

Innovation for the next generation

# ML7128E-LFX-UMT



Universal Module Tester | 128 total Channel |  
 Replaceable 4 daughter cards with 2 slots in each |  
 Passive and Active Interconnect Testing | Long  
 Reach BERT | 3 or 9dB loss | Ethernet Rates | BER  
 Testing

## Summary

The ML7128E-LFX-UMT is a versatile, high-performance universal module tester designed for quick and efficient testing of both active and passive interconnects. Featuring a long-reach Bit Error Rate Tester (BERT) with 128 channels, this tester supports a maximum data rate of up to 112G per lane. The ML7128E-LFX-UMT utilizes a modular design with replaceable daughter cards, enabling flexible and quick configurations for production environments.

The ML7128E-L-UMT includes Feed-Forward Equalization (FFE) in 3 or 7 taps mode on the transmitter (Tx) side, and Continuous-Time Linear Equalization (CTLE) and Decision Feedback Equalization (DFE) on the receiver (Rx) side. These features ensure comprehensive testing and optimization of signal performance, making the ML7128E-LFX-UMT an ideal solution for rapid testing in production environments, ensuring the highest levels of interconnect quality and reliability.

# ML7128E-LFX-UMT

## 128 x 66 GBaud PAM4 BERT

### Introduction

The ML7064E-L-UMT is a fully featured 112G/lane Tester that can be configured for 128 channels, one system needs 4x daughter cards to be fully loaded, you can mix and match each adjacent daughter cards between the options figuring in order information.

Each system contains 2 modules, with 64 channels each, making it a total of 128 channels per system.

Each 2 adjacent daughter cards must be configured to run at the same rate

The transmitters support all standard test patterns mandated by IEEE802.3ck stress testing and OIF such as PRBS13Q, PRBS31Q, etc. Tx can also be programed to output a user-defined pattern.

The ML7128E-LFX-UMT supports transmitter and receiver equalization up to 34dB to overcome signal integrity impairments due to channel losses or reflections.

The user can customize the daughter card on the platform based on the DUT form factor

Additionally, each daughter card adds either 3dB or 9dB loss on the system to emulate real environment conditions.

The ML7064E-L-UMT is designed for interconnect testing: active and passive cables, transceivers, LPO, backplane...

### Key Features

#### Transmit

- Data Rates: 1-1.5Gbps; 2.55-5.9Gbps; 7.3-11Gbps; 24-32Gbps and 41-68Gbps NRZ and 21.25- 21.75GBaud; 26.5625-36GBaud and 44-68GBaud PAM4.
- 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 800mVpp controllable Tx Amplitude swing
- Supports Gray coding
- 3-tap Pre- and Post-emphasis or 7-tap linear FFE
- Available patterns:
  - PRBS7, PRBS9Q, PRBS11Q, PRBS15Q, PRBS23Q, PRBS31Q and PRBS58Q, plus their inversions
  - Square wave
- Burst noise injection
- Real Hardware FEC KP1 and KP4 captures at 53.12Gbaud

#### Receive

- SNR monitoring over time
- PAM histogram monitor
- Error-detection on following patterns:
  - PRBS7(Q), PRBS9(Q), PRBS11(Q), PRBS15(Q), PRBS23(Q), PRBS31(Q) + their inversions
- Automatic pattern detection
- LOS indicators
- Up to 34dB Equalization Capabilities
- Additional 3dB or 9dB from each slot on each daughter card

#### General

- Supported by Multilane Ultimus and basic DVT
- Python Wrapper and API

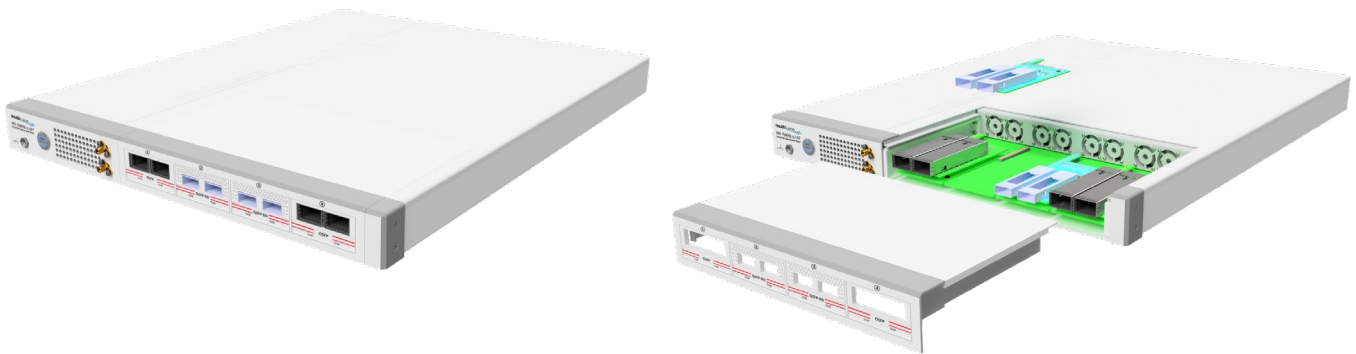
#### Target Applications

- Fast production testing with a pass/fail verdict
- RMA Tester for quick module validation
- Passive interconnect
- Active cables and transceivers
- Backplane

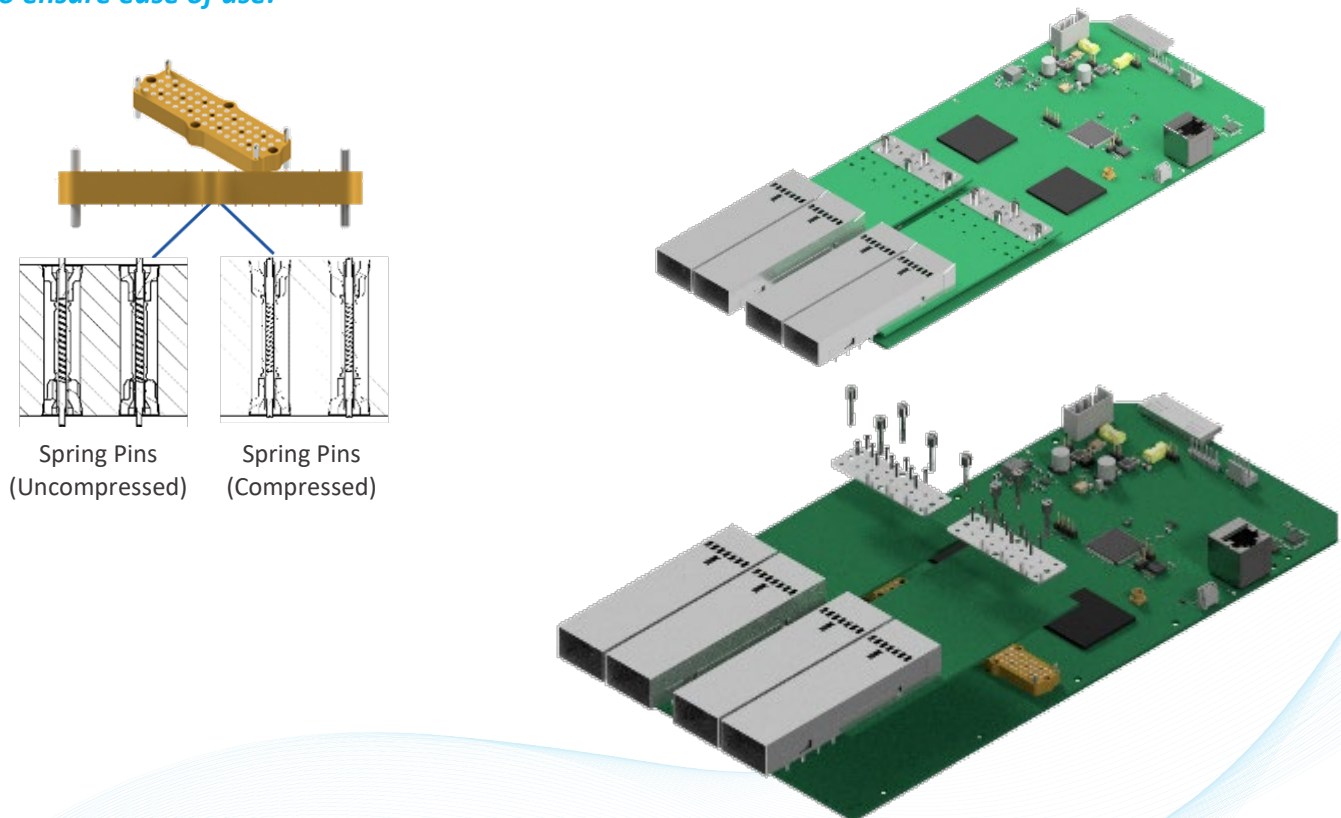
## Mechanical Modularity Concept:

Our innovative design features fast and reliable daughter card replacement after a specific number of insertions, ensuring minimal maintenance interruptions. The daughter card is securely fixed to the main PCB using a robust board-to-board connection, enhanced by captive screws for secure attachment and easy removal. This setup is ideal for environments requiring continuous operation, facilitating quick component swaps, improving work efficiency, and reducing disruptions during the production phase.

*Remove the L shaped cover and the cooling cage at once:*



*Unscrew the components of the daughter card, Screws are captive and reduced to a minimum number to ensure ease of use:*



## Specifications

Parameter	Specifications
Bit Rates	NRZ: 1-1.5Gbps; 2.55-5.9Gbps; 7.3-11Gbps; 24-32Gbps and 41-68Gbps PAM4: 21.25- 21.75GBaud; 26.5625-36GBaud and 44-68GBaud.
TX Amplitude Differential	0 – 800 mVpp
Patterns	Supports PRBS7, PRBS9(Q), PRBS11(Q), PRBS15(Q), PRBS23(Q), PRBS31(Q) plus their inversions
TX Amplitude Adjustment	Steps of 1 mV
Pre-emphasis resolution	1000 steps
Pre- / Post-emphasis	6 dB
Equalizing Filter Spacing	1 UI
Random Jitter RMS <sup>1</sup>	< 250 fs
Rise/ Fall Time (20–80%) <sup>1</sup>	< 10 ps
Coding	Gray coding supported
Output Return Loss up to 10 GHz	< -15 dB
Output Return Loss (16-25 GHz)	< -10 dB
Error Detector input range	50 – 800 mV differential
Clock Connection	Reference Clock: 156.25MHz or external clock
TX/RX connectors	Replaceable Daughter Cards in different form factors
Diff. Input Return Loss	Better than 10 dB
Clock Input Range	Up to 4.4 GHz
Clock Input Amplitude	800 – 1600 mV
Input Impedance	50 Ω
Ambient Temperature	0 – 75 °C
Power	Internal Power Supply 110 V, 1.4 A or 220 V, 0.9 A – 50/60 Hz

<sup>1</sup> With appropriate pre and post emphasis settings and 50 GHz scope with internal CDR. Trigger from adjacent data channel rate/8

## Mechanical Dimensions

ML7064E-L-UMT can be used as a benchtop instrument or fit in a 1RU Rack  
Different testers can be stacked on top of each other's

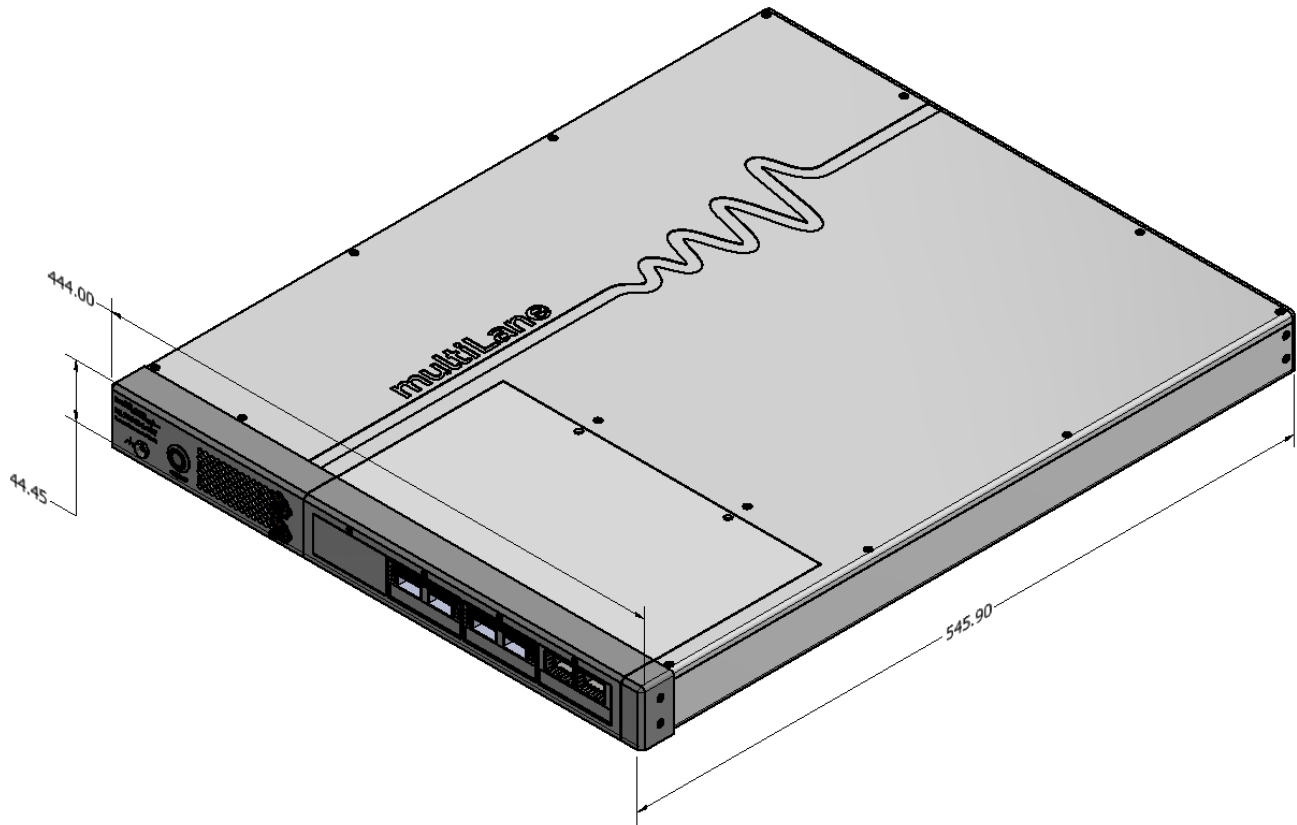


Figure 1: ML7064E-L-UMT Mechanical Dimensions

## Ordering Information

Option	Description
<b>ML 7016E-QSFPDD-112-DC</b>	QSFP-DD-112 Daughter Card, with 2x QSFP-DD-112 slots, one adds 3dB loss and the other is 9dB, mix and match between all available form factors – need a total of 4 daughter cards to fully load the system
<b>ML 7016E-OSFP-112-DC</b>	OSFP-112 Daughter Card, with 2x OSFP-112 slots, one adds 3dB loss and the other is 9dB, mix and match between all available form factors - need a total of 4 daughter cards to fully load the system
<b>Daughter Card Customization</b>	Customize any form factor that has up to 64 channels
<b>3YW</b>	Total 3-year warranty
<b>CAL</b>	Single calibration
<b>3YWC</b>	Total 3-year warranty with 3 annual calibrations

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