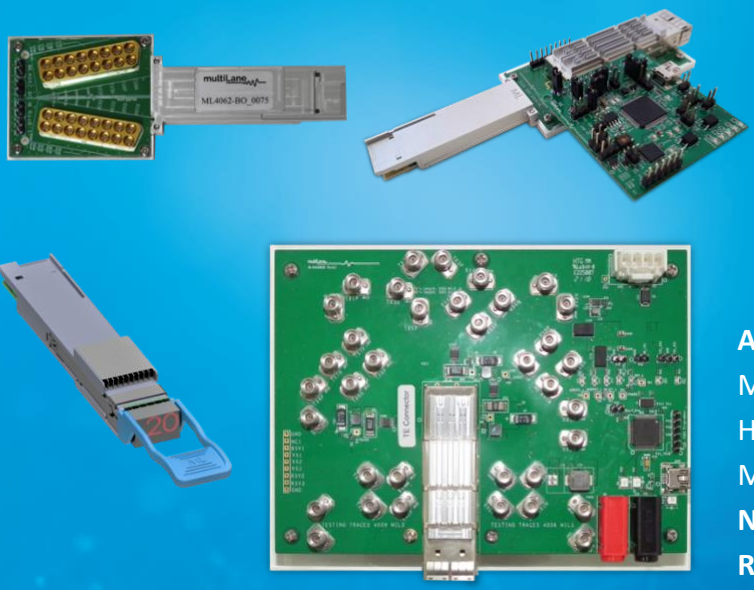
multiLane

TEST DEVELOPMENT KIT

Innovation for the next generation



QSFP-DD

Development Platform
Preliminary Specs

Available products: ML4062-MCB | ML4062-MCB-MXP | ML4062-MCB-LB | ML4062-BO | ML4062-HCB1 | ML4062-HCB2 | ML4062-MCB-TR | ML4062-SLB | ML4062-CNT | ML4062-TL | ML4066-QDD | ML4066-QDD-ANA

New releases: ML4062-TL2a

Related Product: ML4054-QDD

Summary

The **MultiLane QSFP-DD Development Kit** provides the necessary development tools and reference modules required for the development of QSFP-DD based products. This kit is essential for development, testing and characterization of QSFP-DD based products. It can also be used for testing 400G CDRs, 400G Gearbox devices, 400G QSFP-DD ports on routers and line-cards, electro-optical modules, and QSFP-DD active optical cables.

QSFP-DD

QSFP-DD Module Compliance Board

ML4062-MCB

Key Features

- Supports 8x50G interfaces
- I2C master driven from both on board microcontroller or external pin headers
- 40 GHz 2.92 mm K Connectors
- Current Sense
- Matched differential trace length
- All 8 channels come with matching trace length
- High performance signal integrity traces from K connectors to QSFP-DD host connector.
- On-board LEDs display MSA output alarm states
- On-board buttons/jumpers for MSA input control signals
- User friendly GUI for I2C R/W commands and loading custom MSA memory maps
- Four corner testing capability
- USB interface

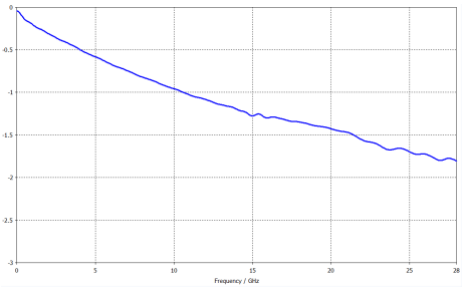


Figure 1: ML4062-MCB Insertion Loss

Figure 2: ML4062-MCB

QSFP-DD Module Compliance Board

ML4062-MCB-MXP

Key Features

- Supports 8x50G interfaces
- I2C master driven from both on board microcontroller or external pin headers
- 2x8 Huber+Suhner MXP Connector rows
- Current Sense
- Internal noise injection option through a programmable switching regulator
- Power can be fed through an external source
- Power margining between 3.1 V and 3.6 V
- Matched differential trace length
- All 8 channels come with matching trace length
- High performance signal integrity traces from MXP connectors to QSFP-DD host connector.
- On-board LEDs display MSA output alarm states
- On-board buttons/jumpers for MSA input control
  signals
- User friendly GUI for I2C R/W commands and loading custom MSA memory maps
- Four corner testing capability
- USB interface

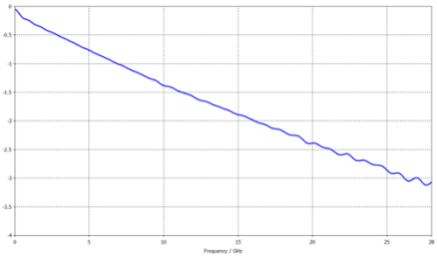


Figure 3: ML4062-MCB-MXP Insertion Loss

Figure 4: ML4062-MCB-MXP

QSFP-DD Module Compliance Board (Host Loopback)

ML4062-MCB-LB

Key Features

- Supports 8x50G interfaces
- I2C master driven from both on board microcontroller or external pin headers
- Current Sense
- Internal noise injection option through a programmable switching regulator
- All TX channels are looped back to the RX side on host with ≈ 1 dB loss
- Power can be fed through an external source
- Power margining between 3.1 V and 3.6 V
- On-board LEDs display MSA output alarm states
- On-board buttons/jumpers for MSA input control signal
- User friendly GUI for I2C R/W commands and loading custom MSA memory maps
- Four corner testing capability
- USB interface

Figure 5: ML4062-MCB-LB

QSFP-DD Breakout Modules

ML4062-BO

Key Features

- All high-speed signals are connected from the QSFP-DD Plug to the front QSFP-DD host connector with superior SI traces
- High performance signal integrity traces
- QSFP-DD MSA form factor
- Low insertion loss
- Built with high performance PCB material
- Production friendly form factor
- Supports 8x50G TX and RX lanes
- High speed signals accessible through 2x8 Huber+Suhner MXP connector rows or multi-SMPM-type A connectors
- Maximum trace length 3923 mils
- Minimum trace length 2850 mils

Application

- Line card and port characterization

Figure 6: ML4062-BO

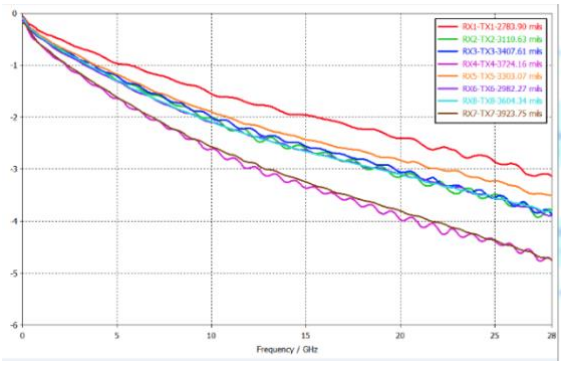


Figure 7: Insertion Loss for all channels

QSFP-DD Host Compliance Board

ML4062-HCB1

Key Features

- High Performance signal integrity traces
- QSFP-DD MSA Form Factor
- Same low Insertion Loss for all traces
- Built with high performance PCB material
- Production friendly form factor
- Supports 4x50 G
- 4 channels: Ch1, Ch2, Ch3, Ch4

CH1		CH2		CH3		CH4	
TX1	RX1	TX2	RX2	TX3	RX3	TX4	RX4

- Built with high performance PCB material
- High speed signals accessible through K connector rows

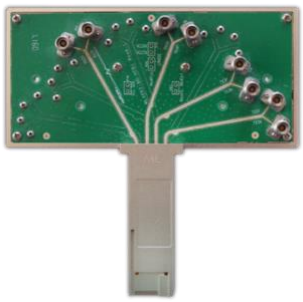


Figure 8: ML4062-HCB1

QSFP-DD Host Compliance Board

ML4062-HCB2

Key Features

- High Performance signal integrity traces
- QSFP-DD MSA Form Factor
- Same low Insertion Loss for all traces
- Built with high performance PCB material
- Production friendly form factor
- Supports 4x50 G
- 4 channels: Ch5, Ch6, Ch7, Ch8

CH5		CH6		CH7		CH8	
TX5	RX5	TX6	RX6	TX7	RX7	TX8	RX8

- Built with high performance PCB material
- High speed signals accessible through K connector rows

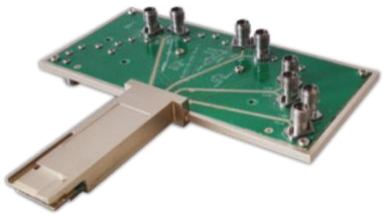


Figure 9: ML4062-HCB2

QSFP-DD Module Compliance Board

ML4062-MCB-TR

Key Features

- Consumable, low-cost MCB for volume testing
- I2C master driven from either on-board microcontroller or external pin headers
- Current sensor
- Voltage sensor
- Two temperature sensors
- Matched differential trace length across all channels
- High performance signal integrity traces from TR40 connectors to QSFP-DD host connector
- On-board LEDs display MSA output alarm states
- On-board jumpers for MSA input control signals
- User friendly GUI for I2C R/W commands and loading custom MSA memory maps
- Four corner testing capability
- USB interface
- QSFP-DD analyzer interface for ML4066-ANA I2C CMIS testing
- No components near QSFP-DD cage makes thermal testing easy to achieve

Figure 10: ML4062-MCB-TR

QSFP-DD Passive Loopback Modules

ML4062-SLB

Summary

The **ML4062-SLB** is packaged in a standard MSA housing compatible with all QSFP-DD ports. Transmit data from the host is electrically routed, (internal to the loopback module), to the receive data outputs and back to the host. It provides an economical way to exercise QSFP-DD ports during R&D validation, production testing, and field testing.

Key Features

- Supports 8x50G electrical interface
- QSFP-DD MSA Form Factor
- Microcontroller programmed to maintain user specified PD or constant temperature
- 4 thermistors on PCBA
- 4 independent power heathers, with 0.1 W resolution, up to 14 W
- Temperature Monitor and alarms warning
- Superior SI performance
- MSA Compatible Configuration and EEPROM
- Loops back TX to RX on all 8 ports
- I2C Interface
- Programmable MSA memory pages
- I2C control from edge connectors and from rear pin header
- 2 status LED Indicator
- Insertions counter
- Hot Pluggable module
- Cutoff temperature preventing module overheating
- Cable assemblies for power & I2C Control
- Custom memory maps

Application

- 8x50G electrical module testing and characterization
- QSFP-DD port compliant testing

Type 1 Modules

ML4062-SLB-V1

Regular QSFP-DD passive loopback module that has shipping available already, compliant with QSFP-DD MSA 2.0 (March 13, 2017).

Datasheet: "ML4062-SLB_DS_V1-rev0.5"

ML4062-SLB-V4

New QSFP-DD passive loopback module, compliant with CMIS 2.8 (May 3, 2018) and CMIS 3.0.

Datasheet: "ML4062-SLB_DS_V4-rev0.3"

ML4062-SLB-V6

New QSFP-DD passive loopback module that is newly available, compliant with CMIS 4.0.

Datasheet: "ML4062-SLB_DS_V6-rev0.1"

Figure 11: ML4062-SLB

QSFP-DD Thermal Load

ML4062-TL

Key Features

- QSFP-DD MSA form factor
- Microcontroller can be programmed to maintain user specified PD or constant temperature
- 4 temperature sensors
- 23 independent power spots
- Temperature monitor and alarms warning
- MSA compatible configuration and EEPROM
- I2C interface
- Programmable MSA memory pages
- I2C control rom edge connectors and from rear pin header
- Hot pluggable module
- Cut-off temperature preventing module overheating
- Controller card with I2C Master, supports multiple modules, USB master
- Cable assemblies for power & I2C control
- Custom memory maps

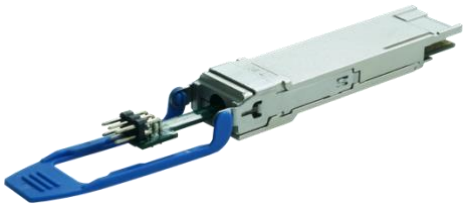


Figure 12: ML4062-TL

QSFP-DD Controller

ML4062-CNT

Key Features

- The controller is powered using a 24 V external power supply.
- Two thermal loads modes are available: constant temperature and constant power dissipation.
  - Constant Temperature
    Option 1: Used to fix the total temperature of the module (Enter the temperature value and click Set)

    Option 2: Used to fix the temperature of a specified spot in the module (Select the spot that you need to fix its temperature, enter the temperature value and click Set).
  - Constant Power Dissipation
    Used to set the power value of the desired spot using the corresponding slider.
- The user can set the temperature cut-off value using the Cut-off temperature field.
- Module VCC can be set to 3.3 or 3.5 V. The temperature values can be logged. The Interval indicates the time spent between consecutive temperature measurements.
- The Total duration indicates the total times of logging temperature values.
- After the logging is done, you can view the graph that shows the temperature in time.

Figure 13: ML4062-CNT

QSFP-DD to QSFP-DD Adapter

ML4066-QDD

Key Features

- All high-speed signals are connected from the QSFP-DD Plug to the front QSFP-DD host connector with superior SI traces
- Low insertion loss PCB traces
- Power pins are accessible via pin headers and can be jumped to connect them to the plugged QSFP-DD transceiver
- All low speed management signals are accessible via pin headers, and can be jumped to connect them to the plugged QSFP-DD transceiver
- I2C SCL and SDA signals accessible via pin headers or can be jumped to connect them to the plugged QSFP-DD transceiver
- Ability to drive I2C from external pin headers, or connect I2C packet analyzer
- Ability to drive 3.3 V from external source for power supply margining
- Ability to break 3.3 V power from Host to module allowing voltage and current measurement
- Signal interface to connect SFF Analyzer board
- ML4066-QDD Pin headers

	Host Side	Module Side
1	VCC	VCC
2	VCC-TX	VCC-TX
3	VCC-RX	VCC-RX
4	MODSEL_L	MODSEL_L
5	RESET_L	RESET_L
6	SCL	SCL
7	SDA	SDA
8	MODPRS_L	MODPRS_L
9	INT_L	INT_L
10	LPMODE	LPMODE
11	GND	GND

SFF Analyzer

ML4066-QDD-ANA

Key Features

- USB Interface
- Windows based GUI and API Library
- Detection and measurement of host pull up + pull down resistors on low speed signals
- Host VCC rails sampling measurement
- VCC spectral noise analysis
- I2C Analyzer
  - Bus speed
  - ACK/NACK DETECTION
  - Clock stretching analysis
  - Time event logging
- Functional tests
  - Control signals
  - Configuration registers
  - Ability to emulate optical module by loading identification registers with custom data
  - Built with advanced PCB Material
  - I2C terminated by microcontroller, I2C slave compliant with MSA
  - Implements MSA memory map and programmable new pages
  - Memory map can be loaded to replicate optical module's identification registers
  - Ability to control/monitor all low speed signals
  - Hot pluggable
  - AC coupled high speed interface

Figure 14: ML4066-QDD

Figure 15: ML4066-QDD ADP/ANA

NEW RELEASES

QSFP-DD Electrical Passive Loopback Module

ML4062-TL2a

Summary

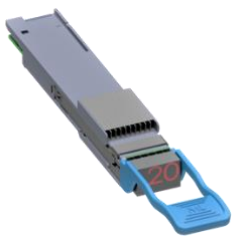
ML4062-TL2a is used for testing QSFP-DD transceiver ports under board level tests, by substituting a full-featured QSFP-DD transceiver with the ML4062-TL2a. The **ML4062-TL2a** covers all QSFP-DD power classes.

The **ML4062-TL2a** is packaged in a standard MSA housing compatible with all QSFP-DD ports. It provides an economical way to exercise QSFP-DD ports during R&D validation, production testing, and field testing.
Note that the ML4062-TL2a follows the **CMIS Rev 4.0** standard.

Key Features

- QSFP-DD MSA Form Factor
- MSA Compatible Configuration and EEPROM
- Programmable MSA memory pages
- Custom memory maps
- I2C Interface
- I2C control from edge connectors and from rear pin header
- Controller card with I2C Master, supports multiple modules, USB master
- Hot Pluggable module
- Ten independent power spots dissipating up to 23.4 W
- Four temperature sensors
- Voltage sensor
- Current sensor
- Temperature Monitor and alarms warning
- Cut-off temperature preventing module overheating

Ordering Options		
Option	**Part Number**	**Description**
#1 – LCD Display	ML4062-TL2a-C-LCD	Temperature and other monitoring values
#2 – LED Indicator	ML4062-TL2a-C-LED	Power mode and alarms monitoring
#3 – Pin Header	ML4062-TL2a-C-CON	Board to board connection



#1 LCD Display

#2 LED Indicator

#3 Pin Header

RELATED PRODUCT

CFP8 to QSFP-DD Adapter

ML4054-QDD

- All high-speed signals are connected from the CFP8 Plug to the front QSFP-DD host connector with superior SI traces.

For more info, please find full datasheet here.

Figure 16: ML4054-QDD

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