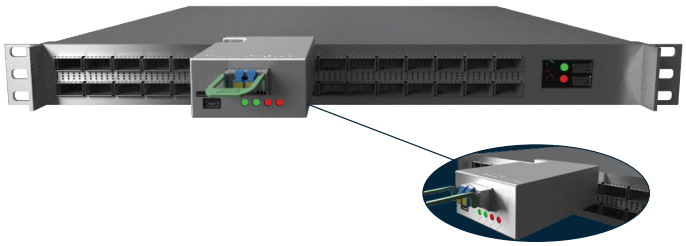


# CHANNEL EMULATION BOARDS

Multilane's Channel Emulation Boards simulate lossy signals allowing vendors to characterize their designs for a variety of real-world environments. The ML4067 features a variety of carefully designed differential test traces, this passive test accessory adds precise ISI (inter-symbol interference) in order to calibrate or stress test DSPs, modules, gearboxes or other relevant systems in real-life environments. The channel emulation board is available to support 112Gbps/lane and 224Gbps/lane, ML4067-112 and ML4067-224, respectively.

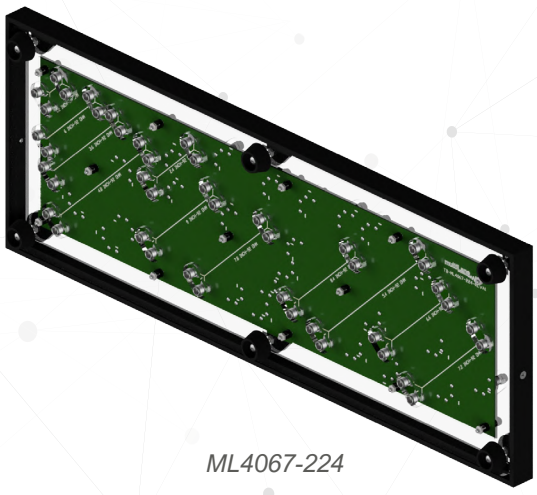
### ML4067-112-18/24 Key Features

- 13 trace paths
- Loss from 2 dB to 24 dB with a 2 dB increment
- Target Nyquist frequency of 26 GHz
- 100 ohms and 93 ohms differential traces
- Available in 1.85-mm or 2.4-mm connectors

### ML4067-224 Key Feautures

- 11 trace paths
- Loss from 3 dB to 25 dB
- Target Nyquist frequency of 53 GHz
- 100 ohms and 93 ohms differential traces
- Available in 1-mm or 1.85-mm connectors

*ML4067-112-24/18*

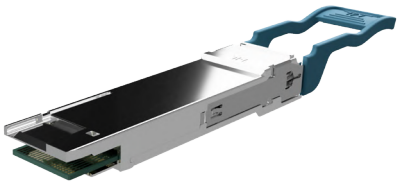


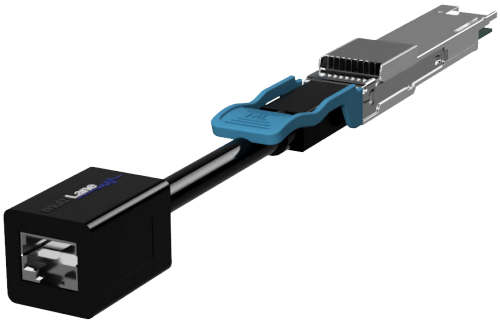
*ML4067-224*

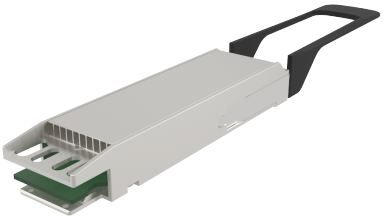
# Active Loopbacks

The move to 800G brings with it a paradigm shift in loopback design. The complex characterization techniques required for host ports at 8x112Gbps necessitate the advent of a new generation of loopbacks to address these challenges. MultiLane's Active Loopbacks are DSP-based modules designed specifically to account for these complex characterization techniques, while also covering the established requirements – thermal management and CMIS interoperability – for host port testing.

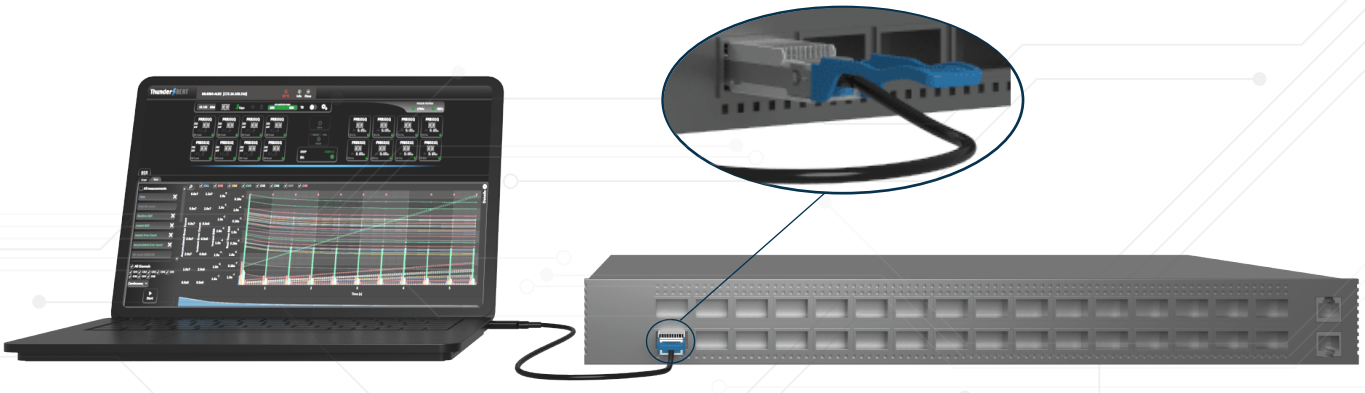
- Thermal Emulation
- OSFP800 (ML4064-ALB2-112) QSFP-DD800 (ML4062-ALB2A/2B-112) Form Factors
- PRBS Generator
- BER/ SNR Diagnostics
- Gray Mapping supported
- FIR taps supported
- 800G DSP enables retiming and equalization of host signals
- CMIS Compatible Configuration and EEPROM
- Communication via USB-C, I2C or ethernet
- Programmable MSA memory pages and custom memory maps
- Separate daughter card for configurable power spots, dissipating up to 19W
- DSP dissipates 10W
- Two temperature sensors, voltage sensors







While all Active Loopbacks are CMIS 5.0 compliant, they can also be enhanced with MultiLane's signature ThunderBERT GUI, resulting in a first-of-its-kind combination of instrument and module that can take the place of a full benchtop setup for host port testing. These ThunderBERT enabled ALBs – ALB-TBs – allow for distinct, separate Tx and Rx checking, making use of the ALB's full BER/SNR diagnostics and a PRBS generator through a much faster and more detailed GUI. With instrument-grade measurements packaged in a module's casing MultiLane's ALB-TBs can serve as benchtop replacements in development, speed up testing during production, and can even act as a field debugging tool post deployment.



# MEASUREMENT SOLUTIONS

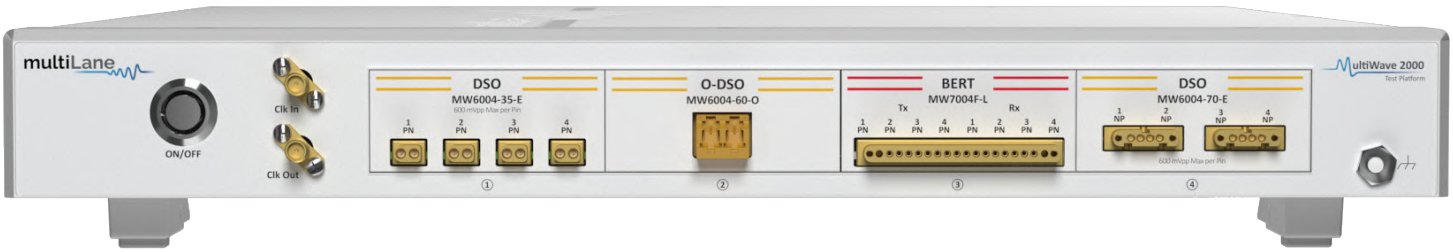
## LEADING INSTRUMENTS FOR A MULTITUDE OF USECASES

A core competency at MultiLane, our Measurement Solutions offer a diversity of instruments for equally diverse applications, from 224Gbps/lane BERT testing, to ultra-high-density interconnect validation, to enhanced signal capture with MultiLane DSOs, to our PAM8-capable AWG. Many MultiLane solutions can be fitted to the MultiWave Test Platform offering customers a completely tailored solution to cover almost any testing requirement.

# Next-Gen Measurement Solutions

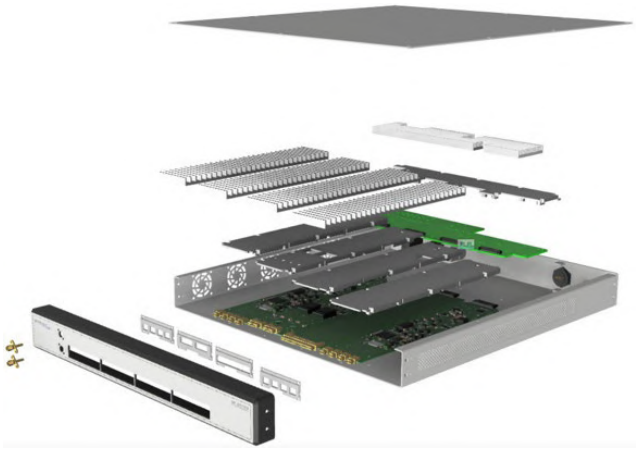
## MultiWave Test Platform

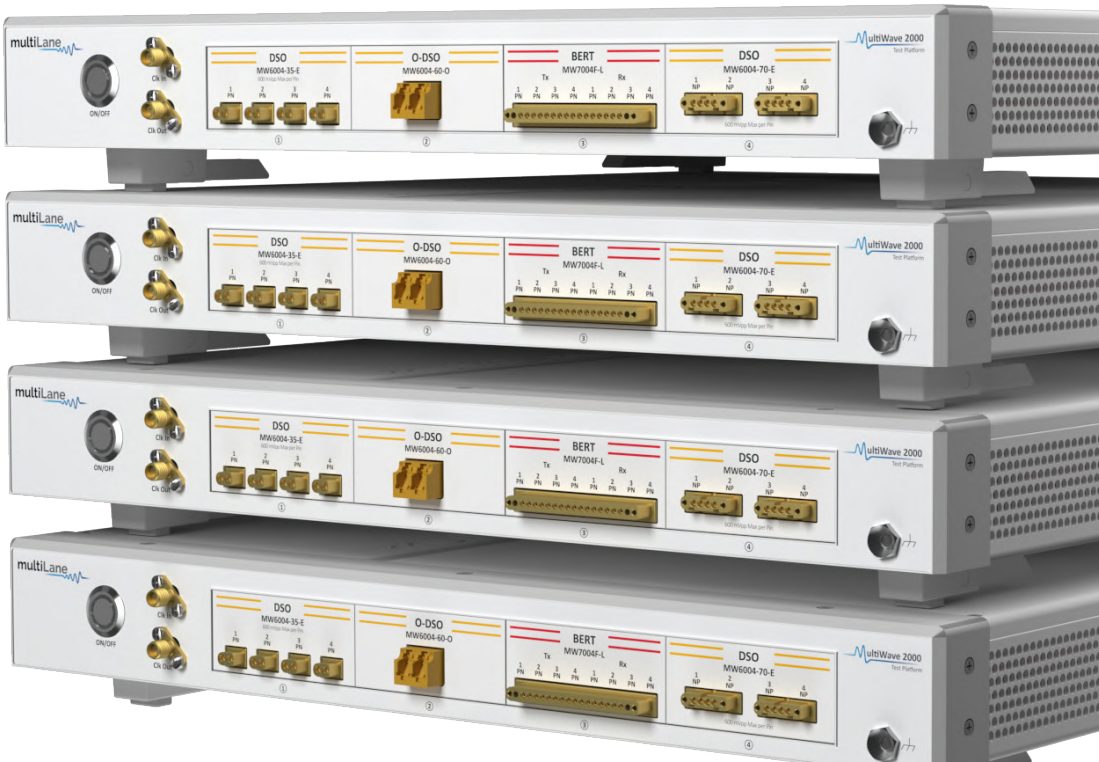
The MultiWave Test Platform (MWTP) is the latest measurement solution from MultiLane, with top-tier performance and flexibility across a wide variety of testing applications. Using the latest MultiLane Mirage Enclosure, the MWTP can house up to 6 different instruments in a single rack unit – for both data center and benchtop environments – offering a range of solutions suited to any testing need. The MWTP provides the perfect balance of flexibility and ease of use. The expanded enclosure allows any combination of MultiLane instruments to be placed into a custom-built MultiWave Test Platform for specific user-defined testing in a fixed package, suitable for any lab.




### MWTP Applications

- Post silicon Validation
- V&V Characterization
- End-of-Line Board-level test
- High-speed component manufacturing
- Field Failure Analysis
- High-density passive and active interconnect characterization & testing

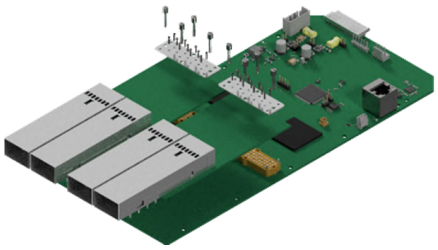




# Next-Gen Measurement Solutions

## Ultra-High-Throughput Copper Validation

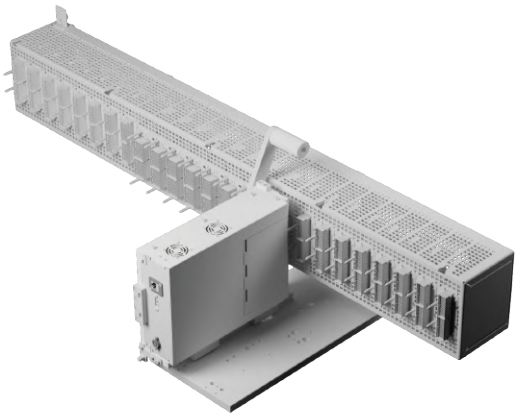
Copper remains a vital component of current and next-gen networks, with high-density copper interconnects key components in AI clusters. With thousands of differential pairs and even a single point of failure capable of bringing down an entire system, rapid, comprehensive testing is essential.



*ML7064E-LX with OSFP daughter cards*

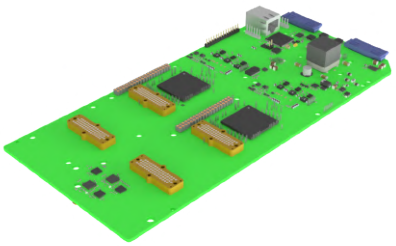
Given the critical issues of reliability, cost, and scale that have come to define this generation of network technology, MultiLane has found that Bit Error Rate Testers (BERTs) serve as more effective solutions than traditional forms of testing.

BERTs offer much faster testing times, lower Total Cost of Ownership, simpler calibration, and fewer false positives than conventional cable testing. BERTs also offer higher resolution testing compared to traditional alternatives: covering key pass/fail metrics, like BER, alongside more detailed measurements like Signal to Noise Ratio (SNR), PRBS locking, and Tx Squelch that can point to specific mechanical failures (poor mating, bent pins, etc.) in cable manufacturing.



*Cartridge and parallel testing enclosure*

MultiLane solutions compound these benefits with an ultra-high-density BERT that greatly accelerate the pace of development and deployment: the ML7064E-LX. A scalable solution that can test at the required speeds, the ML7064E-LX can test up to 64 channels per unit at 112Gbps/lane and PCIe gen 5, 6, and 7, with multiple units fitted into the cartridge testing solution for a testing setup to match the requirements of passive copper interconnects.



*ML7064E-LX with no daughter cards*

The ML7064E-LX offers maximum versatility and can be fitted with daughter cards of any connector type, from MSA connectors like OSFP and OSFP-XD, to 64-channel backplane connectors, or even custom connectors for unique applications.

**ML7064E-LX Key Features**

- Up to 64 channel per module
- Up to 112G/lane
- Supports various ethernet rates including 53.125Gbaud
- Customizable Mechanical Enclosure

**ML7032F-LX Key Features**

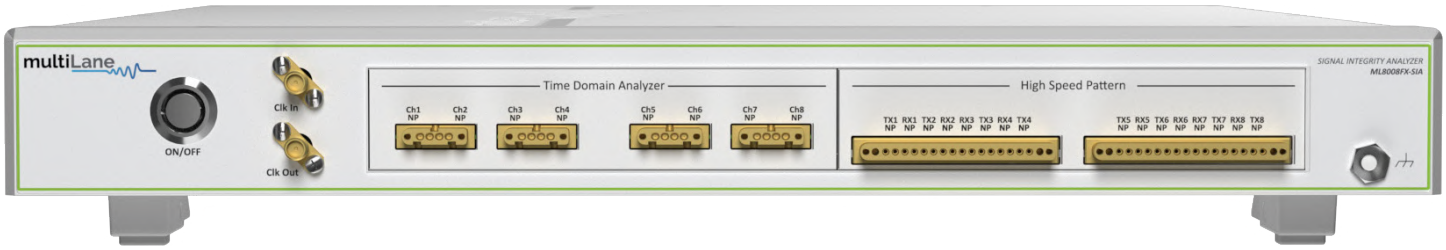
- Up to 32 channel per module
- Up to 224Gbps/lane
- Supports various ethernet rates
- Customizable Mechanical Enclosure
- Available August 2025

## Specialty Instruments

Working at the forefront of high-speed I/O innovation, MultiLane offers pre-built solutions tailored to some of the moste common testing applications required by the industry. These Specialty Instruments target specific – and common – usecases, ensuring an accelerated time to market for technologies in high demand.

## ML8008FX-SIA - Signal Integrity Analyzer

The ML8008FX-SIA Signal Integrity Analyzer is a high-throughput tester optimized for validating passive copper solutions such as switch-based flyover cables, DACs, and backplanes. It supports a wide range of signal integrity measurements, including Sdd21, intra-pair skew (IPS), crosstalk, and common-mode measurements. With automated differential S-parameter validation, multi-channel impedance profiling, and ultra-fast testing capabilities, the ML8008FX-SIA delivers reliable results for high-volume production with a low cost of ownership. Its rapid, high-throughput performance makes it an ideal solution for demanding manufacturing environments.




## Universal Module Tester

The MultiLane Universal Module Tester line comprises high channel count BERTs designed to validate ultra-high density backplanes/interconnects. With 64 and 128 lane count models – the ML7064E-L-UMT and ML7128E-LFX-UMT respectively – the UMT line acts as rapid, high-througput debuggers in any environment, including single-click pass/fail report generation. Equally built for a variety of interconnect testing cases, the UMT comes with replaceable daughter cards, creating a modular front panel that can be tailored to any pluggable and backplane harness.

*ML7064E-L-UMT*

*ML7128E-LFX-UMT*

# ML7004F-L | 224Gbps/Lane BERT

A 4-channel 224Gbps/lane BERT, the ML7004F-L provides an extremely versatile, cost-effective solution both R&D and production. Equipped with up to 40 dB of Rx equalization, the ML7004F-L is capable of validating passive and active interconnects, including Linear Pluggable Optics (LPOs) and high-density backplanes cables. This versatility is further enhanced by the new Multiwave Test Platform (MWTP), a multi-instrument chassis that can house up to four BERTs as MultiWave Modules – MW7004F-L – for a total of 16 channel testing. The stackable, space-saving design of the MWTP also supports scalability, allowing multiple units to be housed in a rack, further enhancing testing capacity.

## ML7004F-L Key Features

- 4 channel BERT, including 4 Tx and 4 Rx
- Long Reach, up to 40db equalization capabilities
- Coverage up to 120Gbaud PAM4 and 120Gbit/s NRZ, including 106.25Gbaud PAM4 and 106.25Gbit/s
- Covering previous ethernet Generations: including 25.78125Gbit/s; 26.5625Gbaud and 53.125Gbaud
- 21 Tx FFE Taps
- SNR, histogram and 27 Rx FFE Tap for monitoring


*Single slot ML7004F-L BERT*


*Four MW7004F-L in a fully loaded MWTP chassis*

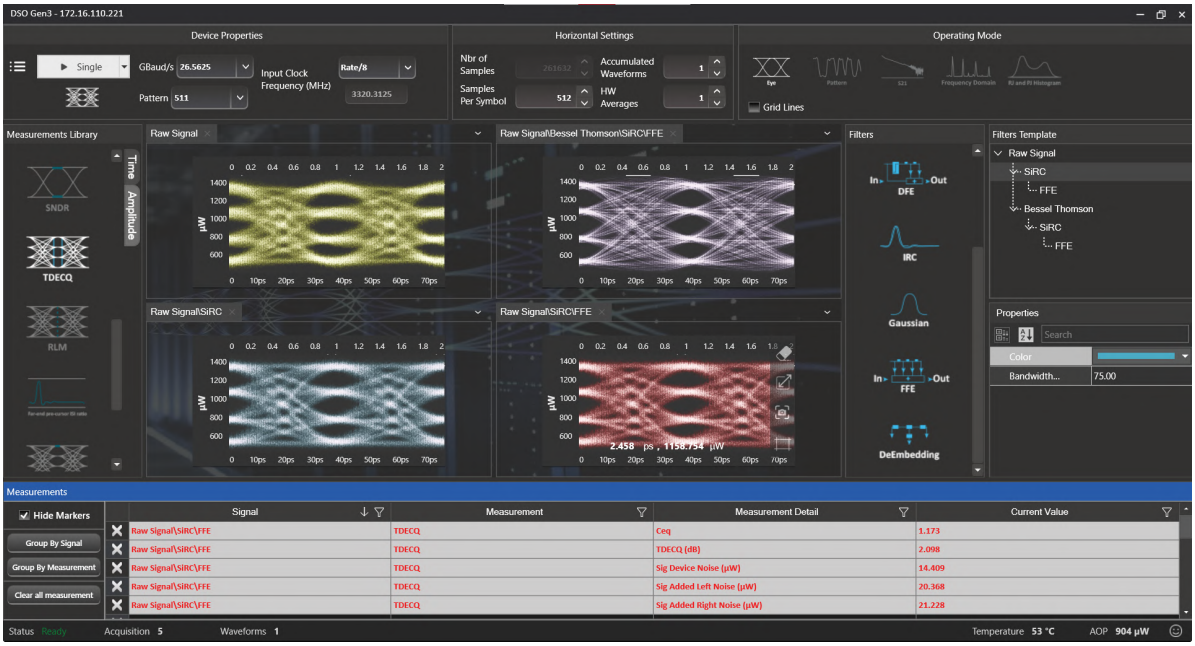
# 3rd-Gen Oscilloscopes – Optimized for 112G Optical/Electrical Signals

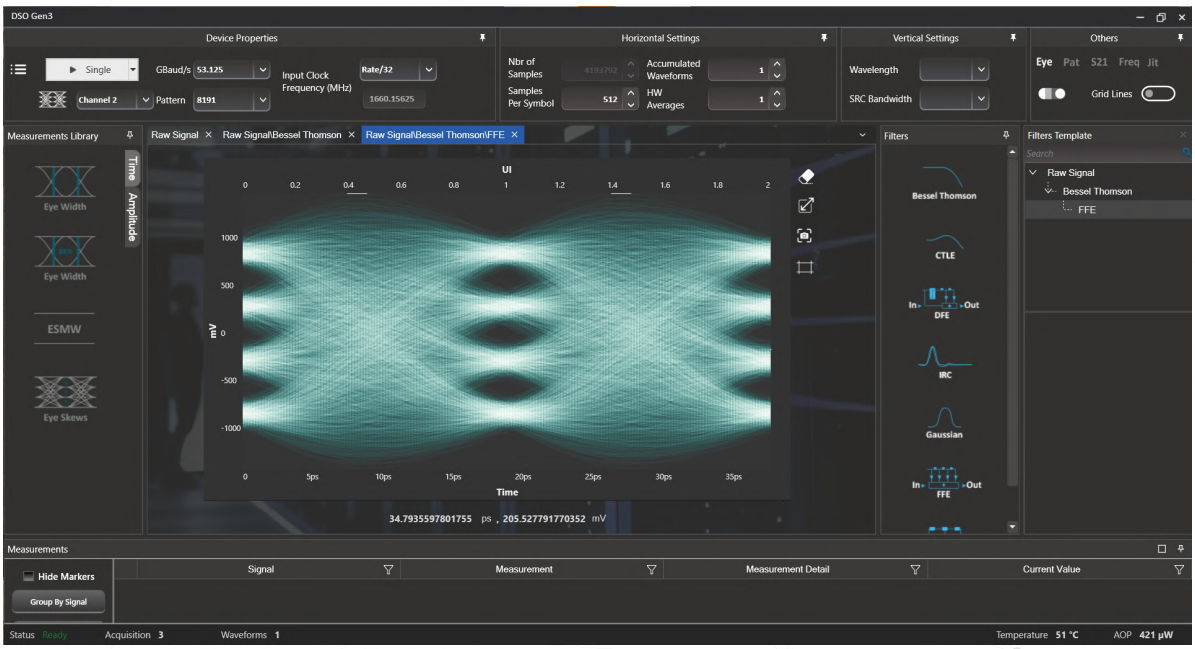
## Revamped GUI | Seamless Workflow, Streamlined UI, Unrivaled Performance

Built from the ground up with continuous feedback from MultiLane partners, the latest oscilloscope GUI is tailored to the industry's most requested requirements. Designed for use with the latest lineup of 3rd-Gen MultiLane DSOs, the revamped GUI emphasizes clarity, user-friendliness, and flexibility, allowing users to take full advantage of the powerful new hardware underpinning MultiLane's most advanced scopes to date.

### Key Features

- Highly configurable to a variety of user requirements
- Save/Load environments with distinct user profiles
- Streamlined experiencewithout compromising performance
- Developed with direct customer feedback



# Instruments

## ML4015E

Serving as either an optical or electrical oscilloscope, the ML4015E is a fully-featured DSO designed for 1G to 800G network testing. With enhanced hardware options offering very low intrinsic noise and phase-based trigger to reduce intrinsic jitter to ensure minimal insertion loss, the ML4015E is particularly effective at capturing 112Gbps/lane signals, benchtop optical characterization, and sensitivity testing for optical receivers.

### Key Features

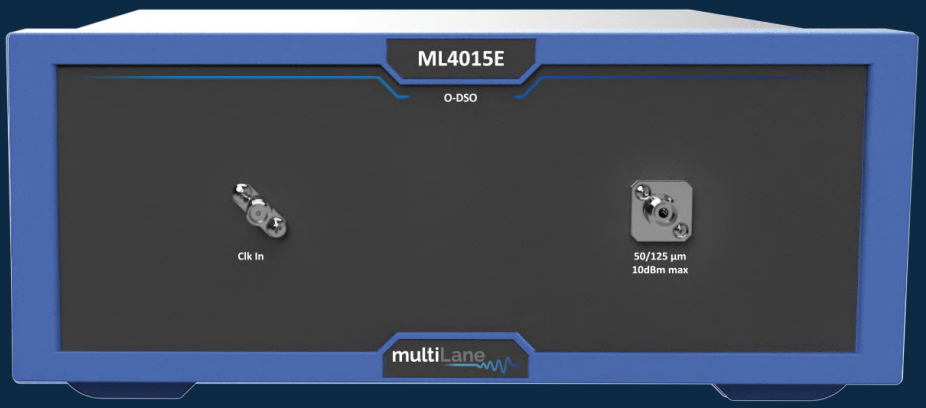
- High-throughput
- Noise floor of 5 µW at an analog bandwidth of 25 GHz, and 6-7 µW at 40 GHz bandwidth.
- Sensitivity level of -11 dBm for a 25.78 Gbps NRZ signal.
- Up to 50 - 70 MHz sampling rate.
- Less than 10 seconds TDECQ on an SSPRQ pattern.
- An extensive library of built-in DSP filters
- Comprehensive eye mask library

## ML6002-70-E

The ML6002-70-E is a fully featured, cost effective, advanced, and highly compact two-channel electrical Digital Sampling Oscilloscope with a 70GHz bandwidth, suitable for 224Gbps/lane applications. The oscilloscope comes equipped with comprehensive software libraries that enable eye measurements, jitter analysis, and processing of NRZ and PAM4 data. The ML6002-70-E features an extensive set of API libraries, making it ideal for automated testing and efficient go/no-go production validation.

### Key Features

- 4 differential inputs channels
- 70 GHz input bandwidth
- Two trigger modes: Phase trigger and frequency-based trigger
- Full eye and mask measurements
- NRZ & PAM4




ML4015E


ML6002-70-E

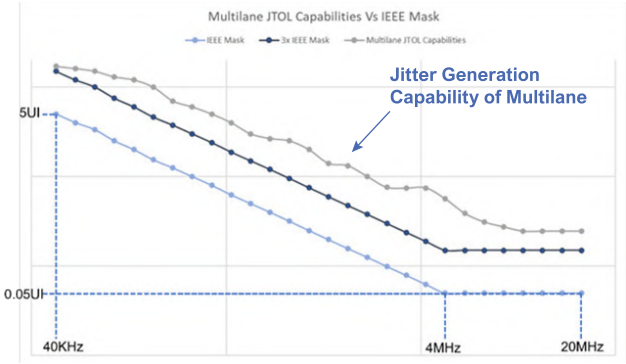
# Stress Receiver Integrated Features

## Are Your Designs Resilient Enough?

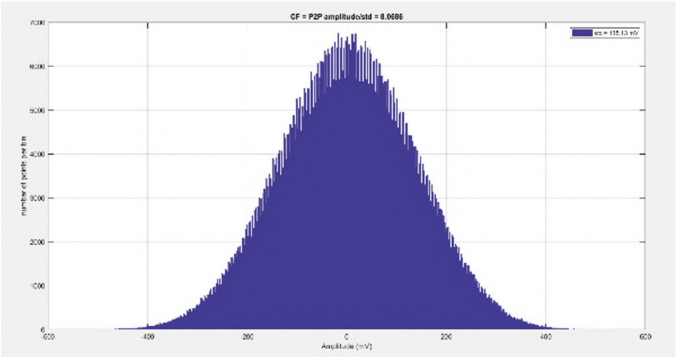
Ensure your devices can stand up to the resilience and sensitivity requirements of the 112G/lane PAM4 ecosystem with MultiLane's new Integrated Stressed Receiver Testing solutions. A new holistic methodology, SITOL integrates ITOL, JTOL, and margin testing into a validation cycle that ensures your designs are capable of meeting and exceeding the expectations at 112G/lane. Even minor dB gains at 100-800G can offer a significant advantage to ensuring server uptime and maximizing results, making an understanding of the margins by which DUTs exceed the base requirements all the more important. With noise injection capabilities three times the standard set by the IEEE, MultiLane's award-winning suite of SITOL capabilities provide a vital edge in an ecosystem that is coming to favor more resilient designs.

MultiLane takes IEEE standard requirements to another level. With automated Jitter and Noise Solutions, 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.

### MultiLane JTOL Performance




### MultiLane ITOL Performance



# Time Domain Reflectometry

## Pulsar

MultiLane Pulsar is a 4-channel Time Domain Reflectometry analyzer that simplifies troubleshooting by providing full SI insights, enabling the detection of impedance mismatches, discontinuities, and skew measurements. Pulsar is designed with scalability for parallel measurements and optimized for high-throughput, making it ideal for testing high-density ports.


ML4025E-PLS


ML4025F-PLS

MultiLane Pulsar

## Instruments

### ML4079E

The ML4079E is an 800G BERT featuring signal to noise ratio (SNR) and histogram measurements, and allows users to implement transmitter and receiver equalizers. Most importantly, it supports real hardware FEC analysis, crucial to 800G setups, providing a clear picture of DUT behavior in a real-world environment. The ML4079E can be combined with the ML407-PAM jitter clock source for jitter tolerance testing.

#### Key Features

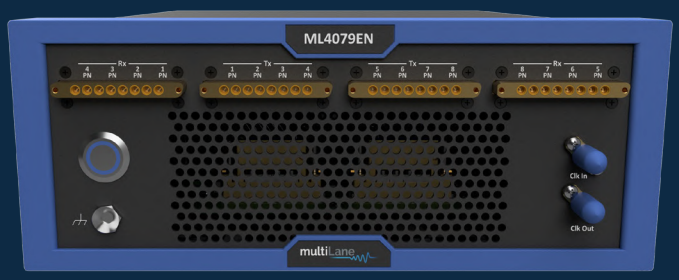
- 23-29 & 46-56 GBd PAM4/NRZ
- Real Hardware FEC (KR4/KP4 Analysis)
- Dense M-SMPM connectors

### ML4079EN

The ML4079EN provides the same basic setup as the ML4079E – real hardware FEC analysis – but with unique stress testing capabilities (JTOL, ITOL…), and an output of 1.5 V. An 800G BERT with signal to noise ratio (SNR) and histogram measurements, and transmitter and receiver equalizers.

#### Key Features

- 20-29 & 36-61 GBd PAM4/NRZ
- Real Hardware FEC (KR4/KP4 Analysis)
- Dense M-SMPM connectors
- Stress Testing Features: Manual and Automated JTOL and ITOL, Inner/Outer Eye Control

# Instruments

## ML4081/4081-X

A dedicated AWGN injector and Pick off-Tee board, respectively, the ML4081 and ML4081-X are designed to highlight the effects of noise on both a signal's BER and eye diagram. Used in a setup with a BERT, a clean signal is passed through the ML4081-X, where the ML4081 injects random noise. The resulting lossy signal is then routed to an awaiting DSO for the eye diagram, and looped back into the BERT to check the effect on the BER. The ML4081/ML4081-X are ideal for use in BIST applications for ATE, margin testing services, or PCIe BIST test applications.

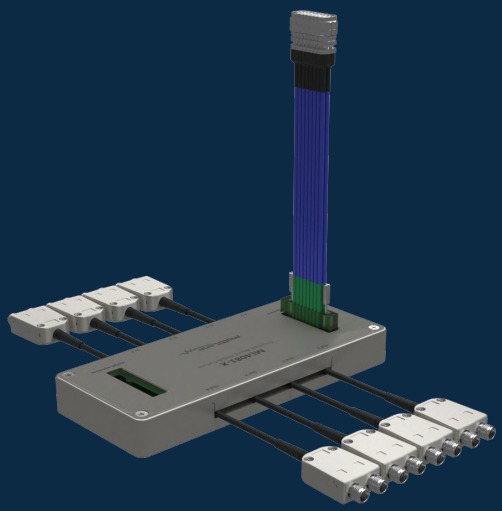
### Key Features

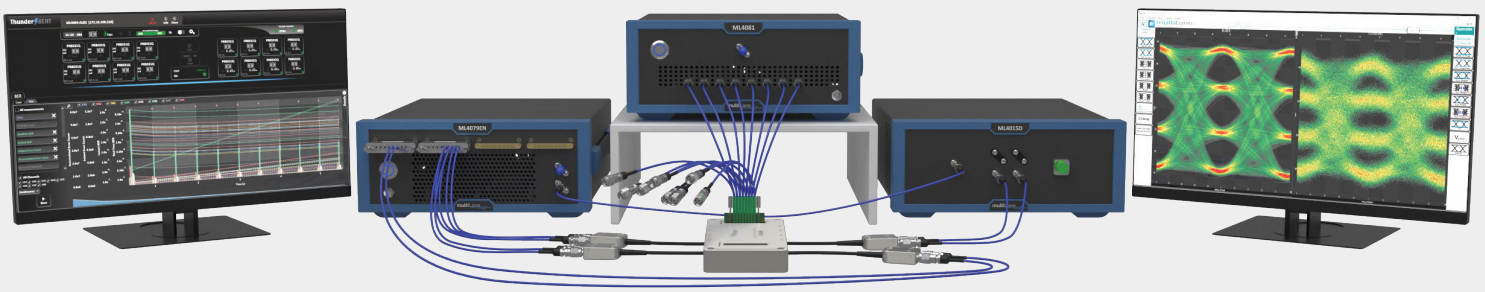
ML4081: AWGN Generator

- IEEE Interference
- Crest Factor >5
- 4 differential or 8 single ended channels
- Programmable Bandwidth 1-30 GHz
- Amplitude -30 dBm to -2 dBm
- Programmable Spectral Shaping
- Calibrated Amplitude accuracy 2 %
- Amplitude noise resolution 0.3 Db
- 2.4 dB Noise flatness to 30 GHz

ML4081-X: Pick Off-Tee Board

- 8 or 16 differential Lanes
- Routing for both clean and Noisy Signals
- Creates a defined stress source for receivers under test



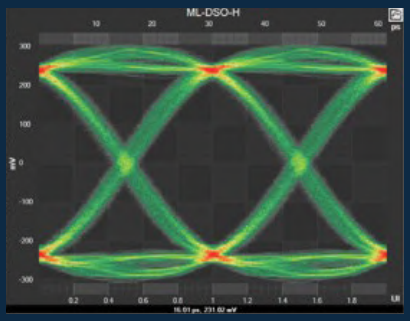
Full ML4081/4081-X Setup

## Arbitrary Waveform Generators

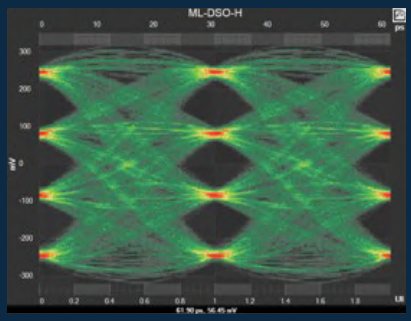
Arbitrary Waveform Generators (AWGs) are essential instruments for generating custom electrical waveforms in advanced testing environments. The ML9004F — our latest high-performance AWG —delivers a 150GSa/s sample rate with an analog bandwidth exceeding 65GHz. Designed for high-speed SerDes transceiver and amplifier validation, the ML9004F enables Rx jitter tolerance testing, signal integrity analysis, and compliance testing for cutting-edge standards such as PCIe, USB, MIPI, and coherent optical communications.


*ML9004E*

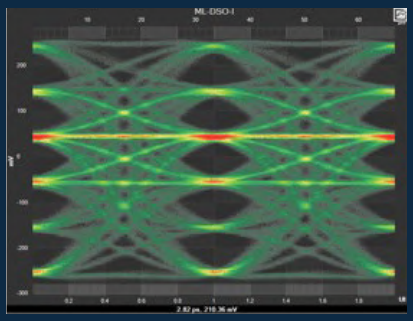

*ML9004F*




*32.5G NRZ Signal*




*32.5G PAM4 Signal*



*30G PAM6 Signal*

## ML4035

The MultiLane ML4035 3-in-1 400G BERT, TDR, and DSO offers a full range of testing capabilities from 400G BER measurements, to NRZ and PAM4 eye diagram characterization, and TDR and S-parameter evaluation, all in one compact package

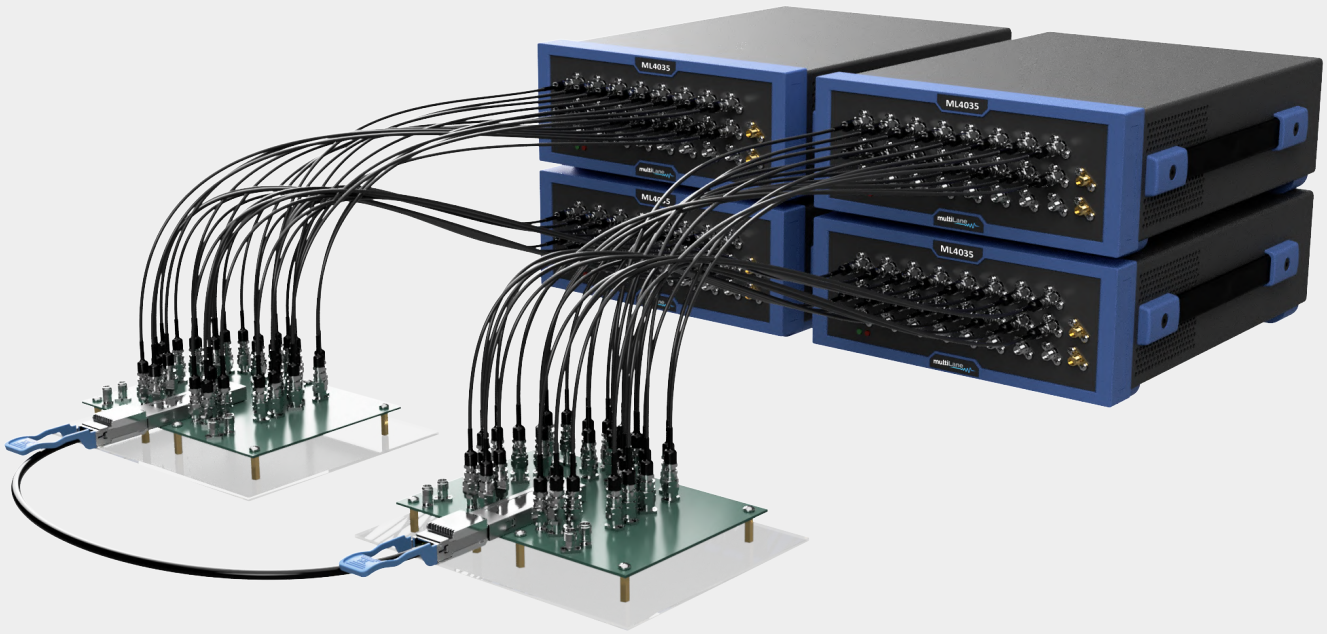

### Key Features

- 4-lane sampling scope
- 4-lane 53 GBd PPG
- 4-lane true-differential TDR/TDT
- 400G BERT
- Automation SW for Cable Testing
- High Throughput

# MultiLane Cable Testing Solutions

## Multiport Cable Testers

MultiLane cable testers are the fastest on the market, capturing S-parameter measurements on 16 differential lanes in seconds while providing the industry's simplest calibration procedure. Optimized for high-volume manufacturing, incoming inspection, RMA, and high-density backplane cables, our multiport cable testing solutions are scalable to over 64 ports. Making full use of our 3 in 1 BERT, TDR, and DSO the ML4035, the user-friendly setup can be fully automated to generate a pass/fail report based on time and frequency domain measurements including insertion loss, return loss, crosstalk, and TDR.




## Active Copper Testers

MultiLane covers the full range of active copper testing, with redriver and retimer solutions for Active Copper Cables (ACC) and Active Electrical Cables (AEC) respectively. Our AEC testing is fully HiWire compliant, using our ML4054E 800G BERTs for real hardware pre- and post-FEC measurements and CMIS validation. Our ACC solution – which uses our ML4035 3 in 1 BERT, TDR, and DSO – is the fastest on the market, capturing S-parameter measurements on 16 differential lanes in seconds, while providing the industry's simplest calibration procedure. All our active cable solutions include fully automated pass/fail report generation, BER, eye diagram, and S-parameter/crosstalk testing, making them ideal for R&D, manufacturing, and RMA.

# EXA Scale MultiLane Extension - ATE

## A New Class of Instrument for Wafer Level Testing

MultiLane has partnered with leading ATE providers to codesign turnkey solutions for an industry that stands to 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 112 GBd PAM4. Our ATE solutions bring our same benchtop signature eye for accurate, scalable solutions, to into the popular industry SOC tester platforms.

### Highspeed Multi-port Datacom Test

- 400/800 Gigabit Ethernet
- PCIe Gen4/5/6
- USB4

### Leading Performance

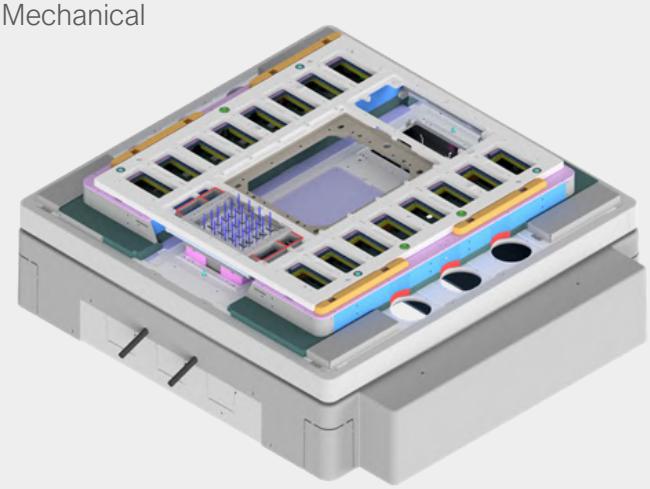
- Up to 224 Gbps/lane
- NRZ/PAM4
- Multisite
- PRBS waveforms
- User-defined waveforms
- Up to 48 Lanes

### Field Deployed

- KGD wafer and packaged parts
- USA OSATs
- Asia OSATs

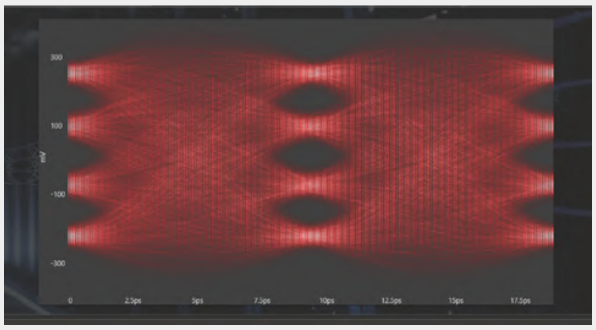
### Semiconductor ATE Compatible

- Hardware
- Software
- Mechanical

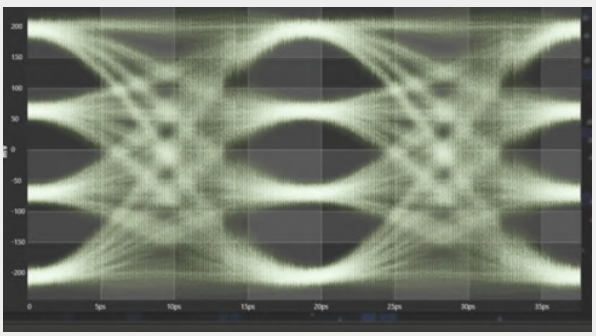


*OT93000 system*

*PAM4 Signal at 224G*

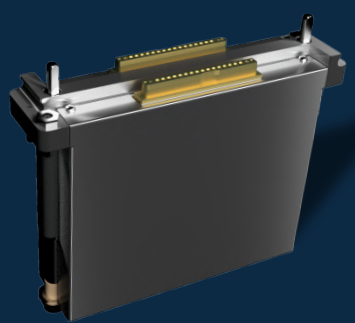


*PAM4 Signal at 53G PRBS13Q*



### OT4039F - 224G BERT

- 4 channel BERT, including 4 Tx and 4 Rx
- Long Reach, up to 40db equalization capabilities
- Coverage up to 120Gbaud PAM4 and 120Gbit/s NRZ, including 106.25Gbaud PAM4 and 106.25Gbit/s
- Covering previous ethernet Generations: including 25.78125Gbit/s; 26.5625Gbaud and 53.125Gbaud
- 21 Tx FFE Taps
- SNR, histogram and 27 Rx FFE Tap for monitoring



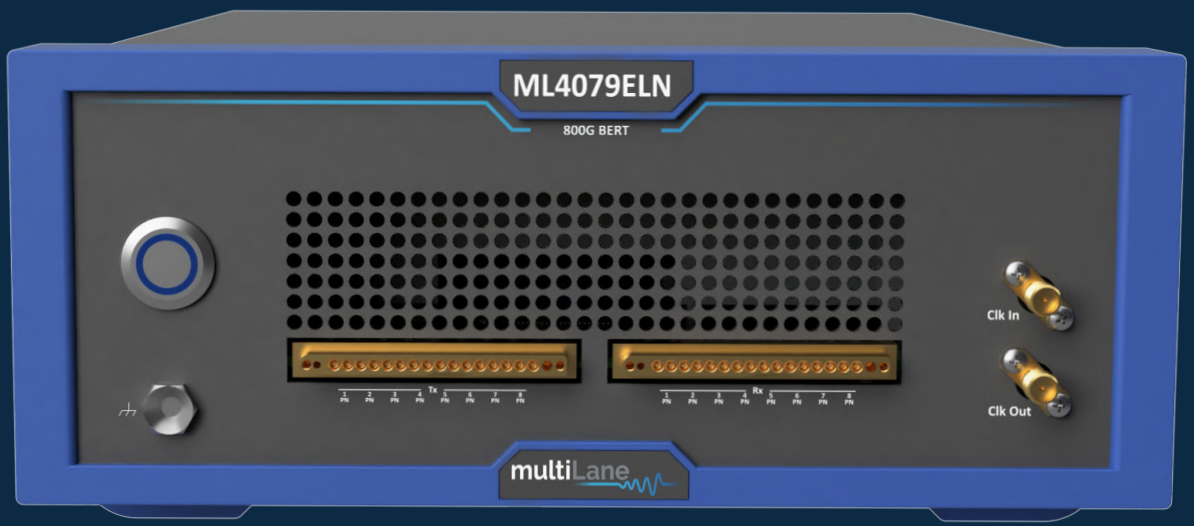
# ML4079ELN | Versatile Long Reach BERT

Designed as an all-in-one solution for the widest variety of applications yet, the ML4079ELN is a long reach 8-channel 800G BERT featuring an Rx equalization of up to 34 dB making it ideal to validate passive and active interconnects including Linear Pluggable Optics, with line rates for ethernet, PCIe, and low rate for Automotive applications.

The ML4079ELN features a wide range of line rate coverage, up to 34dB equalization, built-in AWGN noise injection, and ratio level mismatch (RLM), control, providing a single platform for testing up to 8x66 GBaud. The ML4079ELN includes transmitter equalization (3 or 7 taps FFE), and receiver equalization. The ML4079ELN can provide measurements for Signal-to-Noise Ratio (SNR), histogram measurements, and Real Time BER Measurements and FEC Measurements.

## ML4079ELN Key Features

- Ability to tune the bit rate in steps of 100kbps and find the RX PLL locking margin
- DFE and CTLE Equalization
- Independent control of inner eye levels
- Up to 1Vpp controllable Tx Amplitude swing
- Supports Gray coding
- Error injection
- 3-tap Pre- and Post-emphasis or 7-tap linear FFE
- Real hardware FEC
- Burst and random noise injection
- SNR monitoring over time
- Automatic pattern detection
- LOS indicators
- Up to 34dB Equalization Capabilities



# ENGINEERING TEST SERVICES

## TESTING AS A SERVICE

With a decade of experience developing solutions at the forefront of the industry, MultiLane has cultivated a wealth of engineering and high speed physical layer testing expertise that stands ready to be placed at your fingertips. Our Engineering Test Services provide customised requests either in the form of a plan to validate or test your products at one of MultiLane's labs, team augmentation, or custom engineering solutions.

# Test as a Service

MultiLane Engineering Test Services (ETS) are committed to confidence, enabling accelerated pluggable development and qualification thanks to comprehensive compliance testing and team augmentation.

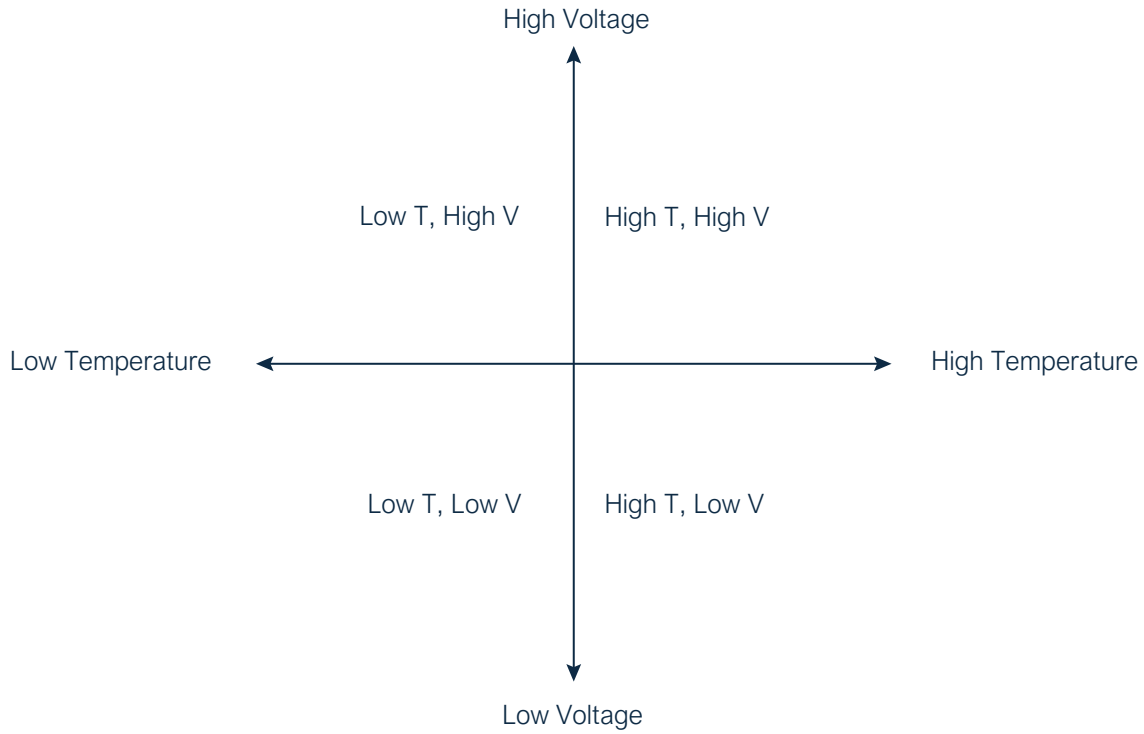
## Compliance Testing

Multilane's compliance testing service encompasses the entire spectrum of transceivers, cables and modules ranging from 1G to 800G covering rigorous evaluations for electrical, optical and environmental measurement as well as extensive testing capabilities for jitter and noise analysis.

Available Tests:


Our multi-corner environment test allows for a fully customisable approach to seeing how your devices perform in a variety of situations, with any combination of the following factors:

- High, low, or nominal temperature
- High, low, or nominal voltage

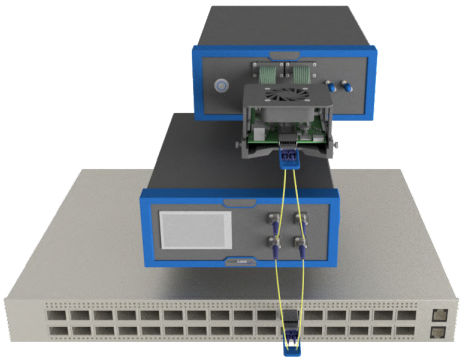


# Interoperability Testing

MultiLane's interoperability services offer a range of custom testing approaches for a number of different parameters for host and module interoperability including:

- Switch BER
- Pre/Post-FEC Link Testing
- CMIS Testing

Switch BER



Pre/Post-FEC Link Testing

CMIS Testing

# Physical Layer Testing

We are experts in HSDIO using our extensive suite of home-grown testing tools to provide a variety of detailed physical layer testing options.

| Link Test & Thermal Management | Output Test | Input Test | CMIS Test |
|---|---|---|---|
| - Validating the link on the host port<br>- Characterizing the ports thermal environment | - TX validation<br>- Eye diagram measurements | - Rx validation<br>- BER/SNR diagnostics<br>- PRBS generation<br>- FEC<br>- Stress testing | - Validate CMIS implementation<br>- Validate I2C communication |
| Passive Loopback<br>Active Loopback | HCB - Electrical DSO | HCB - BERT | ML4066 - ML4066ANA |

# Team Augmentation

MultiLane's extensive network of experienced engineers stand ready to enhance your team. Our team augmentation can be as small as a single engineer providing support to an existing group, or as large as a full team ready to take on a specific project.

## Core Competencies:

- High-speed testing
- PCB layout design
- Mechanical design
- Signal Integrity
- 3D modelling
- Hardware capabilities

# Custom Engineering Solutions

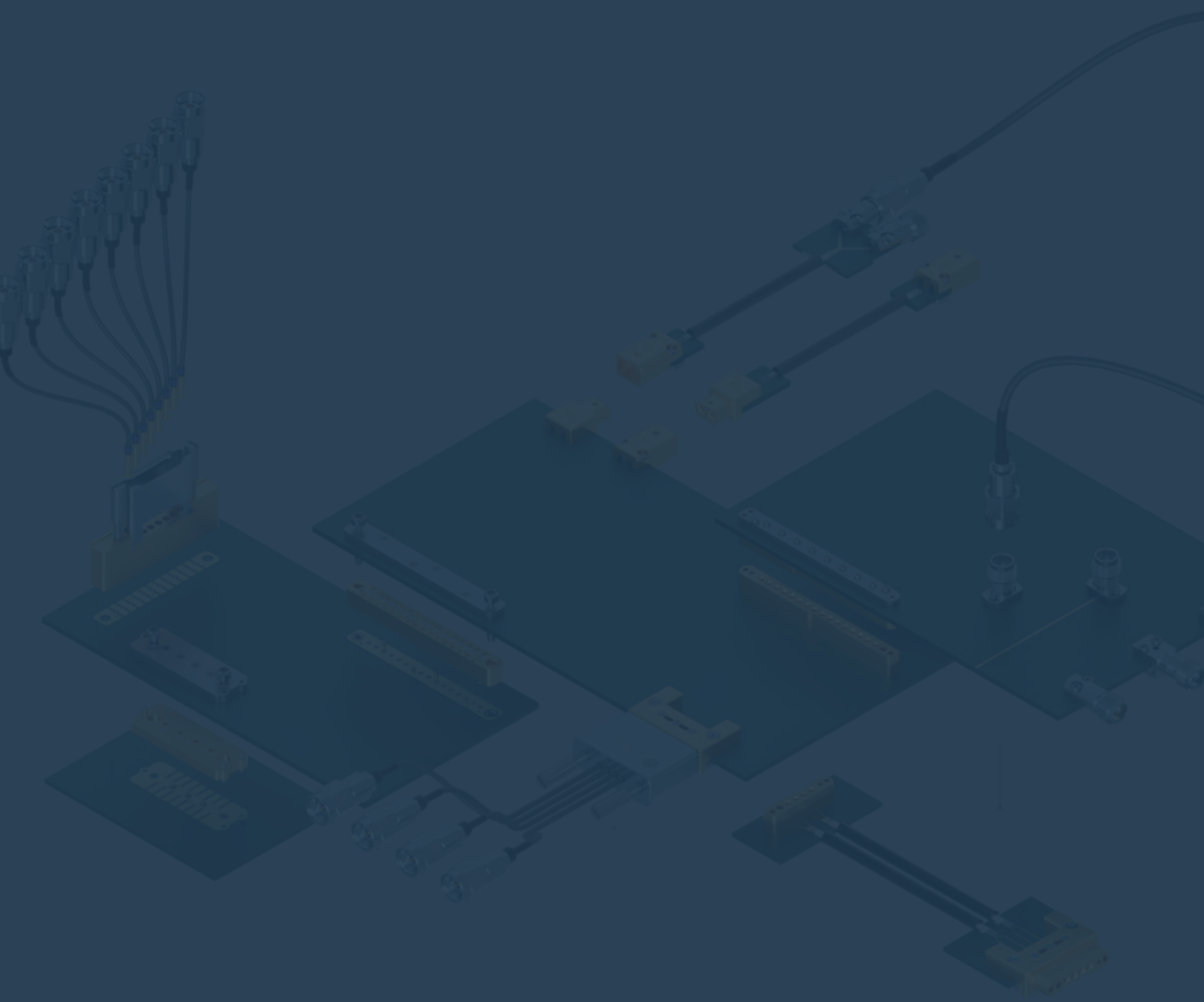
Need a specialized product for HSIO Test and Measurement? Our team has you covered. Whether for box building or protoboards for SOCs, MultiLane handles the supply chain management from idea to production across the product's full lifecycle. With direct access to all of MultiLane's Business Units, we can pull resources from our core competencies to offer specialised test solutions made to your exact specifications.

*Share your thoughts with us and let's see what we can build together at*
***services@multilaneinc.com***

# INTERCONNECT PORTFOLIO

DEPLOY YOUR INSTRUMENTS WITH OUR INNOVATIVE INTERCONNECTS

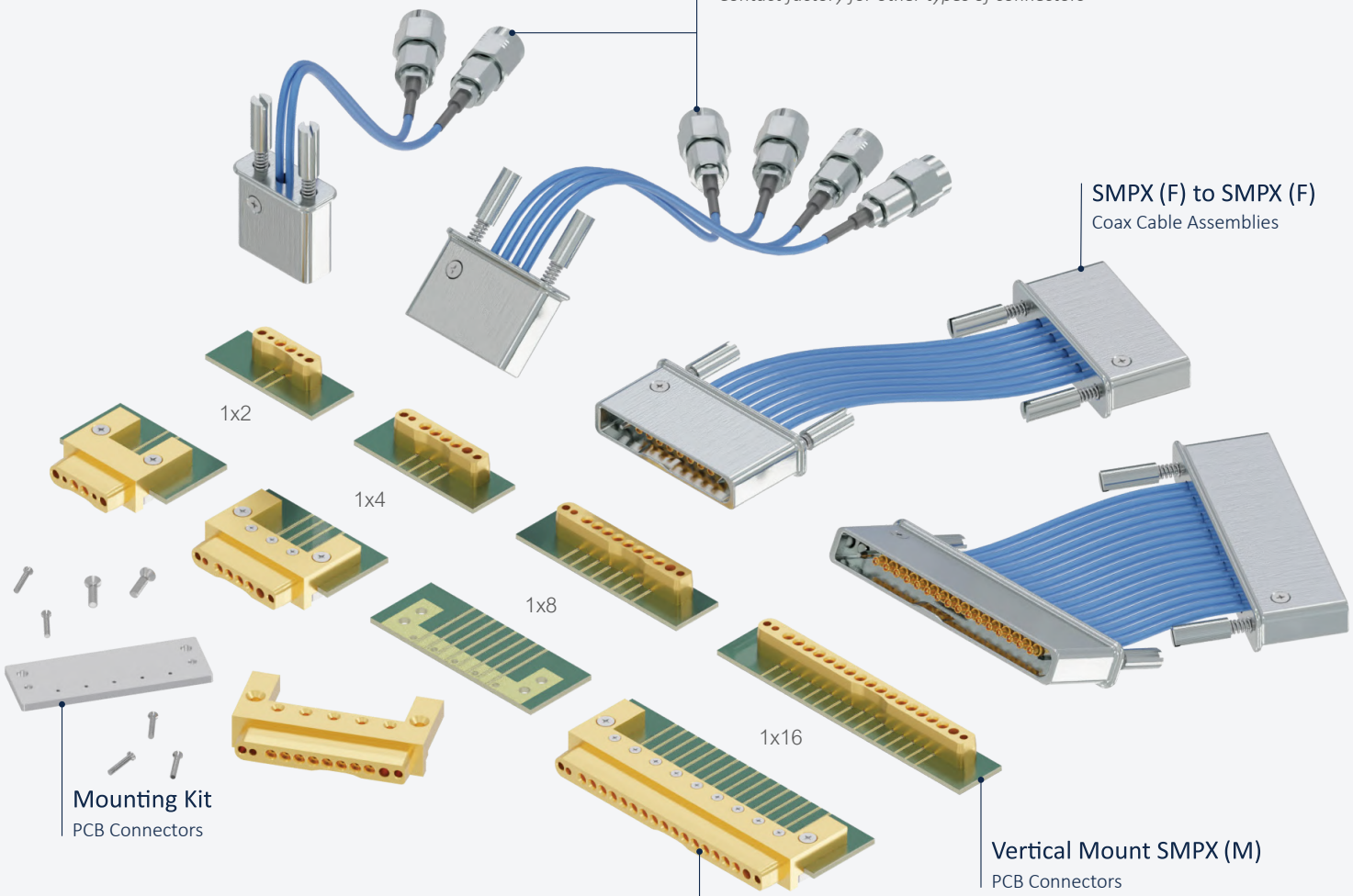
MultiLane Interconnects use the most advanced manufacturing technology available, to develop a suite of solutions emphasizing high density & repeatability for single ended & differential cable assemblies, test boards, precision adaptors, terminators, coaxial adapters, and RF cable assemblies in high volume. All products are designed and assembled with industry-leading quality in our USA branch and Lebanon headquarters.



# SMPX Interconnects | DC- 110 GHz

## Solderless Multiport System

### A Comprehensive Offering:




*Coax cable assemblies' lengths available are:*
*7.5 cm, 15 cm, 30 cm, 45 cm or 60 cm*
**Contact factory for other lengths*

### Features:

- Solderless design
- High density 2.54 mm pitch
- High performance DC-110 GHz
- Blind-mateable mating interface
- Coplanar waveguide & stripline compatible

### Benefits:

- Compact footprint
- Easy field installation & replacement for lower cost, fast cycle time and high repeatability
- Fully customizable
- Cost effective

# SMPM Interconnects | DC - 67 GHz

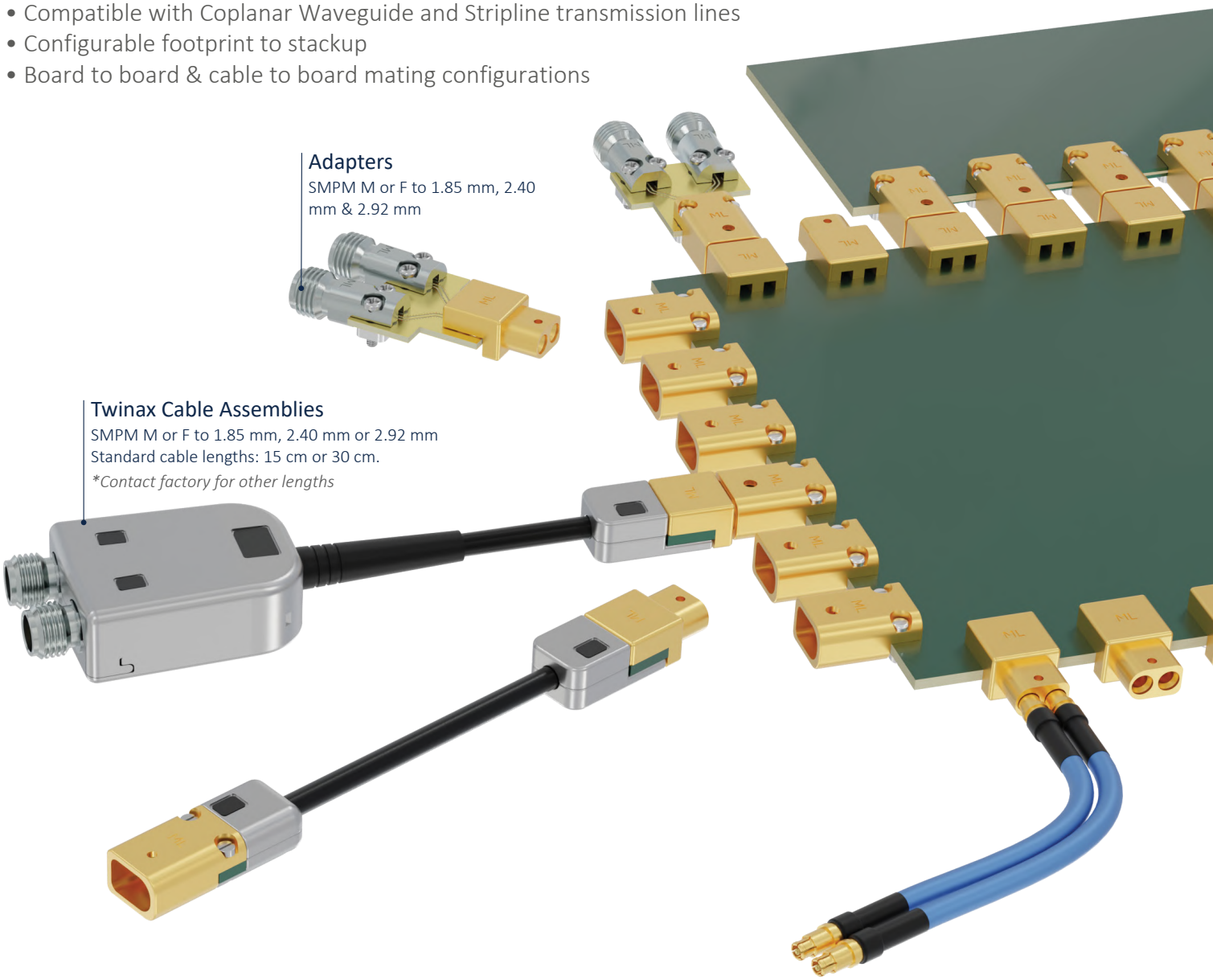
## Subminiature Push On Mini

MultiLane SMPM product line was developed for applications with strict design density limitations and where high performance is crucial. SMPM connector applications include, but are not limited to semiconductor development, ATE testing, and data center testing.

| High Performance DC - 67 GHz | High Density 3.5mm pitch | Solderless Installation | Highly Customizable | Cost Effective Solutions |
|---|---|---|---|---|

### Key Features

- Male & Female solderless edge launch connectors
- 2 ports configuration
- Compatible with Coplanar Waveguide and Stripline transmission lines
- Configurable footprint to stackup
- Board to board & cable to board mating configurations




### Twinax Cable Assemblies

- SMPM M to SMPM M
- SMPM M to SMPM F
- SMPM F to SMPM F
- Standard cable lengths: 15 cm or 30 cm

**Contact factory for other lengths*

### Coax Cable Assemblies

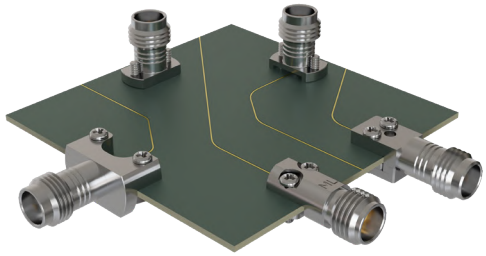
- SMPM F to SMPM F
- SMPM F to 1.85 mm, 2.40 mm or 2.92 mm
- Standard cable lengths: 15 cm or 30 cm

**Contact factory for other lengths*

# INDUSTRY'S MOST REQUESTED
## An interconnect for every instrument

### Solderless Board Mount Precision RF Connectors | DC-110GHz

- Vertical Launch: Coplanar Waveguide and Stripline transmission lines compatible
- Edge Launch: EMI, Wide Body, Narrow Body both Coplanar Waveguide and Stripline transmission lines compatible
- 1.00 mm, 1.35 mm, 1.85 mm, 2.40 mm, 2.92 mm
- Configurable footprint to stack up
- Test boards available
- Customization offered



### Rf Jumpers | DC-110GHz

- Ø.047 Coax Cables with 1.00mm, 1.35 mm, 1.85 mm, 2.40 mm & 2.92 mm precision connector interfaces
- Ø.086 Coax Cables with 1.85 mm, 2.40 mm & 2.92 mm precision connector interfaces
- Phase stable assemblies sold individually and in pairs matched to 2 picoseconds
- 12 in, 24 in, 32 in, 39 in & custom length available
- 50-ohm cable assemblies
- Customization offered

### Adapters | DC-110GHz

- 1.00 mm, 1.35 mm, 1.85 mm, 2.40 mm & 2.92 mm
- Between Series & Within Series
- Straight configuration
- 50 ohms coaxial adapters
- Rated to 500 mating cycles typical

### Terminators | DC-110GHz

- 1.00 mm, 1.35 mm, 1.85 mm, 2.40 mm & 2.92 mm
- Male & Female straight configuration
- 50 ohms coaxial terminators
- Rated to 500 mating cycles typical

multiLane

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