# EPM-1608

**M.2 to 2.5Gb Dual LAN module**

# User's Manual

**1st Ed – 2 February 2023**

Part No: E2047CS0900R

## FCC Statement

THIS DEVICE COMPLIES WITH PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.

(2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS "A" DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES.

THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTATLLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS.

OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

## A Message to the Customer

### *Avalue Customer Services*

Each and every Avalue's product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Avalue device is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Avalue has come to be known.

Your satisfaction is our primary concern. Here is a guide to Avalue's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

### *Technical Support*

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone. So please consult the user's manual first.

To receive the latest version of the user's manual; please visit our Web site at:

http://www.avalue.com.tw/

# Content

# 1. Getting Started

## 1.1 Safety Precautions

**Warning!**

Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

**Caution!**

Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

**Always note** that improper disassembling action could cause damage to the motherboard. We suggest not removing the heatsink without correct instructions in any circumstance. If you really have to do this, please contact us for further support.

## 1.2 Packing List

Before you begin installing your single board, please make sure that the following materials have been shipped:

- 1 x EPM-1608 Dual LAN module
- 1 x Daughter board
- 1 x 121mm LAN bracket
- 1 x 20cm internal LAN cable
- 1 x Thermal pad for EPM-1608

If any of the above items is damaged or missing, contact your retailer.

## 2.1 Product Specifications

| Component | |
|---|---|
| **Form factor** | M.2 2242 B-M Key (2260/2280 plated-holes reserved) |
| **Chip/Controller/Processor** | LAN Chipsetx2 I226 Switch IC x 1 |
| **Input I/F** | Support PCI Express Gne2 x2 (Compatible with PCI Express Gne2 x1) |
| **Output I/F** | GbE LAN x 2 (wafer 1x 15P 1.0mm pitch connector for GbE LAN Signal & 10/100/1000/2500 LED Signal) |
| **Output connector** | RJ45 x2 |
| **DC Input** | +3.3 DC +-5% (Connector: M.2 Golden Finger) |
| **Adapter board or cable** | ● Mounting hole daughter board x1<br>➢ 1 x 15P*2 1.0mm pitch connector for GbE LAN Signal & 10/100/1000/2500 LED Signal<br>➢ 2x RJ45 GbE LAN Port (10/100/1000/2500 LED Indicator)<br>● Board to Board LAN Cable x 1<br>➢ Cable length 20cm |
| **Regulatory Approvals** | CE, FCC |
| **Green Environment** | RoHS, REACH, PoPs, PBTs |
| **Protection** | Complies with IEC 62368-1 2kV HiPOT protection<br>Complies with ±15KV ESD IEC-61000-4-2 Air Discharge<br>Complies with±8KV ESD IEC61000-4-2 Contact Discharge<br>Complies with±4KV ESD IEC61000-4-2 Level 2 Line-to-Line<br>Complies with 2KV Surge IEC61000-4-5 Level 3 Surge Immunity Test |
| **Mechanical & Environmental** | |
| **Power Consumption** | 896mA |
| **Input Voltage** | +3.3 DC +-5% |
| **Operating Temp.** | STD: 0°C ~ +70°C.<br>W/T: -40°C ~ +85°C |
| **Storage Temp.** | -40°C ~ +85°C (-40 ~185°F) |
| **Operating Humidity** | 40°C @ 95% Relative Humidity, Non-condensing |
| **Size (L x W)** (Please consult product engineers for the production feasibility if the size is larger than 410x360mm or smaller than 80x70mm) | ● Main board<br>22.00 x 42.00 mm<br>22.00 x 60.00 mm<br>22.00 x 80.00 mm<br>(2242/2260/2280 plated-holes reserved)<br>● Daughter board: estimated 50 x 28 x 19.37mm |

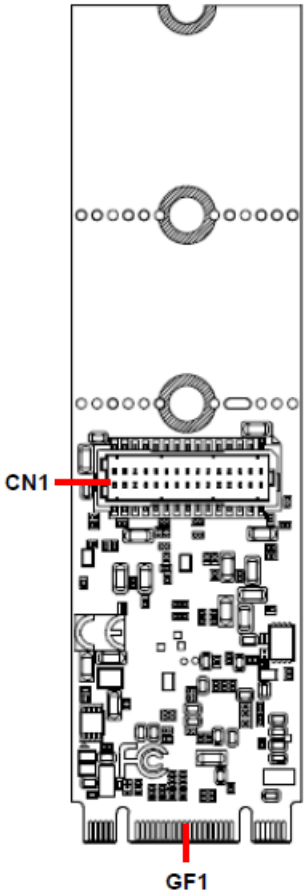
**EPM-1608**

| | |
|---|---|
| **Weight** | Board + LAN daughter weight: 17g<br>Cable weight: 3g |
| **Vibration Test** | 7 Hz to 2K Hz, 20G, 3 axes (IEC 68-2-6 ) |
| **Shock Test** | Duration: 0.5ms, 1500 G, 3 axes (IEC 68-2-27 ) |
| **OS Information** | Windows 10, Windows 11 |

**Note:** Specifications are subject to change without notice.

# 2. Hardware Configuration

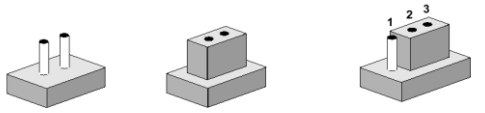
## 2.2 Product Overview



## 2.3 Connector List

You can configure your board to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch.

It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper you connect the pins with the clip. To "open" a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case, you would connect either two pins.




Open Closed Closed 2-3

The jumper settings are schematically depicted in this manual as follows:


Open Closed Closed 2-3

A pair of needle-nose pliers may be helpful when working with jumpers.

Connectors on the board are linked to external devices such as hard disk drives, a keyboard, or floppy drives. In addition, the board has a number of jumpers that allow you to configure your system to suit your application.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

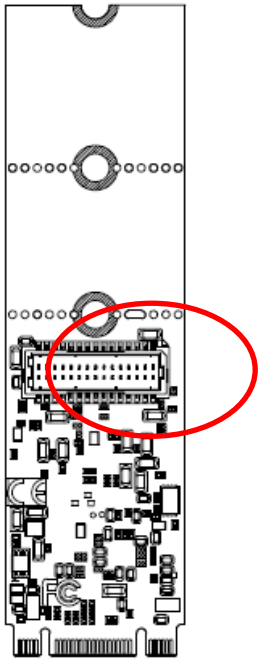
The following tables list the function of each of the board's jumpers and connectors.

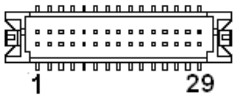
### Connectors

| Label | Function | |
|---|---|---|
| **CN1** | Signal Table | 10 x 2 wafer, pitch 1.00mm |
| **GF1** | Golden Finger | |

## 2.4 Setting Connectors

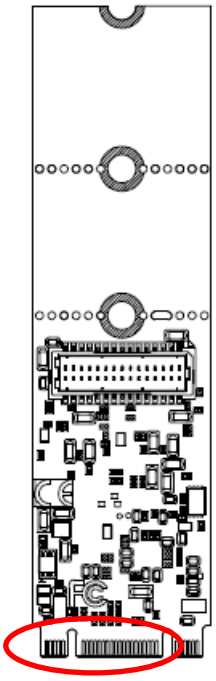
### 2.4.1 Signal Table (CN1)






| Signal | PIN | PIN | Signal |
|---|---|---|---|
| GND | 1 | 2 | GND |
| LAN1_MDIP0 | 3 | 4 | LAN2_MDIP3 |
| LAN1_MDIN0 | 5 | 6 | LAN2_MDIN3 |
| LAN1_MDIP1 | 7 | 8 | LAN2_MDIP2 |
| LAN1_MDIN1 | 9 | 10 | LAN2_MDIN2 |
| GND | 11 | 12 | GND |
| LAN1_MDIP2 | 13 | 14 | LAN2_MDIP0 |
| LAN1_MDIN2 | 15 | 16 | LAN2_MDIN0 |
| LAN1_MDIP3 | 17 | 18 | LAN2_MDIP1 |
| LAN1_MDIN3 | 19 | 20 | LAN1_MDIN1 |
| GND | 21 | 22 | GND |
| LAN1_LED_1000# | 23 | 24 | LAN2_LED_1000# |
| LAN1_LED2.5G# | 25 | 26 | LAN2_LED2.5G# |
| LAN1_LED_ACT# | 27 | 28 | LAN1_LED_ACT# |
| +3.3A_LAN1 | 29 | 30 | +3.3A_LAN2 |

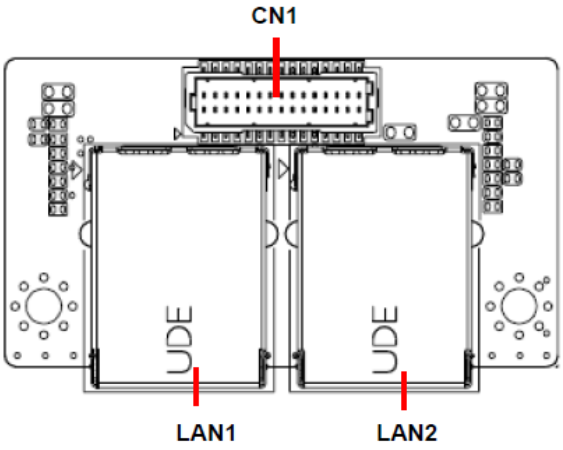
### 2.4.2 Golden Finger (GF1)



| Signal | PIN | PIN | Signal |
|---|---|---|---|
| CONFIG_3 | A1 | B1 | +3.3V |
| GND | A2 | B2 | +3.3V |
| NC | A3 | B3 | NC |
| NC | A4 | B4 | NC |
| NC | A5 | B5 | NC |
| NC | A6 | | |
| CONFIG 0 | A11 | B10 | NC |
| NC | A12 | B11 | NC |
| NC | A13 | B12 | NC |
| GND | A14 | B13 | NC |
| M.2_TXN1_SW | A15 | B14 | NC |
| M.2_TXP1_SW | A16 | B15 | NC |
| GND | A17 | B16 | NC |
| M.2_RXN1_SW | A18 | B17 | NC |
| M.2_RXP1_SW | A19 | B18 | NC |

| Signal | PIN | PIN | Signal |
|---|---|---|---|
| GND | A20 | B19 | NC |
| M.2_TXN0_R | A21 | B20 | NC |
| M.2_TXP0_R | A22 | B21 | NC |
| GND | A23 | B22 | NC |
| M.2_RXN0_R | A24 | B23 | NC |
| M.2_RXP0_R | A25 | B24 | NC |
| GND | A26 | B25 | M.2_RST# |
| M.2_REFCLK_P | A27 | B26 | M.2_CLKREQ# |
| M.2_REFCLK_N | A28 | B27 | LAN_WAKE# |
| GND | A29 | B28 | NC |
| NC | A34 | B29 | NC |
| +3.3V | A35 | B34 | NC |
| GND | A36 | B35 | +3.3V |
| GND | A37 | B36 | +3.3V |
| +3.3V | A38 | B37 | +3.3V |

## 2.5 EPM-1608 DB-A Overviews



## 2.6 EPM-1608 DB-A Connector list

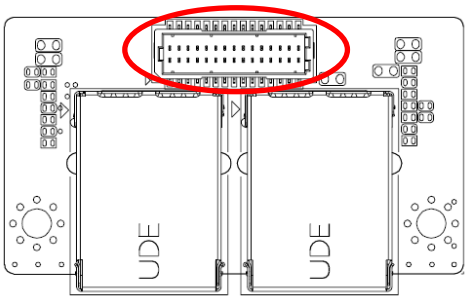
### 2.6.1 EPM-1608 DB-A

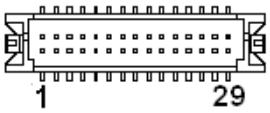
**Connectors**

| Label | Function | Note |
|---|---|---|
| **CN1** | Signal Table | 15 x 2 wafer, pitch 1.00mm |
| **LAN1~2** | LAN connector 1~2 | |

## 2.7 EPM-1608 DB-A Connectors settings

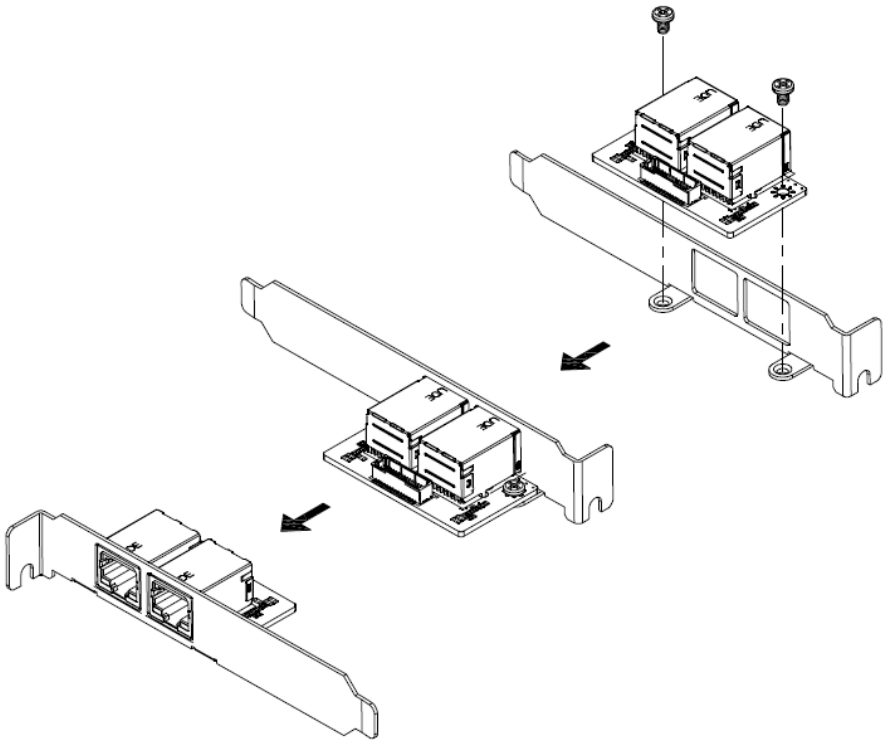
### 2.7.1 Signal Table (CN1)



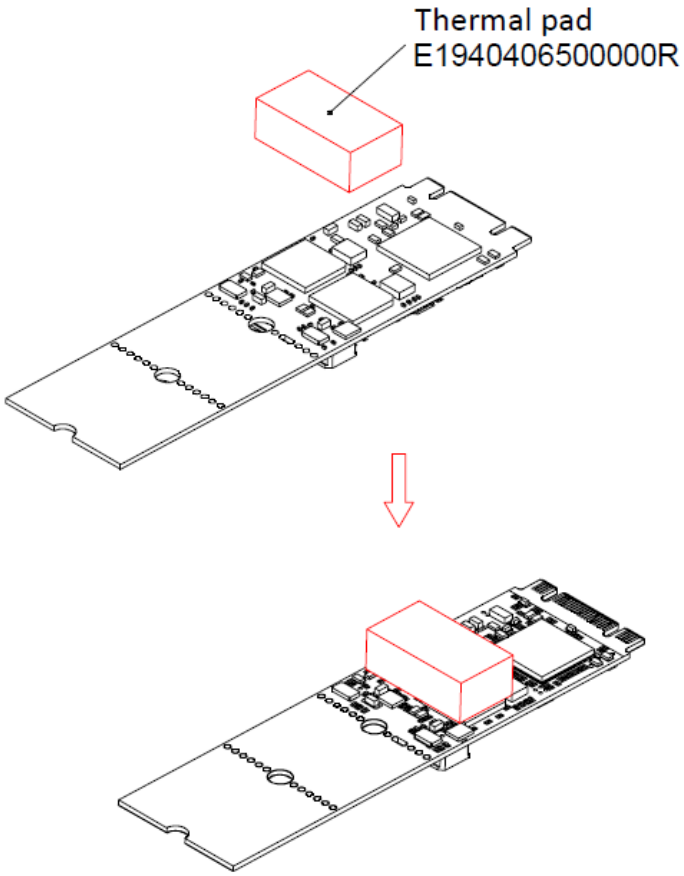



| Signal | PIN | PIN | Signal |
|---|---|---|---|
| GND | 1 | 2 | GND |
| LAN1_MDIP0 | 3 | 4 | LAN2_MDIP0 |
| LAN1_MDIN0 | 5 | 6 | LAN2_MDIN0 |
| LAN1_MDIP1 | 7 | 8 | LAN2_MDIP1 |
| LAN1_MDIN1 | 9 | 10 | LAN2_MDIN1 |
| GND | 11 | 12 | GND |
| LAN1_MDIP2 | 13 | 14 | LAN2_MDIP2 |
| LAN1_MDIN2 | 15 | 16 | LAN2_MDIN2 |
| LAN1_MDIP3 | 17 | 18 | LAN2_MDIP3 |
| LAN1_MDIN3 | 19 | 20 | LAN1_MDIN3 |
| GND | 21 | 22 | GND |
| LAN1_LED_1000# | 23 | 24 | LAN2_LED_1000# |
| LAN1_LED2.5G# | 25 | 26 | LAN2_LED2.5G# |
| LAN1_LED_ACT# | 27 | 28 | LAN1_LED_ACT# |
| +3.3A_LAN1 | 29 | 30 | +3.3A_LAN2 |

## 2.8 Installing Mounting Brackets (EPM-1608 DB-A)



## 2.9 Installing Thermal pad



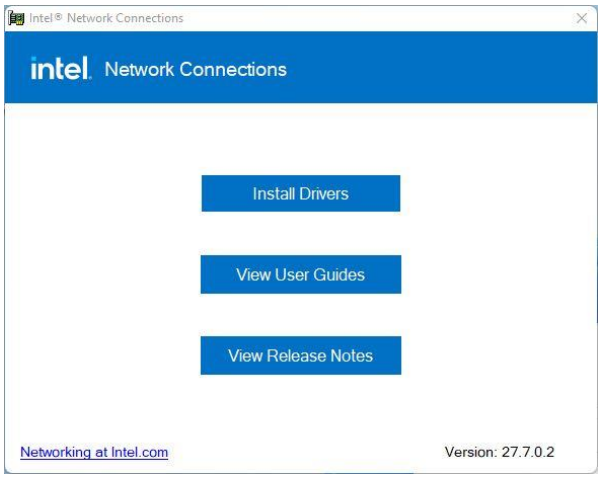
# 3. Drivers Installation

**Note**: Installation procedures and screen shots in this section are for your reference and may not be exactly the same as shown on your screen.

## 3.1 Install Driver

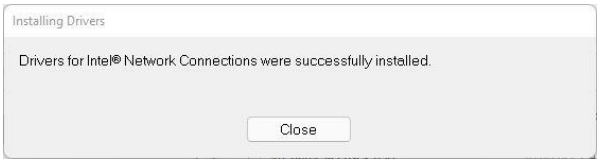
All drivers can be found on the Avalue Official Website: **http://www.avalue.com.tw**.

**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.




**Step1.** Click **Install Drivers**.

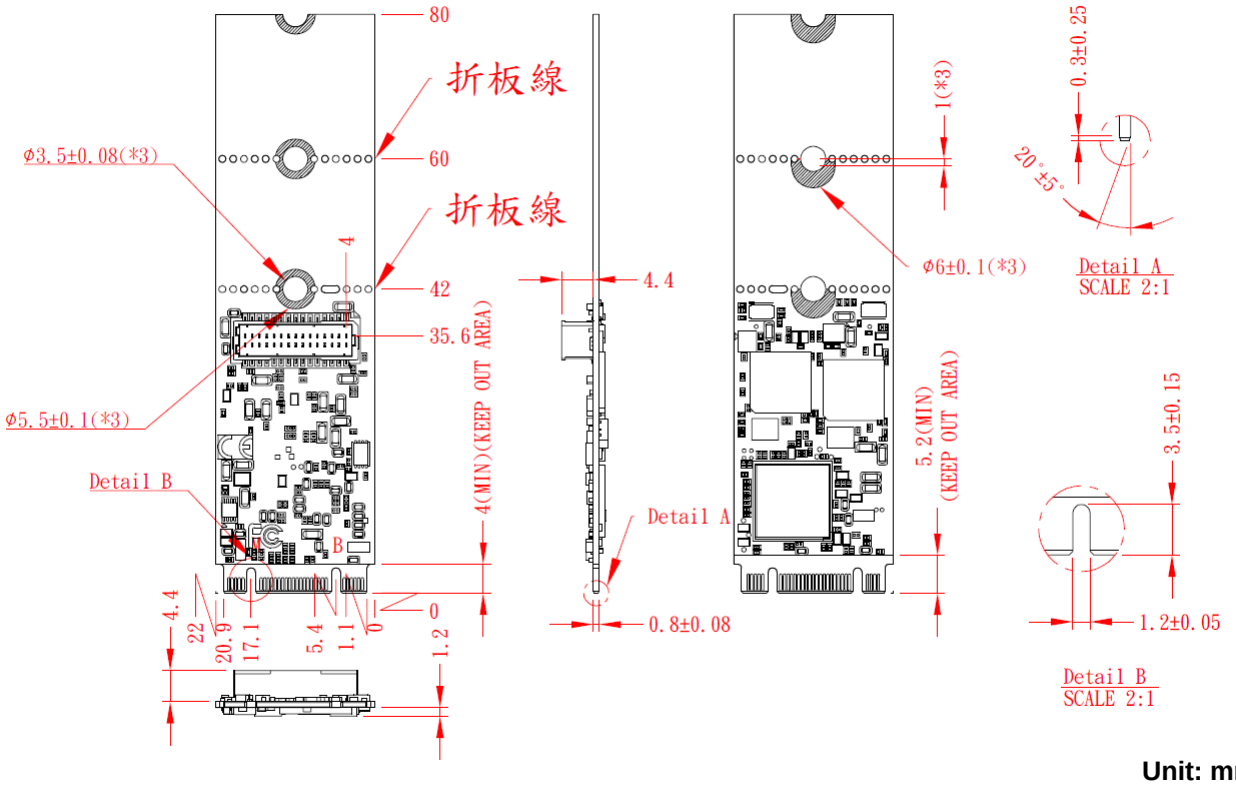

**Step 2.** Click **OK**.




**Step 3.** Setup completed.

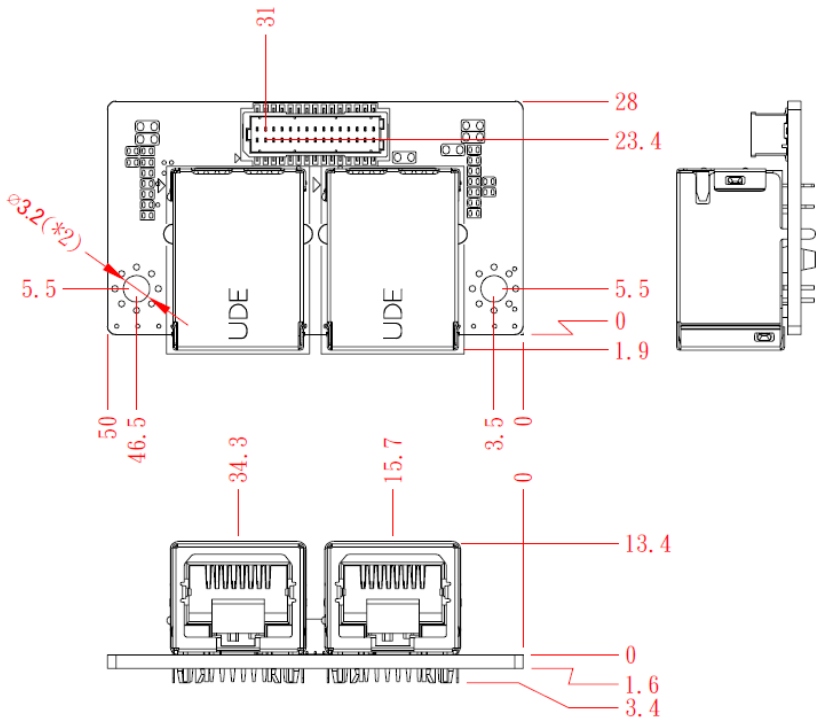
# 4. Mechanical Drawing

## 4.1 EPM-1608




**Unit: mm**

## 4.2 EPM-1608 DB-A




**Unit: mm**