

# ML4019-MCB

## Technical Reference

### MSA Compliant DSFP MCB

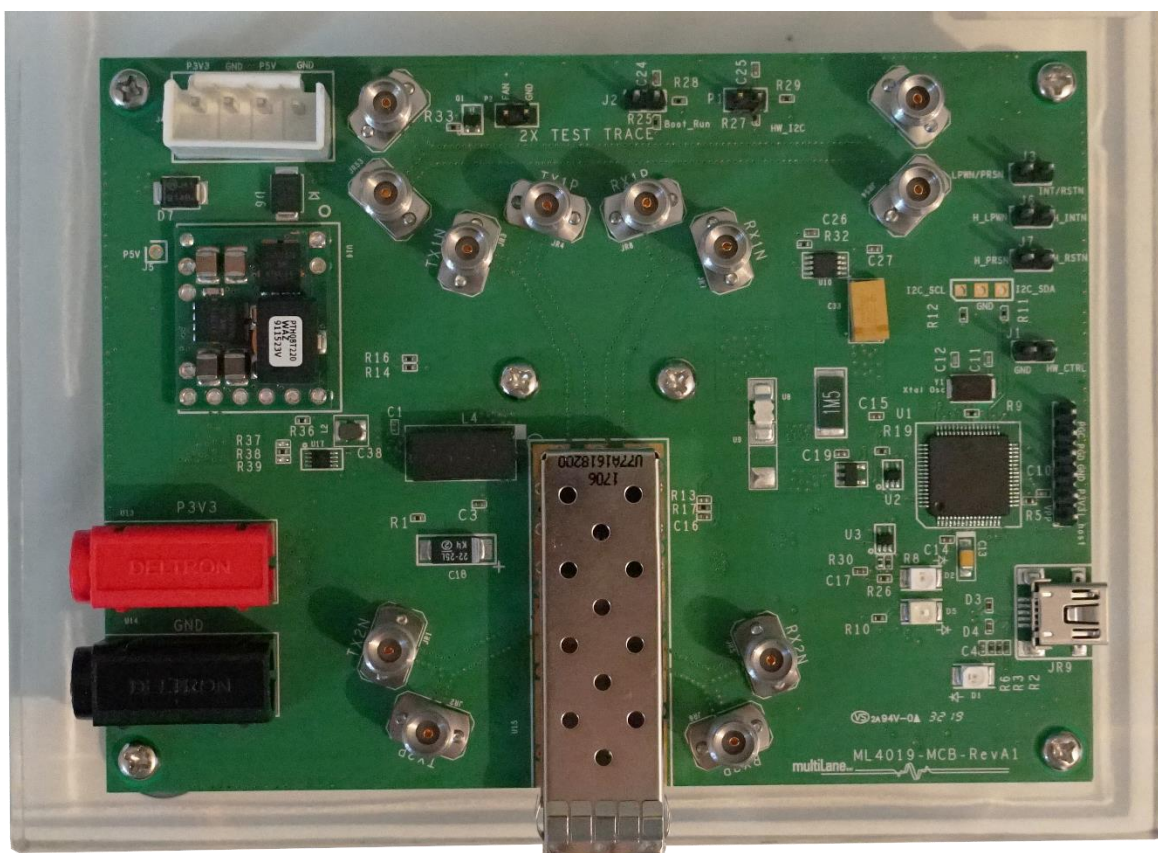


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## 1. Introduction

The ML4019-MCB is designed to provide an efficient and easy method of programming and testing 56G DSFP transceivers and active optical cables. It includes a complete user-friendly GUI supporting all features defined by DSFP MSA and simplifying configuration processes to enable intuitive memory map programming and testing. It is designed to simulate an ideal environment for DSFP transceivers module testing, characterization and manufacturing.

## 2. Key Features

- ✓ supports two lanes that operate up to 28 Gbps each
- ✓ Matched differential traces length
- ✓ High performance signal integrity traces from K-connectors to DSFP host connector
- ✓ I2C master driven from both on board microcontroller or external pin headers
- ✓ On-board pin headers for MSA low speed signals external control
- ✓ Current Sense
- ✓ Voltage Sense
- ✓ Temperature Sense
- ✓ USB interface

## 3. ML4019-MCB Hardware

The subsequent sections cover the essential parts in the hardware, for board operation and testing.

### 3.1 Power-Up

To power up the ML4019-MCB host, steps are as follow:

- The host TOP is where the cage is mounted
- Two options are available to power up the board:
  - Using the four pins power connector (J4) that should be connected to 5V AND 3.3V taking into account pins distribution, where jumper U9 must be populated
  - Using the banana plugs (U13) that should be connected to 3.3V where jumper U8 must be populated
- Connect the host to your PC using a Type-B mini to Type-A USB cable.

3.2 Operating Conditions

According to the powering method described in section 3.1, the input voltage supply must follow the table below.

Parameter	Symbol	Condition	Min	Typical	Max	Unit
+5	P5V	Supply from J4 (P5V pin)	-	5	-	V
+3.3	P3V3	Supply from J4 (P3V3 Pin) OR banana plug U13	3.0	3.3	3.6	

Table 1: Voltage Operating Conditions

3.3 LED Indicators

The ML4019-MCB includes on-board LEDs, for quick debugging and monitoring purposes. LEDs are summarized below:

- LED D1 indicates whether a USB cable is plugged or not.
- LEDs D2 and D5, colored green and red, respectively, are used for diagnostic purposes:
  - ✓ If D2 is on: USB is locked and device is recognized by the USB driver
  - ✓ If D5 is on: USB is not connected or USB driver is not found
  - ✓ If both are off: board is not powered correctly or firmware is corrupted
  - ✓ If both are blinking: the board is in Bootloader mode

3.4 Low Speed Signals

3.4.1 External I2C

The I2C bus can be accessed externally using U7 pins. In this case a jumper should be placed on pin header P1 (HW\_I2C) shown in the image below.

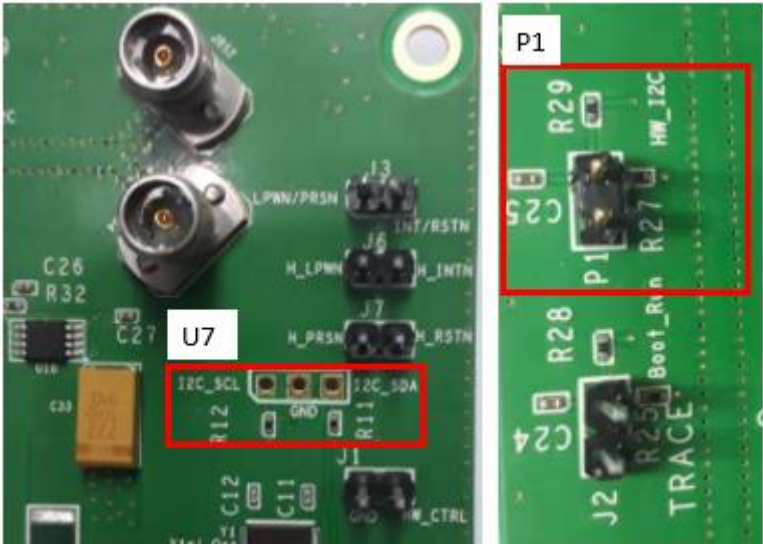


Figure 1: On-board LEDs



### 3.4.2 External HW Control

Also Low Speed Signals are controllable using an external source, this could be done through J6 (H\_LPWN pin) and J7 (H\_RSTN Pin) pin headers. In this case a jumper should be placed on pin header J1 (HW\_CTRL) shown in the image below.

When the jumper is inserted on J1, the output signals are tri-stated from the microcontroller, and hence could be controlled from the external source.

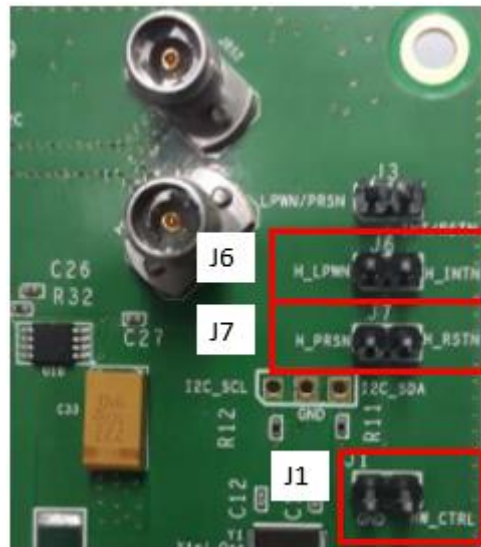


Figure 2: External Control Signals

The low speed signals circuit shown below shows the connection of these signals to the microcontroller and DSFP connector.

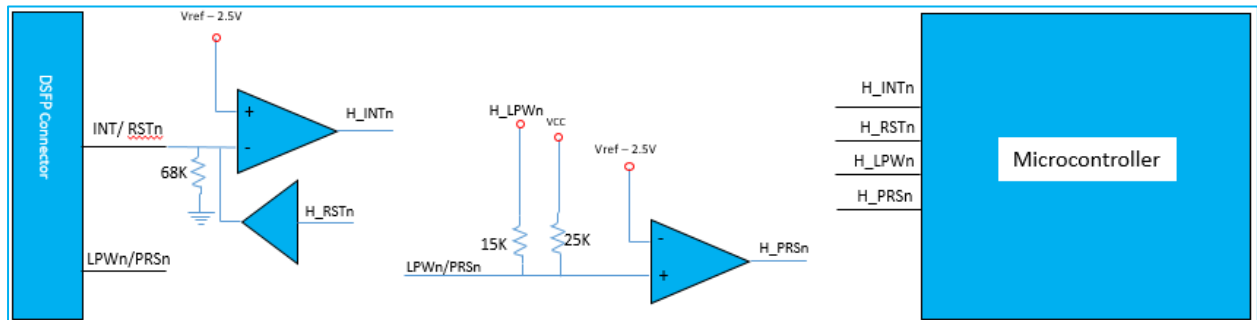


Figure 3: Low Speed Signals Schematics

## 4. ML4019-MCB Software

The ML4019-MCB is accessible and controlled through application software. This software is MSA compliant and provides a user-friendly interface to operate the board and access all features. The communication between the ML4019-MCB board and the software is established through USB connection.

#### 4.1 USB Driver

In order to be able to communicate with the board, user need to install the USB driver of the ML4019-MCB. This is available on the website under the following link (USB Driver icon):

<https://www.multilaneinc.com/product.php?pn=ML4019-MCB>

Below is a brief guide on how to install the USB Driver:

- Power up the board
- Connect the board to the PC through USB cable
- Download the USB driver file
- Go to "Device Manager"
- Find the target device that need to install the driver
- Right-click on the device and select Update Driver Software
- Select Browse my computer for driver software
- Browse you PC and select the driver file
- Click Next and wait until the driver is installed

#### 4.2 GUI

For GUI installation and operation, refer to the link below. GUI user manual is available for detailed description.

<https://www.multilaneinc.com/product.php?pn=ML4019-MCB>

### 5. Hardware Revision

- **ML4019-MCB-RevA:** Initial Version
- **ML4019-MCB-RevB:** Fix the current sense layout

### 6. Firmware Revision

- **ML4019-MCB\_V1\_0:** latest FW revision, compatible with the ML4019-MCB-RevB hardware.

## 7. Bootloader

Accessing in bootloader mode allows the user to reprogram the microcontroller, this is done as described below:

1. Connect a jumper on (J2) situated close to the microcontroller.
2. Connect a USB cable between the PC and Board.
3. Power up the board with a +3.3V supply.
4. LEDs (D2, D5) start blinking.
5. Remove jumper.
6. Open the software "Microchip USB HID Bootloader v2.3".
7. Click on "Open Hex File".
8. Choose the new FW to download.
9. Click on "Program/Verify".
10. Once the software finishes programming press on "Reset Device".
11. After reset the Firmware is successfully updated.

Revision History

Revision	Date	Description
0.1	8/24/2020	▪ Initial Version
0.2	10/30/2020	▪ Update section 5