Module Testing – XPO Host Emulator

Technical Data Sheet

ML5105-XPO

Integrated DSP for High-speed Testing

MultiLane's ML5105-XPO Host Emulator designed to provide an efficient and easy method of testing XPO modules. It supports 64-channel, 224 Gbps PAM4; with an integrated DSP for high-speed module validation and performance testing.

Stimulating an ideal host environment for XPO transceiver module testing and characterization, in a cost-effective box design with an integrated liquid cooling option.

It's a part of a complete XPO test ecosystem that also includes other emulators variants, HCBs, and loopback module, covering every stage from module bring-up to full system-level qualification.

And the host emulator line consists of 12 other variants across three groups: ML5105-XPO with integrated DSP for high-speed testing, ML5102-XPO for high-speed signal integrity testing, and ML5101-XPO for low-speed control and CMIS validation.

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1. Overview

1.1 Supported Standards and Interfaces

- XPO Specification Rev. 1.0
- CMIS 5.3

1.2 Key Features

- Supports 64-channel, 224G per lane
- Block Error Ratio (BLER) bin calculation measurement
- Bit Error Ratio (BER)/Signal to Noise Ratio (SNR)
- FEC statistical measurement
- Supports Real-Time Control and Monitoring of XPO Signals
- Communicates with the DUT Via I2C/I3C
- Integrated active E-Fuse protection, enabling hot-plug support for the XPO Loopback
- Provides a full CMIS testing and validation interface
- Controlled liquid cooling for XPO module and coolant temperature monitoring
- LED status monitoring

2. Technical Specifications

2.1 Power

- Supports XPO module up to 500W across 8 power classes

2.2 CMIS

CMIS provides real-time monitoring and host-side control of the module.

CMIS Monitoring:

- Real time module status: transceiver, sensors (current, temperature, voltage...)
- TX/RX power monitoring, bias
- Module state machine
- Data pass state machine
- Network pass state machine
- Module fault and alarms
- LOL, LOS lock and PRBS Lock flags
- PreFEC & PostFEC diagnostic for line and media side
- VDM statistical monitoring

CMIS Control:

- Module state control
- Lane Control
- Application configuration (APPSEL code configuration)
- Data path and network pass control
- PreFEC and Post FEC
- PRBS generator, checker
- Loopback control for host and media side

Supports Module for Upgrade over CDB

2.3 High-Speed

- Client-side interface compliant with the IEEE P802.3dj specifications
- Total loss budget range TX: 9.1-12.9 @ 56 GHz from DSP to XPO cable assembly
- High-speed lanes support PRBS: 7,9,10,11,13,15,20,23,31,49,58
- TX/RX Invert
- Support for multiple tap configurations TX FIR support on both line and client sides:
    - 7 taps linear: 2 pre-cursor taps, 1 main tap, 4 post-cursor taps
    - 14 taps nonlinear:
        - 3pre+4main+3post + 4floating
        - 1pre+4main+3post + 6floating
- Rx equalization up to 40 dB
- Total loss budget range RX: 13.2-15.8 @ 56 GHz from DSP to XPO cable assembly
- Block Error Ratio (BLER) bin calculation measurement
- BER, SNR diagnostic capabilities
- LOS, LOL, PRBS Lock indicators
- Supports FEC monitoring as per IEEE P802.3dj standard-compliant KP4

2.4 Integrated Liquid Cooling

- Two separate internal liquid cooling loops: one dedicated to the XPO module; the other to the high-speed boards
- The XPO liquid cooling loop features a flow and temperature sensors at both the inlet and outlet of the XPO module
- XPO module temperature regulated by adjusting the speed of heat exchanger fans
- Closed loop system; liquid can be refilled/exchanged through two quick disconnect fittings
- Integrated pump control
- Max inlet T: TBD
- Min liquid pressure: 5 PSI
- Temperature range: TBD

3. Applications & Benefits

- Ideal for testing any XPO module including passive modules
- Reduces cost and complexity of early channel qualification
- High-volume production and qualification testing reducing per-channel test time
- High-speed signal testing at 224 Gbps/lane, alongside CMIS and low-speed control-path validation
- Thermal performance validation for liquid-cooled XPO modules under controlled coolant conditions

4. External Dimensions

PN	External Dimensions (mm)		
	Width	Depth	Height
ML5105-XPO	434	750 (approximate)	88.9

5. Ordering Information

Part Number	Description
ML5105XPO	XPO Host Emulator, 64 channels, 224G per lane

Please contact us at sales@multilaneinc.com

This equipment contains ESD sensitive components and may become damaged when contacted with an electrostatic charge. To prevent equipment damage, please use proper grounding techniques.