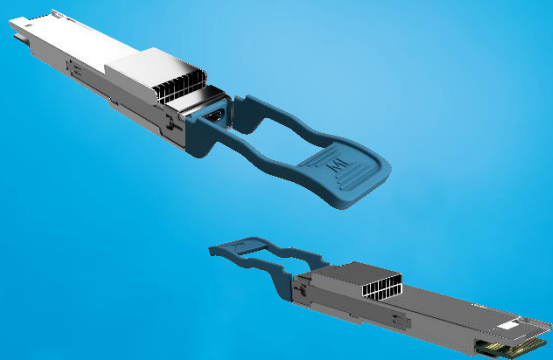


Innovation for the next generation



Active Loopbacks

QSFP-DD 800G/400G Electrical Active Loopback Modules

Active electrical loopback | Validation tool for 400G and 800G ports | CMIS 5.0 Compliant | Standard MSA housing compatible with all QSFP-DD power classes

Summary

As 400G claims increasing volume in modern hyperscale networks, the industry is already gearing towards higher bandwidth with new standards like 800G. With 8x100G host vendors beginning to move towards the production phase, new testing challenges and requirements are presenting themselves.

Balancing power consumption with BER performance is a key factor in host port design and characterization, and the comprehensive equalization techniques and channel profiles at 50G and 100G per channel can realistically leave gaps in the testing capabilities of passive loopbacks. Active Loopbacks (ALBs) are therefore becoming an inevitable necessity to realize full test coverage for 8x50G and 8x100G ports.

To guarantee that the HSIO industry can navigate this new frontier with ease, MultiLane provides new ALB modules in the QSFP-DD and QSFP-DD800 form factors, leading standards to drive the development of 400G and 800G ecosystems.

MultiLane's ALBs incorporate an integrated Digital Signal Processor (DSP) chipset which can equalize the signal for lossy ports/channels, emulate a complex QSFP-DD pluggable with link optimization routines, also including the full debugging capabilities of a CMIS 5.0 compliant pluggable. With capabilities for port calibration and characterization like PRBS generation/detection, production testing for high loss 400G/800G channels, field deployment port failure analysis, and power emulation, MultiLane's fleet of electrical active loopback modules provide a comprehensive method to test QSFP-DD ports at every stage of the development and deployment lifecycle of a modern host system.

Active Loopbacks

QSFP-DD Active 8x50G and 8x100G Loopback Modules

Key Features

- QSFP-DD MSA Form Factor
- MSA Compatible Configuration and EEPROM
- Programmable MSA memory pages
- Custom memory maps
- I2C Interface
- DSP-based architecture
 - Test modules can be fitted with USB-C port for remote control/automation
- Module management supported via standard plug-side I2C CMIS or nose-side USB-C
- Static IP Protocol: communication via USB-C or RJ45 Ethernet
- Embedded electrical DSP chip
- Three independent power heaters, dissipating up to 19.2 W (typ. 25 W total dissipation including DSP)
- Two temperature sensors
- Voltage sensor
- Cut-off temperature preventing module overheating

- Retimer + Equalizer
- Pre-defined TX/RX EQ for variety of profiles
- Supports 8x25, 26 and 53 Gb/s NRZ/PAM4
- Pattern generation and detection (PRBS7-58, 13Q, 15Q, 31Q, SSPRQ, etc.)
- Advanced high resolution bit error tracking

Outline

The ML4062-ALB1-2A/B and ML4062-ALB1-2A/B-112 active electrical loopback (ALB) acts as a fully featured QSFP-DD diagnostic interface and is used for testing QSFP-DD/QSFP-DD800 ports.

The ALB includes a DSP chip with 8xTX channels and 8xRX channels. The DSP generates high speed electrical signals. TX channels transmit data from the transceiver to the host, while RX channels receive data from the host to the transceiver.

Graphical User Interface

Available for TB option only



Configuration option to support ThunderBERT GUI, supporting:

- Dashboard controls for power spots
- CMIS configuration
- Fine-tuning of TX Equalization taps
- PRBS generation/detection on per-channel basis
- Additional features in development

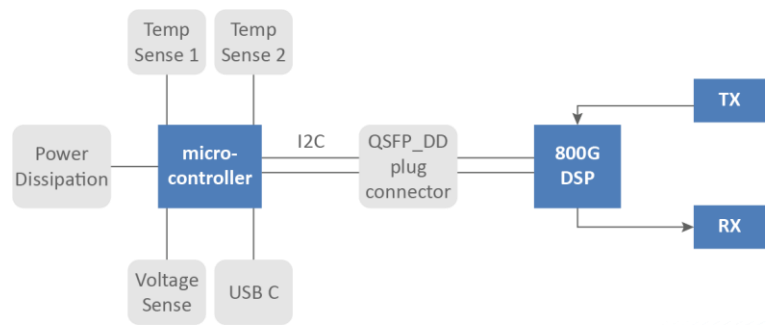


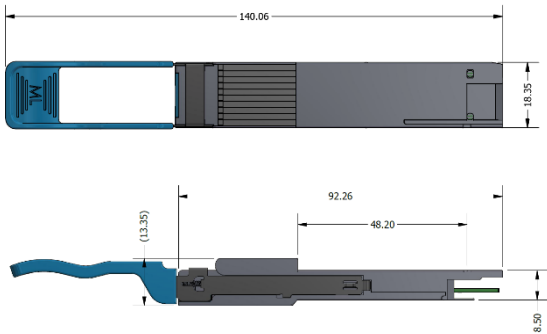
Figure 1: ALB Block Diagram



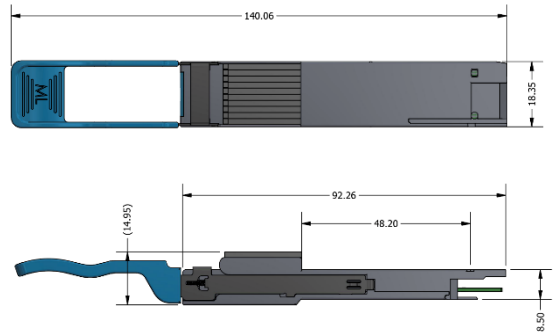
Figure 2: ALB with removable RJ45 adapter

Mechanical Dimensions

Type 2A

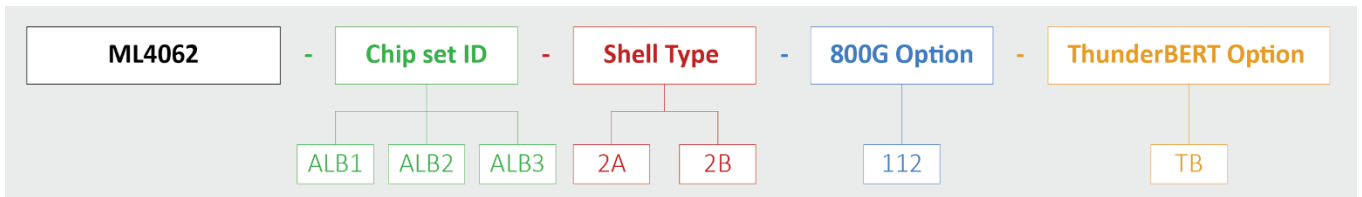


Type 2B



Ordering Information

The module can be ordered with one of the two different heatsink types, type 2A or type 2B. The ThunderBERT option is also available.



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